CareCore NATIONAL | MEDSOLUTIONS

CRITERIA FOR IMAGING

Blue Cross and Blue Shield of Alabama
Blue Advantage Medicare Criteria
Effective May 1, 2015

BlueCross BlueShield of Alabama

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Prepared for Blue Cross and Blue Shield of Alabama Provider Network. Clinical criteria for medical necessity review of outpatient diagnostic imaging.

Please note the following:

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Dear Provider,

This document provides detailed descriptions of CareCore National's basic criteria for medical imaging arranged by CPT code. These criteria are used for the certification of requests for CT, MRI, and PET scans. They have been carefully researched and are continually updated in order to be consistent with the most current evidence-based guidelines and recommendations for imaging from national and international medical societies and evidence-based medicine research centers. In addition, the criteria are supplemented by information published in peer reviewed literature.

Our health plan clients review the development and application of these criteria. Every CareCore National, LLC health plan client develops a unique list of CPT codes that are part of their radiology utilization management programs. Health Plan medical policy supersedes CareCore National, LLC when there is conflict with the CareCore criteria and the health plan medical policy. If you are unsure of whether or not a specific health plan has made modifications to these basic criteria in their medical policy for diagnostic imaging please contact the plan or access the plan's website for additional information. For Medicare beneficiaries, local coverage determinations (LCDs) and/or national coverage determinations (NCDs) supercede all CareCore criteria when applicable.

CareCore National works hard to make your clinical review experience a pleasant one. For that reason, we have peer reviewers available to assist you should you have specific questions about a procedure. For your convenience, CareCore National's Customer Service support is available from 7 a.m. to 7 p.m. Our toll free number is (800) 918-8924.

Gregg P. Allen, M.D. FAAFP
EVP and Chief Medical Officer

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How to Navigate the Evidence-Based Clinical Criteria

This document includes all of the evidenced-based criteria that are used to determine medical necessity for advanced imaging.

The following steps will assist you in determining if your request meets medical necessity:

1. Enter the CPT code you are requesting in the search function of the Adobe document, then select enter. You will be directed to the table of contents, and the code you are looking for will be highlighted. Check the code, and if it is correct, click it and you will be directed to the evidence-based clinical criteria for that CPT code.

2. Identify the indication (by Roman numeral) that most closely describes the clinical problem or working diagnosis.

3. If the indication is not listed, your request will require review by a medical director. Be sure to enter all relevant information in the free text portion of the web-based review or provide it to the clinical reviewer if you are using the telephone.

4. If the clinical indication is listed, additional information may be required in order to demonstrate medical necessity. If additional information is required, [brackets] will indicate which sub elements are necessary.

   The statement in [brackets] only refers to the outline level immediately below the indicator with the bracketed statement. For example, you may see [One of the following]. This means that additional information listed under A or B or C, etc., is needed. You may see [Both], which means that information for both A and B is needed to meet medical necessity. You may see [All], which means that all of the elements listed under the Roman numeral are needed to meet medical necessity.

5. The following is an example of how to use the bracketed statements:

   The indication selected for MRI of the brain without contrast (CPT code 70551) is Demyelinating disease (includes MS). At the level of the Roman numeral, the brackets indicate that information related to one of the sub-elements A or B is needed to meet medical necessity. At the outline level of A (Suspected MS), the brackets indicate that one of the symptoms, 1-16, should be present to meet medical necessity. If B is chosen (Known MS), then information related to sub-element 1 or 2 must be present. If 2 is selected, then one of the symptoms or complaints, a-n, must be present to meet medical necessity.

I. Demyelinating disease (includes MS) [One of the following][15-20]

A. Suspected MS [One of the following]
   1. Difficulty walking
   2. Numbness
   3. Bladder dysfunction
   4. Optic neuritis
   5. Weakness of arms or legs

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6. Difficulty with balance
7. Vertigo
8. Hearing loss
9. Constipation
10. Memory loss
11. Lhermitte's sign
12. Double vision
13. Blurred vision
14. Painful movement of the eye or
15. Nystagmus
16. Impaired coordination or

B. Known MS [One of the following] (MRI with contrast is often preferred but non contrast may be approved if requested)
   1. Annual scan in asymptomatic or stable member with known MS
   2. New or worsening clinical findings [One of the following]
      a. Difficulty walking
      b. Numbness
      c. Bladder dysfunction
      d. Optic neuritis
      e. Weakness of arms or legs
      f. Difficulty with balance
      g. Vertigo
      h. Hearing loss
      i. Constipation
      j. Memory loss
      k. Lhermitte's sign
      l. Double vision
      m. Blurred vision
      n. Painful movement of the eye

6. URLs for sources have been included with the references. If the reader selects a reference from the Centers for Medicare & Medicaid Services website, the user must accept the end user License Agreement before being directed to the appropriate reference.

   Any reference that refers the reader to the National Comprehensive Cancer Network website requires the reader to enter a username and password to access the appropriate reference. This can be obtained free of charge at the main login page for this website.

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CareCore National Criteria for Imaging 2015
Executive Summary of Changes

Criteria for every CPT code covered in the CareCore National Radiology program is reviewed annually. Modifications are made based on changes in national medical society guidelines, evidence based reviews, and the current medical literature. The guidelines for imaging of oncology patients are taken from the recommendations of the National Comprehensive Cancer Network (NCCN) whenever possible. Medicare criteria were compared to local and national coverage determinations and verified to be consistent with those documents.

The following is a list of the most significant *changes* for 2015 (this represents the changes that are most significant are not the complete criteria for a given code or indication. Please consult the 2015 document entitled Criteria for Imaging 2015 for the complete and detailed indications for each CPT code in your program).

I. CT of the brain (70450, 70460, 70470)
    1. Expanded the list of focal neurologic findings
    2. Defined chronic daily headache as headache for 15 or more days a month for at least 3 months

II. CT of the orbit (70480, 70484, 70482)
    1. Head and neck cancer added indication for CT neck if there is concern for tumor extension to the base of the skull if MRI is contraindicated
    2. Hearing loss added cholesteatoma

III. CT of the soft tissues of the neck (70490, 70491, 70492)
    1. Added the indication of Horner's syndrome

IV. CTA of the head (70496)
    1. Added unilateral headache with suspicion of carotid or vertebral dissection or unilateral Horner's syndrome

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V. MRI of the orbit, face, neck (70540, 70542, 70543)

1. Criteria for neck mass other than thyroid have been changed to read as follows (changes highlighted):

Neck mass other than thyroid[6-9] [One of the following]

A. Solitary neck mass (with or without fever; pulsatile or non pulsatile)
B. Multiple neck masses
C. Personal history of cancer with a new neck mass
D. Children: any mass detected by physical examination and other imaging not diagnostic (including but not limited to possible thyroglossal duct cyst, branchial cleft cyst, dermoid cyst, AVM, hemangioma)
E. Fine needle aspiration consistent with metastatic disease (carcinoma, sarcoma) or lymphoma
F. Suspected congenital neck mass [One of the following]
   1. Thyroglossal duct cyst with a non diagnostic ultrasound
   2. Brachial cleft cyst
   3. Lymphangioma
   4. Thymic cyst
G. Neck abscess with pain and swelling at the site of concern [One of the following]
   1. Aural temperature >38.3°C or >100.9°F
   2. Leukocytosis, WBC >11,500/cu.mm

VI. MRA or MRV of the brain (70544, 70545, 70546 Medicare)

1. Aligned with NCD 220.2

I. Subarachnoid hemorrhage (SAH)

II. Proven intracerebral bleed on CT or MRI (hemorrhage or hematoma)

III. Recent stroke by history

IV. Cerebral aneurysm

V. Preoperative study, carotid endarterectomy planned

VI. Abrupt onset of a neurologic deficit – including stroke and TIA

VII. AVM (arteriovenous malformation)

VIII. Suspected cerebral venous thrombosis

IX. Evaluation of tinnitus (ringing, hissing, buzzing, roaring, clicking, or rough sounds heard by patient)

X. Vasculitis

References:

1. National Coverage Determination (NCD) for Magnetic Resonance Imaging (220.2). : http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&KeyWord=magnetic+resonance+imaging&KeyWordLookUp=Title&KeyWordSearchType=Exact&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.

VII. MRA or MRV of the brain (70544, 70545, 70546)

1. Added indication of unilateral headache with suspicion of carotid or vertebral artery dissection or unilateral Horner's syndrome

VIII. MRI of the brain without contrast (70551)

1. Demyelinating disease including suspected or known MS has been added
2. Seizures is now included for both non contrast and contrast MRI of the brain (70552, 70553)

Seizure[3-6] [One of the following]
A. Refractory seizures
B. Surgical candidate or preop planning
C. New onset of seizures unrelated to trauma with alcohol use (only if MRI is contraindicated or not available)
D. New onset of seizures unrelated to trauma with drug use (only if MRI is contraindicated or not available)
E. New-onset seizure unrelated to trauma age 18-40 (only if MRI is contraindicated or not available; MRI without contrast)
F. New-onset seizure unrelated to trauma age 18-40 (MRI without and with contrast)
G. New onset of seizure unrelated to trauma older than age 40 (MRI without and with contrast)
H. New onset of seizure with a focal neurologic deficit not related to trauma
I. New onset of seizures older than 18 following acute trauma (CT)
J. New onset seizure older than 18 post subacute or chronic trauma
K. Partial seizures (MRI without contrast)
L. Epilepsy
M. Suspected neuroectodermal dysplasia
N. Suspicion of migration anomalies or other morphologic brain abnormalities in children
O. Suspicion of cortical dysplasia
P. Partial seizures

3. Suspected cerebral venous thrombosis has been added and is identical to the criteria used in 70552, 70553 in the past. The indication remains unchanged in 70552, 70553
4. Congenital sensorineural hearing loss has been added

IX. MRI of the brain with and without and with contrast 70552, 70553

1. Seizure as above for 70551 added
2. Added the following indications (details can be found in the complete criteria document)
    i. Chronic daily headache
    ii. Unilateral headache with suspicion of carotid or vertebral artery dissection or unilateral Horner's syndrome
    iii. Temporal arteritis
    iv. New headache in immunocompromised individual
    v. Progressive worsening of headache
    vi. Headache associated with cough, exertion or sexual activity
    vii. Ataxia
    viii. Ophthalmoplegia
    ix. Encephalocele

x. Planning for stereotactic or gamma knife surgery

X. CT of the chest (71250, 71260, 71270)

1. Low dose CT for lung cancer screening in smokers should be processed under CPT® 71250.

2. Added suspected pulmonary embolism and added the Well's score of >4 as an indication for imaging

Suspected pulmonary embolism (PE)[31-36] [A and B]

A. Symptoms [one of the following]
   1. Dyspnea
   2. Pleuritic chest pain
   3. Tachypnea

B. History and laboratory findings [one of the following]
   1. Positive D-Dimer
   2. New onset [one of the following]
      a. Hemoptysis
      b. Syncope
      c. Cough
      d. Tachycardia (heart rate >100)
      e. Previous history of pulmonary embolism
      f. 65 or older
   3. Well's score for pretest probability of pulmonary embolism of > 4 points

Suspected or known DVT with leg swelling and pain	3.0 points
Diagnosis other than PE is less likely	3.0 points
Tachycardia >100	1.5 points
Previous DVT or Pulmonary embolus	1.5 points
Immobilization (including surgery) in the past 4 weeks	1.5 points
Hemoptysis	1.0 points
Personal history of cancer treated in the past 6 months or on palliative treatment	1.0 points

3. Deleted indication for evaluation of non lung primary for possible metastatic disease to the lungs and replaced it with the NCCN guidelines for lung imaging for the appropriate cancers
4. For interstitial lung disease, expanded the list of medications and added interstitial infiltrate on CXR with or without abnormal pulmonary function tests
5. Changed criteria for weight loss to only require unintentional weight loss of 5% or more of body weight
6. Added the following indications
   a. Pulmonary hypertension
   b. Ocular melanoma

c. Bronchopulmonary carcinoid
d. Thymic carcinoid
e. Adrenal tumors
f. Poorly differentiated (high-grade) neuroendocrine tumor to large or small cell carcinoma other than lung
g. Horner's syndrome

XI. CTA of the chest (71275)
1. Criteria for pulmonary embolism changed and is identical to those used for CT of the chest above
2. Added pulmonary hypertension

XII. MRA or MRV of the chest (71555)
1. Criteria for pulmonary embolism changed and is identical to those used for CT of the chest above

XIII. All spine imaging (CT and MRI)
1. For spinal stenosis and radiculopathy symptoms lasting at least 6 weeks added and is a possible candidate for interventional or surgical treatment

XIV. MRI of the pelvis (72195, 72196, 72197)
1. All oncology imaging updated to the NCCN guidelines
2. For prostate cancer imaging deleted requirement for non diagnostic ultrasound
3. Added evaluation of pelvic floor dysfunction

XV. For all extremity and joint imaging both CT and MRI deleted OCD or osteochondritis dessicans from AVN and created a separate indication

XVI. Expanded the contrast enhanced indications for osteomyelitis for all MRI of bones and joints to include :
3. Suspicion of infected prosthesis (nuclear studies)
4. Chronic wound overlying surgical hardware
5. Chronic wound overlying a fracture
6. Exposed bone

XVII. CT of the abdomen (74150, 74160, 74170), CT of the abdomen and pelvis (74176, 74177, 74178), and MRI abdomen (74181, 74182, 74183)

1. Pancreatitis

Known or acute suspected pancreatitis with abdominal pain or pancreatic pseudocyst[57-59] [One of the following]

A. Suspected acute pancreatitis with abdominal pain. (This should not be done sooner than 48 – 72 hours if the **diagnosis is clear** based on amylase and lipase levels. A scan performed less than 72 hours after presentation may underestimate the extent of the disease) [One of the following]
   1. Initial scan 48 – 72 hours after onset of symptoms [Both of the following]
      a. Amylase > 3 times the upper normal laboratory value
      b. Lipase > 3 times the upper normal laboratory value
   2. Initial scan at onset of abdominal pain but serum amylase and lipase are not > 3 times normal but with severe abdominal pain and epigastric pain that increases rapidly in severity and persists without any relief.
   3. Follow up scan 7 – 21 days after onset of symptoms with a confirmed diagnosis

B. Known pancreatitis with any of the following allows for repeat exams if present [One of the following]
   1. Hemodynamic instability
      a. Falling hematocrit
      b. Falling blood pressure
   2. Aural temperature > 38.3°C or > 100.9°F
   3. White blood cell count or leukocytosis of > 12,000 cells/mm^3
   4. White blood cell count < 4,000 cells/mm^3
   5. Retroperitoneal air on prior CT
   6. Positive blood culture
   7. Signs of peritonitis (rebound, or guarding, or tenderness)
   8. Poor oxygen saturation, signs of ARDS (adult respiratory distress syndrome)
   9. Signs of renal failure rising BUN and creatinine or oliguria

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2. Adrenal disease or mass

Known or suspected adrenal disease or mass including adrenal carcinoma[47, 62-66] [One of the following]

Note: With suspected pheochromocytoma, if request meets criteria, See CT of the abdomen and pelvis, CPT 74176, or 74177, or 74178.

A. Suspected pheochromocytoma or paraganglioma [One of the following]
   1. Fractionated metanephrines in plasma > 3 – 4 times the upper laboratory limit
   2. 24 hour urinary total metanephrine > 1,800µg
   3. Clonidine suppression test positive (plasma norepinephrine is > 500 pg/ml or > 2.96 nmol/L or < 50% decrease in plasma norepinephrine) if fractionated metanephrines are above normal but less than 4 times the upper limit of normal
   4. Suspicion of pheochromocytoma in individual with MEN2, von Hippel-Lindau syndrome and neurofibromatosis type 1 (NF-1) if the blood and urine tests are not abnormal

B. Follow up after treatment of pheochromocytoma or paraganglioma [One of the following]
   1. 3 – 12 months after resection up to 1 year
   2. 6 – 12 months for 2nd and 3rd years
   3. Annually for years 4 – 10
   4. Rising blood pressure or serum markers (metanephrines, urine VMA)

C. Suspected **Cushing's syndrome** [One of the following]
   1. 24 hour urine free cortisol > 100 mcg/24 hr
   2. No suppression by dexamethasone

D. Suspected **aldosteronoma or primary aldosteronism or Conn's syndrome** [One of the following]
   1. Hypertension that is drug resistant (need for > 3 drugs)
   2. Spontaneous (<3.5 mEq/L) or severe diuretic-induced (< 3 mEq/L) hypokalemia
   3. Plasma aldosterone to renin ratio > 10 when aldosterone is measured in ng/dL
   4. 24 hour urinary aldosterone excretion test > 14µg/day

E. Incidental finding on other imaging such as CT or MRI scan performed for other purposes (CT or MRI of the chest or heart), or US with **no history of malignancy** [One of the following]
   1. No dedicated abdominal CT or MRI performed previously
   2. Screening is negative for hypercortisolism, aldosteronism (if hypertensive) and pheochromocytoma
      a. Follow up CT scan
         i. Benign appearing adenoma < 4 m or myelolipoma on prior scan
            01. Repeat scan 6 – 12 months after initial dedicated scan
               a. No change in size or < 1 cm increase in size then no further imaging
               b. Enlarging (> 1 cm increase in size in one year) repeat CT
         ii. Benign appearing adenoma 4 – 6 cm in size
            01. Repeat scan in 3 – 6 months
               a. No change in size or < 1 cm increase in size repeat 6 – 12 months
               b. Enlarging (> 1 cm increase in size in one year) no repeat imaging (see NCCN guidelines)

F. **Adrenal carcinoma** can be functioning or non functioning with tissue diagnosis
   1. Localized disease after surgery
      a. Image every 3 – 12 months for 5 years

G. Metastatic disease image every 3 months

3. Renal cell cancer follow up was updated to be consistent with NCCN guidelines for imaging

Renal cell carcinoma or kidney cancer[29, 50]

A. Initial staging
B. Active surveillance for **pT1a tumor**
   1. Abdominal CT within 6 months of the initial staging CT, then annually
C. Follow up of **ablative techniques for pT1a**
   1. 3 – 6 months after ablation
   2. Annually for 5 years
D. Partial or radial nephrectomy **for pT1a and pT1b**
   1. Scan 3 – 12 months after surgery to establish a new baseline
   2. If the initial post operative scan is negative then annually for 3 years for partial nephrectomy and at the provider's discretion for radical nephrectomy if the initial post op scan is negative
E. Radical nephrectomy for stage II or III
   1. 3 – 6 months after surgery
   2. 3 – 6 months for 3 years
   3. Annually for 5 years
   4. Additional follow up as clinically indicated
F. Stage IV or medically or surgically unresectable disease or relapse
   1. Every 6 – 16 weeks

4. Added indications for ocular melanoma to CT of abdomen only
5. Added indications for melanoma (skin) only to CT abdomen and pelvis

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XVIII. Brain PET metabolic (78608) - added comments that the use of amyloid specific tracers such as Amyvid and Vizamyl are considered I/E for commercial and Medicaid beneficiaries. For Medicare beneficiaries, Amyvid is covered once per lifetime under CPT code 78811 or 78813 if and only if the member is enrolled in a clinical trial at the University of Kansas Medical Center under the Medicare policy for Coverage with Evidence in Development. CMS has decided to use these codes since PET with Amyvid is neither a metabolic scan nor a perfusion scan.

XIX. Scintimammography under tumor localization (78800, 78801, 78802, 78803, 78804) - is strongly recommended as investigational and/or experimental.

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75574 CTA Coronary Arteries and Structure and Morphology with Function and with Contrast – MEDICARE AL 401

75635 CTA of the Abdominal Aorta and Bilateral Iliofemoral Lower Extremity Runoff 405

76380 CT Limited or Localized Follow-up Study 408

76390 MR Spectroscopy – MEDICARE 409

76498 Unlisted Magnetic Resonance Procedure (e.g. Diagnostic, Interventional) 410

77058 MRI of the Breast Unilateral – MEDICARE 411
77059 MRI of the Breast Bilateral – MEDICARE 411

77084 MRI, Bone Marrow Blood Supply 413

78459 PET Myocardial – Metabolic – MEDICARE AL 414
78491 PET Myocardial Perfusion Imaging, Rest or Stress – MEDICARE AL 414
78492 PET Myocardial Perfusion Imaging Rest and Stress – MEDICARE AL 414

78459 PET Myocardial – Metabolic – MEDICARE 419
78491 PET Myocardial Perfusion Imaging, Rest or Stress – MEDICARE 419
78492 PET Myocardial Perfusion Imaging Rest and Stress – MEDICARE 419

78608 PET Brain Metabolic – MEDICARE 424

78609 PET Brain Perfusion – MEDICARE 425

78811 PET Limited Area – MEDICARE 426
78812 PET Skull Base to Mid-thigh – MEDICARE 426
78813 PET Whole Body - MEDICARE 426
78814 PET/CT Limited Area – MEDICARE 426
78815 PET/CT Skull Base to Mid-thigh – MEDICARE 426
78816 PET/CT Whole Body – MEDICARE 426

G0219 PET Imaging Whole Body; Melanoma for Non-covered Indications – MEDICARE 430

G0235 PET Imaging Any Site Not Otherwise Specified 431

G0252 PET Imaging Full and Partial-Ring PET Scanners Only, for Initial Diagnosis of Breast Cancer and/or Surgical Planning for Breast Cancer (e.g., Initial Staging of Axillary Lymph Nodes) – MEDICARE 432

S8032 Low Dose CT of the Chest for Lung Cancer Screening 433

S8042 MRI Low Field 434

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70450 CT of the Head or Brain without Contrast
70460 CT of the Head or Brain with Contrast
70470 CT of the Head or Brain without and with Contrast

I. Head trauma[1,2] [One of the following]

A. Minor or mild acute closed head trauma without neurologic deficit adult
   1. Glasgow Coma Scale ≥13
B. Mild or moderate acute closed head injury under age 2
C. Minor or acute closed head injury with focal neurologic deficit
D. Moderate or severe acute closed head trauma
E. Subacute or chronic closed head trauma with cognitive and/or neurologic deficit (MRI without contrast)
F. Suspected carotid or vertebral dissection (CTA or MRA of head and neck; see CPT codes 70498, or 70547)
G. Penetrating injury, stable neurologically intact
H. Focal neurologic finding [One of the following]
   1. Motor weakness affecting a limb, or one side of the face or body
   2. Decreased sensation affecting a limb, or one side of the face or body
   3. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
   4. Confusion including memory loss and disorientation
   5. Impaired vision, including amaurosis fugax, visual field loss and diplopia
   6. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
   7. Dysarthria (speech disorder resulting from neurological injury)
   8. Dysphagia with no GI cause
   9. Vertigo with either headache or nystagmus
   10. Numbness, tingling, paresthesias
   11. Decreased level of consciousness
   12. Papilledema
   13. Stiff neck
   14. Drowsiness
   15. New onset of vomiting
   16. Nystagmus
   17. Cranial nerve palsy
   18. Gait disturbance
   19. Personality or behavioral changes
   20. New seizure
   21. Hearing loss or new onset tinnitus
   22. Agitation
   23. Somnolence
   24. Slow response to verbal communication
   25. Sudden falls
   26. Balance problems

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I. Drug or alcohol intoxication and evaluation is suboptimal or inadequate
J. Skull fracture

II. Abrupt onset of a neurologic deficit – including stroke and TIA[3-5] [One of the following]

A. Motor weakness affecting a limb, or one side of the face or body
B. Decreased sensation affecting a limb, or one side of the face or body
C. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
D. Confusion including memory loss and disorientation
E. Impaired vision, including amaurosis fugax, visual field loss and diplopia
F. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
G. Dysarthria (speech disorder resulting from neurological injury)
H. Dysphagia with no GI cause
I. Vertigo with either headache or nystagmus
J. Numbness, tingling, paresthesias
K. Decreased level of consciousness
L. Papilledema
M. Stiff neck
N. New onset of severe headache
O. Drowsiness
P. New onset of vomiting
Q. Nystagmus
R. Cranial nerve palsy
S. Gait disturbance
T. Personality or behavioral changes
U. New seizure
V. Hearing loss or new onset tinnitus
W. Agitation
X. Somnolence
Y. Slow response to verbal communication
Z. Sudden falls
AA. Balance problems

III. Re-evaluation after stroke [One of the following]

A. Anti-coagulation planned
B. Deteriorating clinical status with new or worsening neurologic findings [One of the following]
    1. Motor weakness affecting a limb, or one side of the face or body
    2. Decreased sensation affecting a limb, or one side of the face or body
    3. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
    4. Confusion including memory loss and disorientation
    5. Impaired vision, including amaurosis fugax, visual field loss and diplopia
    6. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
    7. Dysarthria (speech disorder resulting from neurological injury)
    8. Dysphagia with no GI cause

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9. Vertigo with either headache or nystagmus
10. Numbness, tingling, paresthesias
11. Decreased level of consciousness
12. Papilledema
13. Stiff neck
14. New onset of severe headache
15. Drowsiness
16. New onset of vomiting
17. Nystagmus
18. Cranial nerve palsy
19. Gait disturbance
20. Personality or behavioral changes
21. New seizure
22. Hearing loss or new onset tinnitus
23. Agitation
24. Somnolence
25. Slow response to verbal communication
26. Sudden falls
27. Balance problems

C. Repeat after recent hemorrhagic stroke

IV. Headache, indications for imaging[6-9] (MRI except for D, J, and K) [One of the following]

A. Papilledema
B. Worsened by Valsalva maneuver, coughing straining or postural changes
C. Wakens from sleep
D. Suspected subarachnoid hemorrhage (CT in early phase) with one of the following
   1. With sudden onset of severe, exertional, or "thunderclap" headache
   2. Associated with nausea, vomiting, diplopia, seizure, mental status change, or
   3. History of prior known (documented on CTA, MRA, or angiogram) aneurysm or AVM
E. Infection in an extracranial location
F. Change in mental status, personality, or level of consciousness
G. Suspected carotid or vertebral artery dissection or unilateral Horner's syndrome (Headache may be unilateral) (CTA or MRA or MRI) [One of the following]
   1. Neck pain
   2. Unilateral facial or orbital pain
   3. Unilateral headaches
   4. Horner's syndrome, miosis and ptosis (contraction of the iris, drooping eyelid) or
   5. Transient ischemic attacks (TIA)
   6. Minor neck trauma
   7. Rapid onset of headache with strenuous exercise or Valsalva maneuver
H. Head pain that spreads into the lower neck and between the shoulders (may indicate meningeal irritation due to either infection or subarachnoid blood; it is not typical of a benign process)
I. Suspected subdural hematoma with history of major head trauma or minor head trauma in an individual on anticoagulants

J. Thunderclap headache (CT)
K. Worst headache of life (CT)
L. New headache [One of the following]
    1. Abnormal neurologic examination [One of the following]
        a. Motor weakness affecting a limb, or one side of the face or body
        b. Decreased sensation affecting a limb, or one side of the face or body
        c. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
        d. Confusion including memory loss and disorientation
        e. Impaired vision, including amaurosis fugax, visual field loss and diplopia
        f. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
        g. Dysarthria (speech disorder resulting from neurological injury)
        h. Dysphagia with no GI cause
        i. Vertigo with either headache or nystagmus
        j. Numbness, tingling, paresthesias
        k. Decreased level of consciousness
        l. Papilledema
        m. Stiff neck
        n. New onset of severe headache
        o. Drowsiness
        p. New onset of vomiting
        q. Nystagmus
        r. Cranial nerve palsy
        s. Gait disturbance
        t. Personality or behavioral changes
        u. New seizure
        v. Hearing loss or new onset tinnitus
        w. Agitation
        x. Somnolence
        y. Slow response to verbal communication
        z. Sudden falls
        aa. Balance problems
    2. Aural temperature >38.3°C or 100.9°F
    3. Stiff neck (nuchal rigidity)
    4. History of HIV infection
    5. History of TB
    6. History of sarcoidosis
    7. Age 5 years or less
    8. Over age 50
    9. Pregnancy
    10. Headache with exertion
    11. Documented infection outside the brain
    12. Mental status changes
    13. Extracranial malignancy
M. Chronic daily headache – headache for 15 or more days a month for at least 3 months
    1. New neurologic deficit (See L1 above) (MRI without and with contrast)

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2. Imaging is not medically necessary if there is a normal neurologic examination and no new features of the headache

N. Known neurofibromatosis
O. Rapidly increasing frequency of headache
P. Personal history of cancer and new headache (MRI without and with)

V. Seizure[10-12] (MRI with gadolinium) [One of the following]

A. Refractory seizures in a candidate for surgery (only if MRI is contraindicated or not available)
B. New onset of seizures unrelated to trauma with drug use (only if MRI is contraindicated or not available)
C. New onset of seizures unrelated to trauma with alcohol use (only if MRI is contraindicated or not available)
D. New-onset seizure unrelated to trauma age 18-40 (only if MRI is contraindicated or not available; MRI without contrast)
E. New onset of seizure unrelated to trauma older than age 40 (only if MRI is contraindicated or not available; MRI without and with contrast)
F. New onset of seizures with focal neurologic deficit unrelated to trauma (MRI contraindicated or not available)
G. New onset of seizures older than 18 following acute trauma
H. New-onset seizure older than 18 post subacute or chronic trauma (only if MRI is contraindicated or not available; MRI without contrast)
I. Suspicion of migration anomalies or other morphologic brain abnormalities in children
J. Suspicion of cortical dysplasia
K. Partial seizures (MRI without contrast)
L. Epilepsy

VI. CNS infection or abscess with evidence of infection and neurologic complaints or findings or follow up of known cerebral infection[13,14] (MRI without and with contrast) [(Both A and B for new infection) or Cor D or E or F]

A. Findings suggesting infection [One of the following]
   1. Aural temperature >38.3°C or 100.9°F
   2. Leukocytosis, WBC >11,500/cu.mm
   3. Known infection elsewhere
   4. Immunocompromised patient
B. Other clinical findings [One of the following]
   1. Headache
   2. Acute or subacute ataxia
   3. Drowsiness or confusion
   4. Focal neurological findings
   5. Vomiting
   6. Seizure
   7. Stiff neck
   8. Photophobia
   9. Recurrence of symptoms after antimicrobial therapy
C. Creutzfeldt-Jakob disease
D. Bickerstaff encephalitis – usually follows a viral illness [Both of the following]

1. Ophthalmoplegia
2. Cerebellar ataxia

E. Fisher syndrome [Both of the following]
1. Ophthalmoplegia
2. Cerebellar ataxia

F. Follow-up during and after completion of therapy to assess effectiveness

VII. Brain tumor[15-23] – Brain tumors include but are not limited to any of the following:

Astrocytoma
Choroid plexus papilloma
Ependymoma
Glioma
Glioblastoma
Glioblastoma multiforme
Hemangioblastoma
Medulloblastoma
Meningioma
Craniopharyngioma
Oligodendroglioma
Pituitary adenoma
Primitive neuroectodermal tumor (PNET)

A. Evaluation of known primary brain tumor [One of the following]
1. New signs and symptoms or worsening neurological condition [One of the following]
a. Motor weakness affecting a limb, or one side of the face or body
b. Decreased sensation affecting a limb, or one side of the face or body
c. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
d. Confusion including memory loss and disorientation
e. Impaired vision, including amaurosis fugax, visual field loss and diplopia
f. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
g. Dysarthria (speech disorder resulting from neurological injury)
h. Dysphagia with no GI cause
i. Vertigo with either headache or nystagmus
j. Numbness, tingling, paresthesias
k. Decreased level of consciousness
l. Papilledema
m. Stiff neck
n. New onset of severe headache
o. Drowsiness
p. New onset of vomiting
q. Nystagmus
r. Cranial nerve palsy
s. Gait disturbance
t. Personality or behavioral changes
u. New seizure

v. Hearing loss or new onset tinnitus
w. Agitation
x. Somnolence
y. Slow response to verbal communication
z. Sudden falls
aa. Balance problems

2. Interval re-evaluation of known brain tumor
   a. Anaplastic astrocytoma, anaplastic oligodendroglioma or glioblastoma multiforme or any high grade or aggressive primary brain tumor [One of the following]
      i. Re-image after surgery (complete or subtotal)
      ii. Image 2-6 weeks after completion of radiation therapy
      iii. Following completion of chemotherapy
      iv. Every 60-120 days for 2-3 years if asymptomatic and then less often
      v. New signs and symptoms (See 1 above) regardless of date of last imaging
   b. Adult low-grade infiltrative supratentorial astrocytoma or oligodendroglioma
      i. MRI every 3-6 months for 5 years then annually
   c. Adult ependymoma
      i. Following resection
      ii. Every 3-4 months for a year then every 4-6 months for 2nd year then every 6-12 months
   d. Adult medulloblastoma and supratentorial PNET
      i. Post operative restaging
      ii. Every 3 months for 2 years then every 6 months for 3 years then annually
   e. Meningioma
      i. If unresected or WHO Grade 1 (benign) or 2 (atypical), image at 3, 6, 12 months after diagnosis then every 6-12 months or 5 years then every 1-3 years
      ii. WHO Grade 3 (malignant) image at least at 3, 6, 12 months and then every 6-12 months or 5 years and then every 1-3 years more frequent imaging may be required
   f. Other primary intracranial cancers may be imaged at completion of treatment and thereafter at 90 to 180 day intervals if clinically stable and then annually
   g. New signs and symptoms or worsening neurological condition [One of the following]
      i. Motor weakness affecting a limb, or one side of the face or body
      ii. Decreased sensation affecting a limb, or one side of the face or body
      iii. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
      iv. Confusion including memory loss and disorientation
      v. Impaired vision, including amaurosis fugax, visual field loss and diplopia
      vi. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
      vii. Dysarthria (speech disorder resulting from neurological injury)
      viii. Dysphagia with no GI cause
      ix. Vertigo with either headache or nystagmus
      x. Numbness, tingling, paresthesias
      xi. Decreased level of consciousness
      xii. Papilledema
      xiii. Stiff neck
      xiv. New onset of severe headache

xv. Drowsiness
xvi. New onset of vomiting
xvii. Nystagmus
xviii. Cranial nerve palsy
xix. Gait disturbance
xx. Personality or behavioral changes
xxi. New seizure
xxii. Hearing loss or new onset tinnitus
xxiii. Agitation
xxiv. Somnolence
xxv. Slow response to verbal communication
xxvi. Sudden falls
xxvii. Balance problems

B. Evaluation for known or suspected brain metastases in patients with known extracranial malignancy (MRI without and with contrast) [One of the following]
   1. Routine initial staging for one of the following
      a. Sarcoma
      b. Melanoma stage II or higher
      c. Small-cell lung cancer
      d. Non-small cell lung cancer for stage IB and higher
   2. New neurological signs or symptoms with any known malignancy [One of the following]
      a. Motor weakness affecting a limb, or one side of the face or body
      b. Decreased sensation affecting a limb, or one side of the face or body
      c. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
      d. Confusion including memory loss and disorientation
      e. Impaired vision, including amaurosis fugax, visual field loss and diplopia
      f. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
      g. Dysarthria (speech disorder resulting from neurological injury)
      h. Dysphagia with no GI cause
      i. Vertigo with either headache or nystagmus
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      k. Decreased level of consciousness
      l. Papilledema
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      n. New onset of severe headache
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      p. New onset of vomiting
      q. Nystagmus
      r. Cranial nerve palsy
      s. Gait disturbance
      t. Personality or behavioral changes
      u. New seizure
      v. Hearing loss or new onset tinnitus
      w. Agitation
      x. Somnolence
      y. Slow response to verbal communication

z. Sudden falls
aa. Balance problems

3. Prior to prophylactic cranial irradiation for small cell lung cancer
4. Follow-up known brain metastases during or after chemotherapy [One of the following]
   a. Follow-up after intervention to establish a new baseline
   b. Imaging (MRI without and with contrast, and CT should be done only if MRI is absolutely contraindicated or unavailable) every 3 months for 1 year after completion of therapy
   c. After one year imaging is performed based on clinical signs and symptoms (See 2 above)
   d. Melanoma stage IIB or higher annually
5. Follow-up known brain metastases after whole brain radiation therapy [One of the following]
   a. Follow-up after intervention to establish a new baseline then every 6 weeks for 3 months and then
   b. Imaging (preferably MRI) every 3 months for 1 year after completion of therapy
   c. After one year imaging is performed based on clinical signs and symptoms
   d. Melanoma stage IIB or higher annually
6. Follow-up known brain metastases after stereotactic or CyberKnife® radiation treatment
   a. Every 6 weeks x 2, then every 12 weeks x 2, then every 3-6 months if stable
7. Follow-up known brain metastases after surgery [One of the following]
   a. Follow up after intervention to establish a new baseline then every 6 weeks for 3 months and then
   b. Imaging (preferably MRI) every 3 months for 1 year after completion of treatment
   c. After one year imaging is performed based on clinical signs and symptoms
   d. Melanoma stage IIB or higher annually
8. Known brain metastasis with new or worsening symptoms as indicated in number VII.B.2.

C. Cranial nerve palsy (MRI without and with contrast) [One of the following]
   1. Anosmia
   2. Weakness or paralysis of muscles of mastication
   3. Sensory loss in the head and neck
   4. Weakness or paralysis of facial expression
   5. Weakness of the palate
   6. Vocal cord paralysis
   7. Weakness or paralysis of the sternocleidomastoid muscle
   8. Weakness or paralysis of the trapezius
   9. Weakness or paralysis of the tongue
D. Suspected brain tumor (MRI without and with contrast)
   1. New onset of neurologic findings [One of the following]
      a. Motor weakness affecting a limb, or one side of the face or body
      b. Decreased sensation affecting a limb, or one side of the face or body
      c. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
      d. Confusion including memory loss and disorientation
      e. Impaired vision, including amaurosis fugax, visual field loss and diplopia
      f. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)

g. Dysarthria (speech disorder resulting from neurological injury)
h. Dysphagia with no GI cause
i. Vertigo with either headache or nystagmus
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u. New seizure
v. Hearing loss or new onset tinnitus
w. Agitation
x. Somnolence
y. Slow response to verbal communication
z. Sudden falls
aa. Balance problems

VIII. Suspected pituitary disease (microadenoma, macroadenoma)[24-32] [One of the following]

A. Elevated pituitary hormones including precocious puberty [One of the following]
   1. Prolactin (PRL) >20ng/mL [micrograms/L]
   2. Growth hormone (GH) ≥5 ng/mL [micrograms/L]
   3. Thyroid stimulating hormone (TSH) >4U/mL [mcIU/L]
   4. Follicular stimulating hormone (FSH)
      a. Male: >10 mIU/mL
      b. Female: (mIU/mL)
         i. Follicular phase >13
         ii. Luteal phase>13
         iii. Midcycle >22
         iv. Postmenopausal >150
   5. Luteinizing hormone (LH)
      a. Male: >8 mIU/mL
      b. Female: (mIU/mL)
         i. Follicular phase>12
         ii. Luteal phase>15
         iii. Midcycle peak >77
         iv. Postmenopausal >40
   6. Adrenocorticotropic hormone (ACTH) >46 pg/mL (Cushing's disease)

B. Hypopituitarism including hypogonadism [One of the following]
   1. Pituitary apoplexy [One of the following]
      a. Acute headache with vomiting

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b. Ophthalmoplegia
c. Amaurosis
d. Depressed level of consciousness
e. Bitemporal hemianopsia

2. Acquired hypopituitarism [One of the following]
   a. Cranial irradiation
   b. Brain surgery
   c. Head trauma
   d. Empty sella
   e. Hemochromatosis
   f. Prior brain infection
   g. Known pituitary tumor
   h. Langerhans cell histiocytosis of the pituitary
3. Gonadotropin deficiency or hypogonadism [One of the following]
   a. Male [All of the following]
      i. History [One of the following]
         01. Loss of libido
         02. Impotence
         03. History of undescended testicle or cryptorchidism
         04. History of testicular failure
         05. History of chemotherapy or radiation therapy
         06. Visual field disorder
         07. Decreased body hair
         08. Galactorrhea
         09. Gynecomastia
      ii. Laboratory tests
         01. Low to normal free testosterone, LH and FSH (the laboratory values may be requested)
   b. Female [All of the following]
      i. Oligomenorrhea or amenorrhea
      ii. Low normal LH, FSH
4. TSH deficiency < 0.4 and low to low-normal T4 and T3
5. ACTH deficiency (Addison's disease)
6. ADH deficiency (diabetes insipidus)
7. Growth hormone deficiency [One of the following]
   a. Adults [One of the following]
      i. History of radiation or surgery to the pituitary or hypothalamic region
      ii. Decreased levels of 3 or more pituitary hormones (TSH, LH, FSH, ACTH, GHRH, ADH)
      iii. Decreased levels of IGF-I (insulin-like growth factor I) based on laboratory normal range
      iv. Insulin tolerance test (contraindicated in individuals with history of seizures or coronary artery disease)
         01. Growth hormone response ≤10 ng/mL [micrograms/L]
      v. Arginine stimulating test
         01. Growth hormone response ≤10 ng/mL [micrograms/L]

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b. Children with no evidence of malignancy, Crohn's disease, renal disease, hypothyroidism, or Turner's syndrome, and one of the following
   i. Bone age more than 2 standard deviations below the mean for age
   ii. History of surgery or radiation in the pituitary or hypothalamus regions
   iii. Growth hormone levels below normal (≤10 ng/mL [micrograms/L]
   iv. History of intrauterine growth retardation
   v. Prader-Willi syndrome
   vi. Children over the age of 1
      01. Insulin tolerance test positive with GH response ≤10 ng/mL [micrograms/L]
   vii. Neonate random growth hormone level <20 ng/mL [micrograms/L]

8. Visual problems [One of the following]
   a. Bitemporal visual field loss – loss of peripheral vision bilaterally
   b. Optic atrophy
   c. Drooping eyelid
   d. Diabetes insipidus

C. Known pituitary tumor (adenoma, microadenoma, macroadenoma)
1. Following transsphenoidal resection
2. Following radiation therapy
3. New signs or symptoms such as visual changes, new headache, new onset of vomiting, papilledema, drooping eyelid, optic atrophy
4. Follow-up of asymptomatic nonfunctioning microadenoma <10mm in size
   a. MRI at one year
   b. MRI every 1-2 years for 3 years and then less frequently as long as tumor does not increase in size
5. Follow-up of asymptomatic nonfunctioning macroadenoma 6 months after the initial diagnosis and then annually

IX. Evaluation after intervention or surgery (CT should be performed for this indication if MRI is absolutely contraindicated) [One of the following]

A. New or worsening neurologic condition [One of the following]
1. Motor weakness affecting a limb, or one side of the face or body
2. Decreased sensation affecting a limb, or one side of the face or body
3. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
4. Confusion including memory loss and disorientation
5. Impaired vision, including amaurosis fugax, visual field loss and diplopia
6. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
7. Dysarthria (speech disorder resulting from neurological injury)
8. Dysphagia with no GI cause
9. Vertigo with either headache or nystagmus
10. Numbness, tingling, paresthesias
11. Decreased level of consciousness
12. Papilledema
13. Stiff neck
14. New onset of severe headache
15. Drowsiness

16. New onset of vomiting
17. Nystagmus
18. Cranial nerve palsy
19. Gait disturbance
20. Personality or behavioral changes
21. New seizure
22. Hearing loss or new onset tinnitus
23. Agitation
24. Somnolence
25. Slow response to verbal communication
26. Sudden falls
27. Balance problems

B. Aneurysm clip [One of the following]
   1. Stable with no change in neurologic findings
      a. Annual
   2. New neurologic findings (See A above)

X. Suspected acoustic neuroma (schwannoma) or cerebellar pontine angle tumor[33-35] [One of the following]

A. Findings/test results [One of the following]
   1. Asymmetric sensorineural hearing loss by audiometry
   2. Facial weakness
   3. Altered sense of taste
   4. Tinnitus
   5. Balance problems
   6. Facial numbness

B. Neurofibromatosis

XI. Hydrocephalus[36-37] [One of the following]

A. Suspected obstructive hydrocephalus [Clinical findings and supportive history]
   1. Clinical findings [One of the following]
      a. Headache
      b. Papilledema
      c. Diplopia
      d. Mental status changes
      e. Gait disturbance or ataxia (People with ataxia experience a failure of muscle control in their arms and legs, resulting in a lack of balance and coordination or a disturbance of gait)
      f. Seizure
   2. History of [One of the following]
      a. Arteriovenous malformation (AVM)
      b. Aneurysm
      c. Intraventricular or SAH
      d. Meningitis
      e. Known hydrocephalus

B. Normal pressure hydrocephalus (NPH) [One of the following]

1. Gait disturbance (shuffling, magnetic, wide based, disequilibrium, and slow gait)
2. Motor perseveration (tremors)
3. Urinary incontinence, urgency or frequency
4. Dementia
5. Known NPH with worsening symptoms

C. Suspicion of VP (ventriculoperitoneal) shunt malfunction

XII. Evaluation of tinnitus[38-40] (ringing, hissing, buzzing, roaring, clicking, or rough sounds heard by patient)

XIII. Arnold-Chiari malformation[7] [One of the following]

A. Cranial nerve palsy
B. Headache
C. Incontinence
D. Lumbar myelomeningocele
E. Neck or back pain
F. Sensory loss
G. Tethered cord
H. Unsteady gait
I. Lower extremity spasticity
J. Follow up known Chiari with new or changed symptoms

XIV. Craniosynostosis

XV. Fibrous dysplasia

XVI. Macrocephaly

A. Head circumference greater than 2 standard deviations average for age

XVII. Microcephaly

A. Head circumference smaller than 2 standard deviations average for age

XVIII. Encephalocele

XIX. Cephalohematoma

XX. Proptosis including thyroid eye disease and exophthalmus[41] [One of the following]

A. Orbital asymmetry in a child with visual loss
B. Adult with painful visual loss
C. Hyperthyroidism with visual loss or visual compromise (Graves' disease)

XXI. Visual field deficit[41] (MRI) [One of the following]

A. Bitemporal hemianopsia (loss of peripheral vision)
B. Homonymous hemianopsia (loss of vision in the nasal half of one eye and the outer half of the other eye)

C. Scotoma (loss of central vision)
D. Heteronymous hemianopsia (loss of vision in either the nasal half or the outer half of both eyes)

XXII. Hearing loss[33-35] [One of the following]

A. Suspected cholesteatoma and audiogram demonstrating conductive hearing loss (CT of the temporal bone) and one of the following
    1. Acute and intermittent vertigo
    2. Painless otorrhea
    3. Purulent drainage from the ear or mastoid area
    4. Purulent drainage and granulation tissue in the ear
B. Conductive hearing loss
    1. Must have audiogram documenting conductive hearing loss
C. Total deafness, congenital hearing loss (CT of the temporal bone)
D. Preoperative planning for cochlear implant (CT of the temporal bone)
E. Fluctuating hearing loss
    1. History of meningitis
F. Glomus tumor (MRI)
    1. Reddish-blue mass in the ear
G. Sensorineural hearing loss on recent audiogram (MRI of the head without and with contrast)
H. Mixed conductive and sensorineural hearing loss on recent audiogram

XXIII. Vertigo[33]

A. Episodic with or without associated hearing loss or tinnitus
B. Central vertigo with or without other symptoms (MRI of the brain without and with contrast)

XXIV. Follow up proven subdural hematoma, epidural, subarachnoid, or intracerebral (parenchymal) hemorrhage[3,42,43] [One of the following]

A. Motor weakness affecting a limb, or one side of the face or body
B. Decreased sensation affecting a limb, or one side of the face or body
C. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
D. Confusion including memory loss and disorientation
E. Impaired vision, including amaurosis fugax, visual field loss and diplopia
F. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
G. Dysarthria (speech disorder resulting from neurological injury)
H. Dysphagia with no GI cause
I. Vertigo with either headache or nystagmus
J. Numbness, tingling, paresthesias
K. Decreased level of consciousness
L. Papilledema
M. Stiff neck
N. New onset of severe headache
O. Drowsiness
P. New onset of vomiting
Q. Nystagmus

R. Cranial nerve palsy
S. Gait disturbance
T. Personality or behavioral changes
U. New seizure
V. Hearing loss or new onset tinnitus
W. Agitation
X. Somnolence
Y. Slow response to verbal communication
Z. Sudden falls
AA. Balance problems
BB. Follow up within 36 hours of initial presentation if not performed previously
CC. Interval follow up with or without change in clinical signs or symptoms

XXV. Suspected intracranial hemorrhage[3,44] [One of the following]

A. Head trauma [One of the following]
    1. Amnesia
    2. Altered level of consciousness or loss of consciousness
    3. Vomiting
    4. Neurologic symptoms
    5. Seizure
    6. Coagulopathy previously diagnosed (or current treatment with heparin or Coumadin®)
    7. Skull fracture
    8. Ataxia
    9. Aphasia
    10. Decreased sensation in a limb
    11. Visual field loss
    12. Double vision
    13. Memory loss
B. Suspicion of acute subarachnoid hemorrhage [One of the following]
    1. Vomiting
    2. Sudden onset of severe hypertension
    3. Decreased level of consciousness
    4. Thunderclap headache
    5. Worst headache of one's life
    6. Headache and known aneurysm
    7. Headache and first degree relative with aneurysm
    8. Treated aneurysm and/or AVM with new headache or findings on neurologic examination
    9. Stiff neck
    10. Seizure
    11. Third nerve palsy
C. Intracerebral (parenchymal) hemorrhage [One of the following]
    1. Hypertension with new onset headache
    2. Known brain metastases with change in neurologic status
    3. New onset of neurologic symptoms [One of the following]
        a. Motor weakness affecting a limb, or one side of the face or body
        b. Decreased sensation affecting a limb, or one side of the face or body
        c. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)

d. Confusion including memory loss and disorientation
e. Impaired vision, including amaurosis fugax, visual field loss and diplopia
f. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
g. Dysarthria (speech disorder resulting from neurological injury)
h. Dysphagia with no GI cause
i. Vertigo with either headache or nystagmus
j. Numbness, tingling, paresthesias
k. Decreased level of consciousness
l. Papilledema
m. Stiff neck
n. New onset of severe headache
o. Drowsiness
p. New onset of vomiting
q. Nystagmus
r. Cranial nerve palsy
s. Gait disturbance
t. Personality or behavioral changes
u. New seizure
v. Hearing loss or new onset tinnitus
w. Agitation
x. Somnolence
y. Slow response to verbal communication
z. Sudden falls
aa. Balance problems

4. Follow-up within 36 hours of initial presentation if not performed previously
5. Interval follow-up with or without change in signs and symptoms

XXVI. Papilledema or other signs of increased intracerebral pressure (MRI)

XXVII. Acute, chronic or progressive mental status changes (MRI)

A. Deteriorating cognitive function [One of the following]
   1. Progressive loss of memory
   2. Confusion
   3. Disorientation
   4. Personality changes

XXVIII. Evaluation of psychiatric disorders

XXIX. Bell's palsy, with unusual presentation[45-46] [One of the following]

Bell's palsy is the sudden onset of temporary facial paralysis which is the result of an insult to the 7th cranial nerve or the facial nerve. It usually presents as unilateral paralysis of the face including the eyelid and decreased tearing.

A. No improvement in facial paresis after one month
B. Hearing loss
C. Multiple cranial nerve deficits

D. Weakness or sensory loss in an extremity
E. Bilateral symptoms

XXX. Planning for stereotactic or gamma knife surgery- may be approved with MRI of the brain

References:

1. Smits M, Diederick WJ, Dippel DW, et al. Minor head injury: guidelines for the use of CT—a multicenter validation study. Radiology. 2007; 245(3):831-838. http://radiology.rsna.org/content/245/3/831.full.
2. Davis PC, Wippold FJ II, Cornelius RS, et al, Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Head Trauma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/HeadTrauma.pdf.
3. DeLaPaz RL, Wippold FJ II, et al, Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Cerebrovascular Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/CerebrovascularDisease.pdf.
4. Anderson D, Larson D, Lindhom P, et al. Health Care Guideline: Diagnosis and Treatment of Ischemic Stroke Institute for Clinical Systems Improvement July 2012 Tenth Edition. https://www.icsi.org/_asset/xql3xv/Stroke-Interactive0712.pdf.
5. Wippold FJ, Cornelius RS, Aiken AH, et al, Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Focal neurologic deficit. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/FocalNeurologicDeficit.pdf.
6. Douglas AC, Wippold FJ II, Broderick DF, et al, Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Headache. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Headache.pdf.
7. Beithon F, Gallenberg M, Johnson K, et al. Health Care Guideline: Diagnosis and Treatment of Headache. Institute for Clinical Systems Improvement January 2013. https://www.icsi.org/_asset/qwrzng/Headache.pdf.
8. Clinch CR. Evaluation of acute headaches in adults, Am Fam Physician, 2001; 63:685-93.
9. Frishberg BM, Rosenberg JH, Matchar DB, et al. Evidence-based Guidelines in the Primary Care Setting: Neuroimaging in Patients with Nonacute Headache. http://tools.aan.com/professionals/practice/pdfs/gl0088.pdf.
10. Luttrull MD, Cornelius RS, Angtuaco EJ, et al, Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Seizures and Epilepsy. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SeizuresAndEpilepsy.pdf.
11. Marks WJ, Garcia P. Management of Seizures and Epilepsy. American Family Physician Ann Oncol. 1998. http://www.aafp.org/afp/1998/0401/p1589.html.
12. Scottish Intercollegiate Guidelines Network. Diagnosis and Management of Epilepsy in Adults, a National Guideline. 2003. http://www.sign.ac.uk/pdf/sign70.pdf.
13. Enzmann DR, Britt RH, Placone R, et al. Staging of human brain abscess by computed tomography. Radiology. Mar 1983; 146(3):703-708.
14. Zak IT, Altinok D, et al. West Nile virus infection. AJR Am J Roentgenol. Mar 2005; 184(3):957-961.
15. Davis PC, Hudgins PA, et al. Diagnosis of cerebral metastases: double-dose delayed CT vs contrast-enhanced MR imaging. AJNR Am J Neuroradiol. Mar-Apr 1991; 12(2):293-300.
16. Schaefer PW, Budzik RF Jr., Gonzalez RG, et al. Imaging of cerebral metastases. Neurosurg Clin N Am. Jul 1996; 7(3):393-423.
17. Auperin A, Arriagada R, et al. Prophylactic cranial irradiation for patients with small-cell lung cancer in complete remission. Prophylactic Cranial Irradiation Overview Collaborative Group. N Engl J Med. Aug 12 1999; 341(7):476-484.
18. Soffietti R, Cornu P, Delattre JY, et al. Brain metastases. In: Gilhus NE, Barnes MP, Brainin M, editor(s). European handbook of neurological management, 2nd ed., Vol1, Oxford (UK): Wiley-Blackwell; 2011. p.437-45.
19. Stupp R, Tonn JC, et al. High-grade Malignant Glioma: ESMO Clinical Practice Guidelines for Diagnosis, Treatment and Follow-up. 2010. http://annonc.oxfordjournals.org/content/21/suppl_5/v190.full.pdf+html?sid=50d28c84-edd8-421c-827c-e46fea84fcfa.
20. Wippold FJ II, Cornelius RS, Aiken AH, et al, Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Cranial Neuropathy. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/CranialNeuropathy.pdf.
21. Nabors LB, Ammirati M, Bierman PJ, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2013. Central Nervous System Cancers. http://www.nccn.org/professionals/physician_gls/pdf/cns.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Central Nervous System Cancers V2.2013. ©2013 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
22. Ettinger DS, Wood DE, Akerley W, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Non-Small Cell Lung Cancer. http://www.nccn.org/professionals/physician_gls/pdf/nscl.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Non-Small Cell Lung Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.

23. Kalemkerian GP, Akerley W, Bogner P, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Small Cell Lung Cancer. http://www.nccn.org/professionals/physician_gls/pdf/sclc.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Small Cell Lung Cancer V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
24. Acerini CL, Tasker RC, Bellone S, et al. Hypopituitarism in childhood and adolescence following traumatic brain injury: the case for prospective endocrine investigation. Eur J Endocrinol. Nov 2006; 155(5):663-669.
25. Ostrov SG, Quencer RM, Hoffman JC, et al. Hemorrhage within pituitary adenomas: how often associated with pituitary apoplexy syndrome? AJR Am J Roentgenol. Jul 1989; 153(1):153-160.
26. Seidenwurm D, Wippold FJ II, Cornelius RS, et al, Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Neuroendocrine Imaging. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/NeuroendocrineImaging.pdf.
27. Cook DM, Yuen KC, Biller BM, et al. American Association of Clinical Endocrinologists medical guidelines for clinical practice for growth hormone use in growth hormone-deficient adults and transition patients – 2009 update. Endocr Pract. 2009; 15 Suppl 2:1-29. https://www.aace.com/files/growth-hormone-guidelines.pdf.
28. Bhasin S, Cunningham GR, Hayes FJ, et al. Testosterone therapy in adult men with androgen deficiency syndromes: An Endocrine Society Clinical Practice Guideline, J of Cl Endocrinol Metab, 2010; 95:2536-2559.
29. Petak SM, Nankin HR, Spark RF, et al. American Association of Clinical Endocrinologists Medical Guidelines for Clinical Practice for the Evaluation and Treatment of Hypogonadism in adult male patients – 2002 Update, Endocrine Practice, 2002; 8:440-456.
30. Melmed S, Casanueva FF, Hoffman AR, et al. Diagnosis and treatment of hyperprolactinemia: An Endocrine Society Clinical Practice Guideline, J of Clinical Endocrinology and Metabolism, 2011; 96:273-288.
31. Rajasekaran S, Vanderpump M, Baldeweg S, et al. UK guidelines for the management of pituitary apoplexy, Clin Endocrinol, 2011; 74:9-20.
32. Lake MG, Krook LS, Cruz SV. Pituitary adenomas: an overview, Am Fam Physician, 2013;88:319-327.
33. Augtuaco E, Wippold FJ II, Cornelius RS, et al. Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Hearing Loss and/or Vertigo. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/HearingLossVertigo.pdf.
34. Stachler RJ, Chandrasekhar SS, Archer SM, et al, Clinical practice guideline: sudden hearing loss, Otolaryngol Head Neck Surg, 2012;146:S1-S35 accessed at http://oto.sagepub.com/content/146/3_suppl/S1.full.pdf+html.
35. Clinical Practice Advisory Group of the British Association of Otorhinolaryngologists Head and Neck Surgeons. Clinical Effectiveness Guidelines: Acoustic Neuroma (Vestibular Schwannoma). 2002. https://entuk.org/docs/prof/publications/3412_Acoustic_Neuroma.
36. Wippold FJ II, Cornelius RS, et al, Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Dementia and Movement Disorders. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/DementiaAndMovementDisorders.pdf.
37. Shprecher D, Schwalb J, Kurlan R, Curr Neurol Neurosci Rept, 2008;8:371-376.
38. Lockwood AH, Salvi RJ, et al. Tinnitus. N Engl J Med. Sep 19 2002; 347(12):904-910.
39. Henry JA, Dennis KC, et al. General review of tinnitus: prevalence, mechanisms, effects, and management. J Speech Lang Hear Res. Oct 2005; 48(5):1204-1235.
40. Crummer RW, Hassan GA. Diagnostic approach to tinnitus. Am Fam Physician. 2004; 69(1):120-126. http://www.aafp.org/afp/2004/0101/p120.html.
41. Wippold FJ II, Cornelius RS, Berger KL, et al, Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Orbits, Vision and Visual Loss. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/OrbitsVisionAndVisualLoss.pdf.
42. McBride W, Brock DG. Subdural Hematoma in Adults: Prognosis and Management.
43. Proctor MR. Intracranial Subdural Hematoma in Children: Clinical Features, Evaluation and Management.
44. Morgenstern LB, Hemphill C III, Anderson C, et al. Guidelines for the management of spontaneous intracerebral hemorrhage: A guideline for healthcare professionals from the American Heart Association/American Stroke Association, Stroke, 2010; 41:2108-2129. http://stroke.ahajournals.org/content/41/9/2108.full.pdf+html.
45. Ahmed A. When is facial paralysis Bell palsy? Current diagnosis and treatment. Cleve Clin J Med. 2005; 72(5):398-401, 405. http://www.ccjm.org/content/72/5/398.full.pdf+html.
46. National Institute of Neurological Disorders and Stroke of the National Institutes of Health. Bell's Palsy Fact Sheet. http://www.ninds.nih.gov/disorders/bells/detail_bells.htm.

70450, 70460, 70470 CT of the Head or Brain

Clinical criteria reviewed/revised: 9/22/14, 11/21/13, 11/7/13, 9/18/13, 8/22/13, 5/17/13, 3/21/13, 7/13/12, 7/5/12, 4/30/12, 8/5/11, 11/17/10, 5/26/10, 1/20/10, 12/09
Medical Advisory Committee reviewed and approved: 10/1/14, 9/17/14, 4/29/14, 11/8/13, 10/24/13, 9/18/13, 6/12/13, 9/19/12, 4/4/12, 9/21/11

70480 CT Orbit, Sella, Posterior Fossa Outer, Middle or Inner Ear without Contrast
70481 CT Orbit, Sella, Posterior Fossa Outer, Middle or Inner Ear with Contrast
70482 CT Orbit, Sella, Posterior Fossa Outer, Middle or Inner Ear without and with Contrast

VTI exam (studies performed to provide a virtual anatomy guide for use during surgery) are becoming increasingly more common.[1,2]

I. Head and neck cancer[3-9] (MRI) [One of the following]

Includes but not limited to:
Cancer of the arytenoid cartilage
Cancer of the epiglottis
Cancer of the hard palate
Cancer of the infraglottic region
Cancer of the larynx
Cancer of the oral cavity
Cancer of the paranasal sinuses
Cancer of the pharynx
Cancer of the salivary gland(s)
Cancer of the soft palate
Cancer of the supraglottic region
Cancer of the tongue
Cancer of the tonsils
Cancer of the vocal cord(s)
Mucosal melanoma

*Thyroid and parathyroid cancers do not fall into this category.

A. Cervical lymph node biopsy consistent with head and neck malignancy but no known primary
B. Initial staging of new diagnosis of head and neck cancer confirmed by biopsy (For initial staging, CT as well as PET/CT may be needed)
C. Deteriorating clinical condition with known head and neck cancer such as but not limited to new neck mass including new nodes, new hoarseness, weight loss, bleeding, dysphagia
D. New evidence of cranial nerve involvement
E. Post treatment imaging of the primary tumor and neck if treated to be performed within 6 months of completion of treatment
F. Further reimaging of asymptomatic individuals is not recommended

II. Suspected orbital tumor or other pathology (MRI without and with contrast)[10-13]

III. Evaluation of tinnitus[14-16] (ringing, hissing, buzzing, roaring, clicking or rough sounds heard by patient) (MRI)

IV. Evaluation of vertigo[17,18] (MRI brain) [One of the following]
- A. Progressive unilateral hearing loss
- B. Nystagmus
- C. Pain in ear or mastoid area, headache
- D. Nausea or vomiting
- E. Signs suggesting cerebrovascular or demyelinating disease [One of the following]
  1. Weakness
  2. Paresthesia
  3. Other changes in sensory and motor function
  4. Altered level of consciousness
  5. Changes in vision
  6. Ataxia or dysarthria

V. Hearing loss[17,19,21,22] [One of the following]
- A. Suspected cholesteatoma with conductive hearing loss documented on an audiogram [One of the following]
  1. Acute and intermittent vertigo
  2. Painless otorrhea
  3. Purulent drainage from the ear or mastoid area
  4. Purulent drainage and granulation tissue in the ear
- B. Conductive hearing loss
  1. Must have audiogram documenting conductive hearing loss
- C. Total deafness, congenital hearing loss (CT of the temporal bone)
- D. Preoperative planning for cochlear implant (CT of the temporal bone)
- E. Fluctuating hearing loss
- F. Glomus tumor (MRI)
  1. Reddish-blue mass in the ear
- G. Sensorineural hearing loss on recent audiogram (MRI of the head without and with contrast)
- H. Mixed conductive and sensorineural hearing loss on recent audiogram

VI. Evaluation of congenital anomalies of the ear[20]

VII. Cholesteatoma [21, 22]
- A. Conductive hearing loss on an audiogram

VIII. Trauma[23,24] [One of the following]
- A. Infra orbital numbness
- B. Enophthalmos
- C. Inhibited movement of eyes, e.g. diplopia
- D. Suspected foreign body in globe or orbit
- E. Bleeding from ear after injury
- F. Deformation of the globe
- G. Loss of vision

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IX. Evaluation of severe infections of the ear (malignant otitis externa)[21]

X. Cochlear implant evaluation[17]

XI. Congenital hearing loss[17]

XII. Visual field deficit or vision loss (MRI without and with contrast) [One of the following][25]
- A. Bitemporal hemianopsia (loss of peripheral vision)
- B. Homonymous hemianopsia (loss of vision in the nose half of one eye and the outer uveitis half of the other eye)
- C. Scotoma (loss of central vision)
- D. Heteronymous hemianopsia (loss of vision in either the nose half or the outer half of both eyes)

XIII. Congenital anomaly of the orbit[25]

XIV. Otosclerosis

XV. Suspected pituitary disease (microadenoma, macroadenoma) (MRI of the brain with and without contrast)[26-31] [One of the following]
- A. Elevated pituitary hormones including precocious puberty [One of the following]
  1. Prolactin (PRL) > 20 ng/mL [micrograms/L]
  2. Growth hormone (GH) ≥ 5 ng/mL [micrograms/L]
  3. Thyroid stimulating hormone (TSH) > 4 U/mL (mcIU/L)
  4. Follicular stimulating hormone (FSH) or
     a. Male: > 10 mIU/mL
     b. Female: (mIU/mL)
        i. Follicular phase > 13
        ii. Luteal phase > 13
        iii. Midcycle > 22
        iv. Postmenopausal > 150
  5. Luteinizing hormone (LH)
     a. Male: > 8 mIU/mL
     b. Female: (mIU/mL)
        i. Follicular phase > 12
        ii. Luteal phase > 15
        iii. Midcycle peak > 77
        iv. Postmenopausal > 40
  6. Adrenocorticotropic hormone (ACTH) > 46 pg/mL (Cushing's disease)
- B. Hypopituitarism including hypogonadism [One of the following]
  1. Pituitary apoplexy [One of the following]
     a. Acute headache with vomiting or
     b. Ophthalmoplegia
     c. Amaurosis
     d. Depressed level of consciousness
     e. Bitemporal hemianopsia

2. Acquired hypopituitarism [One of the following]
    a. Cranial irradiation
    b. Brain surgery
    c. Head trauma
    d. Empty sella
    e. Hemochromatosis
    f. Prior brain infection
    g. Known pituitary tumor
    h. Langerhans cell histiocytosis of the pituitary
3. Gonadotropin deficiency or hypogonadism [One of the following]
    a. Male [All of the following]
        i. History [One of the following]
            01. Loss of libido
            02. Impotence
            03. History of undescended testicle or cryptorchism
            04. History of testicular failure
            05. History of chemotherapy or radiation therapy
            06. Visual field disorder
            07. Decreased body hair
            08. Galactorrhea
            09. Gynecomastia
        ii. Laboratory tests
            01. Low to normal free testosterone, LH and FSH (laboratory values may be requested)
    b. Female [All of the following]
        i. Oligomenorrhea or amenorrhea
        ii. Low normal LH, FSH
4. TSH deficiency with TSH < 0.4
5. ACTH deficiency (Addison's disease)
6. ADH deficiency (diabetes insipidus)
7. Growth hormone deficiency [One of the following]
    a. Adults [One of the following]
        i. History of radiation or surgery to the pituitary or hypothalamic region
        ii. Decreased levels of 3 or more pituitary hormones (TSH, LH, FSH, ACTH, GHRH, ADH)
        iii. Decreased levels of IGF-I (insulin-like growth factor I) based on laboratory normal range
        iv. Insulin tolerance test (contraindicated in individuals with history of seizures or coronary artery disease)
            01. Growth hormone response ≤ 10 ng/mL [micrograms/L]
        v. Arginine stimulating test
            01. Growth hormone response ≤ 10 ng/mL [micrograms/L]
    b. Children with no evidence of malignancy, Crohn's disease, renal disease, hypothyroidism, or Turner's syndrome, and one of the following:
        i. Bone age more than 2 standard deviations below the mean for age
        ii. History of surgery or radiation in the pituitary or hypothalamus regions
        iii. Growth hormone levels below normal (≤ 10 ng/mL [micrograms/L])

iv. History of intrauterine growth retardation
v. Prader-Willi syndrome
vi. Children over the age of 1
01. Insulin tolerance test positive with GH response ≤ 10 ng/mL [micrograms/L]
vii. Neonate random growth hormone level < 20 ng/mL [micrograms/L]

8. Visual problems [One of the following]
a. Bitemporal visual field loss – loss of peripheral vision bilaterally
b. Optic atrophy
c. Drooping eyelid
d. Diabetes insipidus

C. Known pituitary tumor (adenoma, microadenoma, macroadenoma)
1. Following transsphenoidal resection
2. Following radiation therapy
3. New signs or symptoms such as visual changes, new headache, new onset of vomiting, papilledema, drooping eyelid, optic atrophy
4. Follow-up of asymptomatic nonfunctioning microadenoma < 10mm in size
a. MRI at one year
b. MRI every 1 – 2 years for 3 years and then less frequently as long as tumor does not increase in size
5. Follow-up of asymptomatic nonfunctioning macroadenoma 6 months after the initial diagnosis and then annually

XVI. Proptosis[25] (or exophthalmos) (MRI) [One of the following]

A. Orbital asymmetry in a child with visual loss
B. Adult with painful visual loss

XVII. Conductive hearing loss[17]

A. Documented by audiometry

References:

1. Haluck RS, Krummel TM. Computers and virtual reality for surgical education in the 21st century. Arch Surg. Jul 2000; 135(7):786-792.
2. Dammann F, Bode A, Schwaderer E, et al. Computer-aided surgical planning for implantation of hearing aids based on CT data in a VR environment. Radiographics. Jan-Feb 2001; 21(1):183-191.
3. King AD, Lam WW, Leung SF, et al. Comparison of T2 weighted fat suppressed turbo spin echo and contrast enhanced T1 weighted spin echo MRI in nasopharyngeal carcinoma. Br J Radiol. Dec 1997; 70(840):1208-1214.
4. Loevner LA, Sonners AI, Schulman BJ, et al. Reinterpretation of cross-sectional images in patients with head and neck cancer in the setting of a multidisciplinary cancer center. AJNR Am J Neuroradiol. Nov-Dec 2002; 23(10):1622-1626.
5. Weber AL, Montandon C, Robson CD. Neurogenic tumors of the neck. Radiol Clin North Am. Sep 2000; 38(5):1077-1090.
6. Tien RD, Hesselink JR, Chu PK, et alF. Improved detection and delineation of head and neck lesions with fat suppression spin-echo MR imaging. AJNR Am J Neuroradiol. Jan-Feb 1991; 12(1):19-24.
7. Di Martino E, Nowak B, Hassan HA, et al. Diagnosis and staging of head and neck cancer: a comparison of modern imaging modalities (positron emission tomography, computed tomography, color-coded duplex sonography) with panendoscopic and histopathologic findings. Arch Otolaryngol Head Neck Surg. Dec 2000; 126(12):1457-1461.
8. Scottish Intercollegiate Guidelines Network. Diagnosis and Management of Head and Neck Cancer, a National Clinical Guideline. http://www.sign.ac.uk/pdf/sign90.pdf.
9. Pfister DG, Ang KK, Brizel BA, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2013. Head and Neck Cancers. http://www.nccn.org/professionals/physician_gls/pdf/head-and-neck.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Head and Neck Cancers V2.2013. ©2013 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.

10. Gunduz K, Shields JA, Eagle RC Jr., et al. Malignant rhabdoid tumor of the orbit. Arch Ophthalmol. Feb 1998; 116(2):243-246.
11. Tanaka A, Mihara F, Yoshiura T, et al. Differentiation of cavernous hemangioma from schwannoma of the orbit: a dynamic MRI study. AJR Am J Roentgenol. Dec 2004; 183(6):1799-1804.
12. Gufler H, Laubenberger J, Gerling J, et al. MRI of lymphomas of the orbits and the paranasal sinuses. J Comput Assist Tomogr. Nov-Dec 1997; 21(6):887-891.
13. Meyer PA. Avoiding surgery for thyroid eye disease. Eye (Lond). Oct 2006; 20(10):1171-1177.
14. Lockwood AH, Salvi RJ, Burkard RF. Tinnitus. N Engl J Med. Sep 19 2002;347(12):904-910.
15. Henry JA, Dennis KC, Schechter MA. General review of tinnitus: prevalence, mechanisms, effects, and management. J Speech Lang Hear Res. Oct 2005; 48(5):1204-1235.
16. Crummer RW, Hassan GA. Diagnostic approach to tinnitus. Am Fam Physician. 2004; 69(1):120-126. http://www.aafp.org/afp/2004/0101/p120.html.
17. Angtuaco EJ, Wippold FJ II, Cornelius RS, et al. Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Hearing Loss and/or Vertigo. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/HearingLossVertigo.pdf.
18. Labuguen RH. Initial evaluation of vertigo. Am Fam Physician. Jan 15 2006; 73(2):244-251.
19. Stachler RJ, Chandrasekhar SS, Archer SM, et al, Clinical practice guideline: sudden hearing loss, Otolaryngol Head Neck Surg, 2012; 146:S1-S35. http://oto.sagepub.com/content/146/3_suppl/S1.full.pdf+html.
20. Swartz JD, Faerber EN. Congenital malformations of the external and middle ear: high-resolution CT findings of surgical import. AJR Am J Roentgenol. Mar 1985; 144(3):501-506.
21. Rosenfeld RM, Culpepper L, Doyle KJ, et al. Clinical practice guideline: Otitis media with effusion. Otolaryngol Head Neck Surg. May 2004; 130(5 Suppl):S95-118.
22. Ayache D, Darrouzet V, Dubrulle, et al. Imaging of non-operated cholesteatoma: Clinical practice guidelines, Eur Ann Otorhinol Head and Neck Diseases, 2012; 129:148-152.
23. Caldemeyer KS, Sandrasegaran K, Shinaver CN, et al. Temporal bone: comparison of isotropic helical CT and conventional direct axial and coronal CT. AJR Am J Roentgenol. Jun 1999; 172(6):1675-1682.
24. Rhea JT, Rao PM, Novelline RA. Helical CT and three-dimensional CT of facial and orbital injury. Radiol Clin North Am. May 1999; 37(3):489-513.
25. Wippold FJ II, Cornelius RS, Berger KL, et al. Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Orbits, Vision and Visual Loss. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/OrbitsVisionAndVisualLoss.pdf.
26. Abernethy LJ. Imaging of the pituitary in children with growth disorders. Eur J Radiol. Jan 1998; 26(2):102-108.
27. Chalumeau M, Hadjiathanasiou CG, Ng SM, et al. Selecting girls with precocious puberty for brain imaging: validation of European evidence-based diagnosis rule. J Pediatr. Oct 2003; 143(4):445-450.
28. Neely EK, Wilson DM, Lee PA, et al. Spontaneous serum gonadotropin concentrations in the evaluation of precocious puberty. J Pediatr. Jul 1995; 127(1):47-52.
29. Wilson TA, Rose SR, Cohen P, et al. Update of guidelines for the use of growth hormone in children: the Lawson Wilkins Pediatric Endocrinology Society Drug and Therapeutics Committee. J Pediatr. Oct 2003; 143(4):415-421.
30. Petak SM, Nankin HR, Spark RF, et al. American Association of Clinical Endocrinologists Medical Guidelines for clinical practice for the evaluation and treatment of hypogonadism in adult male patients—2002 update. Endocr Pract. Nov-Dec 2002; 8(6):440-456.
31. Seidenwurm D, Wippold FJ II, Cornelius RS, et al. Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Neuroendocrine Imaging. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/NeuroendocrineImaging.pdf.

70480, 70481, 70482 CT Orbit, Sella, Posterior Fossa, Outer, Middle or Inner Ear

Clinical criteria reviewed/revised: 9/22/14,11/21/13, 10/17/23, 9/18/13, 7/31/13, 5/18/13, 7/5/12, 3/5/12, 8/10/11, 11/17/10, 12/09, 1/21/09
Medical Advisory Committee reviewed and approved: 10/1/14, 4/29/14, 10/24/13, 6/12/13, 9/19/12, 4/4/12, 9/21/11

70486 CT Maxillofacial Area Including Paranasal Sinuses without Contrast
70487 CT Maxillofacial Area Including Paranasal Sinuses with Contrast
70488 CT Maxillofacial Area Including Paranasal Sinuses without and with Contrast

I. Acute complicated rhinosinusitis with headache or facial pain or swelling or orbital pain or purulent nasal discharge[1-7] and one of the following
   A. Findings [One of the following]
      1. Orbital cellulitis (may include but not limited to swelling of the eye, proptosis, difficulty moving the eye)
      2. Facial cellulitis
      3. Suspicion of intracranial infection or meningitis
         a. Mental status changes
         b. Focal neurologic findings
      4. Proptosis
      5. Visual disturbance
      6. Focal neurologic findings
   B. Comorbidities such as one of the following
      1. Diabetes
      2. Immunocompromised state
      3. Past history of facial trauma or surgery
   C. No response to medical management for 2 weeks with no change in signs or symptoms followed by treatment with an alternative antibiotic for 2 weeks of one of the following
      1. Amoxicillin unless contraindicated
      2. Penicillin allergic
         a. Bactrim®
         b. Erythromycin
         c. Zithromax®
         d. Azithromycin
         e. Clarithromycin
   D. Progression of symptoms under medical management

II. Recurrent acute rhinosinusitis with 3 or more episodes within 1 year[1,3,4] and one of the following
   A. Symptoms
      1. Upper respiratory symptoms for more than a week
      2. Colored nasal discharge
      3. Poor response to decongestant
      4. Facial or sinus pain

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5. Nasal obstruction

III. Chronic rhinosinusitis[3,4,7] – symptoms lasting 8 weeks or longer of varying intensity and not responding to antibiotics taken for at least 7 days and one of the following

A. Symptoms [One of the following]
   1. Purulent nasal discharge
   2. Facial pain/pressure
   3. Nasal obstruction
   4. Decreased sense of smell
B. Findings on physical examination [One of the following]
   1. Nasal polyps
   2. Septal deviation

IV. Suspected sinus or nasopharyngeal tumor[8-11] [One of the following]

This may include but is not limited to the following:
Inverting papilloma
Olfactory neuroblastoma (esthesioneuroblastoma)
Juvenile angiofibroma
Squamous cell carcinoma
Adenocarcinoma
Adenoid cystic carcinoma
Odontogenic keratocyst

A. Positive nasal endoscopy
B. Clinical findings [One of the following]
   1. Nasal obstruction
   2. Posterior (Level V) neck mass
   3. Epistaxis
   4. Headache
   5. Serous otitis media with hearing loss, and otalgia
   6. Cranial nerve involvement (is indicative of skull base extension and advanced disease)
   7. Facial or dental pain without obvious cause
   8. Destroyed bone by x-ray
C. Anosmia or dysosmia >2 weeks
D. Recurrent unilateral otitis media or recurrent sinusitis after appropriate antibiotic therapy
E. Epstein-Barr virus (EBV) infection with positive titers
F. Documented history of inverting papilloma
G. Interval follows up of documented sinus or nasopharyngeal tumor

V. Salivary gland pathology[11,12] (MRI for all indications except stones) (For proven cancer of the salivary gland, see VII below) [One of the following]

A. Mass suspected by physical examination or US and MRI cannot be performed
B. Suspected submandibular or parotid duct stone and non diagnostic ultrasound [One of the following]
   1. Acutely swollen and painful gland
   2. Recurrent infections

3. Indeterminate calcifications on x-ray

C. Follow up of known salivary gland tumor
   1. See VII below

VI. Mucocele or nasal polyp(s)[5,10] (For cancer of the nose, see VII below) [One of the following]

A. Mucocele suspected physical findings [One of the following]
   1. Proptosis
   2. Exophthalmos
   3. Loss of vision
   4. Swelling over the sinus
B. Follow-up of known mucocele or polyp(s)
C. Nasal polyps [One of the following]
   1. Anterior rhinoscopy demonstrating polyp(s)
   2. History of cystic fibrosis
   3. Inability to smell (anosmia)
   4. Nasal obstruction

VII. Head and neck cancer[11,12] (MRI for staging of oropharyngeal and oral tumors. MRI should be used to evaluate extension to skull base, orbit, cervical spine or neurovascular structures) [One of the following]

This includes but is not limited to cancer of:
Cancer of the arytenoid cartilage
Cancer of the epiglottis
Cancer of the hard palate
Cancer of the infraglottic region
Cancer of the larynx
Cancer of the oral cavity
Cancer of the paranasal sinuses
Cancer of the pharynx
Cancer of the salivary gland(s)
Cancer of the soft palate
Cancer of the supraglottic region
Cancer of the tongue
Cancer of the tonsils
Cancer of the vocal cord(s)
Mucosal melanoma

*Thyroid and parathyroid cancers do not fall into this category.

A. Cervical lymph node biopsy consistent with head and neck malignancy but no known primary
B. Initial staging of new diagnosis of head and neck cancer confirmed by biopsy (for initial staging CT as well as PET/CT may be needed)
C. Deteriorating clinical condition with known head and neck cancer such as but not limited to new neck mass including new nodes, new hoarseness, weight loss, bleeding, dysphagia
D. New evidence of cranial nerve involvement

D. Post treatment imaging of the primary tumor and neck if treated should be performed within 6 months of completion of treatment
E. Further reimaging of asymptomatic individuals is not recommended

VIII. Trauma [One of the following]

A. Facial subcutaneous air after injury
B. CSF rhinorrhea (clear fluid drainage from nose)
C. Diplopia
D. X-ray evidence or suspicion of orbital floor fracture
E. Suspicion of maxillary fracture
F. Mandibular fracture suspected

IX. Cough, work up of chronic and a chest x-ray demonstrating no cause for the cough or treatment of the findings on the chest x-ray failed to relieve the cough[13,14] (cough lasting more than 3 weeks and all of the following)

A. [Skip section if there is no history of smoking or ACE inhibitor use]
    1. Patient smoked, no response to cessation
    2. Patient used ACE inhibitors, no response to discontinued use
B. No response to empiric treatment of [All of the following]
    1. Upper airway cough syndrome (UACS preferred terminology; old terminology was post nasal drip) no response to >1 week of first generation antihistamines and decongestants
    2. GERD [One of the following]
        a. No response to anti-reflux medication
        b. Negative 24 hour esophageal pH monitoring
    3. Asthma, no response to bronchodilators

References:

1. Snellman L, Adams W, Anderson G, et al. Institute for Clinical Systems Improvement. Diagnosis and Treatment of Respiratory Illness in Children and Adults. https://www.icsi.org/_asset/1wp8x2/RespIllness.pdf..
2. Karmazyn B, Coley BD, Dempsey-Robertson ME, et al, Expert Panel on Pediatric Imaging. American College of Radiology ACR Appropriateness Criteria – Sinusitis–Child. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SinusitisChild.pdf.
3. Cornelius RS, Martin J, Wippold FJ II, Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Sinonasal Disease.
4. Rosenfeld RM, Andes D, Bhattacharyya N, et al. Clinical practice guideline: adult sinusitis. Otolaryngol Head Neck Surg. Sep 2007; 137(3 Suppl):S1-31.
5. Gangel, EK. AAP issues recommendations for the management of sinusitis in children, Am Fam Physician, 2002; 65:1216-1220.
6. Wald ER, Applegate KE, Bordley C, et al. Clinical Practice Guideline for the Diagnosis and Management of Acute Bacterial Sinusitis in Children aged 1-18 years, Pediatrics, 2013; 132:2262-e280.
7. Slavin RG, Spector SL, Bernstein IL, et al. The diagnosis and management of sinusitis: A practice parameter update, J Allergy Clin Immunol, 2005; 116:S13-47.
8. Shotelersuk K, Khorprasert C, Sakdikul S, et al. Epstein-Barr virus DNA in serum/plasma as a tumor marker for nasopharyngeal cancer. Clin Cancer Res. Mar 2000; 6(3):1046-1051.
9. King AD, Vlantis AC, Tsang RK, et al. Magnetic resonance imaging for the detection of nasopharyngeal carcinoma. AJNR Am J Neuroradiol. Jun-Jul 2006; 27(6):1288-1291.
10. Connor SEJ, Hussain S, Woo EK-F. Sinonasal Imaging. Imaging. 2007(19):39-54.
11. Pfister DG, Ang KK, Brizel D, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2012. Head and Neck Cancers. http://www.nccn.org/professionals/physician_gls/pdf/head-and-neck.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Head and Neck Cancers V1.2012. ©2012 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
12. Liyanage SH, Spencer SP, Hogarath KM. Imaging of Salivary Glands. Imaging. 2007;19:14-27.
13. Pratter MR. Chronic upper airway cough syndrome secondary to rhinosinus diseases (previously referred to as postnasal drip syndrome): ACCP evidence-based clinical practice guidelines. Chest. Jan 2006; 129(1 Suppl):63S-71S.
14. McGarvey L, Polley L, MacMahon J. Review Series: Chronic Cough: Common Causes and Current Guidelines SAGE Chronis Respiratory Disease. 2007;4:215-223.

70486, 70487, 70488 CT Maxillofacial Area

Clinical criteria reviewed/revised: 7/10/14, 5/19/13, 5/14/13, 7/6/12, 2/10/12, 8/10/11, 11/17/10, 1/20/10
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70490 CT Soft Tissue Neck without Contrast
70491 CT Soft Tissue Neck with Contrast
70492 CT Soft Tissue Neck without and with Contrast

I. Salivary gland pathology[1,2] (For cancer of the salivary gland, see V below) [One of the following]
- A. Mass suspected by physical examination or US and MRI cannot be performed
- B. Suspected submandibular or parotid duct stone and ultrasound non diagnostic [One of the following]
  1. Acutely swollen and painful gland
  2. Recurrent infections
  3. Indeterminate calcifications on x-ray
- C. Follow-up of known salivary gland tumor
  1. See V below

II. Parathyroid pathology[3-5] (Nuclear parathyroid scan) [One of the following]
- A. Hyperparathyroidism [One of the following]
  1. Ca >normal [>10.6 mg/dL or 2.7 mmol/L]
  2. PTH >normal [>55 pg/mL or 5.8 pmol/L]
- B. Biopsy proven malignancy
  1. Initial staging

III. Neck mass other than thyroid[6-10] [One of the following]
- A. Solitary neck mass (with or without fever; pulsatile or non pulsatile)
- B. Multiple neck masses
- C. Personal history of cancer with a new neck mass
- D. Children: any mass detected by physical examination or other imaging not diagnostic (including but not limited to possible thyroglossal duct cyst, branchial cleft cyst, dermoid cyst, AVM, hemangioma)
- E. Fine needle aspiration consistent with metastatic disease (carcinoma, sarcoma) or lymphoma
- F. Suspected congenital neck mass [One of the following]
  1. Thyroglossal duct cyst with a non-diagnostic ultrasound
  2. Brachial cleft cyst
  3. Lymphangioma
  4. Thymic cyst
- G. Neck abscess with pain and swelling and one of the following
  1. Aural temperature >38.3°C or 100.9°F
  2. Leukocytosis, WBC >11,500/cu.mm

IV. Suspected nasopharyngeal tumor[11-14] (For known cancers, see V below) [One of the following]
- A. Symptoms [One of the following]

1. Epistaxis
2. Recurrent sinusitis after appropriate antibiotic therapy

B. Clinical findings [One of the following]
1. Nasal obstruction
2. Positive endoscopy
3. Serous otitis media with hearing loss and otalgia
4. Epstein - Barr virus (EBV) infection with positive titers
5. Posterior (level V) neck node or mass
6. Cranial nerve involvement (is indicative of skull base involvement and advanced disease)

V. Head and neck cancer[11-15] [One of the following]

Includes but not limited to:
Cancer of the arytenoid cartilage
Cancer of the epiglottis
Cancer of the hard palate
Cancer of the hypopharynx
Cancer of the infraglottic region
Cancer of the lip
Cancer of the glottic larynx
Cancer of the nasopharynx
Cancer of the oral cavity
Cancer of the oropharynx
Cancer of the paranasal sinuses including ethmoid, maxillary
Cancer of the pharynx
Cancer of the salivary gland(s)
Cancer of the soft palate
Cancer of the supraglottic larynx
Cancer of the tongue
Cancer of the tonsils
Cancer of the vocal cord(s)
Mucosal melanoma

*Thyroid and parathyroid cancers do not fall into this category.

A. Cervical lymph node biopsy consistent with head and neck malignancy but no known primary
B. Initial staging of new diagnosis of head and neck cancer confirmed by biopsy (For initial staging, CT as well as PET/CT may be needed)
C. Deteriorating clinical condition with known head and neck cancer such as but not limited to new neck mass including new nodes, new hoarseness, weight loss, bleeding, dysphagia
D. New evidence of cranial nerve involvement
E. Post treatment imaging of the primary tumor and neck if treated should be performed within 6 months of completion of treatment
F. Further reimaging of asymptomatic individuals is not recommended

VI. Neck abscess with pain and swelling and one of the following

A. Aural temperature >38.3°C or 100.9°F

B. Leukocytosis, WBC >11,500/cu.mm

VII. Vocal cord paralysis or hoarseness (dysphonia)[16,17] (Imaging should not be performed prior to laryngoscopy) (For follow up of cancer, see V above) [One of the following]
- A. Unexplained vocal cord paralysis found on laryngoscopy
- B. Mass or lesion on the vocal cord found on laryngoscopy
- C. Injury to the recurrent laryngeal nerve and one of the following
  1. Prior cervical spine surgery
  2. Prior thyroid surgery
  3. Prior esophageal cancer surgery
  4. Prior carotid endarterectomy
  5. Left hilar lung mass
  6. Left pneumonectomy
- D. Congenital cysts
- E. Laryngeal web
- F. Trauma to the larynx

VIII. Airway compromise by neck mass with evidence of upper airway obstruction and either a known neck mass or an enlarged thyroid

IX. Suspected laryngeal fracture with a history of neck trauma and one of the following[18]
- A. Subcutaneous emphysema or crepitus
- B. Dysphonia
- C. Loss of the laryngeal prominence (Adam's apple)
- D. Dysphagia
- E. Odynophagia
- F. Stridor
- G. Hemoptysis
- H. Cough
- I. Pain over the larynx

X. Thyroid mass with an ultrasound that does not demonstrate the complete size or substernal extent of the gland and an enlarged thyroid on a nuclear scan

XI. Lymphoma[19-20] [One of the following]
- A. Initial staging for biopsy proven lymphoma – in addition to PET/CT
- B. During treatment may monitor response to chemotherapy with PET/CT
- C. Follow-up shortly after completion of therapy with PET/CT
- D. Surveillance in asymptomatic individual with no known metastatic disease and no symptoms or signs of relapse with negative PET or PET/CT after completion of treatment
  1. Hodgkin's disease
     - a. Asymptomatic with no signs or symptoms of disease
       - i. If the neck was involved with disease every 6-12 months for the first 2 years
  2. Follicular, MALT, nodal marginal cell, mantle cell lymphoma, Burkitt's lymphoma

a. Asymptomatic with no signs or symptoms of disease
    i. Every 6 months for 2 years
    ii. Annually after 2 years
3. Diffuse large B-cell lymphoma, peripheral T-cell lymphoma as clinically indicated

E. 24 months after completion of treatment CLL and SLL (small lymphocytic lymphoma)
1. CT before initiation of therapy when there is pathologically proven diagnosis of CLL or SLL

XII. Horner's syndrome [21]

References:

1. Browne RF, Golding SJ, et al. The role of MRI in facial swelling due to presumed salivary gland disease. Br J Radiol. Feb 2001;74(878):127-133.
2. Liyanage SH, Spencer SP, et al. Imaging of Salivary Glands. Imaging. 2007;19:14-27.
3. Kukora JS, Zeiger MA, et al. The American Association of Clinical Endocrinologist and the American Association of Endocrine Surgeons Position Statement of the Diagnosis and Management of Primary Hyperparathyroidism. Endocr Pract. 2005;11:49-54.
4. Greenspan BS, Brown ML, et al. Procedure guideline for parathyroid scintigraphy. Society of Nuclear Medicine. J Nucl Med. 1998;39(6):1111-1114. http://interactive.snm.org/docs/Parathyroid_v3.0.pdf
5. Weber AL, Randolph G, et al. The thyroid and parathyroid glands. CT and MR imaging and correlation with pathology and clinical findings. Radiol Clin North Am. Sep 2000;38(5):1105-1129.
6. Gleeson M, Herbert A, et al. Management of lateral neck masses in adults. BMJ. Jun 3 2000;320(7248):1521-1524.
7. Turkington JR, Paterson A, et al. Neck masses in children. Br J Radiol. Jan 2005;78(925):75-85.
8. Schwetschenau E, Kelley DJ. The adult neck mass. Am Fam Physician. Sep 1 2002; 66(5):831-838.
9. Meir JD, Grimmer JF. Evaluation of Neck Masses in Children, Am Fam Physician, 2014; 89:353-358.
10. Wippold FJ II, Cornelius RS, Berger KL, et al, Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Neck Mass/Adenopathy. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/NeckMassAdenopathy.pdf.
11. Chang ET, Adami HO. The enigmatic epidemiology of nasopharyngeal carcinoma. Cancer Epidemiol Biomarkers Prev. Oct 2006;15(10):1765-1777.
12. Bar-Sela G, Kuten A, et al. Prevalence and relevance of EBV latency in nasopharyngeal carcinoma in Israel. J Clin Pathol. Mar 2004;57(3):290-293.
13. Scottish Intercollegiate Guidelines Network. Diagnosis and Management of Head and Neck Cancer, a National Clinical Guideline. http://www.sign.ac.uk/pdf/sign90.pdf.
14. Gilbert R, Devries-Aboud M, et al. The Management of Head and Neck Cancer in Ontario: Organizational and Clinical Practice Guideline Recommendations. 2009. http://www.guidelines.gov/content.aspx?id=24046&search=salivary+gland+tumor.
15. Pfister DG, Ang KK, Brizel D, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2013. Head and Neck Cancers. http://www.nccn.org/professionals/physician_gls/pdf/head-and-neck.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Head and Neck Cancers V2.2013. ©2013 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
16. Schwartz SR, Cohen SM, et al. Clinical practice guideline: hoarseness (dysphonia). Otolaryngol Head Neck Surg. Vol 141. 2010/02/06 ed2009. http://www.entnet.org/Practice/upload/Final-Hoarseness-Guideline-2.pdf.
17. Chin SC, Edelstein S, et al. Using CT to localize side and level of vocal cord paralysis. AJR Am J Roentgenol. Apr 2003;180(4):1165-1170.
18. Thevasasgayam MS, Pracy P. Laryngeal Trauma: a systemic approach to management. Trauma. 2005;7:87-94.
19. Zelenetz AD, Gordon Li, Wierda WG, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014 Panel Members. Non-Hodgkin's Lymphomas. http://www.nccn.org/professionals/physician_gls/pdf/nhl.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Non-Hodgkin's Lymphomas V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
20. Hoppe RT, Advani RH, Ai WZ, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014 Panel Members. Hodgkin's Lymphomas. http://www.nccn.org/professionals/physician_gls/pdf/hodgkins.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Hodgkin's Lymphomas V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
21. Lee JH, Lee HK, Lee DH, et al, Neuroimaging strategies for three types of Horner syndrome with emphasis on anatomic location, AJR, 2007; 188:W74-W81, accessed at http://www.ajronline.org/doi/pdf/10.2214/AJR.05.1588

70490, 70491, 70492 CT Soft Tissue Neck

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70496 CTA of the Head

I. Subarachnoid hemorrhage (SAH)[1-4] [One of the following]
- A. Subarachnoid hemorrhage by CT or lumbar puncture
- B. Proven subarachnoid hemorrhage with negative angiogram requiring follow up imaging

II. Proven intracerebral bleed[1,5] (hemorrhage or hematoma)
- A. CT or MRI positive for intracerebral bleed or hemorrhage or hematoma

III. Recent stroke by history[1,6]

IV. Cerebral aneurysm[1,4-14]
- A. Screening study for cerebral aneurysm [One of the following]
  1. First degree relative with history of cerebral aneurysm
  2. Two or more relatives with a history of SAH
  3. Polycystic kidney disease
  4. Multiple meningiomas
  5. Type IV Ehlers-Danlos syndrome
- B. Suspected cerebral aneurysm [One of the following]
  1. SAH or intracerebral hematoma on prior imaging
  2. Isolated cranial nerve (CN) deficit
- C. Known cerebral aneurysm documented by CTA, MRA or angiography [One of the following]
  1. Follow-up after intervention (embolization or surgery)
     a. Shortly after an interventional procedure (i.e., surgery or embolization)
     b. Every 6 months after embolization
     c. Untreated, unruptured intracerebral aneurysms image at 6-12 month intervals
  2. New or worsening clinical findings [One of the following]
     a. Motor weakness affecting a limb, or one side of the face or body
     b. Decreased sensation affecting a limb, or one side of the face or body
     c. Acute ataxia (unsteady and clumsy motion of the limbs or trunk)
     d. Confusion including memory loss and disorientation
     e. Impaired vision, including amaurosis fugax, visual field loss and diplopia
     f. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
     g. Dysarthria (speech disorder resulting from neurological injury)
     h. Dysphagia with no GI cause
     i. Vertigo with either headache or nystagmus
     j. Numbness, tingling, paresthesias
     k. Decreased level of consciousness
     l. Papilledema
     m. Stiff neck
     n. New onset of severe headache
     o. Drowsiness

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p. New onset of vomiting
q. Nystagmus
r. Cranial nerve palsy
s. Gait disturbance
t. Personality or behavioral changes
u. New seizure
v. Hearing loss or new onset tinnitus
w. Agitation
x. Somnolence
y. Slow response to verbal communication

3. Interval evaluation for stability in an asymptomatic individual
   a. Aneurysm 5mm or less annually for up to 5 years and then every other year or
   b. Aneurysm more than 5 mm every 6 months for up to 5 years and then annually

D. Neurofibromatosis
E. Visual field loss
F. Thunderclap headache
G. Exertional headache
H. Preoperative planning for cerebral aneurysm management (surgical or interventional)

V. Pre-operative study, carotid endarterectomy planned[1] [One of the following]

A. Asymptomatic patient with carotid stenosis of 60% or more by carotid duplex US
B. Symptomatic carotid stenosis with carotid duplex US showing 60% stenosis or
C. Carotid duplex US showing ulcerated plaque

VI. Abrupt onset of a neurologic deficit – including stroke and TIA[1,6] [One of the following]

A. Motor weakness affecting a limb, or one side of the face or body
B. Decreased sensation affecting a limb, or one side of the face or body
C. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
D. Confusion including memory loss and disorientation
E. Impaired vision, including amaurosis fugax, visual field loss and diplopia
F. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
G. Dysarthria (speech disorder resulting from neurological injury)
H. Dysphagia with no GI cause
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Q. Nystagmus
R. Cranial nerve palsy
S. Gait disturbance

T. Personality or behavioral changes
U. New seizure
V. Hearing loss or new onset tinnitus
W. Agitation
X. Somnolence
Y. Slow response to verbal communication
Z. Sudden falls
AA. Balance problems

VII. AVM (arteriovenous malformation)[15] [One of the following]

A. Known AVM documented by CTA, MRA, MRI, catheter angiogram [One of the following]
   1. Immediate follow-up after a therapeutic procedure (i.e., surgery, embolization, radiosurgery)
   2. Routine follow up after a therapeutic procedure
   3. New or worsening clinical findings
      a. Motor weakness affecting a limb, or one side of the face or body
      b. Decreased sensation affecting a limb, or one side of the face or body
      c. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
      d. Confusion including memory loss and disorientation
      e. Impaired vision, including amaurosis fugax, visual field loss and diplopia
      f. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
      g. Dysarthria (speech disorder resulting from neurological injury)
      h. Dysphagia with no GI cause
      i. Vertigo with either headache or nystagmus
      j. Numbness, tingling, paresthesias
      k. Decreased level of consciousness
      l. Papilledema
      m. Stiff neck
      n. New onset of severe headache
      o. Drowsiness
      p. New onset of vomiting
      q. Nystagmus
      r. Cranial nerve palsy
      s. Gait disturbance
      t. Personality or behavioral changes
      u. New seizure
      v. Hearing loss or new onset tinnitus
      w. Agitation
      x. Somnolence
      y. Slow response to verbal communication
      z. Sudden falls
      aa. Balance problems
   4. Planning of intervention (surgical or interventional)
B. Suspected AVM [One of the following]
   1. Severe unexplained headache (thunderclap headache)
   2. Altered level of consciousness

3. Focal neurologic findings
    a. Motor weakness affecting a limb, or one side of the face or body
    b. Decreased sensation affecting a limb, or one side of the face or body
    c. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
    d. Confusion including memory loss and disorientation
    e. Impaired vision, including amaurosis fugax, visual field loss and diplopia
    f. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
    g. Dysarthria (speech disorder resulting from neurological injury)
    h. Dysphagia with no GI cause
    i. Vertigo with either headache or nystagmus
    j. Numbness, tingling, paresthesias
    k. Decreased level of consciousness
    l. Papilledema
    m. Stiff neck
    n. New onset of severe headache
    o. Drowsiness
    p. New onset of vomiting
    q. Nystagmus
    r. Cranial nerve palsy
    s. Gait disturbance
    t. Personality or behavioral changes
    u. New seizure
    v. Hearing loss or new onset tinnitus
    w. Agitation
    x. Somnolence
    y. Slow response to verbal communication
    z. Sudden falls
    aa. Balance problems
4. Subarachnoid hemorrhage on recent CT or MRI of the brain
5. Subarachnoid hemorrhage on lumbar puncture
6. Intracerebral bleed or hematoma, or hemorrhage on prior CT or MRI of the brain

VIII. Suspected cerebral venous thrombosis[16-21] [Both symptoms and risk factors] (MRA, MRI)

A. Symptoms [One of the following]
    1. Papilledema
    2. Headaches
    3. Mental status changes
    4. Vomiting
    5. Changes in vision
    6. Seizures
    7. Lethargy or coma
    8. Alternating focal neurological deficits
    9. Hemiparesis or paraparesis
B. Risk factors [One of the following]

1. Postpartum
2. Post-operative status
3. Skull fracture over dural sinus
4. Calvarial mass
5. Meningitis, sinusitis or middle ear infections
6. Hypercoagulable state [One of the following]
    a. Personal history of cancer
    b. Factor V Leiden mutation
    c. MTHFR
    d. SLE
    e. Sickle cell disease
    f. Contraceptive medications
    g. Protein C deficiency
    h. Protein S deficiency
    i. Antiphospholipid antibodies
    j. Elevated lipoprotein (a)
    k. Elevated platelet count
    l. Prothrombin 20210 gene mutation
    m. Antithrombin III deficiency
7. Ear, sinus, face, mouth or neck infection
8. Brain tumor by history

IX. Evaluation of tinnitus[22] (ringing, hissing, buzzing, roaring, clicking, or rough sounds heard by patient)

X. Vasculitis including temporal arteritis[23-27] [Both of the following]

A. Clinical presentation [One of the following]
    1. Headache
    2. Seizures
    3. Focal neurologic deficit
    4. Altered level of consciousness
    5. Altered mood or personality
    6. Autoimmune disease such as but not limited to [One of the following]
        a. Systemic lupus erythematosus (SLE)
        b. Polyarteritis nodosa
        c. Giant cell arteritis or temporal arteritis with temporal tenderness
        d. Sjögren's syndrome
        e. Behçet's syndrome
        f. Dermatomyositis
B. Laboratory tests [One of the following]
    1. ESR >55 mm/hr
    2. C-reactive protein >10 mg/L
    3. ANA positive
    4. Anticardiolipin antibodies positive

XI. Unilateral headache with suspicion of carotid or vertebral dissection or unilateral Horner's syndrome[27] (CTA or MRA or MRI) [One of the following]

A. Neck pain
B. Unilateral facial or orbital pain
C. Unilateral headaches
D. Horner's syndrome, miosis and ptosis (contraction of the iris, drooping eyelid) or
E. Transient ischemic attacks (TIA)
F. Minor neck trauma
G. Rapid onset of headache with strenuous exercise or Valsalva maneuver
H. Closed head injury

References:

1. DeLaPaz RL, Wippold FJ II, Cornelius RS, et al. Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Cerebrovascular Disease. J Am Coll Radiol. 2011;8(8):532-538. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/CerebrovascularDisease.pdf.
2. Colen TW, Wang LC, Ghodke BV, et al. Effectiveness of MDCT angiography for the detection of intracranial aneurysms in patients with nontraumatic subarachnoid hemorrhage, AJR, 2007; 89:898-903.
3. Teasdale GM, Wardlaw JM, White PM, et al. on behalf of the Davie Cooper Scottish Aneurysm Study Group. The familial risk of subarachnoid hemorrhage, Brain, 2005; 128: 1677-1685.
4. Connolly ES Jr., Rabinstein AA, Carhuapoma R, et al. Guidelines for the Management of Aneurysmal Subarachnoid Hemorrhage: A Guideline for Healthcare Professionals from the American Heart Association/American Stroke Association, Stroke, 2012; 43. http://stroke.ahajournals.org/content/early/2012/05/03/STR.0b013e3182587839.full.pdf+html.
5. Morgenstern LB, Hemphill C III, Anderson C, et al. Guidelines for the Management of Spontaneous Intracerebral Hemorrhage: A Guideline for Healthcare Professionals from the American Heart Association/American Stroke Association, Stroke, 2010; 41:2108-2129. http://stroke.ahajournals.org/content/41/9/2108.full.pdf+html.
6. Wippold FJ II, Cornelius RS, Aiken AJ, et al. Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Focal Neurologic Deficit. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/FocalNeurologicDeficit.pdf.
7. Chapman AB, Rubinstein D, Hughes R, et al. Intracranial aneurysms in autosomal dominant polycystic kidney disease, N Engl J Med, 1992; 327: 916-920.
8. Juvela S, Porras M, Heiskanen O. Natural history of unruptured intracranial aneurysms: a long-term follow-up study, J Neurosurg, 1993; 79:174-182.
9. Wermer MJH, Rinkel GJE, van Gijn J. Repeated screening for intracranial aneurysms in familial subarachnoid hemorrhage, Stroke, 2003; 34:2788-2791.
10. Bederson JB, Connolly ES, Batjer HH, et al. Guidelines for the management of aneurysmal subarachnoid hemorrhage: a statement for healthcare professions form a special writing group of the stroke council, American Heart Association, accessed at http://stroke.ahajournals.org/content/40/3/994.full.pdf.
11. Wiebers DO. Patients with small, asymptomatic, unruptured intracranial aneurysms and no history of subarachnoid hemorrhage should generally be treated conservatively, Stroke, 2005; 36:408-409.
12. Wiebers DO, Whisnant JP, Huston J III, et al. Unruptured intracranial aneurysms: natural history, clinical outcome and risks of surgical and endovascular treatment, Lancet 2003; 362:103-110.
13. Wermer MJH, van der Schaaf IC, Velthuis BK, et al. Yield of short-term follow-up CT/MR angiography for small aneurysms detected at screening, Stroke, 2006; 37:414-418
14. Villablanca JP, Duckwiler GR, Jahan R, et al. Natural history of asymptomatic unruptured cerebral aneurysms evaluated at CT angiography: Growth and rupture incidence and correlation with epidemiologic risk factors, Rad., 2013; 269:258-265.
15. Al-Shahi R, Warlow C. A systematic review of the frequency and prognosis of arteriovenous malformations of the brain in adults, Brain, 2001; 124:1900-1926.
16. Idbaih A, Boukobza M, Crassard I, et al. MRI of clot in cerebral venous thrombosis: high diagnostic value of susceptibility-weighted images. Stroke. Apr 2006; 37(4):991-995.
17. Selim M, Fink J, Linfante I, et al. Diagnosis of cerebral venous thrombosis with echo-planar T2*-weighted magnetic resonance imaging. Arch Neurol. Jun 2002; 59(6):1021-1026.
18. Sebire G, Tabarki B, Saunders DE, et al. Cerebral venous sinus thrombosis in children: risk factors, presentation, diagnosis and outcome, Brain, 2005; 128:477-489.
19. Leach JL, Fortuna RB, Jones BV, et al. Imaging of cerebral venous thrombosis: current techniques, spectrum of findings, and diagnostic pitfalls, RadioGraphics, 2006; 26:S19-S43.
20. Einhaupl K, Bousser MG, de Bruijn SFTM, et al. EFNS guideline on the treatment of cerebral venous and sinus thrombosis, Eur J Neurol, 2006; 13:553-559.

21. Saposnik G, Barinagarrementeria F, Brown RD Jr., et al. Diagnosis and management of cerebral venous thrombosis: A statement for Healthcare Professionals from the American Heart Association /American Stroke Association, Stroke, 2011; 42:1158-1192. http://stroke.ahajournals.org/content/42/4/1158.full.pdf+html.
22. Lockwood AH, Salvi RJ, Burkard RF. Tinnitus, N Engl J Med, 2002; 347: 904-910.
23. Roane DW, Griger DR. An approach to diagnosis and initial management of systemic vasculitis, American Family Physician, 1999; 60:1421-1430.
24. Aviv RI, Benseler SM, Silverman SM, et al. MR imaging and angiography of primary CNS vasculitis of childhood, AJNR, 2006; 27:192-199.
25. Pomper MG, Miller TJ, Stone JH, et al. CNS vasculitis in autoimmune disease: MR imaging findings and correlation with angiography, AJNR, 1999; 20:75-85.
26. Benseler S, Schneider R. Central nervous system vasculitis in children, Curr Opin Rheum, 2004; 16:43-50.
27. Douglas AC, Wippold FJ II, Broderick DF, et al, Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Headache. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Headache.pdf.

70496 CTA of the Head

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Medical Advisory Committee reviewed and approved: 4/29/14, 6/12/13, 9/19/12, 4/4/12, 9/21/11

70498 CTA of the Carotid and Vertebral Arteries

I. Suspected carotid stenosis[1-6] [One of the following]

A. TIA or stroke (See II below)
B. Findings on carotid duplex examination [One of the following]
   1. 60% stenosis or more
   2. Carotid duplex US showing ulcerated plaque
   3. Carotid occlusion
   4. Technically inadequate/equivocal carotid Doppler
C. Carotid endarterectomy planned
D. Duplex carotid ultrasound demonstrating [One of the following]
   1. Stenosis of 60% or more
   2. Ulcerated plaque on carotid duplex

II. Abrupt onset of a neurologic deficit – including stroke and TIA[1,6] [One of the following]

A. Motor weakness affecting a limb, or one side of the face or body
B. Decreased sensation affecting a limb, or one side of the face or body
C. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
D. Confusion including memory loss and disorientation
E. Impaired vision, including amaurosis fugax, visual field loss and diplopia
F. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
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Q. Nystagmus
R. Cranial nerve palsy
S. Gait disturbance
T. Personality or behavioral changes
U. New seizure
V. Hearing loss or new onset tinnitus
W. Agitation
X. Somnolence
Y. Slow response to verbal communication
Z. Sudden falls

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AA. Balance problems

III. Suspected traumatic or spontaneous carotid or vertebral dissection or unilateral Horner's syndrome[6-12] [One of the following]
- A. Neck pain or
- B. Unilateral facial or orbital pain or
- C. Unilateral headaches or
- D. Horner's syndrome, miosis and ptosis (contraction of the iris, drooping eyelid) or
- E. Transient ischemic attacks (TIA see II above) or
- F. Cranial nerve palsy or
- G. New onset of stroke or
- H. Minor neck trauma
- I. Closed head injury

IV. Carotid body tumor[13-15] [Both of the following]
- A. Carotid ultrasound demonstrating a solid mass at the carotid bifurcation and
- B. Preoperative surgical planning

V. Pre-operative evaluation of neck tumor for vascular invasion[16]
- A. CT or MRI of the neck demonstrating a mass close to the carotid artery
- B. Pulsatile neck mass

VI. Subclavian steal[6]
- A. Asymmetric blood pressure and pulses in the arms
- B. Exercise induced arm pain
- C. Duplex ultrasound demonstrating reversed flow in the vertebral artery
- D. Vertebrobasilar insufficiency
  1. Light-headedness
  2. Dizziness
  3. Ataxia
  4. Vertigo
  5. Visual complaints such as diplopia or blurred vision
  6. Confusion
  7. Syncope
  8. Motor deficits
  9. Tinnitus

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References:

1. De La Paz RL, Wippold FJ II, Cornelius RS, et al, Expert Panel on Neurologic Imaging, American College of Radiology. ACR Appropriateness Criteria – Cerebrovascular Disease. J Am Coll Radiol. 2011;8(8):532-538. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/CerebrovascularDisease.pdf.
2. Verro P, Tanenbaum LN, et al. CT angiography in acute ischemic stroke: preliminary results. Stroke. Jan 2002;33(1):276-278.
3. Anderson GB, Ashforth R, et al. CT angiography for the detection and characterization of carotid artery bifurcation disease. Stroke. Sep 2000;31(9):2168-2174.
4. Moore WS, Barnett HJ, et al. Guidelines for carotid endarterectomy. A multidisciplinary consensus statement from the Ad Hoc Committee, American Heart Association. Circulation. Jan 15 1995;91(2):566-579.
5. Toole JF, Howard VJ, et al. Study Design for Randomized Prospective Trial of Carotid Endarterectomy for Asymptomatic Atherosclerosis. The Asymptomatic Carotid Atherosclerosis Study Group. Stroke. 1989;20:844-849.
6. Sturzenegger M. Spontaneous internal carotid artery dissection: early diagnosis and management in 44 patients. J Neurol. Mar 1995;242(4):231-238.
7. Brott TG, Halperin JL, Abbara S, et al. 2011 ASA/ACCF/AHA/AANN/AANS/ACR/ASNR/CNS/SAIP/SCAI/SIR/SNIS/SVM?SVS Guideline on the management of patients with extracranial carotid and vertebral artery disease: executive summary. http://jnis.bmj.com/site/about/ECVDES6-Final.pdf.
8. Sturzenegger M, Spontaneous internal carotid artery dissection: early diagnosis and management in 44 patients. J Neurol. Mar 1995; 242(4):231-238.
9. Ozdoba C, Sturzenegger M, et al. Internal carotid artery dissection: MR imaging features and clinical-radiologic correlation. Radiology. Apr 1996;199(1):191-198.
10. Schievink WI. Spontaneous dissection of the carotid and vertebral arteries. N Engl J Med. Mar 22 2001;344(12):898-906.
11. Schievink WI, Mokri B, et al. Internal carotid artery dissection in a community. Rochester, Minnesota, 1987-1992. Stroke. Nov 1993;24(11):1678-1680.
12. Douglas AC, Wippold FJ II, Broderick DF, et al, Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Headache. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Headache.pdf.
13. Davis PC, Wippold FJ II, Cornelius RS, et al, Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Head Trauma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/HeadTrauma.pdf.
14. Van den Berg R, Verbist BM, Mertens BJ, et al. Head and neck paragangliomas: improved tumor detection using contrast-enhanced 3D time-of-flight MR angiography as compared with fat-suppressed MR imaging techniques. AJNR Am J Neuroradiol. May 2004;25(5):863-870.
15. Arslan H, Unal O, Kutluhan A, et al. Power Doppler scanning in the diagnosis of carotid body tumors. J Ultrasound Med. Jun 2000;19(6):367-370.
16. Colletti PM, Terk MR, Zee CS. Magnetic resonance angiography in neck masses. Comput Med Imaging Graph. Sep-Oct.

70498 CT of the Carotid and Vertebral Arteries

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70540 MRI Orbit, Face, Neck without Gadolinium
70542 MRI Orbit, Face, Neck with Gadolinium
70543 MRI Orbit, Face, Neck without and with Gadolinium

I. Salivary gland pathology[1,2] (For cancer of the salivary gland, see VI below) [One of the following]

A. Follow up of known salivary gland tumor
   1. See VI below
B. Lateral facial swelling or mass
C. Submandibular mass or swelling

II. Parathyroid pathology[3-5] [One of the following]

A. Hyperparathyroidism [One of the following]
   1. Ca >normal [>10.6 mg/dL or 2.7 mmol/L]
   2. PTH ≥normal [≥55 pg/mL or 5.8 pmol/L]
B. Biopsy proven malignancy
   1. Initial staging

III. Neck mass other than thyroid[6-9] [One of the following]

A. Solitary neck mass (with or without fever; pulsatile or non pulsatile)
B. Multiple neck masses
C. Personal history of cancer with a new neck mass
D. Children: any mass detected by physical examination and other imaging not diagnostic (including but not limited to possible thyroglossal duct cyst, branchial cleft cyst, dermoid cyst, AVM, hemangioma)
E. Fine needle aspiration consistent with metastatic disease (carcinoma, sarcoma) or lymphoma
F. Suspected congenital neck mass [One of the following]
   1. Thyroglossal duct cyst with a non diagnostic ultrasound
   2. Brachial cleft cyst
   3. Lymphangioma
   4. Thymic cyst
G. Neck abscess with pain and swelling at the site of concern [One of the following]
   1. Aural temperature >38.3°C or >100.9°F
   2. Leukocytosis, WBC >11,500/cu.mm

IV. Suspected orbital tumor or other pathology[10] [One of the following]

Orbital tumors include but are not limited to the following

Optic nerve glioma
Orbital meningioma
Hemangioma
Lymphangioma
Neurofibroma
Sarcoma

Melanoma
Metastatic disease

A. Unilateral exophthalmos or enophthalmos or bulging of the eyeball
B. Orbital or periorbital mass or vascular malformation
C. Adult with sudden vision loss
D. Proptosis
E. Uveitis, scleritis and vision loss
F. Head injury with visual loss
G. Optic atrophy
H. Orbital cellulitis
I. Optic neuritis (gadolinium suggested) [One of the following]
    1. Vision loss in one eye with known MS
    2. Eye pain worsening with movement of the eye
    3. Visual field deficit which is mostly central
    4. Examination of the eye [One of the following]
        a. Swelling of the optic disc
        b. Blurring of disc margins
        c. Distended veins
    5. Loss of color vision
J. Proptosis in a child with orbital asymmetry and visual loss
K. Progressive visual loss in a child
L. Post-operative evaluation
M. Pre-operative evaluation
N. Papilledema
O. Orbital tumor [One of the following]
    1. Melanoma
    2. Retinoblastoma
    3. Lymphoma
    4. Hemangioma
    5. Optic nerve glioma
    6. Orbital meningioma
    7. Orbital sarcoma
    8. Metastases
P. Leukorrhea
Q. Ophthalmoplegia (weakness of one or more of the muscles that control eye movement)

V. Suspected nasopharyngeal tumor[11-15] (For known cancer, see VI below) [One of the following]

A. Symptoms [One of the following]
    1. Epistaxis
    2. Recurrent sinusitis after appropriate antibiotic therapy
B. Clinical findings [One of the following]
    1. Nasal obstruction
    2. Positive endoscopy
    3. Serous otitis media with hearing loss and otalgia
    4. Epstein-Barr virus (EBV) infection with positive titers

5. Posterior (level V) neck node or mass
6. Cranial nerve involvement (is indicative of skull base extension and advanced disease)

VI. Head and neck cancer[11-14] (MRI) [One of the following]

Includes but not limited to:
Cancer of the arytenoid cartilage
Cancer of the epiglottis
Cancer of the hard palate
Cancer of the infraglottic region
Cancer of the larynx
Cancer of the oral cavity
Cancer of the paranasal sinuses
Cancer of the pharynx
Cancer of the salivary gland(s)
Cancer of the soft palate
Cancer of the supraglottic region
Cancer of the tongue
Cancer of the tonsils
Cancer of the vocal cord(s)
Mucosal melanoma

*Thyroid and parathyroid cancers do not fall into this category.

A. Cervical lymph node biopsy consistent with head and neck malignancy but no known primary
B. Initial staging of new diagnosis of head and neck cancer confirmed by biopsy (For initial staging, CT as well as PET/CT may be needed)
C. Deteriorating clinical condition with known head and neck cancer such as but not limited to new neck mass including new nodes, new hoarseness, weight loss, bleeding, dysphagia
D. New evidence of cranial nerve involvement
E. Post treatment imaging of the primary tumor and neck if treated should be performed within 6 months of completion of treatment
F. Further reimaging of asymptomatic individuals is not recommended

VII. Airway compromise by neck mass

A. Evidence of upper airway obstruction on pulmonary function testing
   1. Known neck mass
   2. Enlarged thyroid

VIII. Neck abscess

A. Aural temperature >38.3°C or >100.9°F
B. Leukocytosis, WBC >11,500/cu.mm
C. Pain and swelling at site

IX. Vocal cord paralysis or hoarseness (dysphonia)[16,17] (For follow up of cancer, see VI above) (Imaging should not be performed prior to laryngoscopy) [One of the following]

A. Unexplained vocal cord paralysis found on laryngoscopy
B. Mass or lesion on the vocal cord found on laryngoscopy
C. Injury to the recurrent laryngeal nerve [One of the following]
    1. Prior cervical spine surgery
    2. Prior thyroid surgery
    3. Prior esophageal cancer surgery
    4. Prior carotid endarterectomy
    5. Left hilar lung mass
    6. Left pneumonectomy

X. Brachial plexus[18,19] [One of the following]

A. Brachial plexus injury [Both symptoms and appropriate history]
    1. Symptoms [One of the following]
        a. Weakness or paralysis of the upper extremity
        b. Sensory loss or numbness of the upper extremity
        c. Horner's syndrome
        d. Shoulder and/or arm pain
        e. Burning or electric sensation in more than one nerve distribution
        f. Loss of deep tendon reflexes in the upper extremity
        g. EMG showing a neurogenic lesion in muscles supplied by at least 2 cervical levels
    2. History [One of the following]
        a. Trauma including birth trauma, motor vehicle accident, falls, sports injuries, gunshot injury, overuse of back packs
        b. Radiation fibrosis
        c. History of radiation therapy to the chest, breast or axilla
B. Primary or metastatic tumor [Both symptoms and appropriate history]
    1. Symptoms [One of the following]
        a. Weakness or paralysis of the upper extremity
        b. Sensory loss or numbness of the upper extremity
        c. Horner's syndrome
        d. Shoulder, axiliary and/or arm pain
        e. Burning or electric sensation in more than one nerve distribution
        f. Loss of deep tendon reflexes in the upper extremity
        g. EMG showing a neurogenic lesion in muscles supplied by at least 2 cervical levels
    2. History [One of the following]
        a. Any known primary tumor
        b. Lung cancer especially a Pancoast tumor
        c. Lymphoma
C. Schwannoma or neurofibroma
    1. Symptoms [One of the following]
        a. Palpable mass in the lower neck or supraclavicular fossa
        b. Weakness or paralysis of the upper extremity
        c. Sensory loss or numbness in the upper extremity
        d. Horner's syndrome
        e. Shoulder and/or arm pain
        f. Burning or electric sensation in more than one nerve distribution
        g. Loss of deep tendon reflexes in the upper extremity

h. EMG showing a neurogenic lesion in muscles supplied by at least 2 cervical levels

D. Entrapment
1. Symptoms [One of the following]
a. Pain and paresthesia along the ulna aspect of the forearm, hand and 4th and 5th fingers
b. Symptoms increase with overhead activities

XI. Proptosis[10] (or exophthalmos)

A. Orbital asymmetry in a child with visual loss
B. Adult with painful visual loss

XII. Thyroid ophthalmopathy or thyroid eye disease and history of Graves' disease[10] (This may be seen in hyperthyroid, hypothyroid or euthyroid individuals)

XIII. Visual field deficit (MRI)

A. Bitemporal hemianopsia (loss of peripheral vision)
B. Homonymous hemianopsia (loss of vision in the nose half of one eye and the outer half of the other eye)
C. Scotoma (loss of central vision)
D. Heteronymous hemianopsia (loss of vision in either the nose half or the outer half of both eyes)

XIV. Thyroid mass with an enlarged thyroid gland on a nuclear scan and ultrasound that is incomplete or cannot demonstrate complete substernal extension

XV. Bell's palsy[20] [One of the following]

A. No improvement in facial paresis after one month
B. Hearing loss
C. Multiple cranial nerve deficits
D. Weakness or sensory loss in an extremity

XVI. Hearing loss[21] [One of the following]

A. Suspected cholesteatoma with conductive hearing loss documented on an audiogram [One of the following]
1. Acute and intermittent vertigo
2. Painless otorrhea
3. Purulent drainage from the ear or mastoid area
4. Purulent drainage and granulation tissue in the ear
B. Conductive hearing loss documented on an audiogram
C. Total deafness and planning for possible cochlear implant
D. Fluctuating hearing loss
E. Glomus tumor and reddish blue mass in the ear
F. Sensorineural hearing loss on recent audiogram (MRI of the head without and with contrast)
G. Mixed conductive and sensorineural hearing loss on recent audiogram

XVII. Deviation of the trachea on chest x-ray

XVIII. Otalgia with a normal ear examination[22]

XIX. Vision loss[10]

A. Acute sudden loss of vision
B. Proptosis and painful loss of vision
C. Uveitis, scleritis and vision loss
D. Ophthalmoplegia
E. Child with orbital asymmetry, proptosis and loss of vision
F. Child with slowly progressive loss of vision

XX. Optic neuritis[23-26] [One of the following]

A. Eye pain worsening with movement of the eye
B. Visual field deficit which is mostly central (scotoma)
C. Visual loss in one eye with known MS
D. Examination of the eye [All of the following]
    1. Swelling of the optic disc and
    2. Blurring of disc margins and
    3. Distended veins
E. Suspicion of multiple sclerosis [One of the following]
    1. Pain on eye movement or tenderness of globe
    2. Impaired color perception
    3. Unilateral rapid visual loss
    4. Visual loss Improves spontaneously
F. Post radiation neuritis, visual loss months or years after radiation therapy to area

XXI. Headache of the skull base, orbits or periorbital area[27]

References:

1. Browne RF, Golding SJ, et al. The role of MRI in facial swelling due to presumed salivary gland disease. Br J Radiol. Feb 2001; 74(878):127-133.
2. Liyanage SH, Spencer SP, et al. Imaging of Salivary Glands. Imaging. 2007; 19:14-27.
3. Kukora JS, Zeiger MA, et al. The American Association of Clinical Endocrinologist and the American Association of Endocrine Surgeons Position Statement of the Diagnosis and Management of Primary Hyperparathyroidism. Endocr Pract. 2005; 11:49-54.
4. Greenspan BS, Brown ML, et al. Procedure guideline for parathyroid scintigraphy. Society of Nuclear Medicine. J Nucl Med. 1998; 39(6):1111-1114. http://interactive.snm.org/docs/Parathyroid_v3.0.pdf.
5. Weber AL, Randolph G, et al. The thyroid and parathyroid glands. CT and MR imaging and correlation with pathology and clinical findings. Radiol Clin North Am. Sep 2000; 38(5):1105-1129.
6. Gleeson M, Herbert A, et al. Management of lateral neck masses in adults. BMJ. Jun 3 2000; 320(7248):1521-1524.
7. Schwetschenau E, Kelley DJ. The adult neck mass. Am Fam Physician. Sep 1 2002; 66(5):831-838.
8. Meir JD, Grimmer JF. Evaluation of neck masses in children Am Fam Physician, 2014; 89:353-358.
9. Wippold FJ II, Cornelius RS, Berger KL, et al, Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Neck Mass/Adenopathy. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/NeckMassAdenopathy.pdf.
10. Wippold FJ II, Cornelius RS, Berger KL, et al, Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Orbits, Vision and Visual Loss. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/OrbitsVisionAndVisualLoss.pdf.
11. Chang ET, Adami HO. The enigmatic epidemiology of nasopharyngeal carcinoma. Cancer Epidemiol Biomarkers Prev. Oct 2006; 15(10):1765-1777.
12. Bar-sela G, Kuten A, et al. Prevalence and relevance of EBV latency in nasopharyngeal carcinoma in Israel. J Clin Pathol. Mar 2004; 57(3):290-293.
13. Scottish Intercollegiate Guidelines Network. Diagnosis and Management of Head and Neck Cancer, a National Clinical Guideline. http://www.sign.ac.uk/pdf/sign90.pdf.
14. Pfister DG, Spencer S, Brizel DM , et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Head and Neck Cancers. http://www.nccn.org/professionals/physician_gls/pdf/head-and-neck.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Head and Neck Cancers V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
15. Cornelius RS, Martin J, Wippold FJ II, et al, Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Sinonasal Disease. http://www.acr.org/~/media/8172B4DE503149248E64856857674BB5.pdf.
16. Schwartz SR, Cohen SM, Dailey SH, et al. Clinical practice guideline: Hoarseness (Dysphonia). Otolaryngol Head Neck Surg. Vol 141, September 2009. http://www.entnet.org/Practice/upload/Final-Hoarseness-Guideline-2.pdf.
17. Chin SC, Edelstein S, et al. Using CT to localize side and level of vocal cord paralysis. AJR Am J Roentgenol. Apr 2003; 180(4):1165-1170.
18. Wippold FJ II, Miller-Thomas MM, et al, Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Plexopathy. 2006. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Plexopathy.pdf.
19. Bromberg M. Brachial plexus syndromes, UpToDate. http://www.uptodate.com/contents/brachial-plexus-syndromes.
20. Ahmed A. When is facial paralysis Bell palsy? Current diagnosis and treatment. Cleve Clin J Med. 2005; 72(5):398-401, 405. http://www.ccjm.org/content/72/5/398.full.pdf+html.
21. Angtuaco EJ, Wippold FJ II, Cornelius RS, et al. Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Hearing Loss and/or Vertigo. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/HearingLossVertigo.pdf.
22. Ely JW, Hansen MR, et al. Diagnosis of ear pain. Am Fam Physician. 2008; 77(5):621-628. http://www.aafp.org/afp/2008/0301/p621.html.
23. Beck RW, Arrington J, Murtagh FR, et al. Brain magnetic resonance imaging in acute optic neuritis. Experience of the Optic Neuritis Study Group. Arch Neurol. Aug 1993; 50(8):841-846.
24. Miller DH, Newton MR, van der Poel JC, et al. Magnetic resonance imaging of the optic nerve in optic neuritis. Neurology. Feb 1988; 38(2):175-179.
25. Lee AG, Lin DJ, Kaufman M, et al. Atypical features prompting neuroimaging in acute optic neuropathy in adults. Can J Ophthalmol. Oct 2000; 35(6):325-330.
26. Balcer LJ. Clinical practice. Optic neuritis. N Engl J Med. Mar 23 2006;354(12):1273-1280.
27. Douglas AC, Wippold FJ II, Broderick DF, et al, Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Headache. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Headache.pdf.

70540, 70542, 70543 MRI Orbit, Face, Neck

Clinical criteria reviewed/revised: 9/22/14, 11/20/13, 9/17/13, 6/19/13, 5/18/13, 3/1/13, 7/10/12, 2/2/12, 9/27/11, 11/17/10, 5/26/10, 11/18/09
Medical Advisory Committee reviewed and approved: 10/1/14, 4/29/14, 12/16/13, 9/18/13, 9/19/12, 7/10/12, 9/21/11

70544 MRA or MRV of the Brain without Gadolinium
70545 MRA or MRV of the Brain with Gadolinium
70546 MRA or MRV of the Brain without and with Gadolinium

MEDICARE

I. Subarachnoid hemorrhage (SAH)

II. Proven intracerebral bleed on CT or MRI (hemorrhage or hematoma)

III. Recent stroke by history

IV. Cerebral aneurysm

V. Preoperative evaluation of a brain tumor

VI. Preoperative study, carotid endarterectomy planned

VII. Abrupt onset of a neurologic deficit (vascular occlusion or thrombosis) – including stroke and TIA

VIII. AVM (arteriovenous malformation)

IX. Suspected cerebral venous thrombosis

X. Evaluation of tinnitus (ringing, hissing, buzzing, roaring, clicking, or rough sounds heard by patient)

XI. Vasculitis

Reference:

1. National Coverage Determination (NCD) for Magnetic Resonance Imaging (220.2). : http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&KeyWord=magnetic+resonance+imaging&KeyWordLookUp=Title&KeyWordSearchType=Exact&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.

70547 MRA or MRV Carotid and Vertebral Arteries without Gadolinium
70548 MRA or MRV Carotid and Vertebral Arteries with Gadolinium
70549 MRA or MRV Carotid and Vertebral Arteries without and with Gadolinium

MEDICARE

I. Suspected carotid stenosis

II. Abrupt onset of a neurologic deficit – including stroke and TIA

III. Suspected traumatic or spontaneous carotid dissection

References:

1. National Coverage Determination (NCD) for Magnetic Resonance Imaging (220.2). Centers for Medicare & Medicaid Services. http://cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=National&NCSelection=NCD&KeyWord=Magnetic+Resonance+Imaging&KeyWordLookUp=Title&KeyWordSearchType=Exact&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.

70547, 70548, 70549 MRA or MRV Carotid and Vertebral Arteries: MEDICARE

Clinical criteria reviewed/revised: 3/11/14, 5/14/13, 3/7/13, 3/5/13
Medical Advisory Committee reviewed and approved: 4/29/14, 9/18/13

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70551 MRI Brain without Gadolinium
70552 MRI Brain with Gadolinium
70553 MRI Brain without and with Gadolinium

I. Suspected pseudotumor cerebri or benign idiopathic intracranial hypertension[1-2]

A. Clinical finding
   1. Symptoms or findings on exam [One of the following]
      a. Headache
      b. Visual disturbances or complete loss of vision, which may be transient
      c. Flashing lights
      d. Diplopia
      e. Loss of vision
      f. Blurred vision
      g. Level of consciousness may be impaired
      h. Nausea and/or vomiting
      i. Tinnitus (pulsatile) or ringing in the ears
      j. Papilledema
      k. Enlargement blind spots
      l. Abducens palsy (inability to deviate the eye laterally)

II. Seizure[3-6] [One of the following]

A. Refractory seizures
B. Surgical candidate or preop planning
C. New onset of seizures unrelated to trauma with alcohol use (only if MRI is contraindicated or not available)
D. New onset of seizures unrelated to trauma with drug use (only if MRI is contraindicated or not available)
E. New-onset seizure unrelated to trauma age 18-40 (only if MRI is contraindicated or not available; MRI without contrast)
F. New-onset seizure unrelated to trauma age 18-40 (MRI without and with contrast)
G. New onset of seizure unrelated to trauma older than age 40 (MRI without and with contrast)
H. New onset of seizure with a focal neurologic deficit not related to trauma
I. New onset of seizures older than 18 following acute trauma (CT)
J. New onset seizure older than 18 post subacute or chronic trauma
K. Partial seizures (MRI without contrast)
L. Epilepsy
M. Suspected neuroectodermal dysplasia
N. Suspicion of migration anomalies or other morphologic brain abnormalities in children
O. Suspicion of cortical dysplasia
P. Partial seizures

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III. CNS infection (meningitis/encephalitis) or abscess with evidence of infection and neurologic complaints or findings or follow up of known cerebral infection[7-10] [(Both A and B for new infection) or C or D or E or F]

A. Findings suggesting infection [One of the following]
   1. Aural temperature >38.3°C or 100.9°F
   2. Leukocytosis, WBC >11,500/cu.mm
   3. Known infection elsewhere
   4. Immunocompromised patient

B. Other clinical findings [One of the following]
   1. Headache
   2. Acute or subacute ataxia
   3. Drowsiness or confusion
   4. Focal neurological findings
   5. Vomiting
   6. Seizure
   7. Stiff neck
   8. Photophobia
   9. Recurrence of symptoms after antibiotic therapy

C. Creutzfeldt-Jakob disease

D. Bickerstaff encephalitis – usually follows a viral illness [Both of the following]
   1. Ophthalmoplegia
   2. Cerebellar ataxia

E. Fisher syndrome [Both of the following]
   1. Ophthalmoplegia
   2. Cerebellar ataxia

F. Follow-up during therapy to assess effectiveness and after completion are appropriate

IV. Brain tumor[10-19] (MRI without and with contrast) [One of the following]

A. Clarification of brain mass detected on CT exam or prior non contrast MRI (For evaluation of possible pituitary problems please see indication XIII below)

B. Evaluation of known primary brain tumor which may include but not limited to any of the following brain tumors:
   Astrocytoma
   Choroid plexus papilloma
   Ependymoma
   Glioma
   Glioblastoma
   Glioblastoma multiforme
   Hemangioblastoma
   Medulloblastoma
   Meningioma
   Craniopharyngioma
   Oligodendroglioma
   Pituitary adenoma (Please see XIII below)
   Primitive neuroectodermal tumor (PNET)
   1. New signs and symptoms or worsening neurological condition [One of the following]

a. Motor weakness affecting a limb, or one side of the face or body
b. Decreased sensation affecting a limb, or one side of the face or body
c. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
d. Confusion including memory loss and disorientation
e. Impaired vision, including amaurosis fugax, visual field loss and diplopia
f. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
g. Dysarthria (speech disorder resulting from neurological injury)
h. Dysphagia with no GI cause
i. Vertigo with either headache or nystagmus
j. Numbness, tingling, paresthesias
k. Decreased level of consciousness
l. Papilledema
m. Stiff neck
n. New onset of severe headache
o. Drowsiness
p. New onset of vomiting
q. Nystagmus
r. Cranial nerve palsy
s. Gait disturbance
t. Personality or behavioral changes
u. New seizure
v. Hearing loss or new onset tinnitus
w. Agitation
x. Somnolence
y. Slow response to verbal communication
z. Sudden falls
aa. Balance problems

2. Interval re-evaluation of known brain tumor [One of the following]
   a. Anaplastic astrocytoma, anaplastic oligodendroglioma or glioblastoma multiforme or any high-grade or aggressive primary brain tumor [One of the following]
      i. Re-image after surgery (complete or subtotal)
      ii. Image 2-6 weeks after completion of radiation therapy
      iii. Following completion of chemotherapy
      iv. Every 60-120 days for 2-3 years if asymptomatic and then every 6 months
      v. New signs and symptoms (See 1 above) regardless of date of last imaging
   b. Adult low-grade infiltrative supratentorial astrocytoma or oligodendroglioma
      i. MRI every 3-6 months for 5 years then annually
   c. Adult ependymoma
      i. Following resection
      ii. Every 3-4 months for a year then every 4-6 months for 2nd year then every 6-12 months
   d. Adult medulloblastoma and supratentorial PNET
      i. Post operative restaging
      ii. Every 3 months for 2 years then every 6 months for 3 years then annually
   e. Meningioma

i. If unresected or WHO Grade 1 (benign) or 2 (atypical) image at 3,6,12 months after diagnosis then every 6-12 months for 5 years then once every 1-3 years
ii. WHO Grade 3 (malignant) image at least at 3, 6, 12 months and then every 6-12 months for 5 years and then every 1-3 years more frequent imaging may be required

f. Other primary intracranial cancers **if clinically stable** may be imaged at completion of treatment for a new baseline and thereafter at 90- to 180-day intervals for 5 years and then at least annually.
g. New signs and symptoms or worsening neurological condition [One of the following]
i. Motor weakness affecting a limb, or one side of the face or body
ii. Decreased sensation affecting a limb, or one side of the face or body
iii. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
iv. Confusion including memory loss and disorientation
v. Impaired vision, including amaurosis fugax, visual field loss and diplopia
vi. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
vii. Dysarthria (speech disorder resulting from neurological injury)
viii. Dysphagia with no GI cause
ix. Vertigo with either headache or nystagmus
x. Numbness, tingling, paresthesias
xi. Decreased level of consciousness
xii. Papilledema
xiii. Stiff neck
xiv. New onset of severe headache
xv. Drowsiness
xvi. New onset of vomiting
xvii. Nystagmus
xviii. Cranial nerve palsy
xix. Gait disturbance
xx. Personality or behavioral changes
xxi. New seizure
xxii. Hearing loss or new onset tinnitus
xxiii. Agitation
xxiv. Somnolence
xxv. Slow response to verbal communication
xxvi. Sudden falls
xxvii. Balance problems

C. **Evaluation for known or suspected brain metastases** in patients with known extra cranial malignancy [One of the following]
1. Routine initial staging for the following [One of the following]
a. Sarcoma
b. Melanoma stage IV or higher
c. Small cell lung cancer
d. Non-small cell lung cancer for IB or higher
2. New neurological signs or symptoms with **any other known malignancy and any stage** [One of the following]
a. Motor weakness affecting a limb, or one side of the face or body

b. Decreased sensation affecting a limb, or one side of the face or body
c. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
d. Confusion including memory loss and disorientation
e. Impaired vision, including amaurosis fugax, visual field loss and diplopia
f. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
g. Dysarthria (speech disorder resulting from neurological injury)
h. Dysphagia with no GI cause
i. Vertigo with either headache or nystagmus
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k. Decreased level of consciousness
l. Papilledema
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n. New onset of severe headache
o. Drowsiness
p. New onset of vomiting
q. Nystagmus
r. Cranial nerve palsy
s. Gait disturbance
t. Personality or behavioral changes
u. New seizure
v. Hearing loss or new onset tinnitus
w. Agitation
x. Somnolence
y. Slow response to verbal communication
z. Sudden falls
aa. Balance problems

3. Prior to prophylactic cranial irradiation for small cell lung cancer
4. Melanoma stage IIB or higher with no evidence of disease annually
5. Follow-up known brain metastases during and after chemotherapy [One of the following]
   a. Follow-up after intervention to establish a new baseline
   b. Imaging every 3 months for one year after completion of therapy
   c. After one year imaging is performed based on clinical signs and symptoms (See C2 above)
   d. Melanoma stage IIB or higher annually
6. Follow-up known brain metastases after whole brain radiation therapy [One of the following]
   a. Follow-up after intervention to establish a new baseline
   b. Imaging (preferably MRI) every 6 weeks x2, then every 3 months for a year
   c. After one year imaging is performed based on clinical signs and symptoms.
   d. Melanoma stage IIB or higher annually
7. Follow-up known brain metastases after stereotactic radiosurgery such as CyberKnife® or Gamma Knife® radiation treatment
   a. Every 6 weeks x2, then every 12 weeks x2, then every 3-6 months if stable
8. Follow-up known brain metastases after surgery [One of the following]
   a. Follow-up after intervention to establish a new baseline

b. Imaging (preferably MRI) every 6 weeks x2 then every 3 months for a year
c. After one year imaging is performed based on clinical signs and symptoms
d. Melanoma stage IIB or higher annually

9. Known brain metastases with new neurological signs or symptoms such as indicated in C2

D. Cranial nerve palsy – See V below
E. Suspected brain tumor [One of the following]
1. New onset of neurologic findings [One of the following]
a. Motor weakness affecting a limb, or one side of the face or body
b. Decreased sensation affecting a limb, or one side of the face or body
c. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
d. Confusion including memory loss and disorientation
e. Impaired vision, including amaurosis fugax, visual field loss and diplopia
f. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
g. Dysarthria (speech disorder resulting from neurological injury)
h. Dysphagia with no GI cause
i. Vertigo with either headache or nystagmus
j. Numbness, tingling, paresthesias
k. Decreased level of consciousness
l. Papilledema
m. Stiff neck
n. New onset of severe headache
o. Drowsiness
p. New onset of vomiting
q. Nystagmus
r. Cranial nerve palsy
s. Gait disturbance
t. Personality or behavioral changes
u. New seizure
v. Hearing loss or new onset tinnitus
w. Agitation
x. Somnolence
y. Slow response to verbal communication
z. Sudden falls
aa. Balance problems

V. Suspected tumor of or affecting one or more cranial nerves[20-23]

A. Anosmia
B. Weakness or paralysis of muscles of mastication
C. Sensory loss in the head and neck
D. Weakness or paralysis of facial expression
E. Weakness of the palate
F. Vocal cord paralysis
G. Weakness or paralysis of the sternocleidomastoid muscle
H. Weakness or paralysis of the trapezius
I. Weakness or paralysis of the tongue

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VI. Suspected or known AVM[24,25] (arteriovenous malformation) [One of the following]

A. Known AVM documented by CTA, MRA, MRI, catheter angiogram [One of the following]
   1. Immediate follow-up after a therapeutic procedure (i.e., surgery, embolization, radiosurgery)
   2. New or worsening clinical findings [One of the following]
      a. Motor weakness affecting a limb, or one side of the face or body
      b. Decreased sensation affecting a limb, or one side of the face or body
      c. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
      d. Confusion including memory loss and disorientation
      e. Impaired vision, including amaurosis fugax, visual field loss and diplopia
      f. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
      g. Dysarthria (speech disorder resulting from neurological injury)
      h. Dysphagia with no GI cause
      i. Vertigo with either headache or nystagmus
      j. Numbness, tingling, paresthesias
      k. Decreased level of consciousness
      l. Papilledema
      m. Stiff neck
      n. New onset of severe headache
      o. Drowsiness
      p. New onset of vomiting
      q. Nystagmus
      r. Cranial nerve palsy
      s. Gait disturbance
      t. Personality or behavioral changes
      u. New seizure
      v. Hearing loss or new onset tinnitus
      w. Agitation
      x. Somnolence
      y. Slow response to verbal communication
      z. Sudden falls
      aa. Balance problems
   3. Planning of intervention (surgical or interventional)

B. Suspected AVM [One of the following]
   1. Severe unexplained headache (thunderclap headache)
   2. Altered level of consciousness
   3. Focal neurologic findings [One of the following]
      a. Motor weakness affecting a limb, or one side of the face or body
      b. Decreased sensation affecting a limb, or one side of the face or body
      c. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
      d. Confusion including memory loss and disorientation
      e. Impaired vision, including amaurosis fugax, visual field loss and diplopia
      f. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)

g. Dysarthria (speech disorder resulting from neurological injury)
h. Dysphagia with no GI cause
i. Vertigo with either headache or nystagmus
j. Numbness, tingling, paresthesias
k. Decreased level of consciousness
l. Papilledema
m. Stiff neck
n. New onset of severe headache
o. Drowsiness
p. New onset of vomiting
q. Nystagmus
r. Cranial nerve palsy
s. Gait disturbance
t. Personality or behavioral changes
u. New seizure
v. Hearing loss or new onset tinnitus
w. Agitation
x. Somnolence
y. Slow response to verbal communication
z. Sudden falls
aa. Balance problems

4. Subarachnoid hemorrhage on recent CT or MRI of the brain
5. Subarachnoid hemorrhage on lumbar puncture
6. Intracerebral bleed or hematoma, or hemorrhage on prior CT or MRI of the brain

VII. Systemic disease affecting the brain[26-30] [One of the following]

A. Systemic lupus erythematosus (SLE) or vasculitis [One of the following]
   1. Alteration in level of consciousness
   2. Cranial nerve involvement
B. HIV [One of the following]
   1. Cerebritis
   2. Encephalitis
   3. Meningitis
   4. Vasculitis
C. Sarcoidosis

VIII. Demyelinating disease[20,31-36] (includes both known or suspected MS) [One of the following]

A. Multiple sclerosis [One of the following]
   1. Clinical findings or symptoms [One of the following]
      a. Difficulty walking
      b. Ataxia
      c. Numbness
      d. Bladder dysfunction
      e. Optic neuritis
      f. Weakness face, arms, or legs

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g. Difficulty with balance
h. Vertigo
i. Hearing loss
j. Constipation
k. Memory loss
l. Lhermitte's sign
m. Double vision
n. Blurred vision
o. Painful movement of the eye
p. Nystagmus
q. Impaired coordination
r. Dysarthria
s. Dysphagia
t. Neuropathic pain including trigeminal neuralgia or extremity pain

2. Follow-up to assess treatment
   a. For individuals with multiple sclerosis who are being treated with medication(s) MRI may be approved every 3-6 months for follow-up
3. Annual study for stable individual with known MS

IX. Suspected acoustic neuroma (schwannoma) or cerebellopontine angle tumor [21,37-39] [One of the following]

A. Findings/test results [One of the following]
   1. Asymmetric sensorineural hearing loss by audiometry
   2. Facial weakness
   3. Altered sense of taste
   4. Tinnitus
   5. Balance problems
   6. Facial numbness
B. Neurofibromatosis

X. Labyrinthitis, vestibular neuronitis[21] [All of the following]

A. Episodic vertigo
B. Ear normal by PE
C. Continued or worsening vertigo after at least one week of medical treatment with any appropriate medication

XI. Suspected cerebral venous thrombosis[2,40-45] [Both A and B]

A. Symptoms [One of the following]
   1. Papilledema
   2. Headaches
   3. Mental status changes
   4. Vomiting
   5. Changes in vision
   6. Seizures
   7. Lethargy or coma
   8. Alternating focal neurological deficits

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9. Hemiparesis or paraparesis

B. Risk factors [One of the following]
   1. Postpartum
   2. Postoperative status
   3. Skull fracture over dural sinus
   4. Calvarial mass
   5. Meningitis, sinusitis or middle ear infections
   6. Hypercoagulable state [One of the following]
      a. Personal history of cancer
      b. Factor V Leiden mutation
      c. MTHFR
      d. SLE
      e. Sickle cell disease
      f. Contraceptive medications
      g. Protein C deficiency
      h. Protein S deficiency
      i. Antiphospholipid antibodies
      j. Elevated lipoprotein (a)
      k. Elevated platelet count
      l. Prothrombin 20210 gene mutation
      m. Antithrombin III deficiency
   7. Ear, sinus, face, mouth or neck infection
   8. Brain tumor by history

XII. Evaluation of tinnitus[46-49] (ringing, hissing, buzzing, roaring, clicking, or rough sounds heard by patient)

XIII. Suspected pituitary abnormality including macroadenomas and microadenomas[50-61] [One of the following]

A. Elevated pituitary hormones including precocious puberty
   1. Prolactin (PRL) >20 ng/mL [micrograms/L]
   2. Growth hormone (GH) higher than laboratory normal range (acromegaly)
   3. Thyroid-stimulating hormone (TSH) > 4U/mL [mcIU/L]
   4. Follicle-stimulating hormone (FSH)
      a. Male: > 10 mIU/mL
      b. Female: (mIU/mL)
         i. Follicular phase >13
         ii. Luteal phase >13
         iii. Mid-cycle >22
         iv. Postmenopausal >150
   5. Luteinizing hormone (LH)
      a. Male: > 8 mIU/mL
      b. Female: (mIU/mL)
         i. Follicular phase >12
         ii. Luteal phase >15
         iii. Mid-cycle peak >77

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iv. Postmenopausal >40
6. Precocious puberty [One of the following]
   a. Random LH >.2 IU/L
   b. Gonadotropin stimulating test using leuprolide with 2-3 fold rise in LH and FSH
   c. Bone age greater than chronological age
7. Adrenocorticotropic hormone (ACTH) >46 pg/mL (Cushing's disease)

B. Hypopituitarism including hypogonadism [One of the following]
1. Pituitary apoplexy [One of the following]
   a. Acute headache with vomiting
   b. Ophthalmoplegia
   c. Amaurosis
   d. Depressed level of consciousness
   e. Bitemporal hemianopsia
2. Acquired hypopituitarism [One of the following]
   a. Cranial irradiation
   b. Brain surgery
   c. Head trauma
   d. Empty sella
   e. Hemochromatosis
   f. Prior brain infection
   g. Known pituitary tumor
   h. Langerhans cell histiocytosis of the pituitary
3. Gonadotropin deficiency or hypogonadism
   a. Male [Both of the following]
      i. History [One of the following]
         01. Loss of libido
         02. Impotence
         03. History of undescended testicle or cryptorchism
         04. History of testicular failure
         05. History of chemotherapy or radiation therapy
         06. Visual field disorder
         07. Decreased body hair
         08. Gynecomastia
         09. Galactorrhea
      ii. Laboratory tests
         01. Low to normal free testosterone, LH, and FSH (laboratory values may be requested)
   b. Female [Both of the following]
      i. Oligomenorrhea or amenorrhea
      ii. Low normal LH, FSH
4. TSH deficiency with TSH <.4 and low to low-normal T4 and T3
5. ACTH deficiency (Addison's disease)
6. ADH deficiency (diabetes insipidus)
7. Growth hormone deficiency [One of the following]
   a. Adults [One of the following]
      i. History of radiation or surgery to the pituitary or hypothalamic region

ii. Decreased levels of 3 or more pituitary hormones (TSH, LH, FSH, ACTH, GHRH, ADH)
iii. Decreased levels of IGF-I (insulin-like growth factor I) based on laboratory normal range
iv. Insulin tolerance test (contraindicated in individuals with history of seizures or coronary artery disease)
01. Growth hormone response ≤10 ng/mL [micrograms/L]
v. Arginine stimulating test
01. Growth hormone response ≤10 ng/mL [micrograms/L]
b. Children with no evidence of malignancy, Crohn's disease, renal disease, hypothyroidism or Turner syndrome and one of the following
i. Bone age more than 2 standard deviations below the mean for age
ii. History of surgery or radiation in the pituitary or hypothalamus regions
iii. Growth hormone levels below normal (≤10 ng/mL [micrograms/L])
iv. History of intrauterine growth retardation
v. Prader-Willi syndrome
vi. Children over the age of 1
01. Insulin tolerance test positive with GH response ≤10 ng/mL [micrograms/L]
vii. Neonate random growth hormone level <20 ng/mL [micrograms/L]
8. Visual problems [One of the following]
a. Bitemporal visual field loss – loss of peripheral vision bilaterally
b. Optic atrophy
c. Drooping eyelid
d. Diabetes insipidus

C. Known pituitary tumor (adenoma, microadenoma, macroadenoma)
1. Following transsphenoidal resection
2. Following radiation therapy
3. New signs or symptoms such as visual changes, new headache, new onset of vomiting, papilledema, drooping eyelid, optic atrophy
4. Follow up of asymptomatic nonfunctioning microadenoma <10mm in size
a. MRI at one year
b. MRI every 1-2 years for 3 years and then less frequently as long as tumor does not increase in size
5. Follow up of asymptomatic nonfunctioning macroadenoma 6 months after the initial diagnosis and then annually

XIV. Suspicion of trigeminal neuralgia[62]

A. Symptoms [One of the following]
1. Intermittent pain in the distribution of V2 and/or V3
2. Facial spasm
3. Failed medical management

XV. Neurofibromatosis[63-66] [One of the following]

A. First-degree relative (parent sibling or child) with neurofibromatosis either 1 or 2
B. Scoliosis
C. Seizure disorder

D. Peripheral neurofibromas (2 or more)
E. Hearing loss
F. Brain tumor suspected (If known see brain tumor indications)
G. Spinal cord tumor
H. Lisch nodules in the iris of the eye
I. Bone dysplasia (sphenoid wing, bowing of long bones)
J. Headache

XVI. Neurosarcoid[25,67-70]

A. Adult with known sarcoid and one of the following
   1. Cranial nerve palsy – See V above
   2. Headache
   3. Seizure
   4. Sensory deficit
   5. Pituitary dysfunction
   6. Vision loss
   7. Cognitive changes
   8. Psychiatric symptoms
B. Children with known sarcoid and one of the following
   1. Seizures
   2. Short stature
   3. Diabetes insipidus
   4. Lack of sexual maturation
   5. Cranial nerve palsy – See V above
   6. Headache
   7. Sensory deficit
   8. Pituitary dysfunction
   9. Vision loss
   10. Cognitive changes
   11. Psychiatric symptoms

XVII. Short stature with height 2 standard deviations below the mean for age and gender[71] [One of the following]

A. History of surgery or radiation in the pituitary or hypothalamus regions
B. Growth hormone levels below normal (≤10 ng/mL [micrograms/L])
C. History of intrauterine growth retardation
D. Prader-Willi syndrome
E. Children over the age of 1
   1. Insulin tolerance test positive
      a. Growth hormone response ≤10 ng/mL [micrograms/L]

XVIII. Papilledema with or without headache

XIX. Cerebral hypotension[72]

A. Headache [One of the following]
   1. Increases when the individual is upright and decreases quickly when recumbent

2. Increases with coughing, straining, sneezing

XX. Proptosis including thyroid eye disease and exophthalmus[20] [One of the following]

A. Orbital asymmetry in a child with loss or decreased vision or sight
B. Adult with painful loss or decreased vision or sight
C. Hyperthyroidism with visual loss or visual compromise (Graves' disease)

XXI. Visual field deficit [One of the following]

A. Bitemporal hemianopsia (loss of peripheral vision)
B. Homonymous hemianopsia (loss of vision in the nasal half of one eye and the outer half of the other eye)
C. Scotoma (loss of central vision)
D. Heteronymous hemianopsia (loss of vision in either the nasal half or the outer half of both eyes)

XXII. Hearing loss[21,22] [One of the following]

A. Suspected cholesteatoma and audiogram demonstrating conductive hearing loss (CT of the temporal bone) and one of the following
    1. Acute and intermittent vertigo
    2. Painless otorrhea
    3. Purulent drainage from the ear or mastoid area
    4. Purulent drainage and granulation tissue in the ear
B. Conductive hearing loss documented on recent audiogram (CT of the temporal bone)
C. Total deafness including congenital hearing loss (CT of the temporal bone)
D. Preoperative planning of cochlear implants (CT of the temporal bone)
E. Fluctuating hearing loss
F. Glomus tumor with reddish-blue mass in the ear
G. Sensorineural hearing loss on recent audiogram
H. Mixed conductive and sensorineural hearing loss on recent audiogram

XXIII. Vertigo[21]

A. Episodic with or without associated hearing loss or tinnitus
B. Central vertigo with or without other symptoms

XXIV. Bell's palsy with unusual presentation[73-75] [One of the following]

A. No improvement in facial paresis after three months
B. Second paralysis on the same side
C. Multiple cranial nerve deficits
D. Weakness or sensory loss in an extremity
E. Bilateral symptoms

XXV. Abrupt onset of a neurologic deficit – including stroke and TIA[24,76,77] [One of the following]

A. Motor weakness affecting a limb, or one side of the face or body
B. Decreased sensation affecting a limb, or one side of the face or body

C. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
D. Confusion including memory loss and disorientation
E. Impaired vision, including amaurosis fugax, visual field loss and diplopia
F. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
G. Dysarthria (speech disorder resulting from neurological injury)
H. Dysphagia with no GI cause
I. Vertigo with either headache or nystagmus
J. Numbness, tingling, paresthesias
K. Decreased level of consciousness
L. Papilledema
M. Stiff neck
N. New onset of severe headache
O. Drowsiness
P. New onset of vomiting
Q. Nystagmus
R. Cranial nerve palsy
S. Gait disturbance
T. Personality or behavioral changes
U. New seizure
V. Hearing loss or new onset tinnitus
W. Agitation
X. Somnolence
Y. Slow response to verbal communication
Z. Sudden falls
AA. Balance problems

XXVI. Re-evaluation after stroke (MRI of the brain without contrast) [One of the following]

A. Deteriorating clinical status with new or worsening neurologic findings
    1. Motor weakness affecting a limb, or one side of the face or body
    2. Decreased sensation affecting a limb, or one side of the face or body
    3. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
    4. Confusion including memory loss and disorientation
    5. Impaired vision, including amaurosis fugax, visual field loss and diplopia
    6. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
    7. Dysarthria (speech disorder resulting from neurological injury)
    8. Dysphagia with no GI cause
    9. Vertigo with either headache or nystagmus
    10. Numbness, tingling, paresthesias
    11. Decreased level of consciousness
    12. Papilledema
    13. Stiff neck
    14. Drowsiness
    15. New onset of vomiting

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16. Nystagmus
17. Cranial nerve palsy
18. Gait disturbance
19. Personality or behavioral changes
20. New seizure
21. Hearing loss or new onset tinnitus
22. Agitation
23. Somnolence
24. Slow response to verbal communication
25. Sudden falls
26. Balance problems

B. Anti-coagulation planned

XXVII. Headache[24,78-84] (CT for D, J, K) [One of the following]

A. Papilledema
B. Worsened by Valsalva maneuver, coughing, straining or postural changes
C. Wakens from sleep
D. Suspected subarachnoid hemorrhage [One of the following]
   1. With sudden onset of severe, exertional or "thunderclap" headache
   2. Associated with nausea, vomiting, diplopia, seizure, mental status change
   3. History of prior known (documented on CTA, MRA, or angiogram) aneurysm or AVM
E. Infection in an extracranial location
F. Change in mental status, personality, or level of consciousness
G. Suspected carotid or vertebral artery dissection or unilateral Horner's syndrome [One of the following] (CTA or MRA or MRI)
   1. Neck pain
   2. Unilateral facial or orbital pain
   3. Unilateral headaches
   4. Horner's syndrome, miosis and ptosis (contraction of the iris, drooping eyelid)
   5. Transient ischemic attacks (TIA) (See XXVI above)
   6. Minor neck trauma
   7. Rapid onset of headache with strenuous exercise or Valsalva maneuver
H. Head pain that spreads into the lower neck and between the shoulders (may indicate meningeal irritation due to either infection or subarachnoid blood; it is not typical of a benign process)
I. Suspected subdural hematoma [One of the following]
   1. Major head trauma
   2. Minor trauma while on anticoagulants
J. Thunderclap headache
K. Worst headache of life
L. New headache [One of the following]
   1. Abnormal neurologic examination [One of the following]
      a. Motor weakness affecting a limb, or one side of the face or body
      b. Decreased sensation affecting a limb, or one side of the face or body
      c. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
      d. Confusion including memory loss and disorientation
      e. Impaired vision, including amaurosis fugax, visual field loss and diplopia

f. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
g. Dysarthria (speech disorder resulting from neurological injury)
h. Dysphagia with no GI cause
i. Vertigo with either headache or nystagmus
j. Numbness, tingling, paresthesias
k. Decreased level of consciousness
l. Papilledema
m. Stiff neck
n. Drowsiness
o. New onset of vomiting
p. Nystagmus
q. Cranial nerve palsy
r. Gait disturbance
s. Personality or behavioral changes
t. New seizure
u. Hearing loss or new onset tinnitus
v. Agitation
w. Somnolence
x. Slow response to verbal communication
y. Sudden falls
z. Balance problems

2. Aural temperature >38.3°C or 100.9°F
3. Stiff neck (nuchal rigidity)
4. History of HIV infection
5. History of TB
6. History of sarcoidosis
7. Age 5 years or less
8. Over age 50
9. Pregnancy
10. Headache with exertion
11. Mental status changes
12. Extracranial malignancy

M. Chronic daily headache – headache for 15 or more days a month for at least 3 months
1. New neurologic deficit (see L1 above) (MRI without and with contrast)
2. Imaging is not medically necessary if there is a normal neurologic examination and no new features of the headache

N. Known neurofibromatosis
O. Rapidly increasing frequency of headache
P. Personal history of cancer (MRI without and with)

XXVIII. Head trauma[85-88] (CT for first 24 hours) [One of the following]

A. Minor or mild acute closed head trauma without neurologic deficit adult
1. Glasgow Coma Scale ≥13

B. Mild or moderate acute closed head injury under age 2
C. Minor or acute closed head injury with focal neurologic deficit
D. Moderate or severe closed head trauma

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E. Subacute or chronic closed head trauma with cognitive and/or neurologic deficit
F. Suspected carotid or vertebral dissection (CTA or MRA head and neck – See CPT codes 70498 or 70547, 70548, 70549)
G. Penetrating injury, stable neurologically intact (CT)
H. Focal neurologic finding
    1. Motor weakness affecting a limb, or one side of the face or body
    2. Decreased sensation affecting a limb, or one side of the face or body
    3. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
    4. Confusion including memory loss and disorientation
    5. Impaired vision, including amaurosis fugax, visual field loss and diplopia
    6. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
    7. Dysarthria (speech disorder resulting from neurological injury)
    8. Dysphagia with no GI cause
    9. Vertigo with either headache or nystagmus
    10. Numbness, tingling, paresthesias
    11. Decreased level of consciousness
    12. Papilledema
    13. Stiff neck
    14. Drowsiness
    15. New onset of vomiting
    16. Nystagmus
    17. Cranial nerve palsy
    18. Gait disturbance
    19. Personality or behavioral changes
    20. New seizure
    21. Hearing loss or new onset tinnitus
    22. Agitation
    23. Somnolence
    24. Slow response to verbal communication
    25. Sudden falls
    26. Balance problems
I. Drug or alcohol intoxication
J. Skull fracture

XXIX. Chronic or progressive mental status changes[89]

A. Deteriorating cognitive function [One of the following]
    1. Progressive loss of memory
    2. Confusion
    3. Disorientation
    4. Personality changes

XXX. Hydrocephalus[90-93] [One of the following]

A. Suspected obstructive hydrocephalus [1 and 2]
    1. Clinical findings [One of the following]
        a. Headache

b. Papilledema
c. Diplopia
d. Mental status changes
e. Gait disturbance or ataxia (People with ataxia experience a failure of muscle control in their arms and legs, resulting in a lack of balance and coordination or a disturbance of gait)
f. Seizure

2. History of [One of the following]
a. Arteriovenous malformation (AVM)
b. Aneurysm
c. Intraventricular or SAH
d. Meningitis
e. Known hydrocephalus

B. Normal pressure hydrocephalus (NPH) [One of the following]
1. Gait disturbance (shuffling, magnetic. wide based, disequilibrium and slow gait)
2. Motor perseveration (tremors)
3. Urinary incontinence, urgency or frequency
4. Dementia
5. Known NPH with worsening symptoms

C. Suspicion of VP (ventriculoperitoneal) shunt malfunction
D. Known hydrocephalus in a child
1. Age 0-5 yrs annually
2. Age 5 or older every 2 years

XXXI. Arnold Chiari malformation[94,95] (MRI of the brain without contrast) [One of the following]

A. Cranial nerve palsy
B. Headache
C. Incontinence
D. Lumbar myelomeningocele
E. Neck or back pain
F. Sensory loss
G. Tethered cord
H. Unsteady gait
I. Lower extremity spasticity
J. Follow up known Chiari with new or changed symptoms

XXXII. Dandy Walker cyst[96] (MRI of the brain without contrast)

XXXIII. Microcephaly (MRI of the brain without contrast)

A. Head circumference less than 2 standard deviations below average for age

XXXIV. Macrocephaly (MRI of the brain without contrast)

A. Head circumference greater than 2 standard deviations above average for age

XXXV. Developmental delay[97] (MRI of the brain without contrast)

XXXVI. Multiple congenital anomalies[96]

XXXVII. Follow up subdural hematoma, epidural, subarachnoid or intracerebral (parenchymal) hemorrhage[98,99] (MRI of the brain without contrast) [One of the following]

A. New neurologic findings [One of the following]
   1. Motor weakness affecting a limb, or one side of the face or body
   2. Decreased sensation affecting a limb, or one side of the face or body
   3. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
   4. Confusion including memory loss and disorientation
   5. Impaired vision, including amaurosis fugax, visual field loss and diplopia
   6. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
   7. Dysarthria (speech disorder resulting from neurological injury)
   8. Dysphagia with no GI cause
   9. Vertigo with either headache or nystagmus
   10. Numbness, tingling, paresthesias
   11. Decreased level of consciousness
   12. Papilledema
   13. Stiff neck
   14. New onset of severe headache
   15. Drowsiness
   16. New onset of vomiting
   17. Nystagmus
   18. Cranial nerve palsy
   19. Gait disturbance
   20. Personality or behavioral changes
   21. New seizure
   22. Hearing loss or new onset tinnitus
   23. Agitation
   24. Somnolence
   25. Slow response to verbal communication
   26. Sudden falls
   27. Balance problems
B. New onset headache or changing headache
C. Follow up within 36 hours of initial presentation if not performed previously
D. Interval follow up with no change in clinical signs or symptoms
E. Follow up of known subarachnoid hemorrhage with negative angiogram

XXXVIII. Parkinson's disease or syndrome[89] (MRI of the brain without contrast)

XXXIX. Huntington's disease[89] (MRI of the brain without contrast)

XL. Dementia[89] (MRI of the brain without contrast) [One of the following]

A. Frontotemporal dementia
B. Vascular dementia

C. Alzheimer's disease
D. Dementia with Lewy bodies
E. Prion disease (Creutzfeldt-Jakob)

XLI. Suspicion of neuroectodermal dysplasia (MRI of the brain without contrast)
A. Frontotemporal dementia
B. Vascular dementia
C. Alzheimer's disease
D. Dementia with Lewy bodies
E. Prion disease (Creutzfeldt-Jakob)

XLII. Follow up of known subarachnoid hemorrhage with negative angiogram[24]

XLIII. Follow up of known intracerebral (parenchymal) hemorrhage[24]

XLIV. Suspected intracranial hemorrhage[98,99] [One of the following]
A. Head trauma [One of the following]
1. Amnesia
2. Altered level of consciousness or loss of consciousness
3. Vomiting
4. Neurologic symptoms
5. Seizure
6. Coagulopathy previously diagnosed (or current treatment with heparin or Coumadin®)
7. Skull fracture
8. Ataxia
9. Aphasia
10. Decreased sensation in a limb
11. Visual field loss
12. Double vision
13. Memory loss
B. Suspicion of acute subarachnoid hemorrhage [One of the following]
1. Vomiting
2. Sudden onset of severe hypertension
3. Decreased level of consciousness
4. Thunderclap headache
5. Worst headache of one's life
6. Headache and known aneurysm
7. Headache and first degree relative with aneurysm
8. Treated aneurysm and/or AVM with new headache or findings on neurologic examination
9. Stiff neck
10. Seizure
11. Third nerve palsy
C. Intracerebral (parenchymal) hemorrhage [One of the following]
1. Hypertension with new onset headache
2. Known brain metastases with change in neurologic status
3. New onset of neurologic symptoms [One of the following]

a. Motor weakness affecting a limb, or one side of the face or body
b. Decreased sensation affecting a limb, or one side of the face or body
c. Acute or subacute ataxia (unsteady and clumsy motion of the limbs or trunk)
d. Confusion including memory loss and disorientation
e. Impaired vision, including amaurosis fugax, visual field loss and diplopia
f. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
g. Dysarthria (speech disorder resulting from neurological injury)
h. Dysphagia with no GI cause
i. Vertigo with either headache or nystagmus
j. Numbness, tingling, paresthesias
k. Decreased level of consciousness
l. Papilledema
m. Stiff neck
n. New onset of severe headache
o. Drowsiness
p. New onset of vomiting
q. Nystagmus
r. Cranial nerve palsy
s. Gait disturbance
t. Personality or behavioral changes
u. New seizure
v. Hearing loss or new onset tinnitus
w. Agitation
x. Somnolence
y. Slow response to verbal communication
z. Sudden falls
aa. Balance problems

XLV. Chronic daily headache – headache for 15 or more days a month for at least 3 months[82]

A. New neurologic deficit
a. Motor weakness affecting a limb, or one side of the face or body
b. Decreased sensation affecting a limb, or one side of the face or body
c. Acute ataxia (unsteady and clumsy motion of the limbs or trunk)
d. Confusion including memory loss and disorientation
e. Impaired vision, including amaurosis fugax, visual field loss and diplopia
f. Aphasia (loss or impairment of the ability to produce or comprehend language due to brain damage)
g. Dysarthria (speech disorder resulting from neurological injury)
h. Dysphagia with no GI cause
i. Vertigo with either headache or nystagmus
j. Numbness, tingling, paresthesias
k. Decreased level of consciousness
l. Papilledema
m. Stiff neck

n. New onset of severe headache
o. Drowsiness
p. New onset of vomiting
q. Nystagmus
r. Cranial nerve palsy
s. Gait disturbance
t. Personality or behavioral changes
u. New seizure
v. Hearing loss or new onset tinnitus
w. Agitation
x. Somnolence
y. Slow response to verbal communication
z. Sudden falls
aa. Balance problems

XLVI. Unilateral headache with suspicion of carotid or vertebral dissection or unilateral Horner's syndrome[82] [One of the following] (CTA or MRA or MRI)
A. Neck pain
B. Unilateral facial or orbital pain
C. Unilateral headaches
D. Horner's syndrome, miosis and ptosis (contraction of the iris, drooping eyelid)
E. Transient ischemic attacks (TIA)
F. Minor neck trauma
G. Rapid onset of headache with strenuous exercise or Valsalva maneuver

XLVII. Temporal arteritis[82] [All of the following]
A. ESR > 55mm/hr
B. Temporal tenderness

XLVIII. New headache in immunocompromised individual[82]

XLIX. Progressive worsening of headache

L. Headache associated with cough, exertion or sexual activity[82]

LI. Encephalocele[100]

LII. Planning for gamma knife or stereotactic radiosurgery may be approve with CT of the brain

References:

1. Gans MS. Idiopathic intracranial hypertension, Medscape reference. http://emedicine.medscape.com/article/1214410-overview.
2. Friedman DI, Jacobson DM. Diagnostic criteria for idiopathic intracranial hypertension, Neurology, 2002; 59:1492-1495.
3. Practice parameter: neuroimaging in the emergency patient presenting with seizure (summary statement). American College of Emergency Physicians, American Academy of Neurology, American Association of Neurological Surgeons, American Society of Neuroradiology. Ann Emerg Med. Jul 1996; 28(1):114-118.
4. Luttrull MD, Cornelius RS, Angtuaco EJ, et al, Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Seizures and Epilepsy. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SeizuresAndEpilepsy.pdf.
5. Dory CE, Coley BD, Karmazyn B, et al, Expert Panel on Pediatric Imaging. American College of Radiology Appropriateness Criteria – Seizures–Child. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SeizuresChild.pdf.
6. Scottish Intercollegiate Guidelines Network, Diagnosis and Management of Epilepsy in Adults, a National Guideline, 2003. http://www.sign.ac.uk/pdf/sign70.pdf.
7. Enzmann DR, Britt RH, Placone R. Staging of human brain abscess by computed tomography. Radiology. Mar 1983; 146(3):703-708.
8. Zak IT, Altinok D, Merline JR, et al. West Nile virus infection. AJR Am J Roentgenology. Mar 2005; 184(3):957-961.
9. Tunkel AR, Hartman BJ, Kaplan SL, et al. Practice guidelines for the management of bacterial meningitis. Clin Infect Dis. Nov 1, 2004.
10. Broderick DF, Wippold FJ, Cornelius RS, et al, Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria-Ataxia. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Ataxia.pdf.
11. Ettinger DS, Wood DE, Akerley W, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Non-Small Cell Lung Cancer. http://www.nccn.org/professionals/physician_gls/pdf/nscl.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Non-Small Cell Lung Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
12. Kalemkerian GP, Akerley W, Bogner P, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Small-Cell Lung Cancer. http://www.nccn.org/professionals/physician_gls/pdf/sclc.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Small Cell Lung Cancer V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
13. Davis PC, Hudgins PA, Peterman SB, et al. Diagnosis of cerebral metastases: double-dose delayed CT vs contrast-enhanced MR imaging. AJNR Am J Neuroradiol. Mar-Apr 1991; 12(2):293-300.
14. Schaefer PW, Budzik RF Jr., Gonzalez RG. Imaging of cerebral metastases. Neurosurg Clin N Am. Jul 1996; 7(3):393-423.
15. Auperin A, Arriagada R, Pignon JP, et al. Prophylactic cranial irradiation for patients with small-cell lung cancer in complete remission. Prophylactic Cranial Irradiation Overview Collaborative Group. N Engl J Med. Aug 12 1999; 341(7):476-484.
16. Soffietti R, Cornu P, Delattre Y, et al. EFNS Guidelines on Diagnosis and Treatment of Brain Metastases: Report of an EFNS Task Force European Journal of Neurology. 2006; 13:674-681.
17. Alberts WM. Diagnosis and management of lung cancer executive summary: ACCP evidence-based clinical practice guidelines (2nd Edition). Chest. Sep 2007; 132(3 Suppl):1S-19S.
18. Wippold FJ II, Cornelius RS, Aiken AH, et al, Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Focal Neurologic Deficit. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/FocalNeurologicDeficit.pdf.
19. Nabors LB, Ammirati M, Bierman PJ, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2013. Central Nervous System Cancers. http://www.nccn.org/professionals/physician_gls/pdf/cns.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Central Nervous System Cancers V2.2013. ©2013 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
20. Wippold FJ II, Cornelius RS, Berger KL, et al, Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Orbits, Vision and Visual Loss. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/OrbitsVisionAndVisualLoss.pdf.
21. Angtuaco EJ, Wippold FJ II, Cornelius RS, et al, Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Hearing Loss and/or Vertigo. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/HearingLossVertigo.pdf.
22. Stachler RJ, Chandrasekhar SS, Archer SM, et al. Clinical practice guideline: sudden hearing loss, Otolaryngol Head Neck Surg, 2012; 146:S1-S35. http://oto.sagepub.com/content/146/3_suppl/S1.full.pdf+html.
23. Wippold FJ II, Cornelius RS, Aiken AH, et al, Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Cranial Neuropathy. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/CranialNeuropathy.pdf.
24. De La Paz RL, Wippold FJ II, Cornelius RS, et al, Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Cerebrovascular Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/CerebrovascularDisease.pdf.
25. Ogilvy CS, Stieg PE, Awad I, et al. Recommendations for the Management of Intracranial Arteriovenous Malformations: A Statement for Healthcare Professionals from a Special Writing Group of the Stroke Council, American Stroke Association, Stroke, 2001; 32:1458-1571. https://stroke.ahajournals.org/content/32/6/1458.full.pdf+html.

26. Pomper MG, Miller TJ, Stone JH, et al. CNS vasculitis in autoimmune disease: MR imaging findings and correlation with angiography. AJNR Am J Neuroradiol. Jan 1999; 20(1):75-85.
27. Greenan TJ, Grossman RI, Goldberg HI. Cerebral vasculitis: MR imaging and angiographic correlation. Radiology. Jan 1992; 182(1):65-72.
28. Dumas JL, Valeyre D, Chapelon-Abric C, et al. Central nervous system sarcoidosis: follow-up at MR imaging during steroid therapy. Radiology. Feb 2000; 214(2):411-420.
29. Aviv RI, Benseler SM, Silverman ED, et al. MR imaging and angiography of primary CNS vasculitis of childhood. AJNR Am J Neuroradiol. Jan 2006; 27(1):192-199.
30. Graham JW, Jan W. MRI and the brain in systemic lupus erythematosus. Lupus. 2003; 12(12):891-896.
31. Filippi M, Rocca MA, Arnold DL, et al. EFNS guidelines on the use of neuroimaging in the management of multiple sclerosis. Eur J Neurol. Apr 2006; 13(4):313-325.
32. Inglese M, Grossman RI, Filippi M. Magnetic resonance imaging monitoring of multiple sclerosis lesion evolution. J Neuroimaging. 2005; 15(4 Suppl):22S-29S.
33. Polman CH, Reingold SC, Edan G, et al. Diagnostic criteria for multiple sclerosis: 2005 revisions to the "McDonald Criteria." Ann Neurol. Dec 2005; 58(6):840-846.
34. Frohman EM, Gooding DS, Calabresi PA, et al. The utility of MRI in suspected MS: report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology. Neurology. 2003; 61(5):602-611. http://www.neurology.org/content/61/5/602.full.pdf.
35. Calabresi PA. Diagnosis and management of multiple sclerosis. Am Fam Physician. Nov 15, 2004; 70(10):1935-1944.
36. Bradburn J, Broughton S, Chadwick D, et al. Multiple Sclerosis: National Clinical Guideline for Diagnosis and Management in Primary and Secondary Care. National Institute for Clinical Excellence (NICE) 2004. http://www.nice.org.uk/nicemedia/live/10930/46699/46699.pdf.
37. Clinical Practice Advisory Group of the British Association of Otorhinolaryngologists Head and Neck Surgeons. Clinical Effectiveness Guidelines: Acoustic Neuroma (Vestibular Schwannoma), 2002. https://entuk.org/docs/prof/publications/3412_Acoustic_Neuroma.
38. Nance WE, Bailey BJ, Broaddus WC, et al. Summary: Vestibular Schwannoma (Acoustic Neuroma Consensus Development Conference). Neurosurgery. 1992; 30:962-964.
39. Swartz JD. Sensorineural hearing deficit: a systematic approach based on imaging findings. Radiographics. May 1996; 16(3):561-574.
40. Idbaih A, Boukobza M, Crassard I, et al. MRI of clot in cerebral venous thrombosis: high diagnostic value of susceptibility-weighted images. Stroke. Apr 2006; 37(4):991-995.
41. Selim M, Fink J, Linfante I, et al. Diagnosis of cerebral venous thrombosis with echo-planar T2*-weighted magnetic resonance imaging. Arch Neurol. Jun 2002; 59(6):1021-1026.
42. Leach JL, Fortuna RB, Jones BV, et al. Imaging of cerebral venous thrombosis: current techniques, spectrum of findings, and diagnostic pitfalls. RadioGraphics. 2006; 26:S19-41.
43. Sébire G, Tabarki B, Saunders DE, et al. Cerebral venous sinus thrombosis in children: risk factors, presentation, diagnosis and outcome, Brain, 2005; 128:477-489.
44. Einhaupl K, Bousser MG, de Bruijn SFTM, et al. EFNS guideline on the treatment of cerebral venous and sinus thrombosis, Eur J Neurol, 2006; 13:553-559.
45. Saposnik G, Barinagarrementeria F, Brown RD Jr., et al. Diagnosis and management of cerebral venous thrombosis: A statement for Healthcare Professionals from the American Heart Association/American Stroke Association, Stroke, 2011; 42:1158-1192. http://stroke.ahajournals.org/content/42/4/1158.full.pdf+html.
46. Morley S, Beale TJ. Imaging of Deafness and Tinnitus. Imaging. 2007; 19:55-70.
47. Crummer RW, Hassan GA. Diagnostic approach to tinnitus, Am Fam Physician, 2004; 69(1):120-126. http://www.aafp.org/afp/2004/0101/p120.html.
48. Henry JA, Dennis KC, Schechter MA. General review of tinnitus: prevalence, mechanisms, effects, and management. J Speech Lang Hear Res. Oct 2005; 48(5):1204-1235.
49. Lockwood AH, Salvi RJ, Burkard RF. Tinnitus. N Engl J Med. Sep 19 2002; 347(12):904-910.
50. Acerini CL, Tasker RC, Bellone S, et al. Hypopituitarism in childhood and adolescence following traumatic brain injury: the case for prospective endocrine investigation. Eur J Endocrinol. Nov 2006; 155(5):663-669.
51. Ostrov SG, Quencer RM, Hoffman JC, et al. Hemorrhage within pituitary adenomas: how often associated with pituitary apoplexy syndrome? AJR Am J Roentgenology. Jul 1989; 153(1):153-160.
52. Seidenwurm D, Wippold FJ II, Cornelius RS, et al, Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Neuroendocrine Imaging. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/NeuroendocrineImaging.pdf.
53. Cook DM, Yuen KC, Biller BM, et al. American Association of Clinical Endocrinologists medical guidelines for clinical practice for growth hormone use in growth hormone-deficient adults and transition patients – 2009 update, Endocr Pract, 2009; 15 Suppl 2:1-29. https://www.aace.com/files/growth-hormone-guidelines.pdf.
54. Bhasin S, Cunningham GR, Hayes FJ, et al. Testosterone therapy in adult men with androgen deficiency syndromes: An Endocrine Society Clinical Practice Guideline, J of Cl Endocrinol Metab, 2010; 95:2536-2559.
55. Petak SM, Nankin HR, Spark RF, et al. American Association of Clinical Endocrinologists Medical Guidelines for Clinical Practice for the Evaluation and Treatment of Hypogonadism in adult male patients – 2002 Update, Endocrine Practice, 2002; 8:440-456.
56. Melmed S, Casanueva FF, Hoffman AR, et al. Diagnosis and treatment of hyperprolactinemia: An Endocrine Society Clinical Practice Guideline, J of Clinical Endocrinology and Metabolism, 2011; 96:273-288.

57. Molitch ME, Clemmons DR, Malozowski S, et al. Evaluation and treatment of adult growth hormone deficiency: An Endocrine Society Clinical Practice Guideline. http://www.endocrine.org/~/media/endosociety/Files/Publications/Clinical%20Practice%20Guidelines/Evaluation-treatment-of-Adult-Growth-Hormone-Deficiency-Clinical-Practice-Guideline-NonCME.pdf.
58. Freda PU, Beckers AM, Katznelson L, et al. Pituitary Incidentaloma: An Endocrine Society Clinical Practice Guideline, J Cl Endoc Metabolism, 2011; 96:894-904.
59. Yoon P-H, Kim DI, Jeon P, et al. Pituitary adenomas: Early postoperative MR Imaging after transsphenoidal resection, AJNR, 2001; 22:1097-1104.
60. Rajasekaran S, Vanderpump M, Baldeweg S, et al. UK guidelines for the management of pituitary apoplexy, Clin Endocrinol, 2011; 74:9-20.
61. Lake MG, Krook LS, Cruz SV. Pituitary adenomas: an overview, Am Fam Physician, 2013; 88:319-327.
62. Woolfall P, Coulthard A. Trigeminal nerve: anatomy and pathology, BJR, 2001; 74:458-467.
63. National Institute of Neurologic Disorders and Stroke, Neurofibromatosis Fact Sheet. http://www.ninds.nih.gov/disorders/neurofibromatosis/detail_neurofibromatosis.htm?css=print.
64. Nunes F, MacCollin M. Neurofibromatosis 2 in the pediatric population. J Child Neurol. Oct 2003; 18(10):718-724.
65. Vivarelli R, Grosso S, Calabrese F, et al. Epilepsy in neurofibromatosis 1. J Child Neurol. May 2003; 18(5):338-342.
66. Ferner RE, Huson SM, Thomas N, et al. Guidelines for the diagnosis and management of individuals with neurofibromatosis 1. J Med Genet. Feb 2007; 44(2):81-88.
67. Baumann RJ, Robertson WC Jr. Neurosarcoid presents differently in children than in adults. Pediatrics. 2003; 112(6 Pt 1):e480-486. http://pediatrics.aappublications.org/content/112/6/e480.full.pdf+html.
68. Zajicek JP, Scolding NJ, Foster O, et al. Central nervous system sarcoidosis – diagnosis and management. QJM. Feb 1999; 92(2):103-117.
69. Smith JK, Matheus MG, Castillo M. Imaging manifestations of neurosarcoidosis. AJR Am J Roentgenology. Feb 2004; 182(2):289-295.
70. Joseph FG, Scolding NJ, Sarcoidosis of the nervous system. Pract Neurol. Aug 2007; 7(4):234-244.
71. Rogol AD. Diagnostic approach to short stature, Up-to-Date. http://www.uptodate.com/contents/diagnostic-approach-to-short-stature.
72. Sun C, Lay C. Pathophysiology, Clinical Features, and Diagnosis of Spontaneous Low Cerebrospinal Fluid Pressure Headache. http://www.uptodate.com/contents/pathophysiology-clinical-features-and-diagnosis-of-spontaneous-low-cerebrospinal-fluid-pressure-headache?source=search_result&selectedTitle=1%7E46.
73. Ahmed A. When is facial paralysis Bell palsy? Current diagnosis and treatment, Cleve Clin J Med, 2005; 72(5):398-401, 405. http://www.ccjm.org/content/72/5/398.full.pdf+html.
74. National Institute of Neurological Disorders and Stroke of the National Institutes of Health, Bell's Palsy Fact Sheet. http://www.ninds.nih.gov/disorders/bells/detail_bells.htm.
75. Baugh RF, Basura GJ, Ishii LE, et al. Clinical Practice Guideline: Bell's palsy, Otolaryngology-Head and Neck Surgery, 2013; 149:S1-S27.
76. Masdeu JC, Irimia, P, Asenbaum, S, et al. EFNS guideline on neuroimaging in acute stroke. Report of an EFNS task force. Eur J Neurol. Dec 2006; 13(12):1271-1283.
77. Anderson D, Larson D, Lindhom P, et al. Health Care Guideline: Diagnosis and Treatment of Ischemic Stroke Institute for Clinical Systems Improvement July 2012 Tenth Edition. https://www.icsi.org/_asset/xql3xv/Stroke-Interactive0712.pdf.
78. Tsushima Y, Endo K. MR Imaging in the Evaluation of Chronic or Recurrent Headache. Radiology. 2005(235):575-579.
79. Beithon F, Gallenberg M, Johnson K, et al. Health Care Guideline: Diagnosis and Treatment of Headache. Institute for Clinical Systems Improvement, January 2013. https://www.icsi.org/_asset/qwrznq/Headache.pdf.
80. Frishberg BM, Rosenberg JH, Matchar DB, et al. Evidence-based Guidelines in the Primary Care Setting: Neuroimaging in Patients with Nonacute Headache. http://tools.aan.com/professionals/practice/pdfs/gl0088.pdf.
81. Hayes LL, Coley BD, Karmazyn B, et al, Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Headache – Child. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/HeadacheChild.pdf.
82. Douglas AC, Wippold FJ II, Broderick DF, et al, Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Headache. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Headache.pdf.
83. Sandrini G, Friberg L, Janig W, et al. Neurophysiological tests and neuroimaging procedures in non-acute headache: guidelines and recommendations. Eur J Neurol. Apr 2004; 11(4):217-224.
84. Silberstein SD. Practice parameter: evidence-based guidelines for migraine headache (an evidence-based review): report of the Quality Standards Subcommittee of the American Academy of Neurology. Neurology. Sep 26 2000; 55(6):754-762.
85. Smits M, Dippel DW, de Haan GG, et al. Minor head injury: guidelines for the use of CT – a multicenter validation study. Radiology. 2007; 245(3):831-838. http://radiology.rsna.org/content/245/3/831.full.
86. Vos PE, Battistin L, Birbamer G, et al. EFNS guideline on mild traumatic brain injury: report of an EFNS task force. Eur J Neurol. May 2002; 9(3):207-219.
87. Davis PC, Wippold FJ II, Cornelius RS, et al, Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Head Trauma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/HeadTrauma.pdf.
88. National Institute for Health and Clinical Excellence. Head Injury: Triage, Assessment, Investigation and Early Management of Head Injury in Infants, Children and Adults. 2007. http://www.nice.org.uk/nicemedia/live/11836/36259/36259.pdf.
89. Wippold FJ II, Brown DC, Broderick DF, et al., Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Dementia and Movement Disorders. 1996. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/DementiaAndMovementDisorders.pdf.

90. Ishikawa M, Hashimoto M, Kuwana, N, et al. Guidelines for management of idiopathic normal pressure hydrocephalus. Neurol Med Chir (Tokyo). 2008; 48 Suppl: S1-23.
91. Bradley WG Jr., Scalzo D, Queralt J, et al. Normal-pressure hydrocephalus: evaluation with cerebrospinal fluid flow measurements at MR imaging. Radiology. Feb 1996; 198(2):523-529.
92. Bradley WG. Normal pressure hydrocephalus: new concepts on etiology and diagnosis. AJNR Am J Neuroradiol. Oct 2000; 21(9):1586-1590.
93. Shprecher D, Schwalb J, Kurlan R, Curr Neurol Neurosci Rept, 2008;8:371-376.
94. Greenlee JD, Donovan KA, Hasan DM, et al. Chiari I malformation in the very young child: the spectrum of presentations and experience in 31 children under age 6 years. Pediatrics. Dec 2002; 110(6):1212-1219.
95. Wu YW, Chin CT, Chan KM, et al. Pediatric Chiari I malformations: do clinical and radiologic features correlate? Neurology. Oct 12 1999; 53(6):1271-1276.
96. Poe LB, Coleman LL, Mahmud F. Congenital central nervous system anomalies. Radiographics. Sep 1989; 9(5):801-826.
97. Williams HJ. Imaging the Child with Developmental Delay Imaging. 2004; 16:174-185.
98. McBride W, Brock DG. Subdural Hematoma in Adults: Prognosis and Management. http://www.uptodate.com/contents/subdural-hematoma-in-adults-prognosis-and-management?source=search_result&selectedTitle=1%7E95.
99. Proctor MR. Intracranial Subdural Hematoma in Children: Clinical Features, Evaluation and Management. http://www.uptodate.com/contents/intracranial-subdural-hematoma-in-children-clinical-features-evaluation-and-management?source=search_result&search=MR+Proctor%2C+intracranial+Subdural+hematoma+in+children&selectedTitle=2%7E150.
100. Poe LB, Coleman LL, Mahmud F. Congenital central nervous system anomalies. Radiographics. Sep 1989; 9(5):801-826.

70551, 70552, 70553 MRI of the Brain

Clinical criteria reviewed/revised: 12/16/14, 9/17/14, 12/2/13, 11/21/13, 11/4/13, 10/28/13, 9/24/13, 7/31/13, 6/7/13, 7/6/12, 2/2/12, 8/23/11, 11/17/10, 12/09, 3/18/09
Medical Advisory Committee reviewed and approved: 4/29/14, 12/16/2013 11/8/13, 10/24/13, 9/18/13, 6/12/13, 9/19/12, 9/21/11

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70551 MRI of the Brain without Gadolinium
70552 MRI Brain with Gadolinium
70553 MRI Brain without and with Gadolinium

MEDICARE[1-4] AL

I. Detection and evaluation of extra-axial tumors

II. Detection and evaluation of A-V malformations

III. Detection and evaluation of cavernous hemangiomas

IV. Detection and evaluation of cerebral aneurysms

V. Lesions of the cranial nerves (MRI without and with contrast is strongly recommended)

VI. Multiple sclerosis

VII. Demyelinating and dysmyelinating disorders such as multiple sclerosis

VIII. Acoustic neuroma (MRI without and with contrast is strongly recommended)

IX. Pituitary lesions (MRI without and with contrast is strongly recommended)

X. Injury from radiation

XI. Developmental abnormalities of the brain including neuroectodermal dysplasia

XII. Subacute subarachnoid hemorrhage 48 hours after onset (CT is to be used acutely)

XIII. Subacute subdural hematoma 48 hours after onset (CT is to be used acutely)

XIV. Subacute intracerebral hematoma or hemorrhage 48 hours after onset (CT is to be used acutely)

XV. Subacute epidural hematoma 48 hours after onset (CT is to be used acutely)

XVI. Acute stroke or CVA

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XVII. Seizure [One of the following]
- A. Complex partial seizure
- B. Seizures refractory to therapy
- C. Atypical seizure disorder

XVIII. Brain infection or inflammation

XIX. CT limited by bone artifact

XX. Iodinated contrast is contraindicated

XXI. Focal neurological problem

XXII. Neurologic problem with change in symptoms

XXIII. Brain tumor

XXIV. Initial staging of melanoma, small cell lung cancer, non-small cell lung cancer stage IB or higher or a sarcoma

XXV. Planning for stereotactic or gamma knife surgery- may be approved with CT of the brain

References:

1. Local Coverage Determination (LCD) for Radiology: Magnetic Resonance Imaging of the Brain (L30051), Alabama. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=2&CntrctrType=1%7c9&KeyWord=70551&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=70551&kq=true&bc=IAAAAAAAAAAA&.
2. LCD for Magnetic resonance imaging of the brain (L29220), First Coast Service Options, Inc., Florida. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=12&CntrctrType=1%7c9&KeyWord=70551&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=70551&kq=true&bc=IAAAAAAAAAAA&.
3. Local Coverage Determination (LCD) for Radiology: Magnetic Resonance Imaging of the Brain (L30051), Georgia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=14&CntrctrType=1%7c9&KeyWord=70551&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=70551&kq=true&bc=IAAAAAAAAAAA&.
4. Local Coverage Determination (LCD) for Radiology: Magnetic Resonance Imaging of the Brain (L30051), Tennessee. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=50&CntrctrType=1%7c9&KeyWord=70551&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=70551&kq=true&bc=IAAAAAAAAAAA&.

70551, 70552, 70553 MRI of the Brain: MEDICARE AL

Clinical criteria reviewed/revised: 8/13/14, 11/21/13, 9/26/13, 9/18/13, 7/05/213, 5/17/13, 5/5/12, 8/23/11, 11/17/10, 12/09, 3/18/09
Medical Advisory Committee reviewed and approved: 4/29/14, 12/16/13, 9/18/13, 9/19/12, 9/21/11

70554 Functional MRI of the Brain without Physician or Psychologist
70555 Functional MRI of the Brain with Physician or Psychologist

I. Evaluation of patients with seizures or brain tumors who are candidates for neurosurgical therapy when the results of testing will obviate the need for either the Wada test or direct electrical stimulation.[1-3]

References:

1. Medina LS, Bernal B, Dunoyer C, et al. Seizure disorders: Functional MR imaging for diagnostic evaluation and surgical treatment-prospective study, Radiology, 2005; 236: 247-253.
2. Petrella JR, Shah LM, Harris KM, et al. Preoperative functional MR imaging localization of language and motor areas: Effect on therapeutic decision making in patients with potentially resectable brain tumors, Radiology, 2006; 240:793-802.
3. Sabsevitz DX, Swanson SJ, Hammeke TA, et al. Use of preoperative functional neuroimaging to predict language deficits from epilepsy surgery, Neurology, 2003; 60:1788-1792.

Clinical criteria reviewed/revised: 8/28/14, 5/30/13, 3/1/12, 8/23/11, 11/17/10, 12/09, 1/21/09
Medical Advisory Committee reviewed and approved: 9/5/14, 4/29/14, 9/19/12, 4/4/12, 9/21/11

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71250 CT of the Chest without Contrast
71260 CT of the Chest with Contrast
71270 CT of the Chest without and with Contrast

For cancers not listed below please refer to NCCN guidelines.

I. Cough with a chest x-ray within the last 4 weeks[1-5] [Both of the following]

A. Prior to CT, in addition to the chest x-ray all of the following should be done
   1. Treatment for any finding on CXR failed to relieve cough
   2. No cause for cough suggested by CXR
   3. If (Skip section if there is no history of smoking or ACE inhibitor use) [One of the following]
      a. If a smoker, no response to stopping
      b. If applicable the member used ACE inhibitors for high blood pressure with no response to discontinued use

B. No response to empiric treatment of [All of the following]
   1. Upper airway cough syndrome (UACS preferred terminology; old terminology was post nasal drip) no response to >1 week of first generation antihistamines and decongestants
   2. GERD [One of the following]
      a. No response to anti-reflux medication
      b. Negative 24 hour esophageal pH monitoring
   3. Asthma, no response to bronchodilators

C. Children under age 15 (children 15 or older should be managed as an adult) with abnormal chest x-ray or spirometry (if more than 3 years old)
   1. No evidence of reversible airway obstruction and history or risk of one of the following
   a. Cystic fibrosis
   b. Immunodeficiency
   c. Congenital lung lesions
   d. Missed foreign body
   e. TB
   f. Non-tuberculous mycobacteria
   g. Rheumatic disease
   h. Cytotoxic drugs
   i. Radiation therapy to the chest
   j. Tracheobronchomalacia

II. Hemoptysis[6-9] [One of the following]

A. Age 40 or greater and at least a 40 pack year history of smoking
B. Recurrent and Age 40 or greater and at least a 40 pack year history of smoking (both risk factors required)
C. Massive hemoptysis associated with cardiopulmonary compromise

III. Vocal cord paralysis or hoarseness (dysphonia)[10-12] [One of the following] (Imaging should not be performed prior to laryngoscopy)
- A. Unexplained vocal cord paralysis found on laryngoscopy
- B. Mass or lesion on the vocal cord found on laryngoscopy
- C. Injury to the recurrent laryngeal nerve [One of the following]
  1. Prior cervical spine surgery
  2. Prior thyroid surgery
  3. Prior esophageal cancer surgery
  4. Prior carotid endarterectomy
  5. Left hilar lung mass
  6. Left pneumonectomy
- D. Congenital cysts
- E. Laryngeal web
- F. Trauma to the larynx

IV. Abnormal findings on prior chest imaging[13-30] [One of the following]
- A. Initial work up of lung nodule or mass on prior chest x-ray [One of the following]
  1. Age >35
  2. Enlarged compared to prior exam
  3. Age <35 with equivocal, eccentric or no calcifications on prior exam
  4. Smoker
  5. Known malignancy elsewhere
  6. Abnormal findings at the lung base on recent CT of the abdomen
- B. New lung or mediastinal or hilar mass
- C. Follow up of pulmonary nodule [One of the following]

  General Statements: A linear density is NOT a nodule. Criteria do not apply to patients known to have or suspected of having malignant disease. Lung nodule follow-up applies only to patients over age 35. In the under 35 population the risk of radiation exposure outweighs risk of cancer (See #3 below). Lung nodule in patient <35 years of age, one low dose CT at 6-12 months.

  Ground glass opacities (semi solid nodules) grow more slowly therefore consideration should be given to extending the follow-up interval and total length of follow-up. For management see below
  1. Asymptomatic patient with no history of malignancy, smoking, exposure to asbestos, uranium or radon or history of lung cancer in first degree relative [One of the following]
     - a. Nodule <3.9 mm, no follow up CT
     - b. Nodule 4-5.9 mm follow up CT 12 months; if no change no additional imaging
     - c. Nodule 6-7.9 mm
       - i. Follow up CT at 6-12 months
       - ii. Follow up CT at 18-24 months if no change on first follow up scan
     - d. Nodule >8mm (follow-up same in smoker and non-smoker) [One of the following]
       - i. Follow up CT at 3, 9, and 24 months
       - ii. Dynamic contrast enhanced CT
       - iii. PET
       - iv. Biopsy

2. Asymptomatic patient with no history of malignancy but with a history of smoking, exposure to asbestos, uranium or radon or history of lung cancer in first degree relative [One of the following]
    a. Nodule <3.9 mm follow up at 12 months; if unchanged no further follow up
    b. Nodule 4-5.9 mm
        i. Follow up CT at 6-12 months
        ii. Follow up CT at 18-24 months if no change on first follow up scan
    c. Nodule 6-7.9 mm
        i. Follow up at 3-6 months then
        ii. Follow up at 9-12 months then
        iii. Follow up at 24 months
    d. Nodule >8mm (follow-up same in smoker and non-smoker) [One of the following]
        i. Follow up CT at 3, 9, and 24 months
        ii. Dynamic contrast enhanced CT
        iii. PET
        iv. Biopsy
3. Lung nodule in patient <35 years of age, one low dose CT at 6-12 months
4. Solitary pure ground glass nodule ≤5 mm in size no follow up is required
5. Solitary pure ground glass nodule >5 mm in size
    a. 3 months after initial CT scan
    b. Annually for at least 3 years
6. Solitary part-solid nodules
    a. 3 months after initial CT scan
    b. If persistent and solid component is <5mm annual surveillance CT for at least 3 years
    c. If persistent and solid component is ≥5 mm then biopsy or surgical resection
7. Multiple purely ground glass nodules ≤5mm
    a. Follow up at 2 and 4 years
8. Multiple pure ground glass > 5 mm
    a. 3 months after initial diagnosis
    b. Annual CT for at least 3 years
9. Multiple part solid nodules with dominant nodule(s) with part solid or solid component
    a. 3 months after initial diagnosis to confirm persistence
    b. Biopsy or resection is recommended especially for lesions with >5 mm solid component

D. Atelectasis or mass by CXR [One of the following]
    1. Entire lung field
    2. Lobar atelectasis >2 days
    3. Segmental atelectasis >2 weeks
E. Bleb, bulla or significant emphysema on prior imaging
F. Pneumonia, persistent or recurring [One of the following]
    1. Unimproved after 3 weeks or not resolved by 8 weeks after antibiotics
    2. Recurrent pneumonia at same site
    3. Immunocompromised host
G. Mediastinal mass or widening
        1. Pericardial or cardiac mass by prior imaging
        a. Primary cardiac masses [One of the following]

i. Prior abnormal heart contour on chest x-ray
ii. Prior abnormal echocardiogram
b. Heart failure or peripheral embolization of unknown etiology
2. Suspected superior vena cava obstruction (CT or CTA of the chest) [One of the following]
a. Edema of head and neck
b. Dilated collateral veins on torso
c. Cyanosis
d. Headache and confusion
3. Mediastinal mass or widening suspected on prior imaging or clinical grounds (CT of the chest) [One of the following]
a. Spinal cord compressive syndrome
b. Vena caval obstruction
c. Pericardial tamponade
d. Congestive heart failure
e. Dysrhythmias
f. Pulmonary stenosis
g. Tracheal compression
h. Esophageal compression
i. Vocal cord paralysis
j. Horner's syndrome
k. Phrenic nerve paralysis
l. Chylothorax
m. Chylopericardium
n. Pancoast's syndrome
o. Postobstructive pneumonitis
4. Follow-up examination after at least three months

H. Hilar enlargement which is a new finding on a recent chest x-ray and follow up CT at least 3 months later
I. Elevated diaphragm which is new and not present on old chest x-ray
J. Pleural effusion including recurrent effusion and/or pleural thickening [One of the following]
1. Thoracentesis reveals malignant cells, primary unknown
2. Exudative pleural effusion
3. Prior to video assisted thoracoscopic or other surgery or chest tube insertion for loculated effusion
4. Initial evaluation prior to intervention
5. Following therapeutic thoracentesis
6. Clinical suspicion for mesothelioma
K. Lung abscess or cavitating lesion on chest imaging [One of the following]
1. Not previously imaged
2. Immunocompromised host
3. Follow up after >2 weeks of intravenous antibiotics
L. Infiltrate (complicated pneumonia) [One of the following]
1. No CXR improvement after 4 weeks
2. No change or worsening of symptoms
a. Aural temperature of >38.3°C or 100.9°F
b. Leukocytosis, WBC >11,500/cu.mm

M. Chest x-ray with new superior sulcus tumor or Pancoast tumor
N. Possible interstitial disease

V. Suspected pulmonary embolism (PE)[31-36] [A and B]

A. Symptoms [one of the following]
   1. Dyspnea
   2. Pleuritic chest pain
   3. Tachypnea
B. History and laboratory findings [one of the following]
   1. Positive D-Dimer
   2. New onset [one of the following]
      a. Hemoptysis
      b. Syncope
      c. Cough
      d. Tachycardia (heart rate >100)
      e. Previous history of pulmonary embolism
      f. 65 or older
   3. Well's score for pretest probability of pulmonary embolism of > 4 points

Suspected or known DVT with leg swelling and pain	3.0 points
Diagnosis other than PE is less likely	3.0 points
Tachycardia >100	1.5 points
Previous DVT or Pulmonary embolus	1.5 points
Immobilization (including surgery) in the past 4 weeks	1.5 points
Hemoptysis	1.0 points
Personal history of cancer treated in the past 6 months or on palliative treatment	1.0 points

VI. Evaluation of non lung primary for possible metastatic disease to the lungs (Also see XXII–XLVII, LIV, LV, LVI, LVII below) and surveillance of asymptomatic

VII. Known primary lung cancer[49, 50] [One of the following]

A. Lung cancer [One of the following]
   1. Initial staging
   2. Following surgery or adjuvant treatment
   3. Surveillance [One of the following]
      a. Non-small cell lung cancer [One of the following]
         i. Every 6-12 months for 2 years then
         ii. Annually
      b. Small-cell lung cancer [One of the following]
         i. Every 3-4 months for 2 years then
         ii. Every 6 months for years 3-5 then
         iii. Annually after the 5th year
   4. Unresectable disease [One of the following]
      a. Initial staging
      b. Establish new baseline at the completion of therapy (chemotherapy or radiation therapy)

c. Change in the chest x-ray
d. New symptoms [One of the following]
i. New onset hemoptysis
ii. New onset cough
iii. New onset chest pain
iv. Hoarseness
v. Shortness of breath
vi. Weight loss

B. Evaluation for possible resection of known metastases
C. New symptoms, findings, or deteriorating clinical situation for any known cancer [One of the following]
1. New or worsening findings on CXR
2. Horner's syndrome
3. Hypercalcemia
4. Rising tumor markers with any known cancer [One of the following]
a. CEA >2.5 in non smokers
b. CEA >5.0 in smokers
c. CA-125 >16U/mL
d. AFP >6.6ng/mL
e. CA19-9 >35 U/mL
f. CA 27.29 >38 U/mL
g. PSA >4
5. Chylothorax
6. Superior vena cava syndrome
7. Weight loss of 10 pounds or more
8. Hoarseness
9. Hemoptysis
10. Dysphagia
11. Recurrent pulmonary infections
12. Compromised airway
13. Cough

VIII. Syndrome of inappropriate ADH (SIADH)[77,78] [All of the following]

A. Decreased serum sodium (<125 mmol/l)
B. Elevated ADH
C. Dilute plasma osmolality

IX. Interstitial lung disease[79-83] (pulmonary fibrosis) and pulmonary function tests showing decreased TLC (total lung capacity) or a restrictive pattern [One of the following]

A. Dyspnea
B. Persistent nonproductive cough
C. Hemoptysis
D. Other associated diseases such as but not limited to one of the following
1. Sarcoidosis
2. Collagen vascular diseases such as but not limited to [One of the following]

a. Scleroderma
b. Dermatomyositis
c. SLE (lupus)
d. Rheumatoid arthritis
e. Polymyositis
f. Sjögren's syndrome
g. Mixed connective tissue disease

3. Tuberous sclerosis
4. Wegener's granulomatosis
5. Bronchiolitis obliterans organizing pneumonia (BOOP)
6. Occupational exposure [One of the following]
   a. Asbestosis
   b. Silicosis
7. Immunocompromised individual

E. Drug related diseases [One of the following]
   1. Adalimumab
   2. Amiodarone (decreased DLCO instead of or in addition to PFTs showing a restrictive pattern)
   3. Cyclophosphamide
   4. Etanercept
   5. Fludarabine
   6. INF alpha
   7. INF beta Nitrofurantoin
   8. Procainamide
   9. Hydralazine
   10. Bleomycin
   11. Methotrexate
   12. Mexiletine
   13. BCNU
   14. Methysergide
   15. Mitomycin C
   16. Nitrofurantoin
   17. Paclitaxel
   18. Penicillamine
   19. Rituximab
   20. Sirolimus
   21. Sulfasalazine
   22. Busulfan
   23. Phenytoin
   24. Infliximab
   25. Azathioprine
   26. Gold
   27. Chlorambucil

F. Interstitial infiltrate on a recent chest x-ray with or without abnormal PFTs
G. Children suspected of having interstitial lung disease with or without abnormal PFTs

X. Suspected or known dissection of the aorta[84-89] (CTA) [One of the following]

A. Unequal blood pressure in the arms
B. Rapid onset of "ripping, tearing, searing or sharp" severe chest or upper back or abdominal pain
C. Syncope and chest pain
D. Shortness of breath
E. CVA or stroke
F. Loss of pulses
G. New aortic insufficiency murmur
H. Marfan's syndrome
I. Recent aortic manipulation (such as catheter angiography)
J. Family history of aortic disease
K. Follow up of known dissection [One of the following]
    1. 1 month after repair, then
    2. 3 months after repair, then
    3. 6 months after repair, then
    4. 12 months after repair, then
    5. Annually after 12 months
L. New symptoms after repair [One of the following]
    1. Unequal blood pressure in the arms
    2. Rapid onset of "ripping, tearing, searing, or sharp" severe chest or upper back or abdominal pain
    3. Syncope and chest pain
    4. Shortness of breath
    5. CVA or stroke
    6. Loss of pulses
    7. New aortic insufficiency murmur

XI. Thoracic or thoracoabdominal aneurysm[90-97] (CTA) [One of the following]

A. Patient with Marfan's or Ehlers-Danlos syndrome
B. Turner's syndrome if initial imaging is normal and there are no risk factors for aortic dissection repeat imaging every 5-10 years
C. Asymptomatic patient with [One of the following]
    1. Ascending aorta with diameter >3.7cm
    2. Aortic arch and/or descending aorta with diameter >3.5 cm
    3. Any segment dilated to twice the adjacent normal diameter
    4. Bicuspid aortic valve on echocardiogram
    5. First degree relative with aortic aneurysm or dissection
D. Known thoracic or thoracoabdominal aneurysm demonstrated on prior CT, CTA, MRI, MRA or ultrasound [One of the following]
    1. Asymptomatic [One of the following]
        a. Follow up scan 6 months after initial diagnosis then
        b. If no change on the 6 month follow up scan then once every 12 months unless symptoms develop
        c. Marfan's syndrome annual screening
        d. Marfan's syndrome with aortic diameter of 4.5 cm or more or there has been growth in the aneurysm imaging should be performed more frequently than once every 12 months

2. Symptoms [One of the following]
    a. Chest pain
    b. New aortic insufficiency, new diastolic murmur
    c. Superior vena cava compression
    d. Left vocal cord paralysis

E. Preoperative planning for endovascular or surgical repair (stent graft)
F. Postoperative evaluation following endovascular repair (stent graft) [One of the following]
    1. 1 month after repair, then
    2. 3 months after repair, then
    3. 6 months after repair, then
    4. 12 months after repair, then
    5. Annually after the first year
    6. Suspicion of endoleak

XII. Chest trauma[98,99] (If vascular injury is of concern then CTA of the chest, 71275, is recommended) [One of the following]

A. Abnormal appearance of aorta or mediastinum on chest x-ray or
B. Suspected sternal fracture not demonstrated on x-ray

XIII. Prior to video assisted thoracoscopic surgery (VATS) for treatment of recurrent pneumothorax, pleural effusions, etc.[100,101]

XIV. Thymoma or suspected or known myasthenia gravis[54, 102-105] [Clinical and lab results or follow-up]

A. Clinical [One of the following]
    1. Ptosis or drooping of the eyelid(s)
    2. Diplopia or double vision
    3. Flattening of the smile
    4. Nasal speech
    5. Difficulty chewing or swallowing
    6. Facial paresis
    7. Proximal limb weakness
    8. Cough
    9. Chest pain
    10. Superior vena cava syndrome
    11. Dysphagia
    12. Hoarseness
    13. New anterior mediastinal mass on recent chest x-ray (may be asymptomatic)
    14. Paraneoplastic syndrome [One of the following]
        a. Pure red cell aplasia
        b. Hypogammaglobulinemia
        c. Pure white cell aplasia
        d. Multi organ autoimmunity
B. Laboratory tests [One of the following]
    1. Positive anti-acetylcholine receptor (anti-AChR) antibodies
    2. Positive MuSK antibody assay

3. Antistriational (anti-titin and anti-ryanodine) receptor antibody assays

C. Follow up after treatment [One of the following]
   1. Follow up after treatment is complete to establish new baseline
   2. Annual CT scan if stable
   3. Change in recent chest x-ray
   4. New signs or symptoms [One of the following]
      a. Ptosis or drooping of the eyelid(s)
      b. Diplopia or double vision
      c. Flattening of the smile
      d. Nasal speech
      e. Difficulty chewing or swallowing
      f. Facial paresis
      g. Proximal limb weakness
      h. Cough
      i. Chest pain
      j. Superior vena cava syndrome
      k. Dysphagia
      l. Hoarseness

XV. Suspected bronchiectasis[106-108] [One of the following]

A. Clinical findings [One of the following]
   1. Cough
   2. Daily production of mucopurulent and tenacious sputum
   3. Hemoptysis
   4. Dyspnea
   5. Wheezing or crackles
   6. Pleuritic chest pain
   7. Digital clubbing
      8. Children [one of the following]
      a. Chronic moist/productive cough every day for 8 weeks
      b. Asthma that does not respond to treatment
      c. Recurrent pneumonia
      d. Unexplained hemoptysis
      e. Single positive sputum culture for one of the following
         i. Staphylococcus aureus
         ii. Haemophilus influenzae
         iii. Pseudomonas aeruginosa
         iv. Non-tuberculous mycobacteria
         v. Burkholderia cepacia complex
B. Bronchiectasis on prior CXR
C. History of cystic fibrosis
D. Primary ciliary dyskinesia
E. Known alpha 1-antitrypsin deficiency (AAT)

XVI. Cystic fibrosis [One of the following]

A. Hemoptysis

B. Respiratory distress
C. Spontaneous pneumothorax
D. Acute onset chest pain
E. Inspiratory rales or crackles
F. Bronchiectasis
G. Chronic or recurrent respiratory infections

XVII. Paraneoplastic syndrome suspicious for lung cancer[75,76] [One of the following]
A. SIADH (syndrome of inappropriate ADH)
1. Decreased serum sodium (less than 125 mmol/l)
B. Hypercalcemia
C. Carcinoid syndrome
D. Glomerulonephritis
E. Thrombophlebitis

XVIII. Fever of unknown origin (FUO)[109,110] with documented aural temperature of > 38.3°C or > 100.9°F on several occasions over 3 weeks (CT scans for this indication have a low yield in general and CT of the chest is generally not recommended) [One of the following]
A. Uncertain diagnosis after lab studies [All of the following]
1. Three blood cultures
2. Urine culture not diagnostic
3. Tuberculin skin test
4. HIV antibody assay and HIV viral load for patients at high risk
5. Negative chest x-ray
B. Night sweats

XIX. Scleroderma (progressive systemic sclerosis)[111,112] [One of the following]
A. Diagnosis of scleroderma [One of the following]
1. Asymptomatic [One of the following]
a. Every 6 months for 5 years after diagnosis then
b. Annually after 5 years
2. Symptomatic

XX. Soft tissue mass of the chest wall[113]
A. Chest x-ray

XXI. Weight loss of 5% of total body weight or 10 pounds or more[114,115] (Note that CT scans for this indication have a low yield)

XXII. Pure seminoma[73] [One of the following]
A. Initial staging if positive abdominal CT or an abnormal chest x-ray
B. Any change on a chest x-ray
C. Stage III after completion of chemotherapy

XXIII. Non seminoma testicular malignancy[73] [One of the following]

A. Initial staging
B. Change in chest x-ray
C. NCCN does not recommend routine CT scan of the chest for early stage individuals being managed with surveillance only/ a chest x-ray is recommended

XXIV. Thymic carcinoma[54] [One of the following]

A. Initial staging (MRI)
B. Follow-up after treatment is complete to establish new baseline
C. Surveillance
    1. Every 6 months for 2 years
    2. Annually for 5 years for thymic carcinoma
    3. Annually for 10 years for thymoma
D. Any change on chest x-ray

XXV. Uterine sarcoma[74] [One of the following]

A. Uterine sarcoma
    1. Initial staging
B. Surveillance [One of the following]
    1. Every 3-6 months for 3 years
    2. Every 6 months for next 2 years
    3. Annually

XXVI. Colon cancer[57] [One of the following]

A. Initial staging
B. Follow up after treatment is complete to establish new baseline
C. Follow-up (Routine CT scans are not recommended beyond 5 years) [One of the following]
    1. Annually for up to 5 years with node negative disease (colon and rectal)
    2. Rising CEA (colon and rectal)
        a. If the CT is negative with elevated CEA repeat in 3 months until either disease is identified or CEA level stabilizes
    3. Colon cancer stage IV treated for cure with no evidence of disease
        a. Every 3-6 months for 2 years
        b. Every 6-12 months for 3 years

XXVII. Rectal cancer[58][One of the following]

A. Initial staging
B. Follow-up after treatment is complete to establish new baseline
C. Follow-up (Routine CT scans are not recommended beyond 5 years) [One of the following]
    1. Annually for up to 5 years if high risk of recurrence (lymphatic or venous invasion or poorly differentiated tumors)
    2. Rising CEA
        a. If the CT is negative with elevated CEA repeat in 3 months until either disease is identified or CEA level stabilizes

XXVIII. Anal cancer[76] [One of the following]

A. Initial staging

B. Restage after completion of each course of therapy (primary or secondary including surgery and/or radiation and/or chemotherapy)
C. Annually for 3 years

XXIX. Bone cancers[55] (including osteogenic sarcoma, Ewing's sarcoma, and chondrosarcoma) [One of the following]

A. Osteosarcoma (MRI) [One of the following]
   1. Initial staging
   2. For high grade osteosarcoma of the lower extremity after preoperative chemotherapy
   3. Restaging after completion of treatment
   4. Follow up after treatment [One of the following]
   5. Every 3 months for 2 years
   6. Every 4 months for the third year
   7. Every 6 months for the for the next 2 years (fourth and fifth)
   8. Annually after 5 years
B. Ewing's sarcoma [One of the following]
   1. Initial staging
   2. Restage primary site after completion of primary treatment (usually chemotherapy)
   3. Follow up after treatment [One of the following]
   4. Every 2 months for 2 years
   5. Every 4 months for the third year
   6. Every 6 months for years 4 and 5
   7. Annually after year 5
C. Chondrosarcoma [One of the following]
   1. Initial staging
   2. Restaging after completion of treatment
   3. Low grade and intracompartmental [One of the following]
   4. Every 6-12 months for 2 years
   5. Annually after 2 years as appropriate
   6. High grade (grade II, grade III or clear cell or extracompartmental)
   7. Every 3-6 months for 5 years
   8. Annually for at least 10 years
D. Chordoma [One of the following]
   1. Initial staging
   2. Every 6 months for 5 years
   3. Annually after 5 years
E. Giant cell tumor [One of the following]
   1. Initial staging
   2. Every 6 months for 2 years
   3. Annually after 2 years

XXX. Melanoma (skin not ocular)[64] [One of the following]

A. Initial staging in addition to PET/CT [One of the following]
   1. Stage III or higher including stage III in transit
   2. Stage I or II if there are specific signs and/or symptoms of systemic disease
B. Follow up

1. Stage IIB–IV with no signs or symptoms of disease every 4 - 12 months for 5 years
2. Any new signs or symptoms of disease

XXXI. Breast cancer[56] [One of the following]

A. Initial staging [One of the following]
    1. Clinical stage I–IIB [One of the following]
    a. Alkaline phosphatase >140 U/L
    b. Total bilirubin >1.9 mg/L
    c. GGT >42IU/L
    d. AST >40IU/L
    e. Palpable abdominal mass
    f. Abdominal pain
    2. Clinical stage IIIA or higher
B. Stage IV or known or suspected recurrent disease
    1. Initial staging or restaging (recurrence)
    2. Establish new baseline after treatment
    3. Evidence of progression of disease such as increasing dyspnea, unexplained weight loss, elevated liver function tests, rising tumor markers such as CEA, CA 15-3, CA27.29, hypercalcemia, new or worsening disease on physical examination
    a. Before starting any new therapy
    b. Chemotherapy every 2-4 cycles
    c. Endocrine therapy every 2-6 months
    d. Concern for progression of disease as described above

XXXII. Bladder cancer[69] [One of the following]

A. Initial work up if there is muscle invasion
B. Surveillance
    1. Every 3-6 months for 2 years

XXXIII. Esophageal cancer[68] [One of the following]

A. Initial staging
B. Follow up after treatment is complete to establish new baseline
C. Prior to chemoradiation only if PET/CT is not done or planned

XXXIV. Gastric cancer[75] [One of the following]

A. Initial staging
B. Restaging at completion of treatment

XXXV. Head and neck cancer[59] (This does not include thyroid or parathyroid cancers) [One of the following]

A. Initial staging [One of the following]
    1. Lip cancer
    2. Cancer of the oral cavity
    3. Cancer of the oropharynx
    4. Cancer of the hypopharynx
    5. Cancer of the nasopharynx

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6. Cancer of the glottis
7. Cancer of the supraglottic larynx
8. Ethmoid sinus tumor
9. Maxillary sinus tumor
10. Occult head and neck cancer
11. Salivary gland cancer
12. Mucosal melanoma

B. Follow-up for all head and neck malignancies
   1. As clinically indicated

XXXVI. Hepatoma or hepatocellular carcinoma[60]

A. Initial staging after the diagnosis is confirmed by biopsy including those hepatomas found incidentally on pathologic review of a biopsy performed for other reasons
B. Following resection or local therapy or waiting for transplant
   1. Every 3-6 months for 2 years
   2. Every 6-12 months

XXXVII. Gallbladder cancer[60]

A. Gallbladder mass on any imaging for initial staging
B. Incidental gallbladder cancer at cholecystectomy

XXXVIII. Cholangiocarcinoma[60]

A. Isolated intrahepatic mass with biopsy proven adenocarcinoma
B. Extrahepatic mass

XXXIX. Hodgkin's lymphoma[61] [One of the following]

A. Initial staging including CNS lymphoma
B. Restaging while on treatment should be done with PET/CT
C. After treatment with radiation therapy restage with either CT or PET/CT if last PET scan was positive
D. Follow-up 3 months after completion of radiation therapy treatment
E. Every 6-12 months for 2 years
F. Clinical or laboratory evidence of recurrence
G. Annual scan if there is increased risk for lung cancer (This is optional if none of the factors below are present) [One of the following]
   1. Treatment with radiation therapy
   2. Treatment with alkylating agent chemotherapy
   3. Smoking history

XL. Renal cell or kidney carcinoma[62] [One of the following]

A. Initial staging
B. Follow up of ablative techniques for pT1a
   1. Annually for 5 years
C. Partial or radial nephrectomy for pT1a and pT1b
   1. Annually for 3 years
D. Radical nephrectomy for stage II or III

1. 3-6 months for 3 years
2. Annually for up to 5 years

E. Stage IV or medically or surgically unresectable disease or relapse
1. Every 6-16 weeks

XLI. Malignant pleural mesothelioma[63] [One of the following]

A. Initial staging
B. Following induction chemotherapy for stage I-III and medically operable
C. Following completion of treatment for restaging

XLII. Neuroendocrine tumors[65] [One of the following]

A. Bronchopulmonary carcinoid or thymic carcinoid
1. Initial staging, then
2. Follow-up after treatment is complete to establish new baseline
3. 3-12 months after resection, then
4. 6-12 months starting 1 year after resection

B. Gastric/duodenal/jejunal/ileal/appendiceal/colon/rectal carcinoid
1. Initial staging

C. Pheochromocytoma/paraganglioma
1. Initial staging

D. Adrenal tumor functional or non functional
1. Initial staging

E. Poorly differentiated (high grade) large or small cell carcinoma
F. Initial staging

XLIII. Ovarian cancer[67] [One of the following]

A. Initial staging
B. Surveillance or follow up stage I-IV
1. As clinically indicated

C. Recurrent disease
1. Restaging to determine extent of disease

XLIV. Non-Hodgkin's lymphoma[66] (follicular lymphoma, marginal zone lymphoma, MALT lymphoma, mantle cell lymphoma, diffuse large B-cell lymphoma, Burkitt's lymphoma, peripheral T-cell lymphoma, mycosis fungoides, hairy cell leukemia, post-transplant lymphoproliferative disorders, CLL/SLL, adult T-cell leukemia/lymphoma) [One of the following]

A. Initial staging in addition to PET/CT if not already done
B. Follow up after completion of treatment to establish a new baseline
C. Diffuse Large B cell lymphoma stage I and II
1. Repeat all positive scans after completing chemotherapy and before radiation therapy
2. Repeat all positive scans after completing radiation therapy

D. Diffuse Large B cell lymphoma stage III and IV
1. Restage after 2-4 cycles of chemotherapy
2. Restage after completing chemotherapy
3. Relapse or refractory disease restage as clinically indicated

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E. Surveillance
    1. Not more frequently than every 6 months for the first 2 years
F. Clinical or laboratory evidence of recurrence
    1. For CLL/SLL CT may be needed prior to initiation of therapy

XLV. Pancreatic cancer[71]

A. Initial staging
B. Restaging after chemotherapy

XLVI. Soft tissue sarcoma[72] [One of the following]

A. Extremity and trunk
    1. Initial staging
    2. Follow up after treatment is complete to establish new baseline
        a. Every 6-12 months for stage I disease
        b. Every 3-6 months for 2-3 years, then every 6 months for next 2 years, then annually for stage II or higher disease, or non resectable primary or stage IV disease
B. Retroperitoneal/intra-abdominal (includes GIST, desmoid, aggressive fibromatosis and other sarcomas) [One of the following]
    1. Initial staging
    2. Follow-up after treatment is complete to establish new baseline
    3. Every 3-6 months for 2-3 years (for GIST tumor every 3-6 months for 3-5 years then annually)
    4. Every 6 months for next 2 years
    5. Annually after 4-5 years

XLVII. Cervical cancer[70] [One of the following]

A. Initial workup
B. Post op if para aortic nodes positive and not done prior to surgery
C. As needed based on symptoms and/or findings on physical examination

XLVIII. Evaluation of pectus deformity of the chest

XLIX. Evaluation of congenital anomalies of the chest

L. Primary central nervous system lymphoma (PCNSL)[116]

A. CT chest after biopsy proven primary CNS lymphoma

LI. Pulmonary hypertension with either dyspnea on exertion, fatigue, chest pain, syncope, palpitations or lower extremity edema CT of the chest to evaluate for pulmonary emboli[118]

LII. Ocular melanoma[119,120]

A. Initial staging
B. Surveillance imaging after completion of therapy CT of the abdomen every 6 months for 2 years then annually for another 3 years

LIII. Bronchopulmonary carcinoid[50,65] [One of the following]
- A. Initial staging
- B. Follow up after treatment is complete to establish new baseline
- C. Surveillance
  1. Every 3-4 months for 2 years
  2. Every 6 months for the next 3 years

LIV. Thymic carcinoid[65]
- A. Initial staging if not already done
- B. 3-12 months after surgery
- C. Annually up to 10 years

LV. Adrenal tumors[65] [One of the following]
- A. ACTH independent Cushing's syndrome with tumor >5 cm or irregular margins, local invasion nor other malignant imaging characteristics
- B. Non functioning tumor
  1. Initial staging if malignant appearance on CT or MRI
  2. Surveillance imaging
     a. Localized disease - every 3-12 months for 5 years
     b. Metastatic disease every 3 months

LVI. Poorly differentiated (high-grade) neuroendocrine tumor or large or small cell carcinoma other than lung[65] [One of the following]
- A. Initial staging
- B. Restaging after completion of therapy
- C. Surveillance [One of the following]
  1. Resectable disease image every 3 months for 1 year and then every 6 months
  2. Unresectable or metastatic image every 3 months

LVII. Horner's syndrome[121]

LVIII. Lung cancer screening for smokers (Low-Dose Chest CT without contrast CPT 71250) Medicare [123] [All of the following]
- A. No prior low-dose CT lung screening in the past 12 months
- B. Age 55-77
- C. No signs or symptoms of lung cancer
- D. 30 pack year history of smoking
- E. Currently smokes or quit less than 15 years ago (Screening should be stopped once the individual has quit smoking for 15 years or more)
- F. For the initial low dose CT lung cancer screening
  1. Must have received a written order from a provider and shared decision making which includes counseling regarding lung cancer screening
- G. For subsequent low dose CT lung cancer screening
  1. Must have received a written order from a provider

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References:

1. Pratter MR, Brightling CE, Boulet LP, et al. An empiric integrative approach to the management of cough: ACCP evidence-based clinical practice guidelines, Chest, 2006; 129:222S-231S.
2. McGarvey LPA, Polley L, MacMahon J. Review Series: Chronic cough: Common causes and current guidelines, Chronic Respiratory Disease, 2007; 4:215-223.
3. McGarvey LPA. Cough – 6: Which investigations are most useful in the diagnosis of chronic cough? Thorax, 2004; 59:342-346.
4. Irwin RS, Baumann MH, Boulet L-P, et al. Diagnosis and management of cough executive summary: ACCP evidence-based clinical practice guidelines, Chest, 2006; 129:1-23.
5. Chang AB, and Glomb WB, Guidelines for evaluating chronic cough in pediatrics ACCPO Evidence Based Clinical Practice Guidelines, Chest, 2006; 129:260S-283S.
6. Jeudy J, Khan AR, Mohammed T-L, et al, Expert Panel on Thoracic Imaging. American College of Radiology Appropriateness Criteria – Hemoptysis. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Hemoptysis.pdf.
7. Bruzzi JF, Rémy-Jardin M, Delhaye D, et al. Multi-Detector Row CT of Hemoptysis, RadioGraphics, 2006; 26(1):3-22.
8. Baird J, Belchamber C, Bellamy D, et al. Guideline Development Group, National Collaborating Centre for Acute Care. Lung cancer: the diagnosis and treatment of lung cancer. National Institute for Clinical Excellence, February 2005. http://www.nice.org.uk/nicemedia/pdf/CG024niceguideline.pdf.
9. Bidwell JL, Pachner RW. Hemoptysis: Diagnosis and Management, Am Fam Physician, 2005; 72(7):1253-1260. http://www.aafp.org/afp/2005/1001/p1253.html.
10. Glazer HS, Aronberg DJ, Lee JK, et al. Extralaryngeal causes of vocal cord paralysis: CT evaluation, AJR, 1983, 141:527-531.
11. Schwartz SR, Cohen SM, Dailey SH, et al. Clinical practice guideline: Hoarseness (Dysphonia). http://www.entnet.org/Practice/upload/Final-Hoarseness-Guideline-2.pdf.
12. Chin S, Edelstein S, Chen CY, et al. Using CT to localize side and level of vocal cord paralysis, AJR, 2003; 180:1165-1170.
13. Kanne JP, Jensen LE, Mohammed T-LH, et al, Expert Panel on Thoracic Imaging. American College of Radiology Appropriateness Criteria – Radiographically Detected Solitary Pulmonary Nodule. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SolitaryPulmonaryNodule.pdf.
14. MacMahon H, Austin JH, Gamsu G, et al. Guidelines for management of small pulmonary nodules detected on CT scans: A statement from the Fleischner Society, Radiology, 2005; 237:395-400.
15. Gould MK, Fletcher J, Iannettoni MD, et al. Evaluation of patients with pulmonary nodules: when is it lung cancer? ACCP evidence-based clinical practice guidelines (2nd edition), Chest, 2007; 132:108-130.
16. Godoy MC, Naidich DP. Subsolid pulmonary nodules and the spectrum of peripheral adenocarcinomas of the lung: recommended interim guidelines for assessment and management, Rad, 2009; 253:606-622.
17. Woodring JH. Determining the cause of pulmonary atelectasis: a comparison of plain radiography and CT AJR, 1988; 150:757-763.
18. Ashizawa K, Hayashi K, Aso N, et al. Lobar atelectasis: diagnostic pitfalls on chest radiography, BJR, 2001; 74:89-97.
19. Kirsch J, Mohammed T-LH, Kanne JP, et al, Expert Panel on Thoracic Imaging. American College of Radiology Appropriateness Criteria – Acute Respiratory Illness in Immunocompetent Patients. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteRespiratoryIllnessInImmunocompetentPatients.pdf.
20. Donnelly LF, Klosterman LA. The yield of CT of children who have complicated pneumonia and noncontributory chest radiography, AJR, 1998; 170:1627-1631.
21. Aquino SL, Chiles C, Halford P. Distinction of consolidative bronchioloalveolar carcinoma from pneumonia: do CT criteria work? AJR, 1998; 171:359-363.
22. Gruden JF, Huang L, Turner J, et al. High-resolution CT in the evaluation of clinically suspected Pneumocystis carinii pneumonia in AIDS patients with normal, equivocal, or nonspecific radiographic findings, AJR, 1997; 169:967-975.
23. Sudakoff GS, Rosen MP, Rybicki FJ, et al, Expert Panels on Vascular Imaging and Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Blunt Abdominal Trauma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/BluntAbdominalTrauma.pdf.
24. Bauman KA, Chan KM. Drug-Induced Lung Disease, American College of Chest Physicians. http://69.36.35.38/accp/pccsu/drug-induced-lung-disease?page=0,3.
25. Baron RL, Levitt RG, Sagel SS, et al. Computed tomography in the evaluation of mediastinal widening. Radiology, 1981; 138:107-113.
26. Pugatch RD, Faling LJ, Robbins AH, et al. CT diagnosis of benign mediastinal abnormalities, AJR, 1980; 134:685-694.
27. Siegel MJ, Sagel SS, Reed K. The value of computed tomography in the diagnosis and management of pediatric mediastinal abnormalities, Radiology, 1982; 149-155.
28. Alexander ES, Proto AV, Clark RA. CT differentiation of subphrenic abscess and pleural effusion, AJR , 1983; 140:47-51.
29. Rahman NM, Chapman SJ, Davies RJO. Pleural effusion: a structured approach to care, British Medical Bulletin, 2004; 72:31-47.
30. Light RW. Pleural Effusion, N Engl J Med, 2002; 346(25):1971-1977.
31. Bettman MA, Baginski SG, White RD, et al, Expert Panel on Cardiac Imaging. American College of Radiology Appropriateness Criteria – Acute Chest Pain–Suspected Pulmonary Embolism. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteChestPainSuspectedPulmonaryEmbolism.pdf.
32. Torbicki A, van Beek EJR, Charbonnier B, et al. Guidelines on diagnosis and management of pulmonary embolism, European Heart Journal, 2000; 21:1301-1336.
33. Dupras D, Bluhm J, Felty C, et al. Institute for Clinical Systems Improvement, Health Care Guideline: Venous thromboembolism diagnosis and treatment, Updated January 2013. https://www.icsi.org/_asset/sw0pgp/VTE.pdf.

34. Wells PS, Anderson DR, Rodger M et al, Derivation of a simple clinical model to categorize patient's probability of pulmonary embolism: Increasing the models utility with the SimpliRED D-dimer, Thromb Heaemost, 2000; 83:416-420.
35. Drescher FS, Chandrika S, Weir ID, et al, Effectiveness and acceptability of a computerized decision support system using modified wells criteria for evaluation of suspected pulmonary embolism, Ann Emerg Med, 20011; 57:613-621.
36. Fesmire FM, Brown MD, Espinosa JA, et al Critical issues in the evaluation and management of adult patients presenting to the emergency department with suspected pulmonary embolism, Ann Emerg Med, 2001; 57:628-652.
37. Mohammed T-LH, Kirsch J, Brown K, et al, Expert Panel on Thoracic Imaging. American College of Radiology Appropriateness Criteria – Screening for Pulmonary Metastases. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ScreeningForPulmonaryMetastases.pdf.
38. Fitzgerald JJ, Roberts CC, Daffner RH, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Follow-up of Malignant or Aggressive Musculoskeletal Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/FollowupMalignantOrAggressiveMusculoskeletalTumors.pdf.
39. Mitchell DG, Javitt MC, Glanc P, et al, Expert Panel on Women's Imaging. American College of Radiology Appropriateness Criteria – Staging and Follow-up of Ovarian Cancer. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/StagingAndFollowUpOvarianCancer.pdf.
40. Albers P, Albrecht W, Algaba F, et al. EAU Guidelines on Testicular Cancer. http://www.uroweb.org/gls/pdf/10_Testicular_Cancer.pdf.
41. Dewhurst C, Rosen MP, Blake MA, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Pretreatment Staging of Colorectal Cancer. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PretreatmentStagingColorectalCancer.pdf.
42. Ljungberg B, Cowan NC, Hanbury DC, et al. EAU Guidelines on Renal Cell Carcinoma: The 2010 Update. http://www.uroweb.org/gls/EU/EAU%20Guidelines%20on%20Renal%20Cell%20Carcinoma%20The%202010%20Update.pdf.
43. Fujioka T, Obara W, and The Committee for establishment of the clinical practice guidelines for the management of renal cell carcinoma and the Japanese Urological Association. Evidence-based clinical practice guidelines for renal cell carcinoma (Summary – JUA 2007 Edition). http://onlinelibrary.wiley.com/doi/10.1111/j.1442-2042.2008.02242.x/pdf.
44. Siegel CL, Andreotti RF, Cardenes HR, et al, Expert Panel on Women's Imaging and Radiation Oncology–Gynecology. American College of Radiology Appropriateness Criteria – Pretreatment Planning of Invasive Cancer of the Cervix. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PretreatmentPlanningInvasiveCancerCervix.pdf.
45. West London Cancer Network, NHS. Clinical guidelines for the management of pancreatic cancer. http://www.nwlcn.nhs.uk/Downloads/Clinical-Guidelines/Pancreatic%20Clinical%20Guidelines.pdf.
46. Lightdale CJ. Esophageal Cancer. http://s3.gi.org/physicians/guidelines/EsophagealCancer.pdf.
47. Rubins J, Unger M, Colice GL. Follow-up and surveillance of the lung cancer patient following curative intent therapy: ACCP evidence-based clinical practice guideline (2nd edition), Chest, 2007; 132:355-367.
48. Mohammed T-LH, Kirsch J, Brown K et al, Expert Panel on Thoracic Imaging, American College of Radiology Appropriateness Criteria-Screening for pulmonary metastases, http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ScreeningForPulmonaryMetastases.pdf.
49. Ettinger DS, Wood DE, Akerley W, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Non-small Cell Lung Cancer. http://www.nccn.org/professionals/physician_gls/pdf/nscl.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Non-small Cell Lung Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
50. Kalemkerian GP, Akerley W, Bogner P, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Small Cell Lung Cancer. http://www.nccn.org/professionals/physician_gls/pdf/sclc.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Small Cell Lung Cancer V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
51. Alberts WM, Chair. Diagnosis and management of lung cancer executive summary, ACCP evidence-based clinical practice guidelines, Chest, 2007; 132:1S-19S. http://journal.publications.chestnet.org/article.aspx?articleid=1211628.
52. Ravenel JG, Mohammed T-LH, Rosenzweig KE, et al, Expert Panels on Thoracic Imaging and Radiation Oncology. American College of Radiology Appropriateness Criteria – Non-invasive Clinical Staging of Bronchogenic Carcinoma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Oncology/NonInvasiveClinicalStagingBronchogenicCarcinoma.pdf.
53. Pfister DG, Johnson DH, Azzoli CG, et al, American Society of Clinical Oncology. Treatment of unresectable non-small-cell lung cancer guideline: update 2003, Journal of Clinical Oncology, 2004; 22(2): 330-353.
54. Ettinger DS, Riley GJ, Akerley W, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Thymomas and Thymic Carcinomas. http://www.nccn.org/professionals/physician_gls/pdf/thymic.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Thymomas and Thymic Carcinomas V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.

55. Biermann JS, Chow W, Adkins DR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Bone Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bone.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bone Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
56. Gradishar WJ, Anderson BO, Blair SL, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Breast Cancer. http://www.nccn.org/professionals/physician_gls/pdf/breast.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Breast Cancer V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
57. Benson AB III, Venook AP, Bekaii-Saab T, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Colon Cancer. http://www.nccn.org/professionals/physician_gls/pdf/colon.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Colon Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
58. Benson AB III, Venook AP, Bekaii-Saab T, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Rectal Cancer. http://www.nccn.org/professionals/physician_gls/pdf/rectal.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Rectal Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
59. Pfister DG, Spencer S, Brizel DM, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Head and Neck Cancers. http://www.nccn.org/professionals/physician_gls/pdf/head-and-neck.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Head and Neck Cancers V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
60. Benson AB III, D'Angelica MI, Abrams TA, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Hepatobiliary Cancers. http://www.nccn.org/professionals/physician_gls/pdf/hepatobiliary.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Hepatobiliary Cancers V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
61. Hoppe RT, Advani RH, Ai WZ, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Hodgkin Lymphoma. http://www.nccn.org/professionals/physician_gls/pdf/hodgkins.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Hodgkin's Lymphomas V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
62. Motzer RJ, Jonasch E, Agarwal JN, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Kidney Cancer. http://www.nccn.org/professionals/physician_gls/pdf/kidney.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Kidney Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
63. Ettinger DS, Krug LM, Akerley W, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Malignant Pleural Mesothelioma. http://www.nccn.org/professionals/physician_gls/pdf/mpm.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Malignant Pleural Mesothelioma V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
64. Coit DG, Thompson JA, Andtbacka R, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Melanoma. http://www.nccn.org/professionals/physician_gls/pdf/melanoma.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Melanoma V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
65. Kulke MH, Shah MH, Benson AB III, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Neuroendocrine Tumors. http://www.nccn.org/professionals/physician_gls/pdf/neuroendocrine.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Neuroendocrine Tumors V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.

66. Zelenetz AD, Gordon WG, Wierda WG, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Non-Hodgkin's Lymphomas. http://www.nccn.org/professionals/physician_gls/pdf/nhl.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Non-Hodgkin's Lymphomas V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
67. Morgan RJ, Armstrong DK, Alvarez RD, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Ovarian Cancer. http://www.nccn.org/professionals/physician_gls/pdf/ovarian.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Ovarian Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
68. Ajani JA, Bentrem DJ, Besh S, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2013. Esophageal and Esophagogastric Junction Cancers. http://www.nccn.org/professionals/physician_gls/pdf/esophageal.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Esophageal and Esophagogastric Junction Cancers V2.2013. ©2013 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
69. Clark PE, Spiess PE, Agarwal N, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version1.2014. Bladder Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bladder.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bladder Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
70. Koh WJ, Greer BE, Abu-Rustum NR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Cervical Cancer. http://www.nccn.org/professionals/physician_gls/pdf/cervical.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Cervical Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
71. Tempero MA, Malafa MP, Behrman SW, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Pancreatic Adenocarcinoma. http://www.nccn.org/professionals/physician_gls/pdf/pancreatic.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Pancreatic Adenocarcinoma V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
72. Von Mehren M, Randall RL, Benjamin RS, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Soft Tissue Sarcoma. http://www.nccn.org/professionals/physician_gls/pdf/sarcoma.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Soft Tissue Sarcoma V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
73. Motzer RJ, Jonasch E, Agarwal N, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Testicular Cancer. http://www.nccn.org/professionals/physician_gls/pdf/testicular.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Testicular Cancer V1.2014.
74. Koh W-J, Greer BE, Abu-Rustum NR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Uterine Neoplasms. http://www.nccn.org/professionals/physician_gls/pdf/uterine.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Uterine Neoplasms V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
75. Ajani JA, Bentrem DJ, Besh S, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2013. Gastric Cancer. http://www.nccn.org/professionals/physician_gls/pdf/gastric.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Gastric Cancer V2.2013. ©2013 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
76. Benson AB III, Venook AP, Bekaii-Saab T, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Anal Carcinoma. http://www.nccn.org/professionals/physician_gls/pdf/anal.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Anal Carcinoma V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
77. Spiro SG, Gould MK, Colice GL. Initial Evaluation of the patient with lung cancer: symptoms, signs. Laboratory tests and paraneoplastic syndromes: ACCP evidenced-based clinical practice guidelines (2nd edition) Chest, 2007; 132:149-160.
78. Ellison DH, Berl T. Clinical practice. The syndrome of inappropriate antidiuresis, N Eng J Med, 2007; 356:2064-2072.
79. King TE Jr. Clinical advances in the diagnosis and therapy of the interstitial lung diseases, Am J Respir Crit Care Med, 2005; 172:268-279.

80. Aziz ZA, Wells AU, Bateman ED, et al. Interstitial lung disease: effects of thin-section CT on clinical decision making, Radiology, 2006; 238:725-733.
81. Copley SJ, Coren M, Nicholson AG, et al. Diagnostic accuracy of thin-section CT and chest radiography of pediatric interstitial lung disease, AJR, 2000; 174:549-554.
82. Travis WD, King TE Jr., Carpron F, et al. American Thoracic Society/European Respiratory Society International Multidisciplinary Consensus Classification of the Idiopathic Interstitial Pneumonias, Am J Respir Crit Care Medicare, 2002; 165:277-304.
83. Kanaparthi L. Restrictive lung disease. http://emedicine.medscape.com/article/301760-overview.
84. Jacobs JE, Latson LA, Abbara S, et al, Expert Panel on Cardiac Imaging. American College of Radiology Appropriateness Criteria – Acute Chest Pain–Suspected Aortic Dissection. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteChestPainSuspectedAorticDissection.pdf.
85. Demehri S, Rybicki FJ, Dill KE, et al, Expert Panel on Vascular Imaging. American College of Radiology Appropriateness Criteria – Blunt Chest Trauma–Suspected Aortic Injury. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/BluntChestTraumaSuspectedAorticInjury.pdf.
86. Erbel R, Alfonso F, Boileau C, et al. Diagnosis and management of aortic dissection: recommendations of the Task Force on Aortic Dissection, European Society of Cardiology, Eur Heart J, 2001, 22:1642-1682.
87. Davis T, Iqbal Q, Puppala VK, et al. Institute for Clinical Systems Improvement. Diagnosis and Treatment of Chest Pain and Acute Coronary Syndrome (ACS). https://www.icsi.org/_asset/ydv4b3/ACS-Interactive1112b.pdf.
88. Hagan PG, Nienaber CA, Isselbacher EM, et al. The International Registry of Acute Aortic Dissection (IRAD): new insights into an old disease, JAMA, 2000; 283: 897-903.
89. Von Kodolitsch Y, Schwartz AG, Nienaber CA. Clinical prediction of acute aortic dissection. Arch Intern Med 2000; 160: 2971-82.
90. Hiratzka LF, Bakris GL, Beckman JA et al Guidelines for the diagnosis and management of patients with thoracic aortic disease, Jam Coll Cardiol, 2010;55:e27-e129.
91. Isselbacher EM. Thoracic and Abdominal Aortic Aneurysms, Circulation, 2005; 111:816-828.
92. Elefteriades JA. Natural history of thoracic aortic aneurysms: indications for surgery, and surgical versus nonsurgical risks, Ann Thorac Surg, 2002; 74:S1877-S1880.
93. Fattori R, Russo V. Degenerative aneurysm of the descending aorta. Endovascular treatment, European Association for Cardio-thoracic Surgery, Multimedia Manual of Cardiothoracic Surgery, 2007. http://mmcts.ctsnetjournals.org/cgi/reprint/2007/1217/mmcts.2007.002824.pdf.
94. Mehard WB, Heiken JP, Sicard GA. High-attenuating crescent in abdominal aortic aneurysm wall at CT: a sign of acute or impending rupture, Radiology, 1994; 192:359-362.
95. Stavropoulos SW, Charagundla SR. Imaging techniques for detection and management of endoleaks after endovascular aortic aneurysm repair, Radiology, 2007; 243:641-655.
96. Hirsch AT, Haskal ZJ, Hertzer NR, et al. ACC/AHA 2005 Practice Guidelines for the Management of Patients With Peripheral Arterial Disease (Lower Extremity, Renal, Mesenteric, and Abdominal Aortic): Executive Summary. A Collaborative Report From the American Association for Vascular Surgery/Society for Vascular Surgery, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine and Biology, Society of Interventional Radiology, and the ACC/AHA Task Force on Practice Guidelines (Writing Committee to Develop Guidelines for the Management of Patients With Peripheral Arterial Disease), Circulation, 2006; 113:1474-1547.
97. Horton KM, Smith C, Fishman EK. MDCT and 3D CT Angiography of Splanchnic Artery Aneurysms, AJR, 2007; 189:641-647.
98. Van Hise ML, Primack SL, Israel RS, Muller NL. CT in blunt chest trauma: indications and limitations, RadioGraphics, 1998; 18:1071-1084.
99. Iochum S, Ludig T, Walter F, et al. Imaging of Diaphragmatic Injury: A Diagnostic Challenge, RadioGraphics, 2002; 22:S103-S118.
100. Solli P, Spaggiari. Indications and developments of video-assisted thoracic surgery in the treatment of lung cancer, Oncologist, 2007; 12:1205-1214.
101. Ciriaco P, Negri G, Puglisi A, et al. Video-assisted thoracoscopic surgery for pulmonary nodules: rationale for preoperative computed tomography-guided hookwire localization, Eur J Cardio-Thoracic Surg, 2004; 25(3):429-433.
102. Epocrates online. Myasthenia gravis. https://online.epocrates.com/u/2922238/Myasthenia+gravis/Basics/Vignette.
103. De Kraker M, Kluin J, Renken N, et al. CT and myasthenia gravis: correlation between mediastinal imaging and histopathological findings, Interact Cardiovasc Thorac Surg, 2005; 4:267-271.
104. Alberta Health Services. Clinical Practice Guideline LU-008: Thymic Neoplasms. http://www.albertahealthservices.ca/hp/if-hp-cancer-guide-lu008-thymic.pdf.
105. Bezjak A, Meneshian A, Giaccone G Clinical presentation and management of thymoma and thymic carcinoma, UpToDate. http://www.uptodate.com/contents/clinical-presentation-and-management-of-thymoma-and-thymic-carcinoma.
106. Rosen MJ. Chronic cough due to bronchiectasis: ACC evidence-based clinical practice guidelines, Chest, 2006; 129:122-131.
107. Barker AF. Bronchiectasis. N Engl J Med, 2002; 346:1383-1393.
108. Pasteur MC, Bilton D, and Hill AT, On behalf of the British Thoracic Society Bronchiectasis (non-CF) Guideline Group: a sub-group of the British Thoracic Society Standards of Care Committee, Thorax, 2010; 65:i1-i58.
109. Mourad O, Palda V, Detsky AS. A comprehensive evidence-based approach to fever of unknown origin, Arch Intern Med, 2003; 163:545-551.
110. Roth AR, Basello GM. Approach to the Adult Patient with Fever of Unknown Origin, Am Fam Physician, 2003, 68:2223-2229.
111. Varga J. Evaluation for and diagnosis of lung disease in systemic sclerosis (scleroderma), UpToDate. http://www.uptodate.com/online/content/topic.do?topicKey=int_lung/9113&selectedTitle=5~150&source=search_result.
112. Wells AU. High-resolution computed tomography and scleroderma lung disease, Rheum, 2008; 47:v59-v61.

113. Zoga AC, Weissman B, Kransdorf JJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Soft Tissue Masses. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SoftTissueMasses.pdf.
114. Bouras EP, Lange SM, Scolapio JS. Rational approach to patients with unintentional weight loss, Mayo Clin Proc, 2001; 76:923-929.
115. Huffman GB. Evaluating and treating unintentional weight loss in the elderly, Am Fam Physician, 2002; Feb 15; 65:640-651.
116. Nabors LB, Ammirati M, Bierman PJ, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2013. Central Nervous System Cancers. http://www.nccn.org/professionals/physician_gls/pdf/cns.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Central Nervous System Cancers V2.2013. ©2013 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
117. U.S. Preventive Services Task Force, Screening for lung cancer: U.S. Preventive Services Task Force Recommendation Statement, Ann Intern Med; 2013 http://www.uspreventiveservicestaskforce.org/uspstf13/lungcan/lungcanfinalrs.pdf.
118. McLaughlin VV, Archer SL, Badesch DB. ACCF/AHA 2009 expert consensus document on pulmonary hypertension: a report of the American College of Cardiology Foundation Task Force on Expert Consensus Documents and the American Heart Association: developed in collaboration with the American College of Chest Physicians, American Thoracic Society, Inc., and the Pulmonary Hypertension Association, Circulation, 2009; 119:2250-2294.
119. Merseyside and Cheshire Cancer Network, NHS, Ocular melanoma liver metastasis pathway, http://www.mccn.nhs.uk/fileuploads/File/Ocular%20Melanoma%20Liver%20Metastasis%20Pathway.pdf.
120. Diener-West M, Reynolds SM, Agugliaro DJ, et al, Screening for metastasis from choroidal melanoma: the collaborative ocular melanoma study group report 23, J Clin Onc, 2004; 22:2438-2444.
121. Lee JH, Lee HK, Lee DH, et al, Neuroimaging strategies for three types of Horner syndrome with emphasis on anatomic location, AJR, 2007; 188:W74-W81, accessed at http://www.ajronline.org/doi/pdf/10.2214/AJR.05.1588
122. Intern Med; 2013. http://www.uspreventiveservicestaskforce.org/uspstf13/lungcan/lungcanfinalrs.pdf.
123. Decision Memo for Screening for Lung Cancer with Low Dose computed Tomography (LDCT) (CAG-00439N) http://www.cms.gov/medicare-coverage-database/details/nca-decision-memo.aspx?NCAId=274.

71250, 71260, 71270 CT of the Chest

Clinical criteria reviewed/revised: 2/17/15, 10/9/14, 9/25/14, 10/28/13, 9/20/13, 8/15/13, 7/31/13, 6/3/2013, 4/14/13, 2/27/13, 7/11/12, 7/3/12, 3/14/12, 8/24/11, 11/17/10, 5/26/10, 1/20/10, 12/09
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71275 CTA Chest

I. Suspected pulmonary embolism (PE)[1-6] [A and B]

A. Symptoms [One of the following]
   1. Dyspnea
   2. Pleuritic chest pain
   3. Tachypnea

B. History and laboratory findings [one of the following]
   1. Positive D-Dimer
   2. New onset [one of the following]
      a. Hemoptysis
      b. Syncope
      c. Cough
      d. Tachycardia (heart rate >100)
      e. Previous history of pulmonary embolism
      f. 65 or older
   3. Well's score for pretest probability of pulmonary embolism of > 4 points

Suspected or known DVT with leg swelling and pain	3.0 points
Diagnosis other than PE is less likely	3.0 points
Tachycardia >100	1.5 points
Previous DVT or Pulmonary embolus	1.5 points
Immobilization (including surgery) in the past 4 weeks	1.5 points
Hemoptysis	1.0 points
Personal history of cancer treated in the past 6 months or on palliative treatment	1.0 points

II. Developmental anomalies of the thoracic vasculature for initial evaluation, treatment planning and post-operative evaluation (MRI or MRA)[7-10] [One of the following]

A. Coarctation of the aorta
B. Right-sided aortic arch
C. Truncus arteriosus
D. Persistent left superior vena cava
E. Interrupted inferior vena cava
F. Total anomalous pulmonary venous return
G. Pulmonary artery atresia
H. Pulmonary artery hypoplasia
I. Bicuspid aortic valve
J. Patent ductus
K. Tetralogy of Fallot
L. ASD
M. Ebstein's anomaly
N. Corrected transposition of the great vessels

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O. Sinus of Valsalva aneurysm
P. Coronary artery anomalies
Q. VSD
R. Other known or suspected congenital anomalies of the heart

III. Suspected or known dissection of the aorta with chest pain[11-17] and [One of the following]
A. Unequal blood pressure in the arms
B. Rapid onset of "ripping, tearing, searing, or sharp" severe chest or upper back or abdominal pain
C. Syncope
D. Shortness of breath
E. Focal neurological deficit
F. Loss of pulses
G. New aortic insufficiency murmur
H. Marfan's syndrome
I. Recent aortic manipulation (such as catheter angiography)
J. Family history of aortic disease
K. Follow up of known dissection [One of the following]
1. 1 month after repair
2. 3 months after repair
3. 6 months after repair
4. 12 months after repair
5. Annually after 12 months
L. New symptoms after repair [One of the following]
1. Unequal blood pressure in the arms
2. Rapid onset of "ripping, tearing, searing, or sharp" severe chest or upper back or abdominal pain
3. Syncope and chest pain
4. Shortness of breath
5. Loss of pulses
6. New aortic insufficiency murmur

IV. Aneurysm of the thoracic aorta or thoracoabdominal aneurysm[17-24] [One of the following]
A. Patient with Marfan or Ehlers-Danlos syndrome
B. Turner's syndrome if initial imaging is normal and there are no risk factors for aortic dissection repeat imaging every 5-10 years
C. Asymptomatic patient with [One of the following]
1. Ascending aorta with diameter >3.7 cm
2. Aortic arch and/or descending aorta with diameter >3.5 cm by chest x-ray
3. Any segment dilated to twice the adjacent normal diameter
4. Bicuspid aortic valve on echocardiogram
5. First degree relative with aortic aneurysm and/or dissection
D. Known thoracic or thoracoabdominal aneurysm demonstrated by CT, CTA, MRI, MRA or ultrasound [One of the following]

1. Asymptomatic [One of the following]
    a. Follow-up scan 6 months after initial diagnosis
    b. If no change on the 6 month follow-up scan then once every 12 months unless symptoms develop or the aneurysm has increased in size
    c. Marfan's syndrome annual screening
    d. Marfan's syndrome with aortic diameter of 4.5 cm or more or there has been growth in the aneurysm imaging should be performed more frequently than once every 12 months
2. Symptoms [One of the following]
    a. Chest pain
    b. Aortic insufficiency, new diastolic murmur
    c. Superior vena cava compression
    d. Left vocal cord paralysis

E. Preoperative planning for endovascular repair (stent graft)
F. Postoperative evaluation following endovascular repair (stent graft) [One of the following]
1. 1 month after repair
2. 3 months after repair
3. 6 months after repair
4. 12 months after repair
5. Annually thereafter
6. Suspicion of endoleak

V. Assess thoracic venous structures[25-27] [One of the following]

A. Superior vena cava syndrome [One of the following]
1. Physical findings [One of the following]
    a. Swelling, edema or cyanosis of body cranial to heart level
        i. Face
        ii. Arms
        iii. Neck
    b. Dilated anterior chest wall veins and/or collateral veins
    c. Cerebral and laryngeal edema
2. Neurologic symptoms [One of the following]
    a. Headache
    b. Dizziness, stupor or syncope
    c. Visual disturbances
3. Bending over or lying down accentuates symptoms

B. Mapping for venous access
C. Pulmonary vein ablation [One of the following]
1. Atrial fibrillation
2. Suspicion of pulmonary vein stenosis after ablation

D. Evaluation of pulmonary vein anomalies

VI. Pulmonary vein mapping[28-29] [One of the following]

A. Planned radiofrequency ablation for treatment of atrial fibrillation
B. Following radiofrequency ablation if there is a suspicion of venous stenosis

VII. Assessment of suspected pulmonary arteriovenous malformation[30] [One of the following]
- A. Screening with family history of Hereditary Hemorrhagic Telangiectasia (HHT)
- B. Findings on prior imaging suggestive of pulmonary avm
- C. Personal history of HHT (MRA if multiple procedures over time are anticipated)

VIII. Trauma[12] [One of the following]
- A. Chest pain
- B. Chest x-ray demonstrating abnormal mediastinal or aortic contour
- C. History of deceleration injury

IX. Planning for transcatheter aortic valve implantation (TAVI) or transcatheter aortic valve replacement (TAVR)[31]

X. Pulmonary hypertension with either dyspnea on exertion, fatigue, chest pain, syncope, palpitations or lower extremity edema CT of the chest to evaluate for pulmonary emboli[32]

References:

1. Bettman MA, Baginski SG, White RD, et al, Expert Panel on Cardiac Imaging. American College of Radiology Appropriateness Criteria – Acute Chest Pain–Suspected Pulmonary Embolism. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteChestPainSuspectedPulmonaryEmbolism.pdf.
2. Torbicki A, van Beek EJR, Charbonnier B, et al. Guidelines on diagnosis and management of pulmonary embolism, European Heart Journal, 2000; 21:1301-1336.
3. Dupras D, Bluhm J, Felty C, et al. Institute for Clinical Systems Improvement, Health Care Guideline: Venous thromboembolism diagnosis and treatment, Updated January 2013. https://www.icsi.org/_asset/sw0pgp/VTE.pdf.
4. Wells PS, Anderson DR, Rodger M et al, Derivation of a simple clinical model to categorize patient's probability of pulmonary embolism: Increasing the models utility with the SimpliRED D-dimer, Thromb Heaemost, 2000; 83:416-420.
5. Drescher FS, Chandrika S, Weir ID, et al, Effectiveness and acceptability of a computerized decision support system using modified wells criteria for evaluation of suspected pulmonary embolism, Ann Emerg Med, 20011; 57:613-621.
6. Fesmire FM, Brown MD, Espinosa JA, et al Critical issues in the evaluation and management of adult patients presenting to the emergency department with suspected pulmonary embolism, Ann Emerg Med, 2001; 57:628-652.
7. Ho VB, Biko DM, White RD, et al, Expert Panel on Cardiovascular Imaging. American College of Radiology Appropriateness Criteria – Known or suspected congenital heart disease in the adult. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/KnownOrSuspectedCongenitalHeartDisease.pdf.
8. Goo HW, Par I-S, Ko JK, et al. CT of congenital heart disease: normal anatomy and typical pathologic conditions, RadioGraphics, 2003; 23: S147-S165.
9. Leschka S, Oechslin E, Husmann L, et al. Pre and postoperative evaluation of congenital heart disease in children and adults with 64-section CT, RadioGraphics, 2007; 27:829-846.
10. Ou P, Celermajer DS, Calcagni G, et al. Three-dimensional CT scanning: a new diagnostic modality in congenital heart disease, Heart, 2007; 93:908-913.
11. Jacobs JE, Latson LA, Sabbara S, et al, Expert Panel on Cardiac Imaging. American College of Radiology Appropriateness Criteria – Acute Chest Pain–Suspected Aortic Dissection. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteChestPainSuspectedAorticDissection.pdf.
12. Demehri S, Rybicki FJ, Dill KE, et al, Expert Panel on Vascular Imaging. American College of Radiology Appropriateness Criteria – Blunt Chest Trauma–Suspected Aortic Injury. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/BluntChestTraumaSuspectedAorticInjury.pdf.
13. Erbel R, Alfonso F, Boileau C, et al. Diagnosis and management of aortic dissection: recommendations of the Task Force on Aortic Dissection, European Society of Cardiology, Eur Heart J, 2001, 22:1642-1682.
14. Davis T Iqbal Q, Puppala VK,, et al. Institute for Clinical Systems Improvement. Diagnosis and Treatment of Chest Pain and Acute Coronary Syndrome (ACS). https://www.icsi.org/_asset/ydv4b3/ACS-Interactive1112b.pdf.
15. Hagan PG, Nienaber CA, Isselbacher EM, et al. The International Registry of Acute Aortic Dissection (IRAD): new insights into an old disease, JAMA, 2000; 283: 897-903.

16. Von Kodolitsch Y, Schwartz AG, Nienaber CA. Clinical prediction of acute aortic dissection. Arch Intern Med 2000; 160: 2971-82.
17. Hiratzka LR, Bakris GL, Beckman JA, et al. 210 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/ SIR/SVM Guidelines for the diagnosis and management of patients with thoracic aortic disease. Circulation, 2010; 121:e266-36.
18. Isselbacher EM. Thoracic and Abdominal Aortic Aneurysms, Circulation, 2005; 111:816-828.
19. Elefteriades JA. Natural history of thoracic aortic aneurysms: indications for surgery, and surgical versus nonsurgical risks, Ann Thorac Surg, 2002; 74:S1877-S1880.
20. Fattori R, Russo V. Degenerative aneurysm of the descending aorta. Endovascular treatment, European Association for Cardio-thoracic Surgery, Multimedia Manual of Cardiothoracic Surgery, 2007. http://mmcts.ctsnetjournals.org/cgi/reprint/2007/1217/mmcts.2007.002824.pdf.
21. Mehard WB, Heiken JP, Sicard GA. High-attenuating crescent in abdominal aortic aneurysm wall at CT: a sign of acute or impending rupture, Radiology, 1994; 192:359-362.
22. Starvropoulos SW, Charagundla SR. Imaging techniques for detection and management of endoleaks after endovascular aortic aneurysm repair, Radiology, 2007; 243:641-655.
23. Hirsch AT, Haskal ZJ, Hertzer NR, et al. ACC/AHA 2005 Practice Guidelines for the Management of Patients With Peripheral Arterial Disease (Lower Extremity, Renal, Mesenteric, and Abdominal Aortic): Executive Summary. A Collaborative Report From the American Association for Vascular Surgery/Society for Vascular Surgery, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine and Biology, Society of Interventional Radiology, and the ACC/AHA Task Force on Practice Guidelines (Writing Committee to Develop Guidelines for the Management of Patients With Peripheral Arterial Disease), Circulation, 2006; 113:1474-1547.
24. Horton KM, Smith C, Fishman EK. MDCT and 3D CT Angiography of Splanchnic Artery Aneurysms, AJR, 2007; 189:641-647.
25. Leyendecker JR, El-Merhi FM, Dillman J, et al. ACR-NASCI-SPR practice guideline for the performance of pediatric and adult body magnetic resonance angiography (MRA). http://www.acr.org/Quality-Safety/Standards-Guidelines/Practice-Guidelines-by-Modality/Cardiovascular.
26. Qanadli SD, El Hajjam M, Bruckert F, et al. Helical CT phlebography of the superior vena cava: diagnosis and evaluation of venous obstruction, AJR, 1999; 172:1327-1333.
27. Dillman JR, Yarram, SG, Hernandez RJ. Imaging of pulmonary venous developmental anomalies, AJR, 2009; 192:1272-1285.
28. Nael K, Krishnam M, Ruehm SG, et al. Time-resolved MR angiography in the evaluation of central thoracic venous occlusive disease, AJR, 2009; 192:1731-1738.
29. Wazni OM, Tsao H-M, Chen S-A. Cardiovascular imaging in the management of atrial fibrillation, J Am Coll Cardio, 2006; 48:2077-2084.
30. Schneider G, Uder M, Koehler M, et al. MR angiography for the detection of pulmonary arteriovenous malformations in patients with hereditary hemorrhagic telangiectasia, AJR, 2008; 190:892-901.
31. Achenbach S, Delgado V, Hausleiter J, et al. SCCT expert consensus document on computed tomography imaging before transcatheter aortic valve implantation (RAVI)/transcatheter aortic valve replacement (TAVR), J Cardiovasc Computed Tomography, 2012; 6:366-380.
32. McLaughlin VV, Archer SL, Badesch DB. ACCF/AHA 2009 expert consensus document on pulmonary hypertension: a report of the American College of Cardiology Foundation Task Force on Expert Consenus documents and the American Heart Association: Developed in collaboration with the American College of Chest Physicians, American Thoracic Society, Inc., and the Pulmonary Hypertension Association, Circulation, 2009; 119:2250-2294.

71275 CTA Chest

Clinical criteria reviewed/revised: 7/22/14, 9/23/13, 7/9/13, 05/31/13, 6/26/12, 4/17/12, 7/27/11, 11/17/10, 5/26/10, 11/18/09
Medical Advisory Committee reviewed and approved: 4/29/14, 10/24/13, 9/18/13, 9/19/12, 9/21/11

71550 MRI of the Chest without Gadolinium
71551 MRI of the Chest with Gadolinium
71552 MRI of the Chest without and with Gadolinium

I. Mediastinum[1-3] (CT of the chest should be performed unless there is a definite contraindication) [One of the following]

A. Hilar enlargement with non-diagnostic CT
B. Pericardial or cardiac mass by prior imaging [One of the following]
    1. Primary cardiac masses [One of the following]
        a. Prior abnormal heart contour on chest x-ray
        b. Prior abnormal echocardiogram
    2. Heart failure or peripheral embolization of unknown etiology
C. Suspected superior vena cava obstruction (CT or CTA of the chest) [One of the following]
    1. Edema of head and neck
    2. Dilated collateral veins on torso
    3. Cyanosis
    4. Headache and confusion
D. Mediastinal mass or widening suspected on prior chest x-ray or clinical grounds (CT of the chest) [One of the following]
    1. Spinal cord compressive syndrome
    2. Vena caval obstruction
    3. Pericardial tamponade
    4. Congestive heart failure
    5. Dysrhythmias
    6. Pulmonary stenosis
    7. Tracheal compression
    8. Esophageal compression
    9. Vocal cord paralysis
    10. Horner's syndrome
    11. Phrenic nerve paralysis
    12. Chylothorax
    13. Chylopericardium
    14. Pancoast's syndrome
    15. Postobstructive pneumonitis

II. Great vessels [One of the following][4-7]

A. Anomalies of the aortic arch [One of the following]
    1. Abnormal mediastinal contour on chest x-ray
    2. Abnormal echocardiogram
B. Monitoring the aorta in Marfan syndrome and annuloaortic ectasia
C. Establishing the source of peripheral embolization [One of the following]
    1. Cyanosis of a single extremity or part of an extremity
    2. Abdominal angina

3. Stroke or TIA

D. Diagnosis and assessment of the severity of coarctation, including post-angioplasty evaluation
E. Diagnosis of periaortic abscess or infectious pseudoaneurysm in bacterial endocarditis of the aortic valve
F. Assessment of the origin and proximal parts of the great vessels for possible causes of cerebrovascular disease
   1. History of stroke or TIA
G. Intramural hematoma
H. Aortitis [One of the following]
   1. Upper extremity claudication
   2. Stroke
   3. Transient cerebral ischemia
   4. Dizziness or syncope
   5. Subclavian steal
   6. Retinopathy
   7. Raynaud's phenomenon
   8. Hypertension, sometimes malignant
I. Suspected thoracic aortic dissection (See indication V below)
J. Thoracic or thoracoabdominal aneurysm (See VI below)

III. Pleura[8] (CT) [One of the following]

A. Tumor [One of the following]
   1. To determine if pleural lesions detected on other examinations are benign or malignant (Metastases are most common)
   2. Mesothelioma
      a. To determine extent of tumor
B. To evaluate pleural fluid in high risk patients (CT)

IV. Brachial plexus[9-14] [One of the following]

A. Brachial plexus injury including radiation therapy [Both of the following]
   1. Symptoms [One of the following]
      a. Weakness or paralysis of the upper extremity
      b. Sensory loss or numbness of the upper extremity
      c. Horner's syndrome
      d. Shoulder, axillary and/or arm pain
      e. Burning or electric sensation in more than one nerve distribution
      f. Loss of deep tendon reflexes in the upper extremity
      g. EMG showing a neurogenic lesion in muscles supplied by at least 2 cervical levels
   2. History [One of the following]
      a. Trauma including birth trauma
      b. Radiation fibrosis
      c. History of radiation therapy to the chest, breast or axilla
      d. Weakness of the shoulder and/or arm
B. Primary or metastatic tumor [Both of the following]
   1. Symptoms [One of the following]
      a. Weakness or paralysis of the upper extremity

b. Sensory loss or numbness of the upper extremity
c. Horner's syndrome
d. Shoulder and/or arm pain
e. Burning or electric sensation in more than one nerve distribution
f. Loss of deep tendon reflexes in the upper extremity
g. EMG showing a neurogenic lesion in muscles supplied by at least 2 cervical levels

2. History [One of the following]
a. Known primary tumor
b. Lung cancer especially a Pancoast tumor
c. Lymphoma

C. Schwannoma or neurofibroma
1. Symptoms [One of the following]
a. Palpable mass in the lower neck or supraclavicular fossa
b. Weakness or paralysis of the upper extremity
c. Sensory loss or numbness in the upper extremity
d. Horner's syndrome
e. Shoulder and/or arm pain
f. Burning or electric sensation in more than one nerve distribution
g. Loss of deep tendon reflexes in the upper extremity
h. EMG showing a neurogenic lesion in muscles supplied by at least 2 cervical levels

D. Entrapment
1. Symptoms [One of the following]
a. Pain and paresthesia along the ulna aspect of the forearm, hand and 4th and 5th fingers
b. Symptoms increase with overhead activities

V. Suspected or known dissection of the aorta with chest pain and[4,15-20] [One of the following]

A. Unequal blood pressure in the arms
B. Rapid onset of "ripping, tearing, searing, or sharp" severe chest or upper back or abdominal pain
C. Syncope
D. Shortness of breath
E. Focal neurological deficit
F. Loss of pulses
G. New aortic insufficiency murmur
H. Follow up of known dissection [One of the following]
1. 1 month after repair
2. 3 months after repair
3. 6 months after repair
4. 12 months after repair
5. Annually after 12 months

I. New symptoms after repair [One of the following]
1. Unequal blood pressure in the arms
2. Rapid onset of "ripping, tearing, searing, or sharp" severe chest or upper back or abdominal pain

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3. Syncope
4. Shortness of breath
5. Focal neurologic deficit
6. Loss of pulses
7. New aortic insufficiency murmur

VI. Aneurysm of the thoracic aorta or thoracoabdominal aneurysm[20-28][One of the following]

A. Patient with Marfan's or Ehlers-Danlos syndrome
B. Turner's syndrome if initial imaging is normal and there are no risk factors for aortic dissection repeat imaging every 5-10 years
C. Asymptomatic patient with [One of the following]
   1. Ascending aorta with diameter >3.7 cm
   2. Aortic arch and/or descending aorta with diameter >3.5 cm by chest x-ray
   3. Any segment dilated to twice the adjacent normal diameter
   4. Bicuspid aortic valve on echocardiogram
   5. First degree relative with aortic aneurysm and/or dissection
D. Known thoracic or thoracoabdominal aneurysm
   1. Asymptomatic with no repair [One of the following]
      a. Follow up scan 6 months after initial diagnosis
      b. If no change on the 6 month follow up scan then once every 12 months unless symptoms develop or the aneurysm has increased in size
      c. Marfan's syndrome annual screening
      d. Marfan's syndrome with aortic diameter of 4.5 cm or more or there has been growth in the aneurysm imaging should be performed more frequently than once every 12 months
   2. Symptoms [One of the following]
      a. Chest pain
         New aortic insufficiency, new diastolic murmur
      b. Superior vena cava compression
      c. Left vocal cord paralysis
E. Preoperative planning for endovascular repair (stent graft)
F. Postoperative evaluation following surgical or endovascular repair (stent graft)
   1. 1 month after repair
   2. 3 months after repair
   3. 6 months after repair
   4. 12 months after repair
   5. Annually
   6. Suspicion of endoleak

VII. Soft tissue mass of the chest wall including a supraclavicular mass or axillary adenopathy[29]

A. Chest x-ray

VIII. Evaluation of congenital anomalies of the chest

References:

1. Maisch B, Seferovic PM, Ristic AD, et al. Guidelines on the diagnosis and management of pericardial diseases full text, The Task Force on the Diagnosis and Management of Pericardial Diseases of the European Society of Cardiology. http://www.escardio.org/guidelines-surveys/esc-guidelines/GuidelinesDocuments/guidelines-pericardial-FT.pdf.
2. Brown D, Aberle DR, Batra P, et al. Current use of imaging in the evaluation of primary mediastinal masses, Chest, 1990; 98:466-473.
3. Stollo DC, Rosado de Christenson ML, Jett JR. Primary mediastinal tumors. Part 1: tumors of the anterior mediastinum, Chest, 1997; 112:511-522.
4. Jacobs JE, Latson LA, Sabbara S, et al, Expert Panel on Cardiovascular Imaging. American College of Radiology ACR Appropriateness Criteria – Acute Chest Pain–Suspected Aortic Dissection. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteChestPainSuspectedAorticDissection.pdf.
5. Davis T, Bluhm J, Burke R, et al. Institute for Clinical Systems Improvement Health Care Guideline, diagnosis and treatment of chest pain and acute coronary syndrome (ACS), Updated November 2012. http://www.icsi.org/guidelines_and_more/gl_os_prot/cardiovascular/acs_acute_coronary_syndrome/acs__acute_coronary_syndrome_and_chest_pain__diagnosis_and_treatment_of__full_version_.html.
6. Desjardins B, Rybicki FJ, Dill KE, et al, Expert Panel on Cardiovascular Imaging. American College of Radiology ACR Appropriateness Criteria – Pulsatile Abdominal Mass. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PulsatileAbdominalMassSuspectedAAA.pdf.
7. Ho VB, Biko DM, White RD, et al, Expert Panel on Cardiovascular Imaging. American College of Radiology ACR Appropriateness Criteria – Known or Suspected Congenital Heart Disease in the Adult. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/KnownOrSuspectedCongenitalHeartDisease.pdf.
8. Hierholzer J, Luo L, Bittner RC, et al. MRI and CT in the differential diagnosis of pleural disease, Chest, 2000; 118:604-609.
9. Wippold FJ II, Cornelius RS, Aiken AH, et al, Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Plexopathy. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Plexopathy.pdf.
10. Yoshikawa T, Hayashi N, Yamamoto S, et al. Brachial plexus injury: clinical manifestations, conventional imaging findings and the latest imaging techniques, RadioGraphics, 2006; 26:S133-S143.
11. Qayyum A, MacVicar AD, Revell P, et al. Symptomatic brachial plexopathy following treatment for breast cancer: utility of MR imaging with surface-coil techniques, Radiology, 2000; 214:837-842.
12. Maravilla KR, Bowen BC. Imaging of the peripheral nervous system: evaluation of peripheral neuropathy and plexopathy, AJNR, 1998; 19:1011-1023.
13. Todd M, Shah G, Mukherji S. MR imaging of the brachial plexus, Top in Mag Reson Imaging, 2004; 15:113-125.
14. Saifuddin A. Imaging tumors of the brachial plexus, Skeletal Radiol, 2003; 32:375-387.
15. Demehri S, Rybicki FJ, Dill KE, et al, Expert Panel on Vascular Imaging. American College of Radiology Appropriateness Criteria – Blunt Chest Trauma–Suspected Aortic Injury. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/BluntChestTraumaSuspectedAorticInjury.pdf.
16. Erbel R, Alfonso F, Boileau C, et al. Diagnosis and management of aortic dissection: recommendations of the Task Force on Aortic Dissection, European Society of Cardiology, Eur Heart J, 2001, 22:1642-1682.
17. Davis T, Iqbal Q, Puppala VK, et al. Institute for Clinical Systems Improvement. Diagnosis and Treatment of Chest Pain and Acute Coronary Syndrome (ACS). https://www.icsi.org/_asset/ydv4b3/ACS-Interactive1112b.pdf.
18. Hagan PG, Nienaber CA, Isselbacher EM, et al. The International Registry of Acute Aortic Dissection (IRAD): new insights into an old disease, JAMA, 2000; 283: 897-903.
19. Von Kodolitsch Y, Schwartz AG, Nienaber CA. Clinical prediction of acute aortic dissection. Arch Intern Med 2000; 160: 2971-82.
20. Hiratzka LR, Bakris GL, Beckman JA, et al. 2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/SVM Guidelines for the diagnosis and management of patients with thoracic aortic disease. Circulation, 2010; 121:e266-369.
21. Isselbacher EM. Thoracic and Abdominal Aortic Aneurysms, Circulation, 2005; 111:816-828.
22. Elefteriades JA. Natural history of thoracic aortic aneurysms: indications for surgery, and surgical versus nonsurgical risks, Ann Thorac Surg, 2002; 74:S1877-S1880.
23. Fattori R, Russo V. Degenerative aneurysm of the descending aorta. Endo vascular treatment, European Association for Cardio-thoracic Surgery, Multimedia Manual of Cardiothoracic Surgery, 2007. http://mmcts.ctsnetjournals.org/cgi/reprint/2007/1217/mmcts.2007.002824.pdf.
24. Mehard WB, Heiken JP, Sicard GA. High-attenuating crescent in abdominal aortic aneurysm wall at CT: a sign of acute or impending rupture, Radiology, 1994; 192:359-362.
25. Stavropoulos SW, Charagundla SR. Imaging techniques for detection and management of endoleaks after endovascular aortic aneurysm repair, Radiology, 2007; 243:641-655.
26. Hirsch AT, Haskal ZJ, Hertzer NR, et al. ACC/AHA 2005 Practice Guidelines for the Management of Patients With Peripheral Arterial Disease (Lower Extremity, Renal, Mesenteric, and Abdominal Aortic): Executive Summary. A Collaborative Report From the American Association for Vascular Surgery/Society for Vascular Surgery, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine and Biology, Society of Interventional Radiology, and the ACC/AHA Task Force on Practice Guidelines (Writing Committee to Develop Guidelines for the Management of Patients With Peripheral Arterial Disease), Circulation, 2006; 113:1474-1547.
27. Horton KM, Smith C, Fishman EK. MDCT and 3D CT Angiography of Splanchnic Artery Aneurysms, AJR, 2007; 189:641-647.
28. Francois CJ, Kramer JH, Rybicki FJ, et al, Expert Panel on Vascular Imaging and Interventional Radiology. American College of Radiology ACR Appropriateness Criteria – Abdominal Aortic Aneurysm: Interventional Planning and Follow-up. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AbdominalAorticAneurysmInterventionalPlanningAndFollowUp.pdf.

29. Morrison WB, Zoga AC, Daffner RH, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Soft-Tissue Masses. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SoftTissueMasses.pdf.

71550, 71551, 71552 MRI of the Chest

Clinical criteria reviewed/revised: 4/9/14, 3/24/14, 6/18/13, 5/31/13, 2/24/13, 4/17/12, 7/28/11, 11/17/10, 1/20/10
Medical Advisory Committee reviewed and approved: 4/29/14, 9/18/13, 6/12/13, 9/19/12, 9/21/11

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71555 MRA or MRV Chest without or with Gadolinium

MEDICARE

I. Known or suspected pulmonary embolism (CTA of the chest should be done, CPT 71275, unless contraindicated such as an allergy to iodinated contrast)

II. Suspected, known or follow-up, dissection of the thoracic aorta

III. Aneurysm of the thoracic aorta or thoracoabdominal aneurysm – preoperative study, postoperative study and follow-up

References:

1. National Coverage Determination (NCD) for Magnetic Resonance Imaging (220.2). http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=National&NCSelection=NCD&KeyWord=Magnetic+Resonance+Imaging&KeyWordLookUp=Title&KeyWordSearchType=Exact&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
2. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L32611), Novitas Solutions, Inc., Arkansas. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=3&CntrctrType=1%7c9&KeyWord=71555&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=71555&kq=true&bc=IAAAAAAAAAAA&.
3. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L32611), Novitas Solutions, Inc., Colorado (effective 11/19/2012). http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=8&CntrctrType=1%7c9&KeyWord=71555&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=71555&kq=true&bc=IAAAAAAAAAAA&.
4. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services, Inc., Connecticut. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=9&CntrctrType=1%7c9&KeyWord=71555&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=71555&kq=true&bc=IAAAAAAAAAAA&.
5. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L31399), Novitas Solutions, Inc., District of Columbia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=10&CntrctrType=1%7c9&KeyWord=71555&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=71555&kq=true&bc=IAAAAAAAAAAA&.
6. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L31399), Novitas Solutions, Inc., Delaware. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=11&CntrctrType=1%7c9&KeyWord=71555&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=71555&kq=true&bc=IAAAAAAAAAAA&.
7. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L29218), First Coast Service Options, Inc., Florida. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=12&CntrctrType=1%7c9&KeyWord=71555&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=71555&kq=true&bc=IAAAAAAAAAAA&.
8. Local Coverage Determination (LCD) for Magnetic resonance Angiography (MRA) (L32611), Novitas Solutions, Inc., Louisiana. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=23&CntrctrType=1%7c9&KeyWord=71555&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=71555&kq=true&bc=IAAAAAAAAAAA&.
9. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services, Inc., Massachusetts. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=24&CntrctrType=1%7c9&CptHcpcsCode=71555&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
10. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L31399), Novitas Solutions, Inc., Maryland. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=25&CntrctrType=1%7c9&KeyWord=71555&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=71555&kq=true&bc=IAAAAAAAAAAA&.

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11. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services, Inc Maine. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=26&CntrctrType=1%7c9&KeyWord=71555&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=71555&kq=true&bc=IAAAAAAAAAAA&.
12. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L32611), Novitas Solutions, Inc., Mississippi. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=31&CntrctrType=1%7c9&KeyWord=71555&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=71555&kq=true&bc=IAAAAAAAAAAA&.
13. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services, Inc New Hampshire. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=37&CntrctrType=1%7c9&KeyWord=71555&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=71555&kq=true&bc=IAAAAAAAAAAA&.
14. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L31399), Novitas Solutions, Inc., New Jersey. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=38&CntrctrType=1%7c9&KeyWord=71555&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=71555&kq=true&bc=IAAAAAAAAAAA&.
15. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L32611), Novitas Solutions, Inc., New Mexico (effective 11/19/2012). http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=39&CntrctrType=1%7c9&KeyWord=71555&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=71555&kq=true&bc=IAAAAAAAAAAA&.
16. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services, Inc., New York. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=41&CntrctrType=1%7c9&KeyWord=71555&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=71555&kq=true&bc=IAAAAAAAAAAA&.
17. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L32611), Novitas Solutions, Inc., Oklahoma (effective 11/19/2012). http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=43&CntrctrType=1%7c9&KeyWord=71555&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=71555&kq=true&bc=IAAAAAAAAAAA&.
18. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L31399), Novitas Solutions, Inc., Pennsylvania. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=45&CntrctrType=1%7c9&KeyWord=71555&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=71555&kq=true&bc=IAAAAAAAAAAA&.
19. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services, Inc Rhode Island. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=47&CntrctrType=1%7c9&CptHcpcsCode=71555&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
20. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L32611), Novitas Solutions, Inc., Texas (effective 11/19/2012). http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=51&CntrctrType=1%7c9&KeyWord=71555&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=71555&kq=true&bc=IAAAAAAAAAAA&.
21. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services, Inc., Vermont.http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=55&CntrctrType=1%7c9&CptHcpcsCode=71555&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.

71555 MRA or MRV Chest: MEDICARE

Clinical criteria reviewed/revised: 4/9/14, 6/10/13, 5/31/13, 8/20/12, 8/1/12, 5/12/12, 4/17/12, 7/28/11, 11/17/10, 1/20/10
Medical Advisory Committee reviewed and approved: 9/5/14, 4/29/14, 9/18/13, 9/19/12, 9/21/11

72125 CT Cervical Spine without Contrast
72126 CT Cervical Spine with Contrast
72127 CT Cervical Spine without and with Contrast

Red Flags

If any of the following are part of the clinical history presented with a request for pre-certification of these CPT codes, the need to meet criteria concerning prior conservative management is waived and the examinations should be pre-certified if other criteria are met:

History of cancer
Unexplained weight loss
Immunocompromised
IV drug use
Abnormal CBC, ESR, etc.
Urinary tract infections
Pain increased when supine
Aural temperature >38.3°C or >100.9°F
Urinary incontinence
Urinary retention
Decreased anal sphincter tone
Saddle anesthesia
Major motor weakness of a limb found on physical examination (objective)
Major acute trauma (This is age-dependent; lesser trauma required in older patients)

I. Neck pain for at least 6 weeks and MRI cannot be performed[1,2] [One of the following]

A. No red flags and failure to respond to conservative medical management consisting of either treatment with anti-inflammatory medication or muscle relaxants for at least 6 weeks or a course of oral steroids
B. Symptoms worsening while under treatment described in A
C. Candidate for surgery or epidural injection after failed conservative therapy as described in

II. Trauma[3,4] [One of the following]

A. Fracture by x-ray
B. Posterior midline (bony) tenderness in the cervical spine
C. Older than 64
D. Paresthesias in the extremities
E. Inability to rotate the neck actively
F. Fracture by CT at other level of the spine
G. Trauma with altered mental status
H. History of DISH (diffuse idiopathic skeletal hyperostosis) or ankylosing spondylitis
I. Falls from height of 3 feet or 5 or more stairs
J. Diving accident
K. Follow up of known cervical spine fracture to assess healing

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III. Suspected malignancy[5-9] [One of the following]

A. Suspected primary or metastatic tumor of the cervical cord or leptomeninges (For medulloblastoma or ependymoma, see X and XI below) [One of the following]
   1. Symptoms or findings on examination [One of the following]
      a. Hyperreflexia
      b. Weakness of the upper or lower extremity (objective weakness on exam that is 3/5 or less)
      c. Spasticity
      d. Bladder dysfunction
      e. Bowel dysfunction
      f. Lhermitte's sign
      g. Sensory deficit
      h. New onset scoliosis
      i. New onset kyphosis
      j. Spastic gait
      k. Radiculopathy
      l. Pain in the neck or back
      m. Localized tenderness over the spine
      n. Spinal pain interfering with sleep
      o. CSF cytology positive for malignant cells

B. Primary or metastatic bone tumor (MRI without contrast)
   1. Known malignancy with cervical spine pain
   2. Follow-up primary or metastatic bone tumor confirmed on prior imaging study
   3. New or worsening pain at site of known bone tumor
   4. Periodic assessment during chemotherapy, radiation Rx, or surgery for bone tumor
   5. Pain
   6. New onset scoliosis
   7. New onset kyphosis

IV. Myelopathy[10] (MRI; CT myelogram should only be performed if MRI is absolutely contraindicated except if myelopathy is suspected to be related to trauma) [One of the following]

A. Symptoms or findings on examination [One of the following]
   1. Clumsiness of the hands
   2. Paresthesias of the hands
   3. Gait disturbance
   4. Lhermitte's sign (cervical flexion and extension producing electric shocks down the arm and leg)
   5. Hoffman's sign (evidence of upper motor neuron lesion from spinal cord compression)
   6. Neck stiffness
   7. Weakness or stiffness of the legs (objective weakness on exam that is 3/5 or less)
   8. Arm pain
   9. Bowel and bladder control problems
   10. Hyperreflexia
   11. Ankle clonus
   12. Numbness and/or tingling in the upper extremities

13. Positive Babinski sign
14. Loss of coordination

B. Known myelopathy including MS [One of the following]
1. Baseline or follow-up of treatment medication
2. New or worsening of symptoms as in A above
3. Annual follow-up with no change in signs or symptom

V. Radiculopathy with symptoms for at least 6 weeks and possible candidate for interventional or surgical treatment[11-13] (MRI; CT should only be performed if MRI is absolutely contraindicated) [One of the following]

Presence of red flags waives any conservative management requirements.

A. Clinical findings and/or symptoms with no red flags; with incomplete resolution with conservative medical management consisting of either treatment with anti-inflammatory medication or muscle relaxants for at least 6 weeks; or a course of oral steroids [One of the following]
1. Arm pain
2. Neck pain
3. Scapular or periscapular pain
4. Paresthesias (tingling)
5. Numbness
6. Weakness of the arm
7. Abnormal reflexes in the arm
8. Muscle atrophy
9. Dysesthesias (burning sensation)
10. Deltoid weakness
11. Scapular winging
12. Weakness of the muscles of the hand
13. Objective weakness in a nerve root distribution on examination which is 3/5 or less
14. Positive Spurling's test

B. Symptoms worsening while under treatment described in A

C. Candidate for surgery or epidural injection after failed conservative therapy (CT should only be performed if MRI is absolutely contraindicated)

VI. Spinal stenosis with symptoms for at least 6 weeks and possible candidate for interventional or surgical treatment[11-13] (MRI; CT should only be performed if MRI is absolutely contraindicated)

A. Clinical findings and/or symptoms with no red flags; with incomplete resolution with conservative medical management consisting of either treatment with anti-inflammatory medication or muscle relaxants for at least 6 weeks; or a course of oral steroids [One of the following]
1. Arm pain
2. Neck pain
3. Scapular or periscapular pain
4. Paresthesias (tingling)
5. Numbness
6. Weakness of the arm

7. Abnormal reflexes in the arm
8. Muscle atrophy
9. Dysesthesias (burning sensation)
10. Deltoid weakness
11. Scapular winging
12. Weakness of the muscles of the hand
13. Objective weakness in a nerve root distribution on examination which is 3/5 or less
14. Positive Spurling's test

B. Symptoms worsening while under treatment described in A
C. Candidate for surgery or epidural injection after failed conservative therapy (CT should only be performed if MRI is absolutely contraindicated)

VII. Infection[14] (MRI without and with contrast, and CT should not be done unless there is an absolute contraindication for MRI) [One of the following]

A. Osteomyelitis [One of the following]
   1. Laboratory findings [One of the following]
      a. Aural temperature >38.3°C or >100.9°F
      b. WBC >11,500/cu.mm
      c. ESR >22 mm/hr
      d. C-reactive protein >10 mg/L
      e. Blood culture positive
   2. History of infection elsewhere
   3. History of diabetes, dialysis or peripheral vascular disease
   4. X-ray suggestive of osteomyelitis of the cervical spine
   5. Sinus tract, poor wound or fracture healing of the spine
   6. History of penetrating injury or surgery of the cervical spine
B. Pre-operative evaluation of osteomyelitis
C. Follow-up during or after therapy for osteomyelitis, epidural abscess or disc space infection [One of the following]
   1. New or worsening pain at site or neurologic signs or symptoms
   2. Periodic evaluation of response to therapy
D. Suspected epidural abscess or disc space infection (MRI with gadolinium) [All of the following]
   1. Progressive neurological symptoms [One of the following]
      a. Radiating nerve root pain
      b. Muscle weakness
      c. Sensory deficit
   2. Risk factors [One of the following]
      a. Trauma
      b. Prior spinal procedure
      c. Infection elsewhere
      d. IV drug use
      e. Diabetes
      f. Immunosuppression
   3. Clinical and laboratory findings [One of the following]
      a. Aural temperature >38.3°C or >100.9°F
      b. WBC >11,500/cu.mm

c. ESR >22 mm/hr
d. C-reactive protein >10 mg/L
e. Blood culture positive

E. Follow-up during therapy for epidural abscess or disc space infection [One of the following]
1. New or worsening pain at site or neurologic signs or symptoms
2. Periodic evaluation of response to therapy

VIII. Discography[15,16]

A. To confirm that the symptoms are attributable to a particular disc prior to therapeutic intervention

IX. Evaluation of scoliosis[12] [One of the following]

A. Preoperative assessment
B. Any neurologic finding in the presence of scoliosis
C. Atypical curve pattern
D. Congenital scoliosis
E. Neurofibromatosis
F. Marfan's syndrome

X. Evaluation for possible vertebroplasty[13]

A. Painful osteoporotic or non neoplastic compression fracture [One of the following]
1. No red flags and failure to respond to conservative medical management
a. Continued pain after anti-inflammatory medication for at least 4 weeks, unless contraindicated or not tolerated
b. Symptoms worsening while under treatment
c. Pain severe enough to require opiates (narcotics) with no relief after 2 days

XI. Evaluation of recurrent symptoms after spinal surgery

A. Evaluation of spinal fusion

XII. CT myelogram

XIII. Evaluation of pediatric spine for congenital anomalies

References:

1. Newman JS, Weissman BN, Angevine PD, et al. Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Chronic Neck Pain. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ChronicNeckPain.pdf.
2. Eubanks JD. Cervical radiculopathy: nonoperative management of neck pain and radicular symptoms, Am Fam Physician, 2010; 81:33-40. http://www.aafp.org/afp/2010/0101/p33.html.
3. Daffner RH, Weissman BN, Wippold FJ II, et al. Expert Panels on Musculoskeletal and Neurologic Imaging. American College of Radiology Appropriateness Criteria – Suspected Spine Trauma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SuspectedSpineTrauma.pdf.
4. Hoffman JR, Mower WR, Wolfson AB, et al. Validity of a set of clinical criteria to rule out injury to the cervical spine in patients with blunt trauma, N Engl J Med, 2000; 343:94-99.
5. Beltran J, Noto AM, Chakeres DW, et al. Tumors of the osseous spine: staging with MR imaging versus CT, Radiology, 1987; 162:565-569.
6. Ilaslan H, Sundaram M, Unni KK, et al. Primary vertebral osteosarcoma: imaging findings, Radiology, 2004; 230:697-702.
7. Van Lom KJ, Kellerhouse LE, Pathria MN, et al. Infection versus tumor in the spine: Criteria for distinction with CT, Radiology, 1988; 166:851-855.
8. Bilsky MH, Lis E, Raizer J, et al. The diagnosis and treatment of metastatic spinal tumor, Oncologist, 1999; 4:459-469.
9. Roberts CC, Weissman BN, Appel M, et al. Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Metastatic Bone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/MetastaticBoneDisease.pdf.
10. Seidenwurm DJ, Wippold FJ II, Cornelius RS, et al. Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Myelopathy. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Myelopathy.pdf.
11. Bono CM, Ghiselli G, Gilbert TJ, et al, Diagnosis and treatment of cervical radiculopathy from degenerative disorders, North American Spine Society Evidence-Based Clinical Guidelines for Multidisciplinary Spine Care https://www.spine.org/Documents/ResearchClinicalCare/Guidelines/CervicalRadiculopathy.pdf.
12. Sampath P, Bendebba M, Davis JD, et al. Outcome in patients with cervical radiculopathy: prospective multicenter study with independent clinical review, Spine, 1999; 24:591-597.
13. Carette S, Fehlings MG. Cervical radiculopathy, N Engl J Med, 2005; 392-399.
14. Zimmerli W. Vertebral osteomyelitis, N Engl J Med, 2010; 362:1022-1029.
15. Tsuchiya K, Katase S, Aoki C, et al. Application of multi-detector row helical scanning to postmyelographic CT, Eur Radiol, 2003; 13:1438-1443.
16. Manchikanti L, Boswell MV, Singh V, et al. Comprehensive evidence-based guidelines for interventional techniques in the management of chronic spinal pain. American Society of Interventional Pain Physicians. Pain Physician, 2009 Jul-Aug;12(4);699-802. http://www.painphysicianjournal.com/2009/july/2009;12;699-802.pdf.

72125, 72126, 72127 CT Cervical Spine

Clinical criteria reviewed/revised: 7/8/14, 3/24/14, 10/2/13, 9/9/13, 6/20/13, 4/19/13, 8/1/12, 7/6/12, 8/12/11, 11/17/10, 9/16/09
Medical Advisory Committee reviewed and approved: 4/29/14, 11/01/13, 9/18/13, 9/19/12, 6/27/12, 9/21/11

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72128 CT of the Thoracic Spine without Contrast
72129 CT of the Thoracic Spine with Contrast
72130 CT of the Thoracic Spine without and with Contrast

Red Flags
If any of the following are part of the clinical history presented with a request for pre-certification of these CPT codes, the need to meet criteria concerning prior conservative management is waived and the examinations should be pre-certified if other criteria are met:

History of cancer
Unexplained weight loss
Immunocompromised
IV drug use
Abnormal CBC, ESR
Urinary tract infections
Pain increased when supine
Aural temperature >38.3°C or >100.9°F
Urinary retention
Urinary incontinence
Decreased anal sphincter tone
Saddle anesthesia
Major motor weakness of a limb found on physical examination (objective)
Major acute Trauma (This is age dependent; lesser trauma required in older patients)

I. Back pain confined to thoracic region for 6 weeks or more and there is an absolute contraindication to MRI[1]
   A. No red flags and incomplete resolution with conservative medical management consisting of either treatment with anti-inflammatory medication or muscle relaxants for at least 6 weeks or a course of oral steroids
   B. Symptoms worsening while under treatment described in A

II. Trauma[2,3] [One of the following]
   A. Back pain or midline tenderness over the thoracic spine
   B. Local signs of thoracolumbar injury
   C. Abnormal neurological signs related to the thoracic spine
   D. Documented cervical or thoracic spine fracture
   E. Major distracting injury
   F. Fracture on CT at different level of the spine

III. Radiculopathy or suspected spinal stenosis with symptoms present for at least 6 weeks and possible candidate for interventional or surgical treatment (MRI; CT should only be performed if MRI is absolutely contraindicated) [One of the following]

Presence of red flags waives any conservative management requirements.

A. Clinical findings and symptoms which may be band like with no red flags incomplete resolution with conservative medical management consisting of either treatment with anti-inflammatory medication or muscle relaxants for at least 6 weeks or oral steroids [One of the following]
   1. Pain in nerve root distribution
   2. Numbness
   3. Tingling sensations (paresthesias)
   4. Burning sensations (dysesthesias)
   5. Shooting pain
B. Symptoms worsening while under treatment
C. Candidate for surgery or epidural injection after failed conservative therapy (CT should only be performed if MRI is absolutely contraindicated)

IV. Myelopathy[4] (MRI; CT myelography should only be performed if MRI is absolutely contraindicated) (The spinal cord ends at about T12 or L1; suspicion of lumbar myelopathy is evaluated by examining the thoracic spine)

A. Symptoms and findings on examination [One of the following]
   1. Clumsiness of the hands
   2. Paresthesias of the hands
   3. Gait disturbance
   4. Lhermitte's sign (cervical flexion and extension producing electric shocks down the arm and leg)
   5. Hoffman's sign (evidence of upper motor neuron lesion from spinal cord compression)
   6. Neck stiffness
   7. Weakness or stiffness of the legs (objective weakness on exam that is 3/5 or less)
   8. Arm pain
   9. Bowel and bladder control problems
   10. Hyperreflexia
   11. Ankle clonus
   12. Numbness and/or tingling in the upper extremities
   13. Positive Babinski sign
   14. Loss of coordination
B. Known myelopathy including MS [One of the following]
   1. Baseline or follow-up of treatment with medication
   2. New or worsening of symptoms as in A above
   3. Annual follow-up with no change in signs or symptoms

V. Suspected malignancy[5-8] (MRI; for bone, MRI without contrast and for soft tissue or tumor in the canal, MRI without and with contrast and should be done unless absolutely contraindicated)

A. Suspected primary or metastatic tumor of the cervical cord or leptomeninges (For medulloblastoma or ependymoma, see X and XI below) [One of the following]
   1. Symptoms or findings on examination [One of the following]
      a. Hyperreflexia
      b. Weakness of the upper or lower extremity (objective weakness on exam that is 3/5 or less)

c. Spasticity
d. Bladder dysfunction
e. Bowel dysfunction
f. Lhermitte's sign
g. Sensory deficit
h. New onset scoliosis
i. New onset kyphosis
j. Spastic gait
k. Radiculopathy
l. Pain in the neck or back
m. Localized tenderness over the spine
n. Spinal pain interfering with sleep
o. CSF cytology positive for malignant cells

B. Primary or metastatic bone tumor (MRI without contrast)
1. Known malignancy with cervical spine pain
2. Follow-up primary or metastatic bone tumor confirmed on prior imaging study
3. New or worsening pain at site of known bone tumor
4. Periodic assessment during chemotherapy, radiation Rx, or surgery for bone tumor
5. Pain
6. New onset scoliosis
7. New onset kyphosis

VI. Infection[9,10] (including osteomyelitis and discitis and epidural abscess) (MRI with and without contrast, and CT should not be done unless there is an absolute contraindication for MRI) [One of the following]

A. Osteomyelitis [One of the following]
1. Laboratory findings [One of the following]
a. Aural temperature >38.3°C or >100.9°F
b. WBC >11,500/cu.mm
c. ESR >22 mm/hr
d. C-reactive protein >10 mg/L
e. Blood culture positive
2. History of infection elsewhere
3. History of diabetes, dialysis or peripheral vascular disease
4. X-ray suggestive of osteomyelitis
5. Sinus tract, poor wound or fracture healing
6. History of penetrating injury or surgery

B. Preoperative evaluation of osteomyelitis

C. Follow-up during or after therapy for osteomyelitis, epidural abscess or disc space infection [One of the following]
1. New or worsening pain at site or neurologic signs or symptoms
2. Periodic evaluation of response to therapy

D. Suspected epidural abscess or disc space infection (MRI with contrast) [All of the following]
1. Progressive neurological symptoms [One of the following]
a. Radiating nerve root pain
b. Muscle weakness

c. Sensory deficit
2. Risk factors [One of the following]
   a. Trauma
   b. Prior spinal procedure
   c. Infection elsewhere
   d. IV drug use
   e. Diabetes
   f. Immunosuppression
3. Clinical and laboratory findings [One of the following]
   a. Aural temperature >38.3°C or >100.9°F
   b. WBC >11,500/cu.mm
   c. ESR >22 mm/hr
   d. C-reactive protein >10 mg/L
   e. Blood culture positive

E. Follow-up during therapy for epidural abscess or disc space infection [One of the following]
   1. New or worsening pain at site or neurologic signs or symptoms
   2. Periodic evaluation of response to therapy

VII. Discography[11]

A. To confirm that the symptoms are attributable to a particular disc prior to therapeutic intervention

VIII. Evaluation of scoliosis[12] [One of the following]

A. Preoperative assessment
B. Any neurologic finding in the presence of scoliosis
C. Atypical curve pattern
D. Congenital scoliosis
E. Neurofibromatosis
F. Marfan's syndrome

IX. Evaluation for possible vertebroplasty[13]

A. Painful osteoporotic or non neoplastic compression fracture [One of the following]
   1. No red flags and failure to respond to conservative medical management
      a. Continued pain after anti-inflammatory medication for at least 4 weeks, unless contraindicated or not tolerated
      b. Symptoms worsening while under treatment
      c. Pain severe enough to require opiates (narcotics) with no relief after 2 days

X. Evaluation of recurrent symptoms after spinal surgery

A. Evaluation of spinal fusion

XI. CT myelography

XII. Evaluation of pediatric spine for congenital anomalies

References:

1. Denniston PL, Kennedy CW, et al. Work loss data institute, Low back – lumbar & thoracic (acute and chronic) pain.
2. Daffner RH, Weissman BN, Wippold FJ II, et al. Expert Panels on Musculoskeletal and Neurologic Imaging. American College of Radiology Appropriateness Criteria – Suspected Spine Trauma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SuspectedSpineTrauma.pdf.
3. Gardner A, Grannum S, Porter K. Thoracic and lumbar spine fractures, Trauma, 2005; 7:77-85.
4. Seidenwurm DJ, Wippold FJ II, Cornelius RS, et al. Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Myelopathy. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Myelopathy.pdf.
5. Beltran J, Noto AM, Chakeres DW, et al. Tumors of the osseous spine: staging with MR imaging versus CT, Radiology, 1987; 162:565-569.
6. Ilaslan H, Sundaram M, Unni KK, et al. Primary vertebral osteosarcoma: imaging findings, Radiology, 2004; 230:697-702.
7. Van Lom KJ, Kellerhouse LE, Pathria MN, et al. Infection versus tumor in the spine: Criteria for distinction with CT, Radiology, 1988; 166:851-855.
8. Bilsky MH, Lis E, Raizer J, et al. The diagnosis and treatment of metastatic spinal tumor, Oncologist, 1999; 4:459-469.
9. Fernandez M, Carrol CL, Baker CJ. Discitis and vertebral osteomyelitis in children: an 18-year review, Pediatrics, 2000; 105:1299-1304.
10. Govender S. Spinal infections, J Bone Joint Surg [Brit], 2005; 87:1454-1458.
11. Manchikanti L, Boswell MV, Singh V, et al. Comprehensive evidence-based guidelines for interventional techniques in the management of chronic spinal pain. American Society of Interventional Pain Physicians. Pain Physician, 2009 Jul-Aug; 12 (4); 699-802. http://www.painphysicianjournal.com/2009/july/2009;12;699-802.pdf.
12. British Scoliosis Society Executive. The management of spinal deformity in the United Kingdom guide to good practice. http://www.spitjudms.ro/_files/protocoale_terapeutice/neurochirurgie/spinaldeformity.pdf.
13. Hirsch JA, Jordan JE, Meyers PM, et al. ACR–ASNR–ASSR–SIR–SNIS Practice Guideline for the Performance of Vertebral Augmentation, American College of Radiology Guidelines and Standards. http://www.acr.org/~/media/ACR/Documents/PGTS/guidelines/Vertebral_Augmentation.pdf.

72128, 72129, 72130 CT Thoracic Spine

Clinical criteria reviewed/revised: 8/24/14, 9/25/13, 9/9/13, 6/26/13, 4/19/13, 4/24/12, 8/12/11, 11/17/10, 9/16/09
Medical Advisory Committee reviewed and approved: 4/29/14, 9/18/13, 9/19/12, 6/27/12, 9/21/11

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72131 CT of the Lumbar Spine without Contrast
72132 CT of the Lumbar Spine with Contrast
72133 CT of the Lumbar Spine without and with Contrast

Red Flags
If any of the following are part of the clinical history presented with a request for pre-certification of these CPT codes the need to meet criteria concerning prior conservative management is waived and the examinations should be pre-certified if other criteria are met:

History of cancer
Unexplained weight loss
Immunocompromised
IV drug use
Abnormal CBC, ESR
Urinary tract infections
Urinary retention
Urinary incontinence
Decreased anal sphincter tone
Aural temperature >38.3°C or >100.9°F
Saddle anesthesia
Major motor weakness of a limb found on physical examination (objective)
Major acute trauma (This is age-dependent; lesser trauma required in older patients)

I. Low back pain[1-5] (including neurogenic claudication) or lumbar spine pain for at least 6 weeks (CT should only be performed if MRI is absolutely contraindicated) [One of the following]
   A. No red flags and failure to respond to conservative medical management consisting of either treatment with anti-inflammatory medication or muscle relaxants for at least 6 weeks or a course of oral steroids
   B. Symptoms worsening while under treatment described in A
   C. Candidate for surgery or epidural injection after failed conservative therapy as described in A

II. Trauma[6] (CT) [One of the following]
   A. Back pain or midline tenderness over the lumbar spine
   B. Local signs of thoracolumbar injury
   C. Abnormal neurological signs related to the lumbar spine
   D. Documented spine fracture any level
   E. Major distracting injury

III. Radiculopathy[1-5,7,8] with symptoms for at least 6 weeks (MRI. CT should only be performed if MRI is absolutely contraindicated.) [One of the following]
   Presence of red flags waives any conservative management requirements

A. Clinical findings and/or symptoms with no red flags; incomplete resolution with conservative medical management consisting of either treatment with anti-inflammatory medication or muscle relaxants for at least 6 weeks; or a course of oral steroids [One of the following]
   1. Hyporeflexia
   2. Atrophy
   3. Weakness objective (objective weakness on exam that is 3/5 or less)
   4. Pain in nerve root distribution
   5. Numbness
   6. Paresthesias (tingling sensations)
   7. Dysesthesias (burning sensations)
   8. Neurogenic claudication
   9. Pain in both legs related to nerve root distribution
   10. Bilateral buttock pain
   11. Dull fatigue in thigh and/or leg
   12. Straight-leg raising reproduces the pain between 30 and 70 degrees of leg elevation
   13. Crossed straight-leg raise test (Lasègue's sign) reproduces the pain at 30 to 70 degrees of leg elevation
B. Symptoms worsening while under treatment as described in A
C. Candidate for surgery or epidural injection after failed conservative therapy as described in A and one of the symptoms described in A

IV. Spinal stenosis with pain that increases with walking for at least 6 weeks and possible candidate for surgery or interventional treatment (CT should only be performed if MRI is absolutely contraindicated)[7] [One of the following]
A. Clinical findings and/or symptoms with no red flags; incomplete resolution with conservative medical management consisting of either treatment with anti-inflammatory medication or muscle relaxants for at least 6 weeks; or a course of oral steroids
B. Symptoms worsening while under treatment as described in A
C. Candidate for surgery or epidural injection after failed conservative therapy as described in A

V. Candidate for surgery or epidural injection after failed conservative therapy (CT should only be performed if MRI is absolutely contraindicated) [One of the following]
A. Clinical findings and/or symptoms with no red flags; incomplete resolution with conservative medical management consisting of either treatment with anti-inflammatory medication or muscle relaxants for at least 6 weeks; or a course of oral steroids [One of the following]
   1. Hyporeflexia
   2. Atrophy
   3. Weakness objective (objective weakness on exam that is 3/5 or less)
   4. Pain in nerve root distribution
   5. Numbness
   6. Paresthesias (tingling sensations)
   7. Dysesthesias (burning sensations)
   8. Neurogenic claudication
   9. Pain in both legs related to nerve root distribution
   10. Bilateral buttock pain

11. Dull fatigue in thigh and/or leg
12. Straight-leg raising reproduces the pain between 30 and 70 degrees of leg elevation
13. Crossed straight-leg raise test (Lasègue's sign) reproduces the pain at 30 to 70 degrees of leg elevation

B. Symptoms worsening while under treatment as described in A

VI. Suspected cauda equina syndrome[1-5] (MRI of the thoracic spine without and with contrast and should be done unless there is an absolute contraindication to MRI)

A. Sudden unexplained onset of [One of the following]
   1. Saddle anesthesia
   2. Profound sensory deficit
   3. Bowel or bladder dysfunction
   4. Leg numbness and weakness
   5. Diminished rectal sphincter tone
   6. Bilateral radiculopathy
   7. Neurogenic claudication

VII. Suspected malignancy[9] (MRI; for bone, MRI without contrast, and for soft tissue tumor or tumor in the spinal canal, MRI without and with contrast should be done unless there is an absolute contraindication to MRI) [One of the following]

A. Suspected primary or metastatic tumor of the cervical cord or leptomeninges (For medulloblastoma or ependymoma, see X and XI below)
   1. Symptoms or findings on examination [One of the following]
      a. Hyperreflexia
      b. Weakness of the upper or lower extremity (objective weakness on exam that is 3/5 or less)
      c. Spasticity
      d. Bladder dysfunction
      e. Bowel dysfunction
      f. Lhermitte's sign
      g. Sensory deficit
      h. New onset scoliosis
      i. New onset kyphosis
      j. Spastic gait
      k. Radiculopathy
      l. Pain in the neck or back
      m. Localized tenderness over the spine
      n. Spinal pain interfering with sleep
      o. CSF cytology positive for malignant cells

B. Primary or metastatic bone tumor (MRI without contrast) [One of the following]
   1. Known malignancy with cervical spine pain
   2. Follow-up primary or metastatic bone tumor confirmed on prior imaging study
   3. New or worsening pain at site of known bone tumor
   4. Periodic assessment during chemotherapy, radiation Rx, or surgery for bone tumor

5. Pain
6. New onset scoliosis
7. New onset kyphosis

VIII. Infection[10-13] (MRI without and with contrast and should be performed unless there is an absolute contraindication for MRI) [One of the following]

A. Osteomyelitis [One of the following]
   1. Laboratory findings [One of the following]
      a. Aural temperature >38.3°C or >100.9°F
      b. WBC >11,500/cu.mm
      c. ESR >22 mm/hr
      d. C-reactive protein >10 mg/L
      e. Blood culture positive
   2. History of infection elsewhere
   3. History of diabetes, dialysis or peripheral vascular disease
   4. X-ray suggestive of osteomyelitis
   5. Sinus tract, poor wound or fracture healing
   6. History of penetrating injury or surgery

B. Pre-operative evaluation of osteomyelitis

C. Follow-up during or after therapy for osteomyelitis, epidural abscess or disc space infection [One of the following]
   1. New or worsening pain at site or neurologic signs or symptoms
   2. Periodic evaluation of response to therapy

D. Suspected epidural abscess or disc space infection (MRI with contrast) [All of the following]
   1. Progressive neurological symptoms [One of the following]
      a. Radiating nerve root pain
      b. Muscle weakness
      c. Sensory deficit
      d. Spinal pain
   2. Risk factors [One of the following]
      a. Trauma
      b. Prior spinal procedure
      c. Infection elsewhere
      d. IV drug use
      e. Diabetes
      f. Immunosuppression
   3. Clinical and laboratory findings [One of the following]
      a. Aural temperature >38.3°C or >100.9°F
      b. WBC >11,500/cu.mm
      c. ESR >22 mm/hr
      d. C-reactive protein > 10 mg/L
      e. Blood culture positive

E. Follow-up during therapy for epidural abscess or disc space infection [One of the following]
   1. New or worsening pain at site or neurologic signs or symptoms
   2. Periodic evaluation of response to therapy

IX. Suspected meningocele or myelomeningocele (MRI)

X. Discography[14]
- A. To confirm that patient's symptoms are attributable to a particular disc, prior to therapeutic intervention

XI. Tethered cord[15] (MRI should be done unless absolutely contraindicated) [One of the following]
- A. Documented Arnold-Chiari malformation
- B. Symptoms [One of the following]
  1. Low back and leg pain worst in the am
  2. Spastic gait
  3. Hair tuft
  4. Dimple
  5. Hemangioma
  6. Incontinence
  7. Scoliosis
  8. Weakness of lower extremity

XII. Evaluation of recurrent symptoms after spinal surgery
- A. Evaluation of spinal fusion

XIII. Evaluation for possible vertebroplasty[16]
- A. Painful osteoporotic or non-neoplastic compression fracture
  1. No red flags and failure to respond to conservative medical management [One of the following]
     a. Continued pain after anti-inflammatory medication for at least 4 weeks, unless contraindicated or not tolerated
     b. Symptoms worsening while under treatment
     c. Pain severe enough to require opiates (narcotics) with no relief after 2 days

XIV. CT myelography

XV. Evaluation of pediatric spine for congenital anomalies

XVI. Evaluation of scoliosis [One of the following]
- A. Preoperative assessment
- B. Any neurologic finding in the presence of scoliosis
- C. Atypical curve pattern
- D. Congenital scoliosis
- E. Neurofibromatosis
- F. Marfan's syndrome

References:

1. Davis PC, Wippold FJ II, Cornelius RS, et al, Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Low Back Pain. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/LowBackPain.pdf.
2. Goertz M, Thorson DC, Bonsell J, et al. ICSI Health Care Guideline: adult acute and subacute low back pain, Fifteenth Edition, November 2012. https://www.icsi.org/_asset/bjvqrj/LBP.pdf.
3. Chiodo A, Alvarez D, Graziano G, et al. Low Back Pain Guideline Team, Acute low back pain, University of Michigan Health System, Guidelines for Clinical Care. http://www.med.umich.edu/1info/fhp/practiceguides/back/back.pdf.
4. Chou R, Qaseem A, Snow V, et al. Diagnosis and treatment of low back pain: A joint clinical practice guideline form the American College of physicians and the American Pain Society, Ann Intern Med. 2007; 147:478-491.
5. Kinkade S. Evaluation and treatment of acute low back pain, Am Fam Physician, 2007; 75:1181-1188. http://www.aafp.org/afp/2007/0415/p1181.html.
6. Daffner RH, Weissman BN, Wippold FJ II, et al, Expert Panels on Musculoskeletal and Neurologic Imaging. American College of Radiology Appropriateness Criteria – Suspected Spine Trauma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SuspectedSpineTrauma.pdf.
7. Kreiner DS, Shaffer WO, Baisden J, et al, NASS Evidence-Based Clinical Guidelines Committee. Evidence-based clinical guidelines for multidisciplinary spine care: diagnosis and treatment of degenerative lumbar spinal stenosis, North American Spine Society. https://www.spine.org/Documents/ResearchClinicalCare/Guidelines/LumbarStenosis.pdf.
8. Kreiner DS, Hwang S, Easa J, et al, NASS Evidence-Based Clinical Guidelines Committee. Evidence-based clinical guidelines for multidisciplinary spine care: diagnosis and treatment of lumbar disc herniation with radiculopathy, North American Spine Society. https://www.spine.org/Documents/ResearchClinicalCare/Guidelines/LumbarDiscHerniation.pdf.
9. Roberts CC, Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Metastatic Bone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/MetastaticBoneDisease.pdf.
10. Zimmerli W. Vertebral osteomyelitis, N Engl J Med, 2010; 362:1022-1029.
11. Dunbar JAT, Sandoe JAT, Rao AS, et al. The MRI appearances of early vertebral osteomyelitis and discitis, Clinical Radiology, 2010; 65:974-981.
12. Brown R, Hussain M, McHugh K. Discitis in young children, J Bone Joint Surg [B]; 2001, 83: 106-111.
13. Mackenzie AR, Laing RBS, Smith CC, et al. Spinal epidural abscess: the importance of early diagnosis and treatment, J Neurol Neurosurg Psychiatry, 1998, 65:209-212.
14. Manchikanti L, Boswell MV, Singh V, et al. Comprehensive evidence-based guidelines for interventional techniques in the management of chronic spinal pain. American Society of Interventional Pain Physicians. http://www.painphysicianjournal.com/2009/july/2009;12;699-802.pdf.
15. Raghavan N, Barkovich AJ, Edwards M, et al. MR imaging in the tethered spinal cord syndrome, AJR, 1989; 152:843-852.
16. Hirsch JA, Jordan JE, Meyers PM, et al. ACR–ASNR–ASSR–SIR–SNIS practice guideline for the performance of vertebral augmentation, American College of Radiology Guidelines and Standards. http://www.acr.org/~/media/ACR/Documents/PGTS/guidelines/Vertebral_Augmentation.pdf.

72131, 72132, 72133 CT of the Lumbar Spine

Clinical criteria reviewed/revised: 6/8/14, 10/2/13, 9/9/13, 6/20/13, 7/25/12, 7/6/12, 8/12/11, 11/17/10, 9/16/09
Medical Advisory Committee reviewed and approved: 4/29/14, 9/18/13, 6/12/13, 9/19/12, 6/27/12, 9/21/11

72141 MRI Cervical Spine without Gadolinium
72142 MRI of the Cervical Spine with Gadolinium
72156 MRI of the Cervical Spine without and with Gadolinium

Red Flags
If any of the following are part of the clinical history presented with a request for pre-certification of these CPT codes the need to meet criteria concerning prior conservative management is waived and the examinations should be pre-certified if other criteria are met:

History of cancer
Unexplained weight loss
Immunocompromised
IV drug use
Abnormal CBC, sed rate
Urinary tract infections
Aural temperature >38.3°C or >100.9°F
Urine retention
Urine incontinence
Decreased anal sphincter tone
Saddle anesthesia
Major motor weakness of a limb found on physical examination (objective)
Major acute trauma (This is age-dependent; lesser trauma required in older patients)

I. Neck pain for at least 6 weeks and possible candidate for surgical or interventional treatment[1-6] (MRI without contrast unless there has been prior cervical surgery from a posterior approach) [One of the following]
   A. No red flags; incomplete resolution with conservative medical management consisting of either treatment with anti-inflammatory medication or muscle relaxants for at least 6 weeks or a course of oral steroids
   B. Symptoms worsening while under treatment described in A

II. Trauma[7-10] (MRI without contrast) [One of the following]
   A. Posterior midline (bony) tenderness in the cervical spine
   B. Older than 64
   C. Paresthesias in the extremities
   D. Inability to rotate the neck actively
   E. Fracture at any level of the spine
   F. Trauma with altered mental status
   G. History of DISH (diffuse idiopathic skeletal hyperostosis) or ankylosing spondylitis
   H. Falls from height of 3 feet or 5 or more stairs
   I. Diving accident

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III. Suspected tumor of bone[11-17] (MRI without contrast) (For cord, see 72142, 72156)
- A. Primary or metastatic bone tumor (Gadolinium not required if there are no neurological signs or symptoms) [One of the following]
  1. Known malignancy with cervical spine pain
  2. Follow-up primary or metastatic bone tumor seen on prior imaging study
  3. New or worsening pain at site of known bone tumor
  4. Periodic assessment during chemotherapy, radiation Rx, or surgery for bone tumor
  5. New onset scoliosis
  6. New onset kyphosis

IV. Suspected or known multiple sclerosis[3,18-22] (MS), myelopathy or demyelinating disease [One of the following]
- A. Suspected [One of the following]
  1. Clumsiness of the hands
  2. Paresthesias of the hands
  3. Gait disturbance
  4. Lhermitte's sign (cervical flexion and extension producing electric shocks down the arm and leg)
  5. Hoffman's sign (evidence of upper motor neuron lesion from spinal cord compression)
  6. Neck stiffness
  7. Weakness or stiffness of the legs (objective weakness on exam that is 3/5 or less)
  8. Arm pain
  9. Bowel and bladder control problems (urinary urgency or hesitancy)
  10. Hyperreflexia
  11. Ankle clonus
  12. Numbness and/or tingling in the upper extremities
  13. Positive Babinski sign
  14. Loss of coordination
- B. Known myelopathy including MS [One of the following]
  1. Baseline or follow up of treatment with medications
  2. New or worsening of symptoms as in A above
  3. Annual follow up with no change in signs or symptoms

V. Spinal stenosis with symptoms for at least 6 weeks and is a possible candidate for interventional or surgical treatment[1-7] (MRI without contrast unless there has been prior cervical spine surgery from a posterior approach) [One of the following]
- A. Clinical findings and/or symptoms with no red flags; incomplete resolution with conservative medical management consisting of either treatment with anti-inflammatory medication or muscle relaxants for at least 6 weeks; or a course of oral steroids [One of the following]
  1. Arm pain
  2. Neck pain
  3. Scapular or periscapular pain
  4. Paresthesias (tingling)

5. Numbness
6. Weakness of the arm
7. Abnormal reflexes in the arm
8. Muscle atrophy
9. Dysesthesias (burning sensation)
10. Deltoid weakness
11. Scapular winging
12. Weakness of the muscles of the hand
13. Objective weakness in a nerve root distribution on examination which is 3/5 or less
14. Positive Spurling's test

B. Symptoms worsening while under treatment described in A
C. Candidate for surgery or epidural injection after failed conservative therapy as described in A. and one of the symptoms described in A

VI. Syrinx or syringomyelia (MRI without and with contrast) [One of the following]

A. Known Chiari malformation
B. Asymmetric sensory loss and or weakness in the arms
C. Objective weakness in arms (objective weakness on exam that is 3/5 or less)
D. Decreased or absent reflexes
E. Facial pain and numbness
F. Scoliosis
G. Muscle atrophy in the extremities
H. Spasticity
I. Loss of bowel and bladder control
J. Tingling in the arms and hands
K. Known syrinx and history or suspicion of spinal trauma, myelitis, or spinal cord tumor [One of the following]
    1. History of myelitis
    2. History of spinal cord tumor
    3. History of spinal cord trauma

VII. Radiculopathy with symptoms lasting at least 6 weeks and is a possible candidate for interventional or surgical treatment[1-7,20,23,24] (MRI with contrast if there has been surgery from a posterior approach) [All of the following]

Presence of red flags waives any conservative management requirements.

A. Clinical findings and/or symptoms with no red flags; incomplete resolution with conservative medical management consisting of either treatment with anti-inflammatory medication or muscle relaxants for at least 6 weeks; or a course of oral steroids [One of the following]
    1. Arm pain
    2. Neck pain
    3. Scapular or periscapular pain
    4. Paresthesias (tingling)
    5. Numbness
    6. Weakness of the arm
    7. Abnormal reflexes in the arm
    8. Muscle atrophy

9. Dysesthesias (burning sensation)
10. Deltoid weakness
11. Scapular winging
12. Weakness of the muscles of the hand
13. Objective weakness in a nerve root distribution on examination which is 3/5 or less
14. Positive Spurling's test

B. Symptoms worsening while under treatment described in A

VIII. Candidate for surgery or epidural injection after failed conservative therapy (CT should only be performed if MRI is absolutely contraindicated)

A. Clinical findings and/or symptoms with no red flags; incomplete resolution with conservative medical management consisting of either treatment with anti-inflammatory medication or muscle relaxants for at least 6 weeks; or a course of oral steroids [One of the following]
   1. Hyporeflexia
   2. Atrophy
   3. Weakness objective (objective weakness on exam that is 3/5 or less)
   4. Pain in nerve root distribution
   5. Numbness
   6. Paresthesias (tingling sensations)
   7. Dysesthesias (burning sensations)
   8. Neurogenic claudication
   9. Pain in both legs related to nerve root distribution
   10. Bilateral buttock pain
   11. Dull fatigue in thigh and/or leg
   12. Straight-leg raising reproduces the pain between 30 and 70 degrees of leg elevation
   13. Crossed straight-leg raise test (Lasègue's sign) reproduces the pain at 30 to 70 degrees of leg elevation
   14. Symptoms worsening while under treatment as described in A

IX. Evaluation of scoliosis[25-27] (MRI without contrast) [One of the following]

A. Preoperative assessment
B. Any neurologic finding in the presence of scoliosis
C. Atypical curve pattern
D. Congenital scoliosis
E. Neurofibromatosis
F. Marfan's syndrome

X. Suspected tumor of the cervical spinal cord or meninges[11-17] (MRI without and with contrast)

A. Suspected primary or metastatic tumor of the cervical cord or leptomeninges (For medulloblastoma or ependymoma, see X and XI below)
   1. Symptoms or findings on examination [One of the following]
      a. Hyperreflexia
      b. Weakness of the upper or lower extremity (objective weakness on exam that is 3/5 or less)
      c. Spasticity

d. Bladder dysfunction
e. Bowel dysfunction
f. Lhermitte's sign
g. Sensory deficit
h. New onset scoliosis
i. New onset kyphosis
j. Spastic gait
k. Radiculopathy
l. Pain in the neck or back
m. Localized tenderness over the spine
n. Spinal pain interfering with sleep
o. CSF cytology positive for malignant cells

XI. Medulloblastoma[17,28-30] (MRI without and with contrast) [One of the following]

A. Initial evaluation
B. Follow-up every 3 months for 2 years then every 6 months for 2 years and then annually if previously known spine disease
C. New or worsening signs or symptoms
D. Evaluation after completion of chemotherapy or radiation therapy

XII. Ependymoma[28] (MRI without and with contrast) [One of the following]

A. Initial evaluation
B. Follow up intervals at every 3-4 months for a year and then every 4-6 months for year 2 and every 6-12 months thereafter if previously known spine disease
C. New or worsening signs or symptoms
D. Evaluation after completion of chemotherapy or radiation therapy

XIII. Myelopathy or demyelinating disease[3,18-22] (MRI without and with contrast)[One of the following]

A. Sensory, motor, or autonomic function is impaired at and below a horizontally defined level [One of the following]
   1. Clumsiness of the hands
   2. Paresthesias
   3. Gait disturbance
   4. Lhermitte's sign (cervical flexion and extension producing electric shocks down the arm and leg)
   5. Hoffman's sign (evidence of upper motor neuron lesion from spinal cord compression)
   6. Neck stiffness
   7. Weakness or stiffness of the legs (objective weakness on exam that is 3/5 or less)
   8. Arm pain or shoulder pain
   9. Bowel and bladder control problems (retention or incontinence)
   10. Hyperreflexia
   11. Atrophy of the hand musculature
   12. Ankle clonus
   13. History of spinal cord trauma
B. Known multiple sclerosis (See IV above)

C. Syrinx or syringomyelia [One of the following]
   1. Known Chiari type 1 malformation
   2. Asymmetric sensory loss
   3. Objective weakness in arms (objective weakness on exam that is 3/5 or less)
   4. Decreased or absent reflexes
   5. Facial pain and numbness
   6. Scoliosis
   7. Muscle atrophy in the extremities
   8. Spasticity
   9. Tingling in the arms and hands
   10. Known syrinx and history or suspicion of spinal trauma, myelitis, or spinal cord tumor
   11. History of myelitis
   12. History of spinal cord tumor
   13. History of spinal cord trauma

XIV. Infection[31-36] (including osteomyelitis and discitis and epidural abscess) (MRI without and with contrast) [One of the following]

A. Osteomyelitis [One of the following]
   1. Laboratory findings [One of the following]
      a. Aural temperature >38.3°C or >100.9°F
      b. WBC >11,500/cu.mm
      c. ESR >22 mm/hr
      d. C-reactive protein >10 mg/L
      e. Blood culture positive
   2. History of infection elsewhere
   3. History of diabetes, dialysis or peripheral vascular disease
   4. X-ray suggestive of osteomyelitis
   5. Sinus tract, poor wound or fracture healing
   6. History of penetrating injury or surgery

B. Pre-operative evaluation of osteomyelitis

C. Follow-up during or after therapy for osteomyelitis, epidural abscess or disc space infection [One of the following]
   1. New or worsening pain at site or neurologic signs or symptoms
   2. Periodic evaluation of response to therapy

D. Suspected epidural abscess or disc space infection (MRI with gadolinium) [All of the following]
   1. Progressive neurological symptoms [One of the following]
      a. Radiating nerve root pain
      b. Muscle weakness
      c. Sensory deficit
   2. Risk factors [One of the following]
      a. Trauma
      b. Prior spinal procedure
      c. Infection elsewhere
      d. IV drug use
      e. Diabetes
      f. Immunosuppression

3. Clinical and laboratory findings [One of the following]
    a. Aural temperature >38.3°C or >100.9°F
    b. WBC >11,500/cu.mm
    c. ESR >22 mm/hr
    d. C-reactive protein >10 mg/L
    e. Blood culture positive

E. Follow-up during therapy for epidural abscess or disc space infection [One of the following]
1. New or worsening pain at site or neurologic signs or symptoms
2. Periodic evaluation of response to therapy

XV. Brachial plexus[37,38] (MRI without and with contrast) [One of the following]

A. Brachial plexus injury [Both of the following]
1. Symptoms [One of the following]
    a. Weakness or paralysis of the upper extremity
    b. Sensory loss or numbness of the upper extremity
    c. Horner's syndrome
    d. Shoulder and/or arm pain
    e. Burning or electric sensation in more than one nerve distribution
    f. Loss of deep tendon reflexes in the upper extremity
    g. EMG showing a neurogenic lesion in muscles supplied by at least 2 cervical levels
2. History [One of the following]
    a. Trauma including birth trauma motor vehicle accident, falls, sports injuries, gunshot injury, overuse of back packs
    b. Radiation fibrosis
    c. History of radiation therapy to the chest, breast or axilla

B. Primary or metastatic tumor [Both of the following]
1. Symptoms [One of the following]
    a. Weakness or paralysis of the upper extremity
    b. Sensory loss or numbness of the upper extremity
    c. Horner's syndrome
    d. Shoulder and/or arm pain
    e. Burning or electric sensation in more than one nerve distribution
    f. Loss of deep tendon reflexes in the upper extremity
    g. EMG showing a neurogenic lesion in muscles supplied by at least 2 cervical levels
2. History [One of the following]
    a. Known primary tumor
    b. Lung cancer especially a Pancoast tumor
    c. Lymphoma

C. Schwannoma or neurofibroma
1. Symptoms [One of the following]
    a. Palpable mass in the lower neck or supraclavicular fossa
    b. Weakness or paralysis of the upper extremity
    c. Sensory loss or numbness in the upper extremity
    d. Horner's syndrome
    e. Shoulder and/or arm pain
    f. Burning or electric sensation in more than one nerve distribution
    g. Loss of deep tendon reflexes in the upper extremity

h. EMG showing a neurogenic lesion in muscles supplied by at least 2 cervical levels

D. Entrapment
1. Symptoms [One of the following]
a. Pain and paresthesia along the ulna aspect of the forearm, hand, and 4th and 5th fingers
b. Symptoms increase with overhead activities

XVI. Neurofibromatosis[39-42] (MRI without and with contrast) [One of the following]

A. Scoliosis
B. Peripheral neurofibromas (2 or more)
C. Hearing loss
D. Brain tumor
E. Spinal cord tumor
F. New onset of [one of the following]
1. Sensory loss
2. Motor deficit
3. Incoordination
4. Bladder or bowel dysfunction

References:

1. Daffner RH, Weissman BN, Angevine PD, et al. Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Chronic Neck Pain. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ChronicNeckPain.pdf.
2. Chou R, Qaseem A, Snow V, et al. for the Clinical Efficacy Assessment Subcommittee of the American College of Physicians and the American College of Physicians/American Pain Society Low Back Pain Guidelines Panel. Diagnosis and Treatment of Low Back Pain: A Joint Clinical Practice Guideline from the American College of Physicians and the American Pain Society, Ann Intern Med. 2007; 147:478-491.
3. Douglass AB, Bope ET. Evaluation and treatment of posterior neck pain in family practice, J Am Board Fam Pract, 2004; 17:S13-22. http://www.jabfm.org/content/17/suppl_1/S13.full.pdf+html.
4. Ross JS. Magnetic resonance imaging of the postoperative spine, Sem Musculoskeletal Radiology, 2000; 4:281-291.
5. Bommireddy R, Kamat A, Smith ET, et al. Magnetic resonance image findings in the early post-operative period after anterior cervical discectomy, Eur Spine J, 2007; 16:27-31.
6. Colosima C, Cianfoni A, Maria Di Lella G, et al. Contrast-enhanced MR imaging of the spine: when, why and how? How to optimize contrast protocols in MR imaging of the spine, Neuroradiology, 2006; 48:18-33.
7. Bono CM, Ghiselli G, Gilbert TJ, et al, Diagnosis and treatment of cervical radiculopathy from degenerative disorders, North American Spine Society Evidence-Based Clinical Guidelines for Multidisciplinary Spine Care accessed at . https://www.spine.org/Documents/ResearchClinicalCare/Guidelines/CervicalRadiculopathy.pdf.
8. Daffner RH, Weissman BN, Wippold FJ II, et al. Expert Panel on Musculoskeletal and Neurologic Imaging. American College of Radiology Appropriateness Criteria – Suspected Spine Trauma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SuspectedSpineTrauma.pdf.
9. Hadley MN, Walters BC, Grabb PA, et al. Guidelines for the Management of Acute Cervical Spine and Spinal Cord Injuries, Section on Disorder of the Spine and Peripheral Nerves of the American Association of Neurological Surgeons and the Congress of Neurologic Surgeons. http://journals.lww.com/neurosurgery/toc/2013/03002.
10. Goddard AJP, Gholkar A. Diagnostic and therapeutic radiology of the spine: an overview, Imaging, 2002; 14:355-373.
11. Roberts CC, Weissman BN, Appel M, et al. Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Metastatic Bone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/MetastaticBoneDisease.pdf.
12. Murphy MD, Andrew CL, Flemming DJ, et al. From the archives of the AFIPO Primary tumors of the spine: radiologic-pathologic correlation, RadioGraphics, 1996; 16:1131-1158.
13. Husband DJ, Grant KA, Raniuk CS. MRI in the diagnosis and treatment of suspected malignant spinal cord compression, The British Journal of Radiology, 2001; 74:15-23.
14. Beltran J, Noto AM, Chakeres DW, et al. Tumors of the osseous spine: staging with MR imaging versus CT, Radiology, 1987; 162:565-569.
15. Ilaslan H, Sundaram M, Unni KK, et al. Primary vertebral osteosarcoma: imaging findings, Radiology, 2004; 230:697-702.
16. Van Lom KJ, Kellerhouse LE, Pathria MN, et al. Infection versus tumor in the spine: Criteria for distinction with CT, Radiology, 1988; 166:851-855.

17. Bilsky MH, Lis E, Raizer J, et al. The diagnosis and treatment of metastatic spinal tumor, Oncologist, 1999; 4:459-469.
18. Bakshi R, Hutton GJ, Miller JR, et al. The use of magnetic resonance imaging in the diagnosis and long-term management of multiple sclerosis, Neurology, 2004; 63(Suppl 5):S3-S11.
19. Frohman EM, Goodin DS, Calabresi A, et al. The utility of MRI in suspected MS: report of the therapeutics and technology assessment subcommittee of the American Academy of Neurology, Neurology, 2003; 61:602-611.
20. Rao R. Neck pain, cervical radiculopathy, and cervical myelopathy, The J Bone & Joint Surg, 2002; 84:1872-1881.
21. Seidenwurm DJ, Wippold FJ IICornelius, et al. Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Myelopathy. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Myelopathy.pdf.
22. Young WF. Cervical spondylotic myelopathy: a common cause of spinal cord dysfunction in older persons, Am Fam Physician, 2000; 62:1064-1070.
23. Carette S, Fehlings MG. Cervical radiculopathy, N Engl J Med, 2005; 353:392-399.
24. Sampath P, Bendebba M, Davis JD, et al. Outcome in patients with cervical radiculopathy: prospective multicenter study with independent clinical review, Spine, 1999; 24:591-597.
25. Evans SC, Edgar MA, Hall-Craggs MA, et al. MRI of 'idiopathic' juvenile scoliosis, J Bone Joint Surg [Br], 1996; 78:314-317.
26. Maiocco B, Deeney VF, Coulon R, et al. Adolescent idiopathic scoliosis and the presence of spinal cord abnormalities: preoperative magnetic resonance imaging analysis, Spine, 1997; 22:2537-3541.
27. Alam A, The J. MRI assessment of scoliosis, Imaging, 2005; 17:226-235.
28. Meyers SP, Wioldenhain SL, Chang J-K, et al. Postoperative evaluation for disseminated medulloblastoma involving the spine: contrast-enhanced MRI findings, CSF cytologic analysis, timing of disease occurrence, and patient outcomes, AJNR, 2000, 21:17157-1765.
29. NICE clinical guideline 75, Metastatic spinal cord compression: diagnosis and management of patients at risk of and with metastatic spinal cord compression. http://www.nice.org.uk/nicemedia/live/12085/42668/42668.pdf.
30. Nabors LB, Portnow J, Ammirati M, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Central Nervous System Cancers. http://www.nccn.org/professionals/physician_gls/pdf/cns.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Central Nervous System Cancers V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
31. Fernandez M, Carrol CL, Baker CJ. Discitis and vertebral osteomyelitis in children: an 18-year review, Pediatrics, 2000; 105:1299-1304.
32. Govender S. Spinal infections, J Bone Joint Surg [Brit], 2005; 87:1454-1458.
33. Zimmerli W. Vertebral osteomyelitis, N Engl J Med, 2010; 362:1022-1029.
34. Lu C-H, Chang W-N, Lui CC, et al. Adult spinal epidural abscess: clinical features and prognostic factors, Cl Neurol Neurosurg, 2002; 104:306-310.
35. Brown R, Hussain M, McHugh K, et al. Discitis in young children, J Bone Joint Surg [Brit], 2001; 83:106-111.
36. Sharif HS. Role of MR imaging in the management of spinal infections, AJR, 1992; 158:1333-1345.
37. Wippold FJ II Cornelius RS, Aiken AH, et al. Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Plexopathy. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Plexopathy.pdf
38. Bromberg, Brachial plexus syndromes in UP To Date accessed at http://www.uptodate.com/contents/brachial-plexus-syndromes.
39. National Institute of Neurologic Disorders and Stroke. Neurofibromatosis Fact Sheet. http://www.ninds.nih.gov/disorders/neurofibromatosis/detail_neurofibromatosis.htm?css=print.
40. Nunes F, MacCollin M. Neurofibromatosis 2 in the pediatric population. J Child Neurol. Oct 2003; 18(10):718-724.
41. Vivarelli R, Grosso S, Calabrese F, et al. Epilepsy in neurofibromatosis 1. J Child Neurol. May 2003; 18(5):338-342.
42. Ferner RE, Huson SM, Thomas N, et al. Guidelines for the diagnosis and management of individuals with neurofibromatosis 1. J Med Genet. Feb 2007; 44(2):81-88.

72146 MRI Thoracic Spine without Contrast
72147 MRI Thoracic Spine with Contrast
72157 MRI Thoracic Spine without and with Contrast

Red Flags

If any of the following are part of the clinical history presented with a request for pre-certification of these CPT codes the need to meet criteria concerning prior conservative management is waived and the examinations should be pre-certified if other criteria are met:

History of cancer
Unexplained weight loss
Immunocompromised
IV drug use
Abnormal CBC, ESR
Urinary tract infections
Pain increased when supine
Urinary incontinence
Urinary retention
Decreased anal sphincter tone
Aural temperature >38.3°C or >100.9°F
Saddle anesthesia
Major motor weakness of a limb found on physical examination (objective)
Major acute trauma (This is age-dependent; lesser trauma required in older patients)

I. Back pain for at least 6 weeks which is confined to the thoracic region and possible candidate for surgical or interventional treatment[1] (MRI without and with contrast if there is a history of thoracic spine surgery) [One of the following]

A. No red flags and incomplete resolution with conservative medical management consisting of either treatment with anti-inflammatory medication or muscle relaxants for at least 6 weeks or a course of oral steroids
B. Symptoms worsening while under treatment described in A

II. Trauma[2,3] (CT) [One of the following]

A. Back pain or midline tenderness over the thoracic spine
B. Local signs of thoracolumbar injury
C. Abnormal neurological signs related to the thoracic spine
D. Documented cervical or lumbar spine fracture
E. Major distracting injury
F. Fracture by x-ray or CT at any other level of the spine

III. Suspected bone tumor[4-11] (non contrast MRI)

A. Primary or metastatic bone tumor [One of the following]

1. Known malignancy with thoracic spine pain
2. Follow-up primary or metastatic bone tumor confirmed on prior imaging study
3. New or worsening pain at site of known bone tumor
4. Periodic assessment during chemotherapy, radiation Rx, or surgery for bone tumor
5. New pain in the mid back
6. New onset scoliosis
7. New onset kyphosis

IV. Suspected or known multiple sclerosis (MS)[12-14] (The spinal cord ends at about T12 or L1; suspicion of lumbar myelopathy is evaluated by examining the thoracic spine) [One of the following]

A. Suspected [One of the following]
   1. Clumsiness of the hands
   2. Paresthesias of the hands
   3. Gait disturbance
   4. Lhermitte's sign (cervical flexion and extension producing electric shocks down the arm and leg)
   5. Hoffman's sign (evidence of upper motor neuron lesion from spinal cord compression)
   6. Neck stiffness
   7. Weakness or stiffness of the legs (objective weakness on exam that is 3/5 or less)
   8. Arm pain
   9. Bowel and bladder control problems
   10. Hyperreflexia
   11. Ankle clonus
   12. Numbness and/or tingling in the upper extremities
   13. Positive Babinski sign
   14. Loss of coordination

B. Known myelopathy including MS [One of the following]
   1. Baseline or follow up of treatment with medication
   2. New or worsening of symptoms as in A above
   3. Follow-up of treatment on medication
   4. Annual follow-up with no change in signs or symptoms

V. Spinal stenosis with symptoms for at least 6 weeks and possible candidate for interventional treatment (non contrast MRI unless there has been surgery) [One of the following]

Presence of red flags waives any conservative management requirements.

A. Clinical findings and symptoms with no red flags and incomplete resolution with conservative medical management consisting of either treatment with anti-inflammatory medication or muscle relaxants for at least 6 weeks or a course of oral steroids [One of the following]
   1. Pain in nerve root distribution which may be band-like spanning the chest wall
   2. Pain referred to retrogastric or retrosternal areas
   3. Numbness
   4. Tingling sensations (paresthesias)
   5. Burning sensations (dysesthesias)
   6. Muscle atrophy

7. Abnormal reflexes

B. Symptoms worsening while under treatment described in A
C. Candidate for surgery or epidural injection after failed conservative therapy as described in A. and one of the symptoms described in A

VI. Radiculopathy[15] (MRI without contrast unless there has been prior thoracic spine surgery) [One of the following]

Presence of red flags waives any conservative management requirements

A. Clinical findings and symptoms with no red flags and incomplete resolution with conservative medical management consisting of either treatment with anti-inflammatory medication or muscle relaxants for at least 6 weeks or a course of oral steroids [One of the following]
   1. Pain in nerve root distribution which may be band like spanning the chest wall
   2. Pain referred to retrogastric or retrosternal areas
   3. Numbness
   4. Tingling sensations (paresthesias)
   5. Burning sensations (dysesthesias)
B. Symptoms worsening while under treatment described in A

VII. Candidate for surgery or epidural injection after failed conservative therapy (CT should only be performed if MRI is absolutely contraindicated)

A. Clinical findings and/or symptoms with no red flags; incomplete resolution with conservative medical management consisting of either treatment with anti-inflammatory medication or muscle relaxants for at least 6 weeks; or a course of oral steroids [One of the following]
   1. Hyporeflexia
   2. Atrophy
   3. Weakness objective (objective weakness on exam that is 3/5 or less)
   4. Pain in nerve root distribution
   5. Numbness
   6. Paresthesias (tingling sensations)
   7. Dysesthesias (burning sensations)
   8. Neurogenic claudication
   9. Pain in both legs related to nerve root distribution
   10. Bilateral buttock pain
   11. Dull fatigue in thigh and/or leg
   12. Straight-leg raising reproduces the pain between 30 and 70 degrees of leg elevation
   13. Crossed straight-leg raise test (Lasègue's sign) reproduces the pain at 30 to 70 degrees of leg elevation
   14. Symptoms worsening while under treatment as described in A

VIII. Evaluation of scoliosis[16-18] (non contrast) [One of the following]

A. Preoperative assessment
B. Any neurologic finding in the presence of scoliosis
C. Atypical curve pattern
D. Congenital scoliosis
E. Neurofibromatosis
F. Marfan's syndrome

IX. Evaluation for possible vertebroplasty[19,20] (non contrast)

A. Painful osteoporotic or neoplastic compression fracture or microfracture documented by MRI and/or a lytic lesion on CT without decreased height of a vertebra which is refractory to medical therapy as defined as one of the following:
   1. Pain from a weakened or fractured vertebral body that renders an individual nonambulatory despite 24 hours of analgesic therapy
   2. Pain from a weakened or fractured vertebral body that prevents an individual from participating in physical therapy despite 24 hours of analgesic therapy
   3. Member with weakened or fractured vertebra that develops confusion, sedation or constipation from analgesic therapy

X. Suspected tumor of the thoracic spinal cord or meninges[6-11]

A. Suspected primary or metastatic tumor of the thoracic cord or leptomeninges [One of the following]
   1. Symptoms or findings on examination with or without personal history of cancer [One of the following]
      a. Hyperreflexia
      b. Weakness of the lower extremities
      c. Spasticity
      d. Bladder dysfunction
      e. Bowel dysfunction
      f. Sensory loss
      g. New onset scoliosis
      h. New onset kyphosis
      i. Spastic gait
      j. Radiculopathy
      k. Localized tenderness over the spine
      l. Pain
      m. Spinal pain interfering with sleep
      n. CSF cytology positive for malignant cells

XI. Medulloblastoma[8,11] [One of the following]

A. Initial evaluation
B. Follow-up every 3 months for 2 years then every 6 months for 2 years and then annually if there is previously known spine disease
C. New or worsening signs or symptoms
D. Evaluation after completion of chemotherapy or radiation therapy

XII. Ependymoma[11] [One of the following]

A. Initial evaluation
B. Follow-up intervals at every 3-4 months for a year and then every 4-6 months for year 2 and every 6-12 months thereafter if there is previously known spine disease
C. New or worsening of symptoms
D. Evaluation after completion of chemotherapy or radiation therapy

XIII. Infection[21-26] (including osteomyelitis and discitis and epidural abscess) [One of the following]

A. Osteomyelitis [One of the following]
   1. Laboratory findings [One of the following]
      a. Aural temperature >38.3°C or >100.9°F
      b. WBC >11,500cu.mm
      c. ESR >22 mm/hr
      d. C-reactive protein >10 mg/L
      e. Blood culture positive
   2. History of infection elsewhere
   3. History of diabetes, dialysis or peripheral vascular disease
   4. X-ray suggestive of osteomyelitis
   5. Sinus tract, poor wound or fracture healing
   6. History of penetrating injury or surgery

B. Pre-operative evaluation of osteomyelitis

C. Follow-up during or after therapy for osteomyelitis, epidural abscess or disc space infection [One of the following]
   1. New or worsening pain at site or neurologic signs or symptoms
   2. Periodic evaluation of response to therapy

D. Suspected epidural abscess or disc space infection (MRI with contrast) [All of the following]
   1. Progressive neurological symptoms [One of the following]
      a. Radiating nerve root pain
      b. Muscle weakness
      c. Sensory deficit
   2. Risk factors [One of the following]
      a. Trauma
      b. Prior spinal procedure
      c. Infection elsewhere
      d. IV drug use
      e. Diabetes
      f. Immunosuppression
   3. Clinical and laboratory findings [One of the following]
      a. Aural temperature >38.3°C or >100.9°F
      b. WBC >11,500/cu.mm
      c. ESR >22 mm/hr
      d. C-reactive protein >10 mg/L
      e. Blood culture positive

E. Follow-up during therapy for epidural abscess or disc space infection [One of the following]
   1. New or worsening pain at site or neurologic signs or symptoms
   2. Periodic evaluation of response to therapy

XIV. Syrinx or syringomyelia [One of the following]

A. Known Chiari type 1 malformation
B. Asymmetric sensory loss
C. Objective weakness in legs
D. Decreased or absent reflexes

E. Facial pain and numbness
F. Scoliosis
G. Muscle atrophy in the extremities
H. Spasticity
I. Tingling in the legs
J. Known syrinx and history or suspicion of spinal trauma, myelitis, or spinal cord tumor [One of the following]
    1. History of myelitis
    2. History of spinal cord tumor
    3. History of spinal cord trauma

XV. Neurofibromatosis[27-30] (MRI without and with contrast) [One of the following]

A. Scoliosis
B. Peripheral neurofibromas (2 or more)
C. Hearing loss
D. Brain tumor
E. Spinal cord tumor
F. New onset of [One of the following]
    1. Sensory loss
    2. Motor deficit
    3. Incoordination
    4. Bladder or bowel dysfunction

XVI. Myelopathy[31-33] [One of the following]

A. Sensory, motor, or autonomic function is impaired [One of the following]
    1. Radiculopathy
    2. Bowel and/or bladder control problems (retention or incontinence)
    3. Hyperreflexia
    4. Ankle clonus
    5. Spasticity
    6. Objective weakness or stiffness of the legs
    7. Numbness or tingling of the legs
    8. Loss of coordination
    9. Positive Babinski sign
    10. Paresthesias
    11. Gait disturbance
B. Known multiple sclerosis (See IV above)
C. Syrinx or syringomyelia [One of the following]
    1. Known Chiari type 1 malformation
    2. Asymmetric sensory loss
    3. Decreased or absent reflexes
    4. Scoliosis
    5. Muscle atrophy in the extremities
    6. Spasticity
    7. Tingling in the legs

400 Buckwalter Place Boulevard, Bluffton, SC 29910 • (800) 918-8924

References:

1. Denniston PL, Kennedy CW, et al. Work Loss Data Institute. Low back – lumbar & thoracic (acute & chronic). http://www.guideline.gov/content.aspx?id=47586.
2. Daffner RH, Weissman BN, Wippold FJ II, et al, Expert Panel on Musculoskeletal and Neurologic Imaging. American College of Radiology Appropriateness Criteria – Suspected Spine Trauma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SuspectedSpineTrauma.pdf.
3. Gardner A, Grannum S, Porter K. Thoracic and lumbar spine fractures, Trauma, 2005; 7:77-85.
4. Roberts CC, Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Metastatic Bone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/MetastaticBoneDisease.pdf.
5. Goddard AJP, Gholkar A. Diagnostic and therapeutic radiology of the spine: an overview, Imaging, 2002; 14:355-373.
6. Murphey MD, Andrews CL, Flemming DJ, et al. From the archives of the AFIP. Primary tumors of the spine: radiologic pathologic correlation, RadioGraphics, 1996; 16:1131-1158.
7. Husband DJ, Grant KA, Romaniuk CS. MRI in the diagnosis and treatment of suspected malignant spinal cord compression, The British Journal of Radiology, 2001; 74:15-23.
8. Meyers SP, Wildenhain SL, Chang J-K, et al. Postoperative evaluation for disseminated medulloblastoma involving the spine: contrast-enhanced MRI findings, CSF cytologic analysis, timing of disease occurrence, and patient outcomes, AJNR, 2000; 21:1757-1765.
9. Bilsky MH, Lis E, Raizer J, et al. The diagnosis and treatment of metastatic spinal tumor, Oncologist, 1999; 4:459-469.
10. Kienstra GEM, Terwee CB, Dekker FW, et al. Prediction of spinal epidural metastases, Arch Neurol, 2000; 57:690-695
11. Nabors LB, Portnow J, Ammirati M, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Central Nervous System Cancers. http://www.nccn.org/professionals/physician_gls/pdf/cns.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Central Nervous System Cancers V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
12. Frohman EM, Goodin DS, Calabresi A, et al. The utility of MRI in suspected MS: report of the therapeutics and technology assessment subcommittee of the American Academy of Neurology, Neurology, 2003; 61:602-611.
13. Simon JH. Update on multiple sclerosis, Radiol Clin N Am, 2006; 44:79-100.
14. Seidenwurm DJ, Wippold FJ II, Cornelius RS, et al, Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Myelopathy. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Myelopathy.pdf.
15. O'Connor RC, Andary MR, Russo RB, et al. Thoracic radiculopathy, Phys Med Rehabil Clin N Am, 2002;13:623-644.
16. Wright N. Imaging in scoliosis, Arch Dis Child, 200; 82:38-40.
17. Davids JR, Chamberlin E, Blackhurst DW. Indications for magnetic resonance imaging in presumed adolescent idiopathic scoliosis, JBJS, 2004; 86:2187-2195.
18. Alam A, Teh J. MRI assessment of scoliosis, Imaging, 2005; 17:226-235.
19. Hackney DB, Daffner RH, Kransdorf MJ, et al. Musculoskeletal Imaging Committee of the Commission on Body Imaging. Practice guideline for the performance of magnetic resonance imaging (MRI) of the adult spine, American College of Radiology Guidelines and Standards. http://www.acr.org/~/media/ACR/Documents/PGTS/guidelines/MRI_Adult_Spine.pdf.
20. Hirsch JA, Jordan JE, Meyers PM, et al. ACR-ASNR-SIR-SNIS Practice guideline for the performance of vertebral augmentation. http://www.acr.org/~/media/ACR/Documents/PGTS/guidelines/Vertebral_Augmentation.pdf.
21. Fernandez M, Carrol CL, Baker CJ. Discitis and vertebral osteomyelitis in children: an 18-year review, Pediatrics, 2000; 105:1299-1304.
22. Govender S. Spinal infections, J Bone Joint Surg [Brit], 2005; 87:1454-1458.
23. Zimmerli W. Vertebral osteomyelitis, N Engl J Med, 2010; 362:1022-1029.
24. Lu C-H, Chang W-N, Lui CC, et al. Adult spinal epidural abscess: clinical features and prognostic factors, Cl Neurol Neurosurg, 2002; 104:306-310.
25. Brown R, Hussain M, McHugh K, et al. Discitis in young children, J Bone Joint Surg [Brit], 2001; 83:106-111.
26. Sharif HS. Role of MR imaging in the management of spinal infections, AJR, 1992; 158:1333-1345.
27. National Institute of Neurologic Disorders and Stroke. Neurofibromatosis Fact Sheet. http://www.ninds.nih.gov/disorders/neurofibromatosis/detail_neurofibromatosis.htm?css=print.
28. Nunes F, MacCollin M. Neurofibromatosis 2 in the pediatric population. J Child Neurol. Oct 2003; 18(10):718-724.
29. Vivarelli R, Grosso S, Calabrese F, et al. Epilepsy in neurofibromatosis 1. J Child Neurol. May 2003; 18(5):338-342.
30. Ferner RE, Huson SM, Thomas N, et al. Guidelines for the diagnosis and management of individuals with neurofibromatosis 1. J Med Genet. Feb 2007; 44(2):81-88.

72146, 72147, 72157 MRI Thoracic Spine

Clinical criteria reviewed/revised: 11/20/14, 10/2/13, 9/23/13, 6/26/13, 4/19/13, 7/9/12, 7/6/12, 8/26/11, 11/17/10, 9/16/09
Medical Advisory Committee reviewed and approved: 4/29/14, 10/24/13, 9/18/13, 9/19/12, 6/27/12, 9/21/11

72148 MRI Lumbar Spine without Gadolinium
72149 MRI Lumbar Spine with Gadolinium
72158 MRI Lumbar Spine without and with Gadolinium

Red Flags

If any of the following are part of the clinical history presented with a request for pre-certification of these CPT codes, the need to meet criteria concerning prior conservative management is waived and the examinations should be pre-certified if other criteria are met:

History of cancer
Unexplained weight loss
Immunocompromised
IV drug use
Abnormal CBC, ESR
Urinary tract infections
Urinary retention
Urinary incontinence
Decreased anal sphincter tone
Aural temperature >38.3°C or >100.9°F
Saddle anesthesia
Major motor weakness of a limb found on physical examination (objective)
Major acute trauma (This is age-dependent; lesser trauma required in older patients)

I. Uncomplicated back pain[1-8] lasting more than 6 weeks and possible candidate for surgical or interventional treatment (with a history of lumbar spine surgery contrast study) [One of the following]

A. No red flags and incomplete resolution with conservative medical management consisting of either treatment with anti-inflammatory medication or muscle relaxants for at least 6 weeks or a course of oral steroids
B. Symptoms worsening while under treatment described in A
C. Candidate for surgery or epidural injection after failed conservative therapy as described in A

II. Radiculopathy[1-8] lasting for at least 6 weeks and possible candidate for surgical or interventional treatment (with a history of lumbar spine surgery contrast study) [One of the following]

Presence of red flags waives any conservative management requirements.

A. Clinical findings and/or symptoms with no red flags; incomplete resolution with conservative medical management consisting of either treatment with anti-inflammatory medication or muscle relaxants for at least 6 weeks or a course of oral steroids [One of the following]
    1. Hyporeflexia
    2. Atrophy
    3. Weakness objective (objective weakness on exam that is 3/5 or less)
    4. Pain in nerve root distribution

5. Numbness
6. Paresthesias (tingling sensations)
7. Dysesthesias (burning sensations)
8. Neurogenic claudication
9. Pain in both legs related to nerve root distribution
10. Bilateral buttock pain
11. Dull fatigue in thigh and/or leg
12. Straight-leg raising reproduces the pain between 30 and 70 degrees of leg elevation
13. Crossed straight-leg raise test (Lasègue's sign) reproduces the pain at 30 to 70 degrees of leg elevation

B. Symptoms worsening while under treatment as described in A
C. Candidate for surgery or epidural injection after failed conservative therapy as described in A. and one of the symptoms described in A

III. Suspected spinal stenosis[1-8] with pain that increases with walking for at least 6 weeks and possible candidate for surgical or interventional treatment (and with a history of lumbar spine surgery contrast study) [One of the following]

Presence of red flags waives any conservative management requirements.

A. Clinical findings and/or symptoms with no red flags; incomplete resolution with conservative medical management consisting of either treatment with anti-inflammatory medication or muscle relaxants for at least 6 weeks; or a course of oral steroids
B. Symptoms worsening while under treatment as described in A
C. Candidate for surgery or epidural injection after failed conservative therapy as described in A and one of the symptoms described in A

IV. Candidate for surgery or epidural injection after failed conservative therapy (CT should only be performed if MRI is absolutely contraindicated) [One of the following]

A. Clinical findings and/or symptoms with no red flags; incomplete resolution with conservative medical management consisting of either treatment with anti-inflammatory medication or muscle relaxants for at least 6 weeks; or a course of oral steroids [One of the following]
    1. Hyporeflexia
    2. Atrophy
    3. Weakness objective (objective weakness on exam that is 3/5 or less)
    4. Pain in nerve root distribution
    5. Numbness
    6. Paresthesias (tingling sensations)
    7. Dysesthesias (burning sensations)
    8. Neurogenic claudication
    9. Pain in both legs related to nerve root distribution
    10. Bilateral buttock pain
    11. Dull fatigue in thigh and/or leg
    12. Straight-leg raising reproduces the pain between 30 and 70 degrees of leg elevation
    13. Crossed straight-leg raise test (Lasègue's sign) reproduces the pain at 30 to 70 degrees of leg elevation
B. Symptoms worsening while under treatment as described in A

V. Suspected cauda equina syndrome[1,2,4] (Contrast)

A. Sudden unexplained onset of [One of the following]
   1. Saddle anesthesia
   2. Profound sensory deficit
   3. Bowel or bladder dysfunction
   4. Severe motor deficit (objective weakness on exam that is 3/5 or less)
   5. Diminished rectal sphincter tone
   6. Bilateral radiculopathy
   7. Neurogenic claudication

VI. Suspected tumor of leptomeninges[9-17] (Contrast)

A. Suspected primary or metastatic tumor of the thoracic cord or leptomeninges
   1. Symptoms or findings on examination with or without personal history of cancer [One of the following]
      a. Hyperreflexia
      b. Weakness of the lower extremities
      c. Spasticity
      d. Bladder dysfunction
      e. Bowel dysfunction
      f. Sensory loss
      g. New onset scoliosis
      h. New onset kyphosis
      i. Spastic gait
      j. Radiculopathy
      k. Localized tenderness over the spine
      l. Pain
      m. Spinal pain interfering with sleep
      n. CSF cytology positive for malignant cells

VII. Infection[18-22] (including osteomyelitis and discitis and epidural abscess) (Contrast) [One of the following]

A. Osteomyelitis [One of the following]
   1. Laboratory findings [One of the following]
      a. Aural temperature >38.3°C or >100.9°F
      b. WBC >11,500/cu.mm
      c. ESR >22 mm/hr
      d. C-reactive protein >10 mg/L
      e. Blood culture positive
   2. History of infection elsewhere
   3. History of diabetes, dialysis or peripheral vascular disease
   4. X-ray suggestive of osteomyelitis
   5. Sinus tract, poor wound or fracture healing
   6. History of penetrating injury or surgery
B. Pre-operative evaluation of osteomyelitis
C. Follow-up during or after therapy for osteomyelitis, epidural abscess or disc space infection [One of the following]

1. New or worsening pain at site or neurologic signs or symptoms
2. Periodic evaluation of response to therapy

D. Suspected epidural abscess or disc space infection (MRI with contrast) [All of the following]
   1. Progressive neurological symptoms [One of the following]
      a. Radiating nerve root pain
      b. Muscle weakness
      c. Sensory deficit
   2. Risk factors [One of the following]
      a. Trauma
      b. Prior spinal procedure
      c. Infection elsewhere
      d. IV drug use
      e. Diabetes
      f. Immunosuppression
   3. Clinical and laboratory findings [One of the following]
      a. Aural temperature >38.3°C or >100.9°F
      b. WBC >11,500/cu.mm
      c. ESR >22 mm/hr
      d. C-reactive protein >10 mg/L
      e. Blood culture positive

E. Follow-up during therapy for epidural abscess or disc space infection [One of the following]
   1. New or worsening pain at site or neurologic signs or symptoms
   2. Periodic evaluation of response to therapy

VIII. Trauma[23] (CT) [One of the following]

A. Back pain or midline tenderness over the lumbar spine
B. Local signs of thoracolumbar injury
C. Abnormal neurological signs related to the lumbar spine
D. Documented cervical or thoracic spine fracture
E. Major distracting injury

IX. Suspected meningocele or myelomeningocele[24] [One of the following]

A. Congenital
B. After lumbar surgery

X. Evaluation of scoliosis[25-29] [One of the following]

A. Preoperative assessment
B. Any neurologic finding in the presence of scoliosis
C. Atypical curve pattern
D. Congenital scoliosis
E. Neurofibromatosis
F. Marfan's syndrome

XI. Tethered cord[24] [One of the following]

A. Documented Arnold-Chiari malformation
B. Symptoms [One of the following]

1. Low back and leg pain worst in the morning
2. Spastic gait
3. Hair tuft
4. Dimple
5. Hemangioma
6. Incontinence
7. Scoliosis
8. Lower extremity weakness (objective)
9. Muscle atrophy
10. Hyporeflexia

XII. Suspected tumor of vertebra or bone[9-17] [One of the following]

A. Primary or metastatic bone tumor (Gadolinium not required if there are no neurological signs or symptoms) [One of the following]
   1. Known malignancy with lumbar spine pain
   2. Follow-up primary or metastatic bone tumor confirmed on prior imaging study
   3. New or worsening pain at site of known bone tumor
   4. Periodic assessment not more frequently than every 3 months unless there are new signs or symptoms during chemotherapy, radiation therapy, or after surgery for bone tumor
   5. New onset scoliosis
   6. New onset kyphosis

XIII. Evaluation for possible vertebroplasty[30,31]

A. Painful osteoporotic or neoplastic compression fracture or microfracture documented by MRI and/or a lytic lesion on CT without decreased height of a vertebra which is refractory to medical therapy as defined as one of the following
   1. Pain from a weakened or fractured vertebral body that renders an individual nonambulatory despite 24 hours of analgesic therapy
   2. Pain from a weakened or fractured vertebral body that prevents an individual from participating in physical therapy despite 24 hours of analgesic therapy
   3. Member with weakened or fractured vertebra that develops confusion, sedation or constipation from analgesic therapy

XIV. Medulloblastoma[13,16] [One of the following]

A. Initial evaluation
B. Follow-up every 3 months for 2 years then every 6 months for 2 years and then annually if there is previously known spine disease
C. New or worsening signs or symptoms
D. Evaluation after completion of chemotherapy or radiation therapy

XV. Ependymoma[16] [One of the following]

A. Initial evaluation
B. Follow-up intervals at every 3-4 months for a year and then every 4-6 months for year 2 and every 6-12 months thereafter if there is previously known spine disease
C. New or worsening of symptoms
D. Evaluation after completion of chemotherapy or radiation therapy

XVI. Neurofibromatosis[32-35] (MRI without and with contrast) [One of the following]

A. Scoliosis
B. Peripheral neurofibromas (2 or more)
C. Hearing loss
D. Brain tumor
E. Spinal cord tumor
F. New onset of [One of the following]
    1. Sensory loss
    2. Motor deficit
    3. Incoordination
    4. Bladder or bowel dysfunction

XVII. Evaluation of pediatric spine for congenital anomalies

References:

1. Davis PC, Wippold FJ II, Cornelius RS, et al. Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Low Back Pain. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/LowBackPain.pdf.
2. Goertz M, Thorson DC, Campbell R, et al. ICSI Health Care Guideline: adult acute and subacute low back pain, Fifteenth Edition, January 2012. https://www.icsi.org/_asset/bjvqrj/LBP.pdf.
3. Chiodo A, Alvarez D, Graziano G, et al, Low Back Pain Guideline Team. Acute low back pain, University of Michigan Health System, Guidelines for Clinical Care. https://docs.google.com/viewer?a=v&q=cache:ZDqos-upCeAJ:cme.med.umich.edu/pdf/guideline/backpain03.pdf+Chiodo+A,+Alvarez+D,+Graziano+G,+et+al,+Low+Back+Pain+Guideline+Team.+Acute+low+back+pain,+University+of+Michigan+Health+System,+Guidelines+for+Clinical+Care&hl=en&gl=us&pid=bl&srcid=ADGEESHFdRFfY6jOQfiKrIcPrcCnsoQmnLCWcn4h1Ox3ClQ_ntxSC6vcvn59xm3iQ3f6U8GfpOXurVHrLbrQSEcDcPhYXGxrczOw0IBOYG8fiT0vJ8XlQ3RPXNuH1E-keOkkBJQlHZl0&sig=AHIEtbTttON3p80Bawpn40m59X9Gkwr_1w.
4. Chou R, Qaseem A, Snow V, et al, for the Clinical Efficacy Assessment Subcommittee of the American College of Physicians and the American College of Physicians/American Pain Society Low Back Pain Guidelines Panel. Diagnosis and Treatment of Low Back Pain: A Joint Clinical Practice Guideline from the American College of Physicians and the American Pain Society, Ann Intern Med. 2007; 147:478-491.
5. Kinkade S. Evaluation and treatment of acute low back pain, Am Fam Physician, 2007; 75:1181-1188. http://www.aafp.org/afp/2007/0415/p1181.html.
6. Kreiner DS, Shaffer WO, Baisden J, et al, NASS Evidence-Based Clinical Guidelines Committee. Evidence-based clinical guidelines for multidisciplinary spine care: diagnosis and treatment of degenerative lumbar spinal stenosis, North American Spine Society. https://www.spine.org/Documents/ResearchClinicalCare/Guidelines/LumbarStenosis.pdf.
7. Kreiner DS, Hwang S, Easa J, et al, NASS Evidence-Based Clinical Guidelines Committee. Evidence-based clinical guidelines for multidisciplinary spine care: diagnosis and treatment of lumbar disc herniation with radiculopathy, North American Spine Society. https://www.spine.org/Documents/ResearchClinicalCare/Guidelines/LumbarDiscHerniation.pdf.
8. Alvarez JA, Hardy RH. Lumbar Spine Stenosis: a common cause of back and leg pain, Am Fam Physician, 1998; 57:1825-1834.
9. Lawrie I. Back pain in malignant disease – metastatic spinal cord compression? British Journal of Pain, 2010; 4:14-17.
10. Jacobs WB, Perrin RG. Evaluation and treatment of spinal metastases: an overview, Neurosurg Focus 2001 11:1-11.
11. Murphey MD, Andrews CL, Flemming DJ, et al. From the archives of the AFIP. Primary tumors of the spine: radiologic pathologic correlation, RadioGraphics, 1996; 16:1131-1158.
12. Husband DJ, Grant KA, Raniuk CS. MRI in the diagnosis and treatment of suspected malignant spinal cord compression, The British Journal of Radiology, 2001; 74:15-23.
13. Meyers SP, Wioldenhain SL, Chang J-K, et al. Postoperative evaluation for disseminated medulloblastoma involving the spine: contrast-enhanced MRI findings, CSF cytologic analysis, timing of disease occurrence, and patient outcomes, AJNR, 2000, 21:17157-1765.
14. Bilsky MH, Lis E, Raizer J, et al. The diagnosis and treatment of metastatic spinal tumor, Oncologist, 1999; 4:459-469.
15. Kienstra GEM, Terwee CB, Dekker FW, et al. Prediction of spinal epidural metastases, Arch Neurol, 2000; 57:690-695.
16. Nabors LB, Portnow J, Ammirati M, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Central Nervous System Cancers. http://www.nccn.org/professionals/physician_gls/pdf/cns.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Central Nervous System Cancers V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
17. Roberts CC, Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Metastatic Bone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/MetastaticBoneDisease.pdf.

18. Fernandez M, Carrol CL, Baker CJ. Discitis and vertebral osteomyelitis in children: an 18-year review, Pediatrics, 2000; 105:1299-1304.
19. Govender S. Spinal infections, J Bone Joint Surg [Brit], 2005; 87:1454-1458.
20. Brown R, Hussain M, McHugh K, et al. Discitis in young children, J Bone Joint Surg [Brit], 2001; 83:106-111.
21. Sharif HS. Role of MR imaging in the management of spinal infections, AJR, 1992; 158:1333-1345.
22. Lu C-H, Chang W-N, Lui CC, et al. Adult spinal epidural abscess: clinical features and prognostic factors, Cl Neurol Neurosurg, 2002; 104:306-310.
23. Daffner RH, Weismann BN, Wippold FJ II, et al, Expert Panels on Musculoskeletal and Neurologic Imaging. American College of Radiology Appropriateness Criteria – Suspected Spine Trauma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SuspectedSpineTrauma.pdf.
24. Barnes PD, Lester PD, Yamanashi WS, et al. MRI in infants and children with spinal dysraphism, AJR, 1986; 147:339-346.
25. Diagnostic Imaging Pathways – Adolescent scoliosis, Government of Western Australia Department of Health. http://www.imagingpathways.health.wa.gov.au/index.php/imaging-pathways/paediatrics/adolescent-scoliosis#pathway-home.
26. Wright N. Imaging in scoliosis, Arch Dis Child, 200; 82:38-40.
27. Davids JR, Chamberlin E, Blackhurst DW. Indications for magnetic resonance imaging in presumed adolescent idiopathic scoliosis, JBJS, 2004; 86:2187-2195.
28. Alam A, Teh J. MRI assessment of scoliosis, Imaging, 2005; 17:226-235.
29. Goddard AJP, Gholkar A. Diagnostic and therapeutic radiology of the spine: an overview, Imaging, 2002; 14:355-373.
30. Anderson MW, Dalinka MK, DeSmet AA, et al. Musculoskeletal Imaging Committee of the Commission on Body Imaging. ACR-ASNR-SCBT-MR Practice Guideline for the Performance of Magnetic Resonance Imaging (MRI) of the Adult Spine. http://www.acr.org/~/media/ACR/Documents/PGTS/guidelines/MRI_Adult_Spine.pdf.
31. Hirsch JA, Jordan JE, Meyers PM, et al. ACR-ASNR-SIR-SNIS Practice guideline for the performance of vertebral augmentation. http://www.acr.org/~/media/ACR/Documents/PGTS/guidelines/Vertebral_Augmentation.pdf.
32. National Institute of Neurologic Disorders and Stroke. Neurofibromatosis Fact Sheet. http://www.ninds.nih.gov/disorders/neurofibromatosis/detail_neurofibromatosis.htm?css=print.
33. Nunes F, MacCollin M. Neurofibromatosis 2 in the pediatric population. J Child Neurol. Oct 2003; 18(10):718-724.
34. Vivarelli R, Grosso S, Calabrese F, et al. Epilepsy in neurofibromatosis 1. J Child Neurol. May 2003; 18(5):338-342.
35. Ferner RE, Huson SM, Thomas N, et al. Guidelines for the diagnosis and management of individuals with neurofibromatosis 1. J Med Genet. Feb 2007; 44(2):81-88.

72148, 72149, 72158 MRI Lumbar Spine

Clinical criteria reviewed/revised: 6/8/14, 10/3/13, 9/23/13, 9/17/13, 6/26/13, 4/19/13, 7/26/12, 8/26/11, 11/17/10, 9/16/09, 3/18/09
Medical Advisory Committee reviewed and approved: 4/29/14, 11/8/13, 11/01/13, 9/18/13, 6/12/13, 9/19/12, 6/27/12, 9/21/11

72159 MRA Spinal Canal with or without Contrast

MEDICARE

This procedure is considered to be not medically reasonable and necessary

References:

1. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L32611), Novitas Solutions, Inc., Arkansas, https://www.novitas-solutions.com/policy/jh/l32611-r2.html.
2. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L32611), Novitas Solutions, Inc., Colorado, https://www.novitas-solutions.com/policy/jh/l32611-r2.html.
3. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services Inc., Connecticut, http://www.ngsmedicare.com/wps/portal/ngsmedicare/!ut/p/c5/hY3BDoIwEES_xR9gdynb4hFBEBRMrIm0F4PGEBILHgz-vkS9EmeO8_IGLEztm7Frm2c39M0darDyjJVIopQDRM2M-RoPqtTKx4DgBGY1QWaCZhLhX4X9EIWOv0S5RMwjqdMsQ7Gv_N8-7zdg1ezD1ocjmBgKsN3Fea-r89CTxEwsCUkJYhVAnUC1GdwNHm7cyUNIoWgXb-fwDGE!/dl3/d3/L2dBISEvZ0FBIS9nQSEh/?clearcookie&savecookie&REGION&LOB=Part%20B&digest=N_5daMHgbyRiOPvt7gua6g.
4. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L31399), Novitas Solutions, Inc., District of Columbia, https://www.novitas-solutions.com/policy/mac-ab/l31399-r6.html.
5. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L31399), Novitas Solutions, Inc., Delaware, https://www.novitas-solutions.com/policy/mac-ab/l31399-r6.html.
6. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L29218) First Coast Options Inc., Florida, http://medicare.fcso.com/Fee_lookup/LCDDisplay.asp?id=L29218&submitcode=+Submit+.
7. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L32611), Novitas Solutions, Inc., Louisiana, https://www.novitas-solutions.com/policy/jh/l32611-r2.html.
8. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L31399), Novitas Solutions, Inc., Maryland, https://www.novitas-solutions.com/policy/mac-ab/l31399-r6.html.
9. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L32611), Novitas Solutions, Inc., Mississippi, https://www.novitas-solutions.com/policy/jh/l32611-r2.html.
10. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L31399), Novitas Solutions, Inc., New Jersey, https://www.novitas-solutions.com/policy/mac-ab/l31399-r6.html.
11. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L32611), Novitas Solutions, Inc., New Mexico, https://www.novitas-solutions.com/policy/jh/l32611-r2.html.
12. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services Inc., New York, http://www.ngsmedicare.com/wps/portal/ngsmedicare/!ut/p/c5/hY3BDoIwEES_xR9gdynb4hFBEBRMrIm0F4PGEBILHgz-vkS9EmeO8_IGLEztm7Frm2c39M0darDyjJVIopQDRM2M-RoPqtTKx4DgBGY1QWaCZhLhX4X9EIWOv0S5RMwjqdMsQ7Gv_N8-7zdg1ezD1ocjmBgKsN3Fea-r89CTxEwsCUkJYhVAnUC1GdwNHm7cyUNIoWgXb-fwDGE!/dl3/d3/L2dBISEvZ0FBIS9nQSEh/?clearcookie&savecookie&REGION&LOB=Part%20B&digest=N_5daMHgbyRiOPvt7gua6g.
13. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L32611), Novitas Solutions, Inc., Oklahoma, https://www.novitas-solutions.com/policy/jh/l32611-r2.html.
14. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L31399), Novitas Solutions, Inc., Pennsylvania, https://www.novitas-solutions.com/policy/mac-ab/l31399-r6.html.
15. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L32611), Novitas Solutions, Inc., Texas, https://www.novitas-solutions.com/policy/jh/l32611-r2.html.
16. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services Inc., Illinois, http://www.cms.gov/medicare-coverage-database/details/lcd-details.aspx?LCDId=25367&ContrId=273&ver=70&ContrVer=1&Date=01%2f01%2f2014&DocID=L25367&SearchType=Advanced&bc=KAAAAAgAAAAAAA%3d%3d&.
17. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services Inc., Minnesota, http://www.cms.gov/medicare-coverage-database/details/lcd-details.aspx?LCDId=25367&ContrId=274&ver=70&ContrVer=1&Date=01%2f01%2f2014&DocID=L25367&SearchType=Advanced&bc=KAAAAAgAAAAAAA%3d%3d&.

18. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services Inc., Wisconsin, http://www.cms.gov/medicare-coverage-database/details/lcd-details.aspx?LCDId=25367&ContrId=275&ver=70&ContrVer=1&Date=01%2f01%2f2014&DocID=L25367&SearchType=Advanced&bc=KAAAAAgAAAAAAA%3d%3d&.
19. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services Inc., Connecticut , http://www.cms.gov/medicare-coverage-database/details/lcd-details.aspx?LCDId=25367&ContrId=180&ver=70&ContrVer=1&Date=01%2f01%2f2014&DocID=L25367&SearchType=Advanced&bc=KAAAAAgAAAAAAA%3d%3d&.
20. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services Inc., Maine, http://www.cms.gov/medicare-coverage-database/details/lcd-details.aspx?LCDId=25367&ContrId=291&ver=70&ContrVer=1&Date=01%2f01%2f2014&DocID=L25367&SearchType=Advanced&bc=KAAAAAgAAAAAAA%3d%3d&.
21. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services Inc., Massachusetts http://www.cms.gov/medicare-coverage-database/details/lcd-details.aspx?LCDId=25367&ContrId=292&ver=70&ContrVer=1&Date=01%2f01%2f2014&DocID=L25367&SearchType=Advanced&bc=KAAAAAgAAAAAAA%3d%3d&.
22. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services Inc., New Hampshire, http://www.cms.gov/medicare-coverage-database/details/lcd-details.aspx?LCDId=25367&ContrId=293&ver=70&ContrVer=1&Date=01%2f01%2f2014&DocID=L25367&SearchType=Advanced&bc=KAAAAAgAAAAAAA%3d%3d&.
23. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services Inc., Rhode Island, http://www.cms.gov/medicare-coverage-database/details/lcd-details.aspx?LCDId=25367&ContrId=295&ver=70&ContrVer=1&Date=01%2f01%2f2014&DocID=L25367&SearchType=Advanced&bc=KAAAAAgAAAAAAA%3d%3d&.
24. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services Inc., Vermont, http://www.cms.gov/medicare-coverage-database/details/lcd-details.aspx?LCDId=25367&ContrId=294&ver=70&ContrVer=1&Date=01%2f01%2f2014&DocID=L25367&SearchType=Advanced&bc=KAAAAAgAAAAAAA%3d%3d&.

72159 MRA Spinal Canal: MEDICARE

Clinical criteria reviewed/revised: 4/9/14, 4/1/14 6/27/13, 7/26/12, 8/27/11, 11/17/10
Medical Advisory Committee reviewed and approved: 4/29/14, 9/19/12, 9/21/11

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72191 CTA of the Pelvis

Note: For evaluation of PVD, the appropriate CPT code is 75635 (CTA abdominal aorta with runoff) rather than either CTA abdomen or CTA pelvis.

I. Suspected occlusion or stenosis of iliac or femoral arteries[1-6] (CTA of the abdominal aorta with runoff, 75635)

II. Aortic aneurysm or aneurysm of the pelvic arteries[1,2,7-13] (including mycotic aneurysm) (CTA of the abdomen and pelvis, 74174)

III. Suspected pelvic AVM[1,14] [One of the following]
- A. Pulsatile pelvic mass
- B. Incidental finding on prior imaging including ultrasound
- C. Pelvic pain

IV. Pelvic trauma with suspected vascular injury

V. Uterine fibroid embolization[1]
- A. Pre-embolization evaluation

VI. Evaluation of renal transplant for suspected renal artery stenosis [Both of the following]
- A. New onset of hypertension
- B. Rising renal function tests

VII. Intestinal angina or chronic mesenteric ischemia[1,2,15-21] (CTA of the abdomen and pelvis, 74174)

VIII. Ischemic colitis[20,21] (CTA of the abdomen and pelvis, 74174)

IX. Evaluation of pelvic veins[1] [One of the following]
- A. Suspicion of iliac vein thrombus
  1. Indeterminate duplex venous ultrasound which includes evaluation of phasic respiratory signals and swelling of the entire leg
- B. Suspicion of inferior vena cava thrombus
  1. Bilateral leg swelling
- C. May-Thurner syndrome
  1. Swelling and pain of the left leg not explained by venous ultrasound including duplex venous ultrasound
- D. Tumor invasion

X. Suspected dissection of the aorta[1,22-24] (CTA of the abdomen and pelvis, 74174)

XI. Peripheral arterial vascular disease[1,6] (CTA of the abdominal aorta with runoff, 75635)

Note: For evaluation of PVD, unlike with MRA studies, the appropriate CPT code is 75635 (CTA abdominal aorta with runoff) rather than either CTA abdomen and/or CTA pelvis.

References:

1. American College of Radiology (ACR), North American Society for Cardiovascular Imaging (NASCI), Society for Pediatric Radiology (SPR), ACR-NASCI-SPR practice guideline for the performance of pediatric and adult body magnetic resonance angiography (MRA), [online publication]. http://www.guidelines.gov/content.aspx?id=32520&search=abdominal+aortic+aneurysm.
2. Pilleul F, Beuf O. Abdominal arteries should be evaluated by 3D contrast - enhanced MRA as the first step, Acta Radiological, 2002; 43(5): 544-542.
3. Frykberg RG, Zgonis T, Armstrong DG, et al. Diabetic foot disorders: a clinical practice guideline (2006 revision), Journal of Foot and Ankle Surgery, 2006; 45(5):S1-S66.
4. Rooke TW, Hirsch AT, Misra S, et al. 2011 ACC/AHA update of the guideline for the management of patients with peripheral arterial disease (updating the 2005 guideline). http://content.onlinejacc.org/article.aspx?articleid=1146931.
5. Dill KE, Rybicki FJ, Desjardins B, et al, Expert Panel on Cardiovascular Imaging. American College of Radiology ACR Appropriateness Criteria – Claudication–Suspected Vascular Etiology. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ClaudicationSuspectedVascularEtiology.pdf.
6. Desjardin B, Rybicki FJ, Dill KE, et al, Expert Panel on Vascular Imaging, American College of Radiology ACR Appropriateness Criteria – Pulsatile Abdominal Mass–Suspected Abdominal Aortic Aneurysm. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PulsatileAbdominalMassSuspectedAAA.pdf.
7. Mehard WB, Heiken JP, Sicard GA. High-attenuating crescent in abdominal aortic aneurysm wall at CT: A sign of acute or impending rupture. Radiology, 1994; 192:359-362.
8. Lederle FA, Wilson SE, Johnson GR, et al. Immediate repair compared with surveillance of small abdominal aortic aneurysms. N Eng J Med, 2002; 346:1437-1444.
9. Starvropoulos SW, Charagundla SR. Imaging techniques for detection and management of endoleaks after endovascular aortic aneurysm repair. Radiology, 2007; 243:641-655.
10. Brady AR, Thompson SG, Fowkes GR, et al. Abdominal aortic aneurysm expansion: Risk factors and time intervals for surveillance, Circulation, 2004; 110:16-21.
11. Lindholt JS, Vammen S, Juul S, et al. Optimal interval screening and surveillance of abdominal aortic aneurysms, Eur J Endovasc Surg,2000; 20:369-373.
12. Caronno R, Piffaretti G, Tozzi M, et al. Endovascular treatment of isolated iliac artery aneurysms, Annals of Vascular Surgery, 2006; 20:496-501.
13. Fleming C, Whitlock EP, Beil TL. Screening for abdominal aortic aneurysm: a best-evidence systematic review for the U.S. Preventive Services Task Force. http://www.uspreventiveservicestaskforce.org/uspstf05/aaascr/aaarev.pdf.
14. Candamio MJD, Lee VS, Rofsky, et al. Pelvic arteriovenous malformation: gadolinium-enhanced three dimensional MR angiography findings, European Radiology, 2000; 10:1257-1260.
15. Shih MP, Hagspiel KD. CTA and MRA in mesenteric ischemia: part 1, role in diagnosis and differential diagnosis, AJR, 2007; 188:452-461.
16. Shih MP, Angle JF, Leung DA, et al. CTA and MRA in mesenteric ischemia: part 2, normal findings and complications after surgical and endovascular treatment, AJR, 2007; 188: 462-471.
17. American Gastroenterological Association medical position statement: guidelines on intestinal ischemia, Gastroenterology, 2000; 118:951-953.
18. Souba WW, Fink MP, Jurkovich GJ, et al. ACS Surgery Principles & Practice, 6th Edition. 2007 WebMD, Chapter 83, p.1016. http://www.acssurgery.com.
19. Wolff BG, Fleshman, JW, Beck, DE, et al. The ASCRS Textbook of Colon and Rectal Surgery, 2007 Springer Science & Business Media, LLC, Chapter 43, p.401.
20. Theodoropoulou A, Koutroubakis IE. Ischemic colitis: Clinical practice in diagnosis and treatment World J Gastroenterol 2008 December 28; 14(48): 7302-7308.
21. Sreenarasimhaiah J. Diagnosis and management of intestinal ischaemic disorders BMJ. 2003 June 21; 326(7403): 1372–1376.
22. Jacobs JE, Latson LA, Abbara S, et al, Expert Panel on Cardiovascular Imaging. American College of Radiology ACR Appropriateness Criteria – Acute Chest Pain–Suspected Aortic Dissection. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteChestPainSuspectedAorticDissection.pdf.
23. Demehri S, Rybicki FJ, Dill KE, et al, Expert Panel on Cardiovascular Imaging. American College of Radiology ACR Appropriateness Criteria – Blunt Chest Trauma–Suspected Aortic Injury. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/BluntChestTraumaSuspectedAorticInjury.pdf.
24. Erbel R, Alfonso F, Boileau C, et al. Diagnosis and management of aortic dissection: recommendations of the task force on aortic dissection, European Society of Cardiology, European Heart Journal, 2001, 22:1642-1682.

72191 CTA of the Pelvis

Clinical criteria reviewed/revised: 10/24/14, 6/27/13, 6/18/12, 10/12/11, 8/21/11, 11/17/10, 12/09, 1/21/09
Medical Advisory Committee reviewed and approved: 9/18/13, 9/19/12, 9/21/11

72192 CT of the Pelvis without Contrast
72193 CT of the Pelvis with Contrast
72194 CT of the Pelvis without and with Contrast

Note: For radiation therapy planning, use 77014.
For CyberKnife® planning, use 77014.
For CT guided needle placement, biopsy or drainage, use 77012.
For CT guided tissue ablation, use 77013.

I. Complaints associated with abdominal or pelvic pain[1-11] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

II. Evaluation of symptoms after any abdominopelvic surgery[1] [See CT of the abdomen and pelvis, 74176, 74177, or 74178, unless this is a follow up for a known complication that is localized to the pelvis]

III. Aneurysm[12-20] [See CTA of the abdomen and pelvis 74174]

IV. Obstruction of bowel[21-23] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

V. Known cancer including lymphoma other than pelvic cancer (except head and neck cancer) [24-63] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

VI. Diverticulitis, suspected or known in a patient with lower abdominal pain and/or mass[4,5] [See CT of the abdomen and pelvis, 74176, 74177, or 74178 except for follow up of known diverticulitis]

VII. Appendicitis[6,7] (In children and pregnant women, ultrasound as the initial study except for follow-up of known appendicitis with suspected complications. If this is not possible then see CT of the abdomen and pelvis [74176, 74177, or 74178]. MRI abdomen [74181, 74182, or 74183] in pregnant women.)

VIII. Suspected pelvic abscess, pelvic inflammatory disease (PID)[1] with non-diagnostic ultrasound [One of the following]
- A. Symptoms [One of the following]
  1. Lower abdominal pain
  2. Menstrual disturbances
  3. Cervical and adnexal tenderness
- B. Objective findings [One of the following]

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1. Local pelvic tenderness
2. Aural temperature >38.3°C or 100.9°F
3. Leukocytosis, WBC >11,500/cu.mm
4. Purulent cervical discharge

IX. Follow-up of known pelvic abscess or fistula during or after treatment [One of the following]
- A. Follow up evaluation at completion of treatment
- B. Evaluation prior to removal of drain

X. Hematuria[3,64-66] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

XI. Complex ovarian, adnexal or other pelvic mass found on imaging or physical examination[67] (MRI unless contraindicated. Transabdominal and/or transvaginal imaging must be done and be indeterminate prior to MRI or CT)

XII. Urethral diverticulum and ultrasound fails to demonstrate a diverticulum[68-69] (MRI; CT should not be used unless MRI is contraindicated. CT virtual endoscopy may be used if MRI is not feasible) [One of the following]
- A. Incontinence
- B. Urinary frequency, urgency, burning on urination, dysuria
- C. Dribbling, dyspareunia

XIII. Lumbosacral plexopathy with MRI or CT of the LSS non-diagnostic and MRI of the pelvis is contraindicated[70-72] (MRI) [One of the following]
- A. Leg numbness or weakness in distribution of more than one nerve root
- B. Fasciculations
- C. Muscle atrophy
- D. Meralgia paresthetica (pain, paresthesia, and sensory loss in the lateral aspect of the thigh)
- E. Suspected pelvic mass with back pain radiating to the leg(s)
- F. History of pelvic radiation [One of the following]
  1. Paresthesias
  2. Sensory loss
  3. Leg weakness

XIV. Suspected sacral or pubic fracture[73-76] (MRI) [One of the following]
- A. Stress or insufficiency fracture suspected and negative or non diagnostic x-ray 10-14 days after injury
- B. Stress or insufficiency fracture suspected and normal x-ray but bone scan non-specific and positive
- C. Stress or insufficiency fracture suspected and elderly individual with normal x-ray and bone scan positive
- D. Stress or insufficiency fracture suspected and normal x-ray and bone scan in last 48 hours with documented osteoporosis or long term steroid use
- E. Trauma with negative or non diagnostic x-rays

F. Post radiation therapy to the pelvis with sacral or pubic pain

XV. Fever of unknown origin (FUO)[77] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

XVI. Abdominal and pelvic trauma[78-80] [See CT of the abdomen and pelvis 74176, 74177, or 74178]

XVII. Cryptorchidism (undescended testicle)[81-83] (MRI unless contraindicated. The correct procedure is MRI of the abdomen and pelvis. If CT must be used because the MRI is contraindicated it should be of the abdomen and pelvis.)

XVIII. Crohn's disease and inflammatory bowel disease[8,9,84,85] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

XIX. CT enterography[8,9,84,85] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

XX. Suspected or known dissection of the aorta[86-89] [See CTA of the abdomen and pelvis]

XXI. Weight loss[90] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

XXII. Kidney or renal stones[3] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

XXIII. Abdominal distention on physical examination [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

XXIV. Soft tissue mass of the abdominal wall[91]

XXV. Suspected or known neuroendocrine tumor including carcinoid, pheochromocytoma, paraganglioma, poorly differentiated or high grade or aggressive small cell tumor neuroendocrine tumors other than lung[53,63] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

XXVI. Unilateral leg edema[92] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

XXVII. Anal cancer[42] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

XXVIII. Bladder cancer[24,43] with no muscle invasion [See CT of the abdomen and pelvis if there is muscle invasion, 74176, 74177, or 74178] [One of the following]

A. High grade or sessile tumor prior to TURBT

XXIX. Breast cancer[44] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

XXX. Cervical cancer[47] [One of the following]
- A. Initial staging
- B. Restaging after completion of therapy
- C. When clinically indicated

XXXI. Colon cancer[25,48] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

XXXII. Rectal cancer[49] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

XXXIII. Esophageal cancer[51] [Usually CT of the abdomen]

XXXIV. Gastric cancer[52] [Usually CT of the abdomen, but see CT of the abdomen and pelvis, 74176, 74177, or 74178, should be performed as clinically indicated]

XXXV. Hodgkin's lymphoma[30,58] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

XXXVI. Non-Hodgkin's lymphoma[32,33,59] (follicular lymphoma, marginal zone lymphoma, MALT lymphoma, mantle cell lymphoma, diffuse large B-cell lymphoma, Burkitt's lymphoma, peripheral T-cell lymphoma, mycosis fungoides, hairy cell leukemia, post-transplant lymphoproliferative disorders, CLL/SLL) [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

XXXVII. Renal cell carcinoma or kidney cancer[29,56] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

XXXVIII. Carcinoid[53,63] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

XXXIX. Poorly differentiated or high grade or anaplastic small cell carcinoma other than lung[55] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

XL. Ovarian cancer,' fallopian tube cancer, and primary peritoneal cancer[39,50] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

XLI. Pancreatic cancer[38,39] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

XLII. Testicular cancer[61] [See CT of the abdomen and pelvis, 74176, 74177, or 74178]

XLIII. Prostate cancer[93] [One of the following]
- A. Initial staging for T3 and T4 disease

B. Initial staging for T1 and T2 disease if the nomogram indicates probability of lymph node involvement is more than 10%
C. Following radical prostatectomy with rising PSA on 2 or more tests
D. Immediately after radical prostatectomy with PSA detectable
E. Following radiation therapy with either PSA rise by 2 ng/mL or more above the lowest post treatment PSA or positive digital rectal examination and candidate for local therapy (CT abdomen and pelvis)
F. Following treatment with androgen deprivation therapy and rising PSA
G. Active surveillance with repeat prostate biopsy suggesting progression for restaging and determination of additional treatment

XLIV. Primary or metastatic bone tumor of the pelvis–known or suspected[97-99] An x-ray is required prior to imaging a suspected bone tumor ; if the x-ray is definitely benign and the lesion is not an osteoid osteoma clinically or radiographically no further imaging is required [One of the following]
A. X-ray results or CT results and suspected (not known) bone tumor [one of the following]
    1. Negative or does not explain the regional symptoms (MRI without contrast)
    2. Suspicious for osteoid osteoma clinically or radiographically (CT)
    3. Indeterminate for malignancy (MRI without and with contrast)
    4. Aggressive appearance on x-ray (MRI without and with contrast)
    5. Pathologic fracture; not definitely benign (MRI without and with contrast)
    6. Incidental finding on prior CT that is not definitely benign (MRI without and with contrast)
B. Osteosarcoma of the pelvis [One of the following] (MRI)
    1. Initial staging of primary site
    2. For high grade osteosarcoma of the pelvis after preoperative chemotherapy
    3. Restaging after completion of treatment
    4. Follow up after treatment
        a. Every 3 months for 2 years
        b. Every 4months for the third year
        c. Every 6 months for the next 2 years (fourth and fifth)
        d. Annually after 5 years
C. Ewing's sarcoma of the pelvis [One of the following] (MRI)
    1. Initial staging of primary site
    2. Restage primary site after completion of primary treatment (usually chemotherapy)
    3. Follow up after surgery, or radiation and chemotherapy
        a. Every 2-3 months for 2 years
        b. Every 4 months for the third year
        c. Every 6 months for years 4 and 5
        d. Annually after year 5
D. Chondrosarcoma of the pelvis [One of the following] (MRI)
    1. Initial staging of primary site
    2. Restaging after completion of treatment
    3. Low grade and intracompartmental [One of the following]
        a. Every 6-12 months for 2 years
        b. Annually after 2 years as appropriate
    4. High grade (grade II, grade III or clear cell or extracompartmental)

a. Imaging as clinically indicated

E. Chordoma of the pelvis [One of the following] (MRI)
1. Initial staging of primary site
2. Restaging after completion of treatment (surgery and/or radiation therapy)
3. Conventional or chondroid chordoma
a. Imaging of primary site as clinically indicated

F. Giant cell tumor of the bone in the pelvis [One of the following] (MRI)
1. Initial staging of primary site
2. Restaging after completion of treatment
3. Following completion of therapy image primary site as clinically indicated

G. Known primary malignancy other than bone [One of the following]
1. Bone pain in the pelvis with known malignancy and non diagnostic bone scan
2. Known bone metastases with pathologic fracture in the pelvis
3. Positive bone scan in the pelvis with no pain

XLV. Evaluation of congenital anomalies of the pelvis

XLVI. Evaluation of known complex pelvic fractures for treatment planning [One of the following]

A. Pelvic fracture demonstrated on x-ray or MRI
B. Non-diagnostic x-ray or MRI with suspicion of pelvic fracture

XLVII. Evaluation of complex fractures of the acetabulum [One of the following]

A. Known fracture on recent x-ray or MRI
B. Non-diagnostic x-ray or MRI with strong suspicion of acetabular fracture

References:

1. Yaghmai V, Rosen MP, Lalani T, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology ACR Appropriateness Criteria – Acute (Nonlocalized) Abdominal Pain and Fever or Suspected Abdominal Abscess. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteAbdominalPainFeverSuspectedAbdominalAbscess.pdf.
2. Coursey CA, Casalino DD, Remer EM, et al, Expert Panel on Urologic Imaging. American College of Radiology ACR Appropriateness Criteria – Acute Onset Flank Pain–Suspicion of Stone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteOnsetFlankPainSuspicionStoneDisease.pdf.
3. Ramchandani P, Kisler T, Francis IR, et al, Expert Panel on Urologic Imaging. American College of Radiology ACR Appropriateness Criteria, Hematuria. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Hematuria.pdf.
4. Miller FH, Rosen MP, Lalani T et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology ACR Appropriateness Criteria, Left Lower Quadrant Pain–Suspected Diverticulitis. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/LeftLowerQuadrantPainSuspectedDiverticulitis.pdf.
5. Rafferty J, Shellito P, Hyman NH, et al. Standards Committee of American Society of Colon and Rectal Surgeons. Practice parameters for sigmoid diverticulitis. Dis Colon Rectum, 2006; 49:939-944. http://www.acr.org/~/media/ACR/Documents/PGTS/guidelines/CT_Colonography.pdf.
6. Smith MP, Katz DS, Rosen MP, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology ACR Appropriateness Criteria – Right Lower Quadrant Pain–Suspected Appendicitis. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/RightLowerQuadrantPainSuspectedAppendicitis.pdf.
7. Weyant MJ, Eachempati SR, Maluccio MA, et al. Interpretation of computed tomography does not correlate with laboratory or pathologic findings in surgically confirmed acute appendicitis, Surgery, 2000; 128:145-152. http://www.surgjournal.com/article/S0039-6060 (00)72397-X/pdf.
8. Knutson D, Greenberg G, Cronau H. Management of Crohn's Disease—a practical approach. American Family Physician. http://www.aafp.org/afp/2003/0815/p707.html.
9. Fidler JL, Rosen MP, Blake MA, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology ACR Appropriateness Criteria, Suspected Crohn Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/CrohnDisease.pdf.
10. Carter MJ, Lobo AJ, Travis SPL, on behalf of the IBD Section of the British Society of Gastroenterology. Guidelines for the management of inflammatory bowel disease in adults. Gut, 2004; 53(Suppl V):v1-v16. http://gut.bmj.com/content/53/suppl_5/v1.full
11. ACS Surgery Principles & Practice, 6th Edition, Chapter 43: Acute Abdominal Pain (pages 475-4830). https://services3.horizon-bcbsnj.com/hcm/MedPol2.nsf/MedicalPolicies/HNBE-929JZC.
12. Mehard WB, Heiken JP, Sicard GA. High-attenuating crescent in abdominal aortic aneurysm wall at CT: A sign of acute or impending rupture, Radiology, 1994; 192:359-362.
13. Lederle FA, Wilson SE, Johnson GR, et al. Immediate repair compared with surveillance of small abdominal aortic aneurysms, N Eng J Med, 2002; 346:1437-1444.
14. Stavropoulos SW, Charagundla SR. Imaging techniques for detection and; management of endoleaks after endovascular aortic aneurysm repair, Radiology, 2007; 243:641-655.
15. Hirsch AT, Haskal AJ, Hertzer NR, et al. ACC/AHA 2005 guidelines for the management of patients with peripheral arterial disease (lower extremity, renal, mesenteric and abdominal aortic): a collaborative report from the American Association for Vascular Surgery/Society for Vascular Surgery, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine and Biology, Society of Interventional Radiology and the ACC/AHA Task Force on Practice Guidelines (Writing Committee to Develop Guidelines for the Management of Patients with Peripheral Arterial Disease), J Am Coll Cardiol, 2006; 47:1-192.
16. Fattori R, Russo V. Degenerative aneurysm of the descending aorta. Endovascular Treatment, European Association for Cardio-thoracic Surgery, Multimedia Manual of Cardiothoracic Surgery. http://mmcts.ctsnetjournals.org/cgi/reprint/2007/1217/mmcts.2007.002824.pdf.
17. Horton KM, Smith C, Fishman EK. MDCT and 3D CT angiography of splanchnic artery aneurysms, AJR, 2007; 189:641-647.
18. Macari M, Chandarana H, Balthazar E, et al. Intestinal ischemia versus intramural hemorrhage: CT evaluation, AJR, 2002; 180:177-184.
19. Wiesner W, Khurana B, Ji H, et al. CT of acute bowel ischemia, Radiology, 2003; 226:635-650.
20. U.S. Preventive Services Task Force. Screening for abdominal aortic aneurysm recommendation statement. http://www.uspreventiveservicestaskforce.org/uspstf05/aaascr/aaars.htm.
21. Furukawa A, Yamasaki M, Furuichi K, et al. Helical CT in the diagnosis of small bowel obstruction, RadioGraphics, 2001; 21:341-355.
22. Katz, DS, Baker ME, Rosen MP, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology ACR Appropriateness Criteria – Suspected Small Bowel Obstruction. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SuspectedSmallBowelObstruction.pdf.
23. Diaz JJ, Bokhari F, Mowery NT, et al. Practice management guidelines for small bowel obstruction, EAST Practice Parameter Workgroup for management of small bowel obstruction. http://www.east.org/Content/documents/practicemanagementguidelines/small-bowl-obstruction.pdf.
24. Leyendecker JR, Clingan MJ, Remer EM, et al, Expert Panel on Urologic Imaging. American College of Radiology ACR Appropriateness Criteria – Pretreatment Staging of Invasive Bladder Cancer. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PretreatmentStagingInvasiveBladderCancer.pdf.
25. Desch CE, Benson AB, Somerfield MR, et al. Colorectal cancer surveillance: 2005 update of an American Society of Clinical Oncology practice guideline, JCO, 2005; 23:8512-8519.
26. Pfister DG, Johnson DH, Azzoli CG, et al. American Society of Clinical Oncology Treatment of Unresectable Non-Small-Cell Lung Cancer Guideline: Update 2003, JCO, 2004; 22:320-353.

27. Casalino DD, Remer EM, Bishoff JT,, et al, Expert Panel on Urologic Imaging. American College of Radiology ACR Appropriateness Criteria – Post-treatment Follow-up of Renal Cell Carcinoma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PostTreatmentFollowUpRenalCellCarcinoma.pdf.
28. Israel GM, Casalino DD, Remer EM, et al, Expert Panel on Urologic Imaging. American College of Radiology Appropriateness Criteria – Indeterminate Renal Masses. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/IndeterminateRenalMasses.pdf.
29. Casalino DD, Remer EM, Bishoff JT, et al, Expert Panel on Urologic Imaging. American College of Radiology ACR Appropriateness Criteria – Renal Cell Carcinoma Staging. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/RenalCellCarcinomaStaging.pdf.
30. Chul HS, Hodgson DC,, Advani R, et al, Expert Panel on Radiation Oncology. American College of Radiology ACR Appropriateness Criteria, Follow –up of Hodgkin's Lymphoma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Oncology/FollowUpHodgkinsLymphoma.pdf.
31. Jelic S, Sotiropoulos GC, on behalf of the ESMO Guidelines Working Group. Hepatocellular carcinoma: ESMO clinical practice guidelines of diagnosis, treatment and follow-up. http://annonc.oxfordj ournals.org/content/21/suppl_5/v59.full.pdf+html.
32. Tilly H, Vitolo U, Walewski J, et al. Diffuse large B-cell lymphoma: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow up. http://annonc.oxfordjournals.org/content/23/suppl_7/vii78.full.pdf+html.
33. Dreyling M, Ghielmini M, Marcus R, et al. Newly diagnosed and relapsed follicular lymphoma: Clinical Practice Guidelines for diagnosis, treatment and follow-up, Ann of Oncol, 2011; 22:(suppl 6):vi59-vi63. http://annonc.oxfordjournals.org/content/22/suppl_6/vi59.full.
34. Soft tissue and visceral sarcomas: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. http://annonc.oxfordjournals.org/content/23/suppl_7/vii92.full.pdf+html.
35. The ESMO/European Sarcoma Network Group, Bone sarcomas: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. http://annonc.oxfordjournals.org/content/23/suppl_7/vii100.full.pdf+html.
36. Lalwani J, Dubinsky T, Javitt MC, et al, Expert Panel on Women's Imaging and Radiation Oncology-Gynecology. American College of Radiology ACR Appropriateness Criteria – Pretreatment Evaluation and Follow-up of Endometrial Cancer. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Oncology/PretreatmentEvaluationAndFollowUpEndometrialCancer.pdf.
37. Zeman RK, Cooper C, Zeiberg AS, et al. TNM Staging of Pancreatic Carcinoma Using Helical CT, AJR, 1997; 169:459-464.
38. Tempero MA, Malafa MP, Behrman SW, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Pancreatic Adenocarcinoma. http://www.nccn.org/professionals/physician_gls/pdf/pancreatic.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Pancreatic Adenocarcinoma V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
39. Lalani T, Couto CA, Rosen MP, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology ACR Appropriateness Criteria – Jaundice. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Jaundice.pdf.
40. 2006 Update of ASCO recommendations for the use of tumor markers in gastrointestinal cancer. http://jop.ascopubs.org/content/2/6/314.full.pdf+html.
41. Scottish Intercollegiate Guidelines Network. Management of patients with lung cancer, a national clinical guideline 2005. http://www.sign.ac.uk/pdf/SIGN137.pdf.
42. Benson AB, Venook AP, Bekaii-Saab T, , et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Anal Carcinoma. http://www.nccn.org/professionals/physician_gls/pdf/anal.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Anal Carcinoma V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
43. Morgan RJ, Alvarez RD, Armstrong DK, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Ovarian Cancer http://www.nccn.org/professionals/physician_gls/pdf/ovarian.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Ovarian Cancer V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
44. Gradishar W, Anderson BO, Blair SL, Burstein, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Breast Cancer. http://www.nccn.org/professionals/physician_gls/pdf/breast.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Breast Cancer V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
45. Nabors LB, Portnow J, Ammirati M, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Central Nervous System Cancers. http://www.nccn.org/professionals/physician_gls/pdf/cns.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Central Nervous System Cancers V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
46. Siegel CL, Andreotti RF, Cardenes HR, et al, Expert Panel on Women's Imaging. American College of Radiology ACR Appropriateness Criteria – Pretreatment Planning of Invasive Cancer of the Cervix. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PretreatmentPlanningInvasiveCancerCervix.pdf.

47. Koh W-J, Greer BE, Abu-Rustum NR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014 Panel Members. Cervical Cancer. http://www.nccn.org/professionals/physician_gls/pdf/cervical.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Cervical Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
48. Benson, AB, Venook AP,, Bekaii-Saab T, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Colon Cancer. http://www.nccn.org/professionals/physician_gls/pdf/colon.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Colon Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
49. Benson AB III, Venook AP, Bekaii-Saab T, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Rectal Cancer. http://www.nccn.org/professionals/physician_g ls/pdf/rectal.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Rectal Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
50. Morgan RJ, Alvarez RD, Armstrong DK, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Ovarian Cancer http://www.nccn.org/professionals/physician_gls/pdf/ovarian.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Ovarian Cancer V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
51. Ajani JA, Bentrem DJ, Besh S, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2013. Esophageal and Esophagogastric Junction Cancers. http://www.nccn.org/professionals/physician_gls/pdf/esophageal.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Esophageal and Esophagogastric Junction Cancers V2.2013. ©2013 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
52. Ajani JA, Bentrem DJ, Besh S, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2013. Gastric Cancer. http://www.nccn.org/professionals/physician_gls/pdf/gastric.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Gastric Cancer V2.2013. ©2013 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
53. Kulke MH, Shah MH, Benson AB, Bergsland E, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014 Panel Members. Neuroendocrine Tumors. http://www.nccn.org/professionals/physician_gls/pdf/neuroendocrine.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Neuroendocrine Tumors V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
54. Ettinger DS, Wood DE, Akerley W et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Non-Small Cell Lung Cancer. http://www.nccn.org/professionals/physician_gls/pdf/nscl.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Non-Small Cell Lung Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
55. Kalemkerian GP, Akerley W, Bogner P, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Small Cell Lung Cancer. http://www.nccn.org/professionals/physician_gls/pdf/sclc.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Small Cell Lung Cancer V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
56. Motzer RJ, Agarwal N, Beard C, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Kidney Cancer. http://www.nccn.org/professionals/physician_gls/pdf/kidney.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Kidney Cancer V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
57. Benson AB, D'Angelica, Abrams TA, Chandrakanth A, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014 Panel Members. Hepatobiliary Cancers. http://www.nccn.org/professionals/physician_gls/pdf/hepatobiliary.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Hepatobiliary Cancers V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.

58. Hoppe RT, Advani RH, Ai WZ, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Hodgkin Lymphoma. http://www.nccn.org/professionals/physician_gls/pdf/hodgkins.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Hodgkin's Lymphomas V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
59. Zelenetz AD, Gordon LI, Wierda WG, Abramson JS, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Non-Hodgkin's Lymphoma. http://www.nccn.org/professionals/physician_gls/pdf/nhl.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Non-Hodgkin's Lymphomas V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
60. Von Mehren M, Randall RL, Benjamin RS, Boles S, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Soft Tissue Sarcoma. http://www.nccn.org/professionals/physician_gls/pdf/sarcoma.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Soft Tissue Sarcoma V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
61. Motzer RJ, Jonasch E, Agarwal N, Beard C, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Testicular Cancer. http://www.nccn.org/professionals/physician_gls/pdf/testicular.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Testicular Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
62. Sturgeon. Practice Guidelines for tumor marker use in the clinic, Clinical Chemistry, 2002; 48:1151-1159.
63. Oberg K, Knigge U, Kwekkeboom D, et al. Neuroendocrine gastro-entero-pancreatic tumors: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. http://annonc.oxfordjournals.org/content/23/suppl_7/vii124.full.pdf+html.
64. Ramchandani P, Kisler T, Francis IR, et al Expert Panel on Urologic imaging, American College of Radiology Appropriateness Criteria-Hematuria. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Hematuria.pdf.
65. Grossfeld GD, Wolf JS, Litwin MS, et al. Asymptomatic microscopic hematuria in adults: Summary of the AUA best practice policy recommendations, Am Fam Physician, 2001; 63:1145-11154.
66. Dillman JR, Coley BD, Karmazyn B, et al, Expert Panel on Pediatric Imaging. American College of Radiology ACR Appropriateness Criteria. Hematuria–Child. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/HematuriaChild.pdf.
67. Horrow MM, Javitt MC, Glanc P, et al, Expert Panel on Women's Imaging. American College of Radiology ACR Appropriateness Criteria – Clinically Suspected Adnexal Mass. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ClinicallySuspectedAdnexalMass.pdf.
68. Kim B, Hricak H, Tanagho EA. Diagnosis of urethral diverticula in women: value of MR imaging, AJR, 1993; 161:809-815.
69. Chou C-P, Huang J-S, Yu, Chia-Cheng P, et al. Urethral Diverticulum: Diagnosis with Virtual CT Urethroscopy AJR, 2005: 184: 1889-1890.
70. Maravilla KR, Bowen BC. Imaging of the peripheral nervous system: evaluation of peripheral neuropathy and plexopathy, AJNR, 1998; 19:1011-1023.
71. Gebarski KS, Gebarski SS, Glazer GM, et al. The lumbosacral plexus: anatomic-radiologic-pathologic correlation using CT, RadioGraphics, 1986; 6:401-425.
72. Wippold FJ II, Cornelius RS, Aiken AH, et al, Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Plexopathy. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Plexopathy.pdf.
73. Work Loss Data Institute, Hip & Pelvis (Acute and Chronic). http://www.guideline.gov/content.aspx?id=47583.
74. Cooper J. Pelvic ring injuries, Trauma, 2006; 8:95-100.
75. Mack LA, Harley JD, Winquist RA, CT of acetabular fractures: analysis of fracture patterns, AJR, 1982; 138:407-412.
76. Harley JD, Mack LA, Winquist RA. CT of acetabular fractures: comparison with conventional radiography, AJR, 1982; 138:4013-417.
77. Mourad O, Palda V, Detsky AS. A comprehensive evidence-based approach to fever of unknown origin, Arch Intern Med, 2003; 163:5454-551.
78. Sudakoff GS, Rosen MP, Rybicki FJ, et al, Expert Panels on Vascular Imaging and Gastrointestinal Imaging. American College of Radiology ACR Appropriateness Criteria – Blunt Abdominal Trauma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/BluntAbdominalTrauma.pdf.
79. Holevar M, Ebert J, Luchette F, et al. Practice management guidelines for the management of genitourinary trauma, The East Practice Management Guidelines Work Group. http://www.east.org/Content/documents/practicemanagementguidelines/genitourinary-trauma.pdf.
80. Salim A, Sangthong B, Martin M, et al. Whole body imaging in blunt multisystem trauma patients without obvious signs of injury, results of a prospective study, Arch Surg, 2006; 141:468-475.
81. Kier R, McCarthy S, Rosenfield AT, et al. Nonpalpable testes in young boys: evaluation with MR imaging, Radiology, 1988; 169:429-433.
82. Fritzsche PJ, Hricak H, Kogan BA, et al. Undescended testis: Value of MR imaging, Radiology, 1987; 164:169-173.
83. Friedland GW, Chang P, The role of imaging in the management of the impalpable undescended testes, AJR, 1988; 151:1107-1111.

84. Paulsen SR, Huprich JE, Fletcher JG, et al. CT enterography as a diagnostic tool in evaluating small bowel disorders: Review of clinical experience with over 700 cases, RadioGraphics, 2006; 26:641-662.
85. Booya F, Fletcher JG, Huprich JE, et al. Active Crohn's disease: CT findings and interobserver agreement for enteric phase CT Enterography, Radiology, 2006; 241:787-795.
86. Jacobs JE, Latson LA, Abbara S, et al, Expert Panel on Cardiovascular Imaging. American College of Radiology ACR Appropriateness Criteria – Acute Chest Pain–Suspected Aortic Dissection. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteChestPainSuspectedAorticDissection.pdf.
87. Demehri S, Rybicki FJ, Dill KE, et al, Expert Panel on Cardiovascular Imaging. American College of Radiology ACR Appropriateness Criteria – Blunt Chest Trauma–Suspected Aortic Injury. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/BluntChestTraumaSuspectedAorticInjury.pdf.
88. Erbel R, Alfonso F, Boileau C, et al. Diagnosis and management of aortic dissection: recommendations of the task force on aortic dissection, European Society of Cardiology, European Heart Journal, 2001, 22:1642-1682.84, November 9, 2010.
89. Hoffman U, Venkatesh V, White R, et al, Expert Panel on Cardiovascular Imaging. American College of Radiology ACR Appropriateness Criteria – Acute Nonspecific Chest Pain–Low Probability Of Coronary Artery Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteNonspecficChestPainLowProbabilityCoronaryArteryDisease.pdf .
90. Bouras EP, Lange SM, Scolapio JS. Rational approach to patients with unintentional weight loss, Mayo Clin Proc, 2001; 76:923-929.
91. Zoga AC, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Soft Tissue Masses. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SoftTissueMasses.pdf.
92. Ely JW, Osheroff JA, Chambliss ML, et al. Approach to leg edema of unclear etiology, JABFM, 2006, 19:148-160.
93. Mohler JL, Kantoff PW, Armstrong, et al, National Comprehensive Cancer Network (NCCN) Guideline Version 1.2014. Prostate Cancer. http://www.nccn.org/professionals/physician_gls/pdf/prostate.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Prostate Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
94. Biermann JS, Chow W, Adkins DR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Bone Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bone.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bone Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
95. Roberts CC, Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Metastatic Bone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/MetastaticBoneDisease.pdf.
96. Morrison WB, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Primary Bone Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PrimaryBoneTumors.pdf
97. Morrison WB, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Primary Bone Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PrimaryBoneTumors.pdf.
98. Roberts CC, Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Metastatic Bone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/MetastaticBoneDisease.pdf.
99. Biermann JS, Chow W, Adkins DR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Bone Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bone.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bone Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.

72192, 72193, 72194 CT of the Pelvis

Clinical criteria reviewed/revised: 10/28/14, 7/31/14 9/30/13, 8/13/13, 6/28/13, 2/24/13, 7/26/12, 4/16/12, 8/27/11, 11/17/10, 5/26/10, 1/18/09
Medical Advisory Committee reviewed and approved: 9/17/14, 10/24/13, 9/18/13, 6/12/13, 9/19/12, 6/27/12, 9/21/11

72192 CT of the Pelvis without Contrast
72193 CT of the Pelvis with Contrast
72194 CT of the Pelvis without and with Contrast

MEDICARE[1-3] AL

Note: For radiation therapy planning use 77014.
For CT guided needle placement, biopsy or drainage use 77012.
For CT guided tissue ablation use 77013.

I. Complaints associated with abdominal or pelvic pain

II. Abdominal or pelvic mass

III. Evaluation of abdominal or pelvic fluid collection

IV. Clarification of findings on other imaging

V. Clarification of abnormal laboratory results

VI. Congenital anomaly of abdominal or pelvic organs

VII. Known cancer primary or metastatic cancer

VIII. Diverticulitis, suspected or known in a patient with lower abdominal pain and/or mass

IX. Appendicitis

X. Suspected abdominal or pelvic abscess, pelvic inflammatory disease (PID)

XI. Follow-up of known pelvic abscess or fistula during or after treatment

XII. Known abdominal or pelvic tumor for staging or restaging after completion of therapy

XIII. Hematuria

XIV. Abdominal and pelvic trauma

XV. Suspected dissection of the aorta

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XVI. Kidney or renal stones

XVII. Soft tissue mass of the abdominal

XVIII. Radiation therapy planning

A. Diagnostic CT is not medically necessary for radiation therapy filed planning. Use code 77014 for treatment planning.

XIX. Aneurysm

References:

1. Local Coverage Determination (LCD) for Radiology: Computed tomography of the Abdomen and Pelvis (L30048), Cahaba Government Benefit Administrators, LLC, Alabama. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=2&CntrctrType=1|9&KeyWord=72192&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=72192&kq=true&bc=IAAAAAAAAAAA&.
2. Local Coverage Determination (LCD) for Radiology: Computed tomography of the Abdomen and Pelvis (L30048), Cahaba Government Benefit Administrators, LLC, Georgia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=14&CntrctrType=1|9&KeyWord=72192&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=72192&kq=true&bc=IAAAAAAAAAAA&.
3. Local Coverage Determination (LCD) for Radiology: Computed tomography of the Abdomen and Pelvis (L30048), Cahaba Government Benefit Administrators, LLC, Tennessee. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=50&CntrctrType=1|9&KeyWord=72192&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=72192&kq=true&bc=IAAAAAAAAAAA&.

72192, 72193, 72194 CT of the Pelvis: MEDICARE AL

Clinical criteria reviewed/revised: 3/31/14 6/27/13, 8/27/11, 11/17/10, 1/20/10
Medical Advisory Committee reviewed and approved: 9/5/14, 9/18/13, 9/19/12, 9/21/11

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72195 MRI of the Pelvis without Gadolinium
72196 MRI of the Pelvis with Gadolinium
72197 MRI of the Pelvis without and with Gadolinium

I. Mass detected by other means[1]
- A. Ultrasound nondiagnostic and mass on physical examination
- B. Short term follow up
  1. Complex or solid mass
     a. Enlarging on short term sonography (TV, TA, and Doppler)

II. Adenomyosis[2-5] if ultrasound (including transvaginal sonography is not diagnostic [One of the following]
- A. Abnormal uterine bleeding
- B. Painful menses
- C. Chronic pelvic pain
- D. Impaired fertility
- E. Uterine enlargement by US

III. Endometriosis[5-12] suspected and negative or normal ultrasound including transvaginal ultrasound [Both A and B (symptoms and findings) or C]
- A. Symptoms [One of the following]
  1. Severe dysmenorrhea
  2. Dyspareunia
  3. Pain with voiding
  4. Pain with defecation
  5. Pelvic pain
  6. Ovulation pain
  7. Infertility
  8. Chronic fatigue
- B. Findings [One of the following]
  1. Pelvic tenderness
  2. Fixed retroverted uterus
  3. Tender utero-sacral ligaments or nodularity
  4. Enlarged ovaries
- C. Laparoscopy nondiagnostic for endometriosis or contraindicated

IV. Suspected congenital anal, vaginal or uterine anomaly[13-15] (septate, bicornate, didelphic) [One of the following]
- A. Pelvic pain
- B. Irregular menses
- C. Dysmenorrhea
- D. Infertility

E. Repeated spontaneous abortions
F. Cervical septum
G. Hysterosalpingogram and US nondiagnostic

V. Known or suspected tumor including lymphoma[16-50] (CT) [One of the following]

A. Initial staging [One of the following]
    1. Lymphoma including primary CNS lymphoma, Hodgkin's disease and non-Hodgkin's lymphoma (A separate diagnostic CT is not medically necessary if it was done as part of the PET/CT)
    2. Bladder cancer (MRI) [One of the following]
        a. High grade or sessile tumor prior to TURBT
        b. Muscle invasion
    3. Rectal cancer
    4. Anal cancer
    5. Colon cancer
    6. Cervical cancer (MRI)
        a. Initial staging for clinical stage IB2 or higher
    7. Breast cancer (This may be done in addition to PET/CT when that study is indicated)
        a. Clinical stage I–IIB [One of the following]
            i. Alkaline phosphatase >140 U/L and/or
            ii. Total bilirubin >1 mg/L and/or
            iii. GGT > 42 IU/L and/or
            iv. AST >40 IU/L and/or
            v. Palpable abdominal mass
            vi. Abdominal pain
    8. Prostate cancer (See XIII below)
    9. Carcinoid
    10. Kidney or renal cell cancer
    11. Esophageal cancer
    12. Gastric cancer
    13. Soft tissue sarcoma involving the retroperitoneum, pelvis, or abdomen
    14. Endometrial cancer (MRI)
    15. Uterine sarcoma
    16. Bone tumor arising in the pelvis
    17. Transitional cell carcinoma of the ureter
    18. Ovarian cancer
    19. Testicular cancer both seminoma and non seminoma
B. New or worsening clinical data reported (CT of the abdomen and pelvis) [One of the following]
    1. Anorexia
    2. Weight loss
    3. Abdominal or pelvic pain
    4. Abdominal or pelvic mass
    5. Hepatomegaly
    6. Ascites
    7. Bowel obstruction by KUB
    8. Pelvic or lower extremity pain
    9. Leg weakness or numbness

10. Hematuria
11. Rectal bleeding
12. Vaginal bleeding
13. New or worsening hydronephrosis
14. New onset of renal insufficiency [One of the following]
    a. New onset of BUN > 20 mg/dL
    b. New onset of creatinine > 1.5mg/dL
15. Lab values elevated/increasing [One of the following]
    a. Elevated CEA (>2.5 in non smoker and >5.0 in smoker) on two consecutive tests
    b. Rising bilirubin (total bilirubin >1.9mg/dL)
    c. Alkaline phosphatase >120 IU/L
    d. Rising CA 19-9 (pancreatic cancer) >120 IU/ml
    e. Rising CA125 >35 U/ml
    f. Rising PSA on 2 consecutive tests >4 ng/ml

VI. Evaluation before or after uterine artery embolization[51-54] (also known as uterine fibroid embolization [UFE]) [One of the following]

A. Patients selected for uterine artery embolization (UAE) may be approved for preoperative MRI to allow planning of the procedure
   1. Postoperatively if there is [One of the following]
      a. Bleeding
      b. Aural temperature >38.3°C or 100.9°F
      c. Prolonged pain
B. Post embolization for evaluation of results including establishing a new baseline for size of fibroids following the procedure

VII. Evaluation before or after uterine myomectomy[55,56] [One of the following]

A. Preoperative planning
B. Postoperatively if there is:
   1. Bleeding or
   2. Aural temperature >38.3°C or 100.9°F or
   3. Prolonged pain

VIII. Urethral diverticulum[57-61] [One of the following]

A. Tender cystic swelling protruding from the vagina
B. Urinary frequency, urgency, burning on urination, dysuria
C. Dribbling
D. Dyspareunia

IX. Suspected sacral or pubic fracture[62] with normal or non diagnostic x-ray [One of the following]

A. Stress or insufficiency fracture suspected and negative or non diagnostic x-ray 10-14 days after injury
B. Stress or insufficiency fracture suspected and normal x-ray but bone scan non-specific and positive

C. Stress or insufficiency fracture suspected and elderly individual with normal x-ray and bone scan positive
D. Stress or insufficiency fracture suspected and normal x-ray and bone scan in last 48 hours with documented osteoporosis or long term steroid use
E. Trauma with negative or non diagnostic x-rays
F. Post radiation therapy to the pelvis with sacral or pubic pain

X. Suspected sacroiliitis with low back pain or pain over the sacroiliac joints and no improvement after at least 4 weeks of conservative medical management with anti-inflammatory medication or muscle relaxants[63-66] [One of the following]
A. Positive Patrick's test
B. Lower back pain radiating to ipsilateral groin

XI. Lumbosacral plexopathy with a lumbar spine MRI that does not explain the etiology of the pain[67-71] (gadolinium recommended) [One of the following]
A. Leg numbness or weakness in distribution of more than one nerve root
B. Leg fasciculations
C. Muscle atrophy
D. Meralgia paresthetica (pain, paresthesia, and sensory loss in the lateral aspect of the thigh)
E. Suspected pelvic mass with back pain radiating to the leg(s)
F. History of pelvic radiation [One of the following]
1. Paresthesias
2. Unilateral or bilateral sensory loss in the lower extremities
3. Unilateral or bilateral weakness of the lower extremities
4. Bowel or bladder incontinence

XII. Prostate cancer[16,17,50] (This may be an endorectal MRI or may be called multiparametric MRI; if pelvic MRI is used for detection then the same study should be used for initial staging) [One of the following]
A. Detection of prostate cancer (if positive includes staging; only one pelvic MRI for detection and/or staging
1. Mass detected on digital rectal examination
2. PSA > 3.5
B. Initial staging for T3 and T4 disease with biopsy proven diagnosis and no prior pelvic MRI
C. Initial staging for T1 and T2 disease if the nomogram indicates probability of lymph node involvement is more than 10% with biopsy proven diagnosis and no prior MRI
D. For planning of ultrasound biopsy using MRI/US fusion
E. Following radical prostatectomy with rising PSA on 2 or more tests
F. Immediately after radical prostatectomy with PSA detectable
G. Following radiation therapy with either PSA rise by 2 ng/mL or more above the lowest post treatment PSA or positive digital rectal examination and candidate for local therapy
H. Following treatment with androgen deprivation therapy and rising PSA

XIII. Suspected dissection of the aorta[72-78] [One of the following]

A. Unequal blood pressure in the arms
B. Rapid onset of "ripping, tearing, searing" severe chest or upper back or abdominal pain
C. Syncope and chest pain
D. Shortness of breath
E. CVA or stroke
F. Loss of pulses
G. New aortic insufficiency murmur
H. Marfan's syndrome
I. Recent aortic manipulation (such as catheter angiography)
J. Family history of aortic disease
K. Follow up of known dissection
    1. 1 month after repair
    2. 3 months after repair
    3. 6 months after repair
    4. 12 months after repair
    5. Annually after 12 months
L. New symptoms after repair [One of the following]
    1. Unequal blood pressure in the arms
    2. Rapid onset of "ripping, tearing, searing, or sharp" severe chest or upper back or abdominal pain
    3. Syncope and chest pain
    4. Shortness of breath
    5. CVA or stroke
    6. Loss of pulses
    7. New aortic insufficiency murmur

XIV. Aneurysm[79-89](See 74176, 74177, or 74178)

A. Patient with Marfan's or Ehlers-Danlos syndrome
B. Turner's syndrome
C. Known AAA [One of the following]
    1. Periodic follow-up of an asymptomatic known AAA will be according to the following schedule if there is an inadequate ultrasound and there has not been a surgical repair
        a. 2.5-2.9 cm every 5 years
        b. 3.0-3.4 cm every 3 years
        c. 3.5-3.9 cm every 2 years
        d. 4.0-4.4 cm every year
        e. 4.5-4.9 cm every 6 months
        f. 5.0-5.5 cm every 3-6 months
    2. New onset of pain
D. Postoperative evaluation following repair including endovascular repair (stent graft) [One of the following]
    1. 1 month after repair
    2. 3 months after repair
    3. 6 months after repair
    4. 12 months after repair
    5. Annually after repair
    6. Suspicion of endoleak

E. Aneurysm of any other intraabdominal artery detected on other imaging
F. Vascular insufficiency of the bowel (suspicion of) [One of the following]
    1. Abdominal pain often starting as periumbilical and often out of proportion to exam findings
    2. Other clinical findings [One of the following]
        a. Leukocytosis, WBC >11,500/cu.mm
        b. Stool positive for occult blood
        c. Nausea, vomiting or diarrhea
        d. History of abdominal angina (pain after eating for approximately 3 hours)
G. Planning for endovascular repair
H. Screening for aneurysm (Ultrasound screening is the appropriate study. CTA or MRA should only be used if the aorta cannot be visualized adequately on US and this must be documented with the US report which must be submitted along with the request.) [One of the following]
    1. Pulsatile mass with non diagnostic ultrasound (a copy of the US report is required)
    2. History of first degree relative with an abdominal aortic aneurysm and non interpretable ultrasound
    3. Male age 65-75 with history of smoking
I. Pulsatile mass on abdominal, vaginal or rectal examination
J. Relative with an abdominal aortic aneurysm and non-interpretable ultrasound

XV. Evaluation of recurrent or complex anal fistula disease[90-92]

XVI. Soft tissue mass (not a hernia) of the abdominal wall[93]

A. Abdominal x-ray

XVII. MR enterography[94-96] [One of the following]

A. Bowel obstruction
B. Celiac disease
C. Complications of Crohn's disease
    1. Abscess
    2. Fistula
    3. Small bowel obstruction
    4. Peri-anal fistula
    5. Stenosis
    6. Stricture
D. Polyposis syndromes
E. Small bowel tumor
F. Suspected Crohn's disease [One of the following]
    1. Aural temperature >38.3°C or 100.9°F
    2. Diarrhea
    3. Weight loss
    4. Fatigue
    5. Crampy abdominal pain
    6. Perianal fistula or fissure
    7. Enterovesical fistula
    8. Enterovaginal fistula
    9. Enterocutaneous fistula

10. Right lower quadrant tenderness
11. Ulcerative colitis

XVIII. Pelvic floor dysfunction

XIX. Breast cancer[33]

A. Initial staging [One of the following]
   1. Clinical stage I–IIB [One of the following]
      a. Alkaline phosphatase > 140 U/L
      b. Total bilirubin > 1 mg/L
      c. GGT > 42 IU/L
      d. AST > 40 IU/L
      e. Palpable abdominal mass
      f. Abdominal pain
   2. Clinical stage IIIA or higher
B. Any evidence of breast cancer recurrence after treatment
C. Known metastatic disease [One of the following]
   1. Documented progression of disease
   2. Known metastatic disease following completion of treatment to establish new baseline

XX. Cervical cancer[20,34] [One of the following]

A. Initial staging
B. Restaging after completion of therapy
C. When clinically indicated

XXI. Colon cancer[35] [One of the following]

A. Initial staging
B. Following treatment and no known metastases annually for 3-5 years
C. Known metastases – stable with no clinical change or laboratory changes such as rising tumor markers or elevated liver function tests
   1. Every 3-6 months for 2 years
   2. Every 6-12 months for up to 5 years
D. Rising CEA on 2 consecutive tests
   1. >2.5 in non smokers
   2. >5.0 in smokers
E. Rising CA 19-9 >35 U/mL

XXII. Rectal cancer[19,36] [One of the following]

A. Initial staging
B. Following treatment with no known metastases and stable [One of the following]
   1. Annually for 3-5 years
   2. Rising CEA (>2.5 non smokers; >5.0 smokers) if negative repeat in 3 months
C. Known non resectable metastases
   1. Following chemotherapy aimed at conversion to resectable disease may be done every 2 months to evaluate resectability
D. Rising CEA on 2 consecutive tests [One of the following]

1. >2.5 in nonsmokers
2. >5.0 in smokers

XXIII. Ovarian cancer, fallopian tube cancer and primary peritoneal cancer[37] [One of the following]

A. Initial staging
B. Following treatment and stable
C. Rising CA-125 with or without prior chemotherapy
D. Clinical relapse with or without prior chemotherapy

XXIV. Esophageal cancer[38] [One of the following]

A. Initial staging
B. Prior to chemoradiation if PET/CT not done
C. Clinical recurrence

XXV. Gastric (stomach) cancer[39] [One of the following]

A. Initial staging
B. Following completion of treatment
C. Clinical recurrence

XXVI. Carcinoid[40] [One of the following]

A. Initial staging
B. Restaging after completion of therapy to establish a new baseline
C. Surveillance
    1. Carcinoid tumors larger than 2 cm or with incomplete resection and are stable with no evidence of disease (CT of the abdomen and pelvis)
    2. Every 3-12 months after resection every 6-12 months
    3. Every 6-12 months thereafter
D. Abnormal laboratory tests suggesting recurrence [One of the following]
    1. Elevated urine 5HIAA >15mg/24hr
    2. Elevated chromogranin A (CgA) >39ng/L
    3. Elevated substance P >270 ng/L or pg/mL

XXVII. Poorly differentiated or high grade or anaplastic small cell carcinoma other than lung[40] [One of the following]

A. Initial staging
B. Restaging after completion of therapy to establish a new baseline
C. Surveillance following treatment of resectable disease
    1. Every 3 months for a year
    2. Every 6 months after 1 year
D. Surveillance following treatment of unresectable or metastatic disease
    1. Every 3 months

XXVIII. Hodgkin's lymphoma[23,25,42] (CT) [One of the following]

A. Initial staging in addition to PET/CT
B. Restaging while on treatment should be done with PET/CT

C. After treatment with radiation therapy restage with either CT or PET/CT if last PET scan was positive
D. Follow up after completion of radiation therapy treatment
E. Scan every 6-12 months for 2-5 years
F. Annual scan if there is increased risk for lung cancer (This is optional if none of the factors below are present) [One of the following]
    1. Treatment with radiation therapy
    2. Treatment with non-alkylating agent chemotherapy
    3. Smoking history

XXIX. Non Hodgkin's lymphoma[26,27,43] (CT) (follicular lymphoma, marginal zone lymphoma, MALT lymphoma, mantle cell lymphoma, diffuse large B-cell lymphoma, Burkitt's lymphoma, peripheral T cell lymphoma, mycosis fungoides, hairy cell leukemia post-transplant lymphoproliferative disorders, CLL/SLL)

A. Initial staging in addition to PET/CT
B. Restaging after completion of therapy to establish a new baseline
C. Surveillance
    1. Not more frequently than every 6 months for the first 2 years and not more frequently than annually thereafter

XXX. Soft tissue sarcoma[28,44] [One of the following]

A. Myxoid/round cell liposarcoma (CT of the abdomen and pelvis for initial staging)
B. Retroperitoneal/intra-abdominal (includes GIST, desmoid, aggressive fibromatosis and other sarcomas) (CT of the abdomen and pelvis for initial staging)
    1. Initial staging
    2. Follow up
        a. Restaging after completion of therapy to establish a new baseline
        b. Every 3-6 months for 2-3 years (for GIST tumor every 3-6 months for 3-5 years)
        c. Every 6 months for next 2 years
        d. Annually after 4-5 years

XXXI. Testicular cancer[45] [One of the following]

A. Pure seminoma (CT of the abdomen and pelvis for initial staging) [One of the following]
    1. Initial staging
    2. Follow up after treatment to establish a new baseline
    3. Surveillance of Stage IA and IB tumors not treated with chemotherapy or radiation therapy [One of the following]
        a. Every 6 months for 1-2 years
        b. Every 6-12 months for year 3
        c. Annually for years 4 and 5
    4. Stage 1A and IB tumors treated with single agent
        a. Annual CT of the abdomen and pelvis for 1-3 years
    5. Stage IA, IB and I S treated with radiation
        a. Annual CT of the abdomen and pelvis for 1-3 years
    6. Stage IIA and IIB following completion of radiation therapy [One of the following]

a. Every 6-12 months for 1-2 years
b. Annually for year 3

7. Stage IIB, IIC and III after chemotherapy
   a. Following completion of therapy
      i. No residual mass or mass less than or equal to 3cm with normal AFP, beta HCG and LDH may be repeated at
      ii. Residual mass >3 cm and normal AFP, beta HCG and LDH following a PET scan 6 weeks after completion of therapy if there is activity repeat the CT of the abdomen and pelvis following either retroperitoneal lymph node dissection or second line chemotherapy or RT 3-6 months after last treatment

B. Non seminoma (CT of the abdomen and pelvis for initial staging) [One of the following]
   1. Stage IA, IB if surveillance only
      a. Every 3-4 months for 1st year
      b. Every 4-6 months for 2nd year
      c. Every 6-12 months for 3rd and 4th year
      d. Annually for 5th year
      e. Every 1-2 years
   2. Stage IB, IIA and IIB after chemotherapy
      a. Follow up after treatment to establish a new baseline
      b. Negative AFP with or without a mass
         i. Every 6 months for 1 year
         ii. Every 6-12 months for the 2nd year
         iii. Annually years 3-5

XXXII. Anal cancer[31] [One of the following]

A. Initial staging
B. After completion of treatment
C. Surveillance after first post treatment scan
   1. Annual CT scan of the abdomen and pelvis for three years if stable
   2. Annually for abdominoperineal resection
D. Clinical suspicion of recurrence
   1. Findings on physical examination suggestive of recurrence
   2. Anorexia
   3. Weight loss
   4. Alkaline phosphatase >140 U/L
   5. Rising bilirubin (total bilirubin >1.9mg/dL)
   6. Abdominal or pelvic pain
   7. Abdominal or pelvic mass
   8. Hepatomegaly
   9. Ascites
   10. Bowel obstruction by KUB

XXXIII. Bladder cancer[18,22,32]

A. Initial staging if muscle invasion on biopsy
B. Following completion of treatment and bladder in place (include imaging of upper tracts)
   1. Every 3-6 months for 2 years

C. Following completion of treatment including cystectomy (include imaging of upper tracts)
   1. Every 3-12 months for 2 years

XXXIV. New bone lesion suspicious for a metastatic lesion with no known cancer[29,49] [Both of the following]
   A. X-ray demonstrating a bone lesion suspicious for a metastatic lesion
   B. 40 years of age or older

XXXV. Endometrial cancer[21,48]
   A. Initial staging
   B. Follow up as clinically indicated

XXXVI. Uterine leiomyosarcoma[48]
   A. Known or suspected extrauterine disease
   B. Every 3-6 months for 3 years then every 6 months for next 2 years and then annually

XXXVII. Renal cell cancer follow up of known cancer (CT) [One of the following][24,41]
   A. Initial staging
   B. Follow up 2-12 months after completion of treatment
   C. Annual scan for pT1NO, Nx disease
   D. pT2-4 No Nx
      1. Every 6 months for 3 years
      2. Annually for an additional 2 years
   E. Active surveillance (no surgery or ablation)
      1. One scan within 6 months of diagnosis
      2. Annually thereafter
   F. Ablation therapy
      1. 3 months after ablative therapy
      2. 6 months after ablative therapy
      3. Annually thereafter for 5 years
   G. Additional follow up as clinically indicated

XXXVIII. Evaluation of fetal anomalies when ultrasound is not sufficient to determine treatment[97-99]

XXXIX. Appendicitis[100] (In children and pregnant women, ultrasound as the initial study except for follow-up of known appendicitis with suspected complications) [If this is not possible then CT of the abdomen and pelvis is the appropriate study 74176, 74177, or 74178. MRI abdomen 74181, 74182, or 74183 in pregnant women]

XL. Primary or metastatic bone tumor of the pelvis – known or suspected[29,49,101,102]. An x-ray is required prior to imaging a suspected bone tumor [One of the following]
   A. Osteosarcoma of the pelvis (MRI) [One of the following]

1. Initial staging
2. For high grade osteosarcoma of the pelvis after preoperative chemotherapy
3. Restaging after completion of treatment
4. Follow up after treatment
    a. Every 3 months for 2 years
    b. Every 4months for the third year
    c. Every 6 months for the fourth year
    d. Annually after 4 years

B. Ewing's sarcoma of the pelvis (MRI) [One of the following]
1. Initial staging
2. Restage after chemotherapy
3. Follow up after treatment
    a. Every 2 months for 2 years
    b. Every 4 months for the third year
    c. Every 6 months for years 4 and 5
    d. Annually after year 5

C. Chondrosarcoma of the pelvis (MRI)
1. Initial staging
2. Restaging after completion of treatment
3. Low grade and intracompartmental [One of the following]
    a. Every 6-12 months for 2 years
    b. Annually after 2 years as appropriate
4. High grade (grade II, grade III, or clear cell or extracompartmental)
    a. Imaging as clinically indicated

D. Chordoma of the pelvis (MRI)
1. Initial staging
2. Restaging after completion of treatment
3. Conventional or chondroid chordoma
    a. Imaging of primary site as clinically indicated

E. Giant cell tumor of the bone in the pelvis (MRI)
1. Initial staging
2. Restaging after completion of treatment
3. Following completion of therapy image primary site as clinically indicated

F. Osteoid osteoma – CT is the study of choice
1. Clinical [One of the following]
    a. Bone pain worse at night which is relieved by aspirin
    b. Pain increases with activity
2. Known diagnosis and planning for surgery
3. Known diagnosis and planning for radiofrequency ablation
4. Known diagnosis and post intervention evaluation to establish a new baseline
5. Restaging after completion of treatment

G. Known primary malignancy other than bone [One of the following]
1. Bone pain in the pelvis with known malignancy and non diagnostic bone scan
2. Known bone metastases with pathologic fracture in the pelvis
3. Positive bone scan in the pelvis with no pain

XLI. Athletic pubalgia or Sports Hernia

A. BCBS AL considers this indication to be investigational

References:

1. Harris RD, Javitt MC, Glanc P, et al Expert Panel on Women's Imaging, American College of Radiology Appropriateness Criteria - Clinically suspected adnexal mass accessed at http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ClinicallySuspectedAdnexalMass.pdf
2. Chopra S, Lev-Toff AS, Ors F, et al. Adenomyosis: Common and uncommon manifestations on sonography and magnetic resonance imaging, J Ultrasound Med, 2006; 25:617-627.
3. Kunz G, Beil, D, Huppert P, et al. Adenomyosis in endometriosis-prevalence and impact on fertility. Evidence from magnetic resonance imaging, Human Reproduction, 2005; 20(8):2309-2316.
4. Parazzini F, Vercellini P, Panazza S, et al. Risk factors for Adenomyosis, Human Reproduction 12(6):1275-1279.
5. Royal College of Obstetricians and Gynaecologists. Guideline No. 41, The initial management of chronic pelvic pain. http://www.rcog.org.uk/files/rcog-corp/CPP_GTG2ndEdition230512.pdf.
6. Dunselman GA, Vermeulen N, Becker C, et al, ESHRE guideline: management of women with endometriosis, Hum Reprod, 2014; 29:400-12. http://www.medscape.com/viewarticle/822100
7. Woodward PJ, Sohaey R, Mezzetti TP Jr. From the archives of the AFIP. Endometriosis: radiologic-pathologic correlation, RadioGraphics, 2001; 21:193-216.
8. Kuligowska E, Deeds L, Kang Lu. Pelvic pain: overlooked and underdiagnosed gynecologic conditions, RadioGraphics, 2005; 25:3-20.
9. Togashi K, Nishimura K, Kimura I, et al. Endometrial cysts: diagnosis with MR imaging, Radiology, 1991; 180:73-78.
10. Carbognin G, Guarise A, Minelli L, et al. Pelvic endometriosis: US and MRI features, Abdom Imaging, 2004; 29:609-618.
11. Imaoka I, Wada A, Matsuo M, et al. MR imaging of disorders associated with female infertility: use in diagnosis, treatment and management, RadioGraphics, 2003; 23:1401-1421.
12. Practice Bulletin Number 114, Management of Endometriosis, American College of Obstetricians and Gynecologists, July 2010.
13. Siegeleman ES, Outwater EK, Banner MP, et al. High-resolution MR imaging of the vagina, RadioGraphics, 1997; 1183-1203.
14. Hricak H, Chang YCF, Thurnher S. Vagina: evaluation with MR imaging, Radiology, 1988; 169:169-174.
15. Pellerito JS, McCarthy SM, Doyle MB, et al. Diagnosis of uterine anomalies: relative accuracy of MR imaging, endovaginal sonography and hysterosalpingography, Radiology, 1992; 173:795-800.
16. Eberhardt SC, Carter S, Casalino DD, et al. Expert panels on urologic imaging and radiation oncology-prostate, American College of Radiology Appropriateness criteria- Prostate cancer-pretreatment detection staging and surveillance, accessed at http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ProstateCancerPretreatmentDetectionStagingSurveillance.pdf
17. Casalino DD, Remer EM, Arellano RS,, et al. Expert Panel on Urologic Imaging and Radiation Oncology–Prostate. American College of Radiology ACR Appropriateness Criteria – Post treatment follow up of prostate cancer. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PostTreatmentFollowUpProstateCancer.pdf
18. Leyendecker JR, Clingan MJ, Remer EM, et al. Expert Panel on Urologic Imaging. American College of Radiology ACR Appropriateness Criteria – Pretreatment Staging of Invasive Bladder Cancer. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PretreatmentStagingInvasiveBladderCancer.pdf.
19. Tjandra JJ, Kilkenny JW, Buie WD, et al. Practice parameters for the management of rectal cancer (revised), Dis Colon Rectum, 2005; 48:411-423.
20. Siegel CL, Andreotti RF, Cardenes HR, et al. Expert Panel on Women's Imaging. American College of Radiology ACR Appropriateness Criteria – Pretreatment Planning of Invasive Cancer of the Cervix. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PretreatmentPlanningInvasiveCancerCervix.pdf.
21. Lee J, Dubinsky T, Andreotti RF, et al, Expert Panel on Women's Imaging and Radiation Oncology–Gynecology. American College of Radiology ACR Appropriateness Criteria – Pretreatment Evaluation and Follow-up of Endometrial Cancer http://www.acr.org/~/media/ACR/Documents/AppCriteria/Oncology/PretreatmentEvaluationAndFollowUpEndometrialCancer.pdf.
22. Howard G, Kirk D, Brush J, et al. Scottish Intercollegiate Guidelines Network, Management of transitional cell carcinoma of the bladder. http://www.sign.ac.uk/pdf/sign85.pdf.
23. Diagnostic Imaging in Lymphoma, a Cancer Care Ontario Recommendations Report, March, 2006. https://www.cancercare.on.ca/common/pages/UserFile.aspx?serverId=6&path=/File%20Database/CCO%20Files/PEBC/pebcdilymphf.pdf.
24. Casalino DD, Francis IR, Arellano RS, et al. Expert Panel on Urologic Imaging. American College of Radiology ACR Appropriateness Criteria – Post-treatment Follow-up of Renal Cell Carcinoma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PostTreatmentFollowUpRenalCellCarcinoma.pdf.
25. Ha CS, Hodgson DC, Advani R, et al. Expert Panel on Radiation Oncology, American College of Radiology ACR Appropriateness Criteria – Follow-up of Hodgkin's Lymphoma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Oncology/FollowUpHodgkinsLymphoma.pdf.
26. Tilly H, Vitolo U, Walewski J et al. Diffuse large B-cell lymphoma: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow up. http://annonc.oxfordjournals.org/content/23/suppl_7/vii78.full.pdf+html.
27. Dreyling M, Ghielmini M, Marcus R, et al. Newly diagnosed and relapsed follicular lymphoma: Clinical Practice Guidelines for diagnosis, treatment and follow-up, Ann of Oncol, 2011; 22:(Suppl 6):vi59-vi63. http://annonc.oxfordjournals.org/content/22/suppl_6/vi59.full.
28. Soft tissue and visceral sarcomas: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. http://annonc.oxfordjournals.org/content/23/suppl_7/vii92.full.pdf+html.

29. ESMO/European Sarcoma Network Group. Bone sarcomas: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow- up. http://annonc.oxfordjournals.org/content/23/suppl_7/vii100.full.pdf+html.
30. 2006 Update of ASCO recommendations for the use of tumor markers in gastrointestinal cancer. http://jop.ascopubs.org/content/2/6/314.full.pdf+html.
31. Benson AB, Benook AP,Bekaii-Saab T, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Anal Carcinoma. http://www.nccn.org/professionals/physician_gls/pdf/anal.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Anal Carcinoma V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
32. Clark PE, Spiess PE, Agarwal N, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Bladder Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bladder.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bladder Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
33. Gradishar WJ, Anderson BO, Blair SL, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Breast Cancer. http://www.nccn.org/professionals/physician_gls/pdf/breast.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Breast Cancer V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
34. Koh W-J, Greer BE, Abu-Rustum NR, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Cervical Cancer. http://www.nccn.org/professionals/physician_gls/pdf/cervical.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Cervical Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
35. Benson, AB, Venook AP, Bekaii-Saab T, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Colon Cancer. http://www.nccn.org/professionals/physician_gls/pdf/colon.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Colon Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
36. Benson AB III, Venook AP, Bekaii-Saab T, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Rectal Cancer. http://www.nccn.org/professionals/physician_gls/pdf/rectal.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Rectal Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
37. Morgan RJ, Armstrong DK, Alvarez RD, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Ovarian Cancer. http://www.nccn.org/professionals/physician_gls/pdf/ovarian.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Ovarian Cancer V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
38. Ajani JA, Bentrem DJ, Besh S, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2013. Esophageal and Esophagogastric Junction Cancers. http://www.nccn.org/professionals/physician_gls/pdf/esophageal.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Esophageal and Esophagogastric Junction Cancers V2.2013. ©2013 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
39. Ajani JA, Bentrem DJ, Besh S, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2013. Gastric Cancer. http://www.nccn.org/professionals/physician_gls/pdf/gastric.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Gastric Cancer V2.2013. ©2013 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
40. Kulke MH, Shah MH, Benson AB, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Neuroendocrine Tumors. http://www.nccn.org/professionals/physician_gls/pdf/neuroendocrine.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Neuroendocrine Tumors V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
41. Motzer RJ, Jonasch E, Agarwal N, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Kidney Cancer. http://www.nccn.org/professionals/physician_gls/pdf/kidney.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Kidney Cancer V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.

42. Hoppe RT, Advani RH, Ai WZ, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Hodgkin Lymphoma. http://www.nccn.org/professionals/physician_gls/pdf/hodgkins.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Hodgkin's Lymphomas V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
43. Zelenetz AD, Gordon WG, Wierda WG, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Non-Hodgkin's Lymphomas. http://www.nccn.org/professionals/physician_gls/pdf/nhl.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Non-Hodgkin's Lymphomas V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
44. Von Mehren M, Lor Randall R Benjamin RS, , et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Soft Tissue Sarcoma. http://www.nccn.org/professionals/physician_gls/pdf/sarcoma.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Soft Tissue Sarcoma V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
45. Motzer RJ, Jonasch E, Agarwal N, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Testicular Cancer. http://www.nccn.org/professionals/physician_gls/pdf/testicular.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Testicular Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
46. Sturgeon. Practice Guidelines for tumor marker use in the clinic, Clinical Chemistry, 2002; 48:1151-1159.
47. Vachani C. Patient guide to tumor markers. http://www.oncolink.org/treatment/article.cfm?id=296&s=42&c=7.
48. Koh W-J, Greer BE, Abu-Rustum NR, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Uterine Neoplasms. http://www.nccn.org/professionals/physician_gls/pdf/uterine.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Uterine Neoplasms V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
49. Biermann JS, Chow W, Adkins DR, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Bone Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bone.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bone Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
50. Mohler JL, Kantoff PW, Armstrong AJ, , et al. National Comprehensive Cancer Network (NCCN) Guideline Version 1.2014. Prostate Cancer. http://www.nccn.org/professionals/physician_gls/pdf/prostate.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Prostate Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
51. Burke CT, Ray CE, Lorenz JM, et al. Expert Panel on Interventional Radiology. American College of Radiology ACR Appropriateness Criteria – Radiologic Management of Uterine Leiomyomas. http://www.acr.org/Quality-Safety/Appropriateness-Criteria/~/media/31734E9D3D1D4F3E88538EC35788E8DE.pdf.
52. Platt JF, Daly BD, Hara AK, et al. ACR practice guideline for the performance of magnetic resonance imaging (MRI) of the soft-tissue components of the pelvis. http://www.acr.org/~/media/ACR/Documents/PGTS/guidelines/MRI_Soft_Tissue_Pelvis.pdf.
53. Andrew RT, Spies JB, Sacks D, et al. Patient care and uterine artery embolization for leiomyoma, J Vasc Interv Radiol, 2004; 15:115-120.
54. Pelage JP, Guaou NG, Jha RC, et al. Uterine fibroid tumors: long-term MR imaging outcome after embolization Radiology, 2004; 230: 803-809.
55. Tsuji S, Takahashi K, Imaoka I, et al. MRI evaluation of the uterine structure after myomectomy, Gynecol Obstet Invest, 2006;61:106-110.
56. AAGL Practice Report: Practice guidelines for the diagnosis and management of submucous leiomyomas, J of Minimally Invasive Gynecology, 2012; 19:152-171
57. Kim B, Hricak H, Tanagho E. Diagnosis of urethral diverticula in women: value of MR imaging, AJR. 1993; 161: 809-815.
58. Hahn WY, Israel GM, Lee VS. MRI of female urethral and periurethral disorders, 2004; 182:677-682.
59. Blaivas JG, Flisser AJ, Bleustein CB, et al. Periurethral masses: etiology and diagnosis in a large series of women, Obstetrics & Gynecology, 2004; 103(5):842-847.
60. Chou C-P, Levenson RB, Elsayes KM, et al. Imaging of female urethral diverticulum: an update, Radiographics, 2008; 28:1917-1930.
61. Vasavada SP. Urethral Diverticula, Medscape reference. http://emedicine.medscape.com/article/443296-overview#a03.
62. Daffner RH, Weissman BN, Appel M, et al. Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Stress (Fatigue/Insufficiency) Fracture, Including Sacrum, Excluding Other Vertebrae. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/StressFatigueInsufficiencyFractureIncludingSacrumExcludingOtherVertebrae.pdf.

63. Hegmann KT. Low back disorders, Occupational Medicine Practice Guidelines: Evaluation and management of common health problems and functional recovery in workers. http://www.guideline.gov/content.aspx?id=38438.
64. Bredella MA, Steinbach LS, Morgan S, et al. MRI of the sacroiliac joints in patients with moderate to severe ankylosing spondylitis, AJR, 2006; 187:1420-1426.
65. Yu W, Feng F, Dion E, et al. Comparison of radiography, computed tomography and magnetic resonance imaging in the detection of sacroiliitis accompanying ankylosing spondylitis, Skeletal Radiol, 1998;27(6):311-310.
66. Murphy MD, Wetzel LH, Bramble JM, et al. Sacroiliitis: MR imaging findings. Radiology, 1991; 180: 239-244.
67. Wippold FJ II, Cornelius RS, Aiken AH, et al. Expert Panel on Neurologic Imaging. American College of Radiology ACR Appropriateness Criteria – Plexopathy. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Plexopathy.pdf.
68. Dworkin RH, Backonja M, Rowbotham MC, et al. Advances in Neuropathic Pain, Arch Neurol, 2001; 60:1524-1534. http://archneur.ama-assn.org/cgi/reprint/60/11/1524.
69. Maravilla KR, Bowen B. Imaging of the peripheral nervous system: evaluation of peripheral neuropathy and plexopathy, AJNR., 1998; 19: 1011-1023.
70. Gebarski KS, Gebarski SS, Glazer GM, et al. The lumbosacral plexus: anatomic-radiologic- pathologic correlation using C., RadioGraphics, 1986; 6:401-42539.
71. Meier RH III. Radiation-induced lumbosacral plexopathy clinical presentation, Medscape reference. http://emedicine.medscape.com/article/316604-clinical#a0217.
72. Jacobs JE, Latson LA, Abbara S, et al, Expert Panel on Cardiac Imaging. American College of Radiology Appropriateness Criteria – Acute Chest Pain–Suspected Aortic Dissection. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteChestPainSuspectedAorticDissection.pdf.
73. Demehri S, Rybicki FJ, Dill KE, et al, Expert Panel on Vascular Imaging. American College of Radiology Appropriateness Criteria – Blunt Chest Trauma–Suspected Aortic Injury. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/BluntChestTraumaSuspectedAorticInjury.pdf.
74. Erbel R, Alfonso F, Boileau C, et al. Diagnosis and management of aortic dissection: recommendations of the Task Force on Aortic Dissection, European Society of Cardiology, Eur Heart J, 2001, 22:1642-1682.
75. Davis T, Bluhm J, Burke R, et al. Institute for Clinical Systems Improvement. Diagnosis and Treatment of Chest Pain and Acute Coronary Syndrome (ACS). https://www.icsi.org/_asset/ydv4b3/ACS-Interactive1112b.pdf.
76. Hagan PG, Nienaber CA, Isselbacher EM, et al. The International Registry of Acute Aortic Dissection (IRAD): new insights into an old disease, JAMA, 2000; 283: 897-903.
77. Von Kodolitsch Y, Schwartz AG, Nienaber CA. Clinical prediction of acute aortic dissection. Arch Intern Med 2000; 160: 2971-82.
78. Hiratzka LR, Bakris GL, Beckman JA, et al. 2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/SVM Guidelines for the diagnosis and management of patients with thoracic aortic disease. Circulation, 2010; 121:e266-369
79. Isselbacher EM. Thoracic and Abdominal Aortic Aneurysms, Circulation, 2005; 111:816-828.
80. Elefteriades JA. Natural history of thoracic aortic aneurysms: indications for surgery, and surgical versus nonsurgical risks, Ann Thorac Surg, 2002; 74:S1877-S1880.
81. Fattori R, Russo V. Degenerative aneurysm of the descending aorta. Endo vascular treatment, European Association for Cardio-thoracic Surgery, Multimedia Manual of Cardiothoracic Surgery, 2007. http://mmcts.ctsnetjournals.org/cgi/reprint/2007/1217/mmcts.2007.002824.pdf.
82. Mehard WB, Heiken JP, Sicard GA. High-attenuating crescent in abdominal aortic aneurysm wall at CT: a sign of acute or impending rupture, Radiology, 1994; 192:359-362.
83. Stavropoulos SW, Charagundla SR. Imaging techniques for detection and management of endoleaks after endovascular aortic aneurysm repair, Radiology, 2007; 243:641-655.
84. Hirsch AT, Haskal ZJ, Hertzer NR, et al. ACC/AHA 2005 Practice Guidelines for the Management of Patients With Peripheral Arterial Disease (Lower Extremity, Renal, Mesenteric, and Abdominal Aortic): Executive Summary. A Collaborative Report From the American Association for Vascular Surgery/Society for Vascular Surgery, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine and Biology, Society of Interventional Radiology, and the ACC/AHA Task Force on Practice Guidelines (Writing Committee to Develop Guidelines for the Management of Patients With Peripheral Arterial Disease), Circulation, 2006; 113:1474-1547.
85. Horton KM, Smith C, Fishman EK. MDCT and 3D CT Angiography of Splanchnic Artery Aneurysms, AJR, 2007; 189:641-647.
86. U.S. Preventive Services Task Force. Screening for abdominal aortic aneurysm recommendation statement. http://www.uspreventiveservicestaskforce.org/uspstf05/aaascr/aaars.htm.
87. Lederle FA, Wilson SE, Johnson GR, et al. Immediate repair compared with surveillance of small abdominal aortic aneurysms. N Eng J Med, 2002; 346:1437-1444.
88. Macari M, Chandarana H, Balthazar E, et al. Intestinal ischemia versus intramural hemorrhage: CT evaluation, AJR, 2002; 180:177-184.
89. Wiesner W, Khurana B, Ji H, et al. CT of acute bowel ischemia, Radiology, 2003; 226:635-650.
90. Buchanan G, Halligan S, Williams A. Effect of MRI on clinical outcome of recurrent fistula-in-ano. Lancet. 2002 Nov 23; 360(9346):1661-2.
91. Buchanan G, Halligan S, Williams A. Magnetic resonance imaging for primary fistula in ano Br J. Surgery 2003 Jul;90(7):877-81.
92. Berman L, Israel GM, McCarthy SM, et al. Utility of magnetic resonance imaging in anorectal disease World J Gastroenterology 2007 June 21;13(23): 3153-3158.
93. Zoga AC, Weissman BN, Kransdorf MJ, et al. Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Soft Tissue Masses. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SoftTissueMasses.pdf.

94. Lee SS, Kim A-Y, Yang S-K, et al. Crohn disease of the small bowel: comparison of CT enterography, MR enterography and small-bowel follow-through as diagnostic techniques.
95. Leyendecker JR, Bloomfeld RS, DiSantis DJ, et al. MR enterography in the management of patients with Crohn disease, RadioGraphics, 2009; 29:1827-1846.
96. Siddiki HA, Fidler JL, Fletcher JG, et al. Prospective Comparison of state-of-the-art MR enterography and CT enterography in small-bowel Crohn's disease, AJR, 2009; 193:113-121.
97. Coakley FV, Glenn OA, Qayyum A, et al. Fetal MRI: a developing technique for the developing patient, AJR, 2004: 182:243-252.
98. Hernanz-Schulman M, Chung T, Coley B, et al. ACR-SPR Practice Guideline for the Safe and Optimal Performance of Fetal Magnetic Resonance Imaging (MRI). http://www.acr.org/~/media/ACR/Documents/PGTS/guidelines/MRI_Fetal.pdf.
99. Hubbard AM. Ultrafast fetal MRI and prenatal diagnosis, Seminars in Pediatric Surgery, 2003; 12:143-153.
100. Rosen MP, Ding A, Blake MA, et al. Expert Panel on Gastrointestinal Imaging. American College of Radiology ACR Appropriateness Criteria – Right Lower Quadrant Pain–Suspected Appendicitis. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/RightLowerQuadrantPainSuspectedAppendicitis.pdf.
101. Roberts CC, Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Metastatic Bone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/MetastaticBoneDisease.pdf.
102. Morrison WB, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Primary Bone Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PrimaryBoneTumors.pdf

72195, 72196, 72197 MRI Pelvis

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72198 MRA or MRV of the Pelvis without or with Gadolinium

I. Peripheral arterial vascular disease with abnormal ankle brachial index as defined in A and one additional of the following[1-3]

Note: For evaluation of PVD, if meets criteria for MRA abdomen, MRA lower extremity (one only) should be certified. An MRA of the pelvis or another lower extremity should NOT be certified.

A. ABI (ankle brachial index, ankle systolic BP divided by brachial systolic BP)
   1. Rest ABI <0.90 in symptomatic member
   2. Exercise ABI <0.90 in symptomatic member with rest ABI >0.90
   3. Toe brachial index <0.90 or pulse volume recording evidence of peripheral vascular disease if the ABI >1.30
B. Abnormal pulses
C. Bruit
D. Claudication
E. Diabetic with [One of the following]
   1. Skin changes
   2. Loss of hair
   3. Poor capillary refill
   4. Thickened nails
   5. Thin skin
F. Arteritis or vasculitis (Takayasu's arteritis, giant cell arteritis) [One of the following]
   1. ESR >22 mm/hr
   2. Positive ANA
   3. Positive RF or rheumatoid factor
G. Scleroderma
H. Hypercoagulable state [One of the following]
   1. Antiphospholipid antibodies
   2. Behçet's syndrome
   3. Protein C deficiency
   4. Protein S deficiency
   5. Factor V Leiden deficiency
   6. Lupus anticoagulant
   7. Hyperactive platelet syndrome
   8. MRHFR
   9. Anti-cardiolipin antibodies
   10. Elevated homocysteine level
   11. Anti B2 glycoprotein antibodies
   12. Elevated fibrinogen
   13. PTT abnormal
   14. Antithrombin III antibodies
   15. Oral contraceptive use
   16. Hormone replacement

17. Sickle cell anemia

I. Buerger's disease (thromboangiitis obliterans) [Both of the following]
   1. History of smoking
   2. Loss of pulses or decreased pulses in the lower extremity

J. Known atherosclerotic occlusive disease when catheter angiography fails to demonstrate an occult runoff vessel suitable for vascular bypass

II. Aneurysm of aorta or iliac arteries[4-10] (CTA of abdomen and pelvis unless there is a documented contraindication to MRI) [One of the following]

A. Patient with Marfan's or Ehlers-Danlos syndrome
B. Turner's syndrome
C. Asymptomatic patient with any segment dilated to twice the adjacent normal diameter
D. Known AAA [One of the following]
   1. Periodic follow-up of an asymptomatic known AAA will be according to the following schedule if there is an inadequate ultrasound (must submit a copy of the ultrasound report) and there has not been a surgical repair [One of the following]
      a. 2.5 - 2.9 cm every 5 years
      b. 3.0 - 3.4 cm every 3 years
      c. 3.5 - 3.9 cm every 2 years
      d. 4.0 - 4.4 cm every year
      e. 4.5 - 4.9 cm every 6 months
      f. 5.0 - 5.5 cm every 3-6 months
   2. New onset of pain with an inadequate ultrasound (must submit a copy of the ultrasound report)
E. Postoperative evaluation following repair including endovascular repair (stent graft) [One of the following]
   1. 1 month after repair
   2. 3 months after repair
   3. 6 months after repair
   4. Annually after repair
   5. Suspicion of endoleak
F. Aneurysm of any intraabdominal or peripheral artery detected on other imaging
G. Vascular insufficiency of the bowel [Both of the following]
   1. Abdominal pain often starting as periumbilical and often out of proportion to findings on exam
   2. Other clinical findings [One of the following]
      a. WBC >11,500/cu.mm
      b. Stool positive for occult blood
      c. Nausea, vomiting or diarrhea
      d. History of abdominal angina (pain after eating for approximately 3 hours)
H. Planning for endovascular repair
I. Pulsatile mass on abdominal, vaginal or rectal examination

III. Suspected or known dissection of the aorta (CTA) [One of the following][12-18]

A. Unequal blood pressure in the arms

B. Rapid onset of "ripping, tearing, searing or sharp" severe chest or upper back or abdominal pain
C. Syncope and chest pain
D. Shortness of breath
E. CVA or stroke
F. Loss of pulses
G. New aortic insufficiency murmur
H. Marfan's syndrome
I. Recent aortic manipulation (such as catheter angiography)
J. Family history of aortic disease
K. Follow up of known dissection [One of the following]
    1. 1 month after repair, then
    2. 3 months after repair, then
    3. 6 months after repair, then
    4. 12 months after repair, then
    5. Annually after 12 months
L. New symptoms after repair [One of the following]
    1. Unequal blood pressure in the arms
    2. Rapid onset of "ripping, tearing, searing, or sharp" severe chest or upper back or abdominal pain
    3. Syncope and chest pain
    4. Shortness of breath
    5. CVA or stroke
    6. Loss of pulses
    7. New aortic insufficiency murmur

IV. Suspected pelvic AVM[1,11] [One of the following]

A. Pulsatile pelvic mass
B. Incidental finding on prior imaging including ultrasound
C. Pelvic pain
D. Follow up of therapeutic measures

V. Pelvic trauma, with suspected vascular injury

VI. Prior to and after uterine artery embolization (MRA of the abdomen or pelvis)[1]

VII. Intestinal angina or chronic mesenteric ischemia (CTA)[1,19-26]

A. Recurrent acute episodes of abdominal pain [One of the following]
    1. Postprandial epigastric pain, occasionally radiates to the back
    2. Weight loss
    3. Fear of eating
    4. Diarrhea which may be bloody

VIII. Acute mesenteric ischemia[19-26] (CTA) [One of the following]

IX. Evaluation of pelvic veins[1] [One of the following]

A. Suspicion of iliac vein thrombus
   1. Indeterminate duplex venous ultrasound which includes evaluation of phasic respiratory signals and swelling of the entire leg
B. Suspicion of inferior vena cava thrombus
   1. Bilateral leg swelling
C. May-Thurner syndrome
   1. Swelling and pain of the left leg not explained by venous ultrasound including duplex venous ultrasound
D. Tumor invasion

X. Evaluation of a renal transplant for suspected renal artery stenosis with Doppler ultrasound demonstrating flow in both the renal artery and renal vein[1] [One of the following]
   A. New onset of hypertension
   B. Rising renal function tests

XI. Planning for TAVR[27] (transcatheter aortic valve replacement) (CTA abdomen and pelvis should be done unless there is a documented contraindication to CT)

References:

1. American College of Radiology (ACR), North American Society for Cardiovascular Imaging (NASCI), Society for Pediatric Radiology (SPR). ACR-NASCI-SPR practice guideline for the performance of pediatric and adult body magnetic resonance angiography (MRA) [online publication]. http://www.guidelines.gov/content.aspx?id=32520&search=abdominal+aortic+aneurysm.
2. Dill KE, Rybicki FJ, Desjardins B, et al, Expert Panel on Cardiovascular Imaging. American College of Radiology ACR Appropriateness Criteria – Claudication–Suspected Vascular Etiology. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ClaudicationSuspectedVascularEtiology.pdf.
3. Rooke TW, Hirsch AT, Misra S, et al. 2011 ACC/AHA update of the guideline for the management of patients with peripheral arterial disease (updating the 2005 guideline). http://content.onlinejacc.org/article.aspx?articleid=1146931.
4. Desjardins B, Rybicki FJ, Dill KE,, et al, Expert Panel on Vascular Imaging. American College of Radiology ACR Appropriateness Criteria – Pulsatile Abdominal Mass, Suspected Abdominal Aortic Aneurysm. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PulsatileAbdominalMassSuspectedAAA.pdf.
5. Brady AR, Thompson SG, Fowkes GR, et al. Abdominal aortic aneurysm expansion: Risk factors and time intervals for surveillance, Circulation, 2004; 110:16-21.
6. Lindholt JS, Vammen S, Juul S, et al. Optimal interval screening and surveillance of abdominal aortic aneurysms, Eur J Endovasc Surg,2000; 20:369-373.
7. Brady AR, Thompson SG, Fowkes GR, et al. Abdominal aortic aneurysm expansion: Risk factors and time intervals for surveillance, Circulation, 2004; 110:16-21.
8. Mehard WB, Heiken JP, Sicard GA. High-attenuating crescent in abdominal aortic aneurysm wall at CT: A sign of acute or impending rupture. Radiology, 1994; 192:359-362.
9. Lederle FA, Wilson SE, Johnson GR, et al. Immediate repair compared with surveillance of small abdominal aortic aneurysms. N Eng J Med, 2002; 346:1437-1444.
10. Stavropoulos SW, Charagundla SR. Imaging techniques for detection and management of endoleaks after endovascular aortic aneurysm repair. Radiology, 2007; 243:641-655.
11. Candamio MJD, Lee VS, Rofsky, et al, Pelvic arteriovenous malformation: gadolinium-enhanced three dimensional MR angiography findings, European Radiology, 2000; 10:1257-1260.
12. Jacobs JE, Latson LA, Abbara S, et al, Expert Panel on Cardiovascular Imaging, American College of Radiology ACR Appropriateness Criteria – Acute Chest Pain–Suspected Aortic Dissection. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteChestPainSuspectedAorticDissection.pdf.
13. Demehri S, Rybicki FJ, Dill KE, et al, Expert Panel on Cardiovascular Imaging, American College of Radiology ACR Appropriateness Criteria – Blunt Chest Trauma–Suspected Aortic Injury. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/BluntChestTraumaSuspectedAorticInjury.pdf.
14. Erbel R, Alfonso F, Boileau C, et al. Diagnosis and management of aortic dissection: recommendations of the Task Force on Aortic Dissection, European Society of Cardiology, Eur Heart J, 2001, 22:1642-1682.
15. Davis T, Iqbal Q, Puppala VK, et al. Institute for Clinical Systems Improvement. Diagnosis and Treatment of Chest Pain and Acute Coronary Syndrome (ACS). https://www.icsi.org/_asset/ydv4b3/ACS-Interactive1112b.pdf.
16. Hagan PG, Nienaber CA, Isselbacher EM, et al. The International Registry of Acute Aortic Dissection (IRAD): new insights into an old disease, JAMA, 2000; 283: 897-903.
17. Von Kodolitsch Y, Schwartz AG, Nienaber CA. Clinical prediction of acute aortic dissection. Arch Intern Med 2000; 160: 2971-82.
18. Hiratzka LR, Bakris GL, Beckman JA, et al. 2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/SVM Guidelines for the diagnosis and management of patients with thoracic aortic disease. Circulation, 2010; 121:e266-369
19. American Gastroenterological Association medical position statement: guidelines on intestinal ischemia, Gastroenterology, 2000; 118:951-953.
20. Kibbe MR, Hassoun HT. Acute Mesenteric Ischemia. In: Souba WW, Fink MP, Jurkovich GJ, et al, eds. ACS Surgery Principles & Practice. 6th ed. WebMD; 2007: 1016-1026.
21. Wolff BG, Pemberton JH, Wexner SD, et al, eds. The ASCRS Textbook of Colon and Rectal Surgery. Springer Science + Business Media, LLC; 2007: Chapter 43, P401.
22. Shih MP, Hagspiel. CTA and MRA in mesenteric ischemia: part 1, role in diagnosis and differential diagnosis, AJR, 2007; 188:452-461.
23. Shih MP, Angle JF, Leung DA, et al. CTA and MRA in mesenteric ischemia: part 2, normal findings and complications after surgical and endovascular treatment, AJR, 2007; 188: 462-471.
24. Theodoropoulou A, Koutroubakis IE. Ischemic colitis: Clinical practice in diagnosis and treatment. World J Gastroenterol. 2008 Dec 28; 14(48):7302-7308.
25. Sreenarasimhaiah J. Diagnosis and management of intestinal ischaemic disorders. BMJ. 2003 June 21; 326(7403):1372–1376.
26. Oliva IB, Davarpanah, AH, Rybicki FJ, et al Expert Panel on Vascular Imaging, American College of Radiology Appropriateness Criteria-Imaging of mesenteric ischemia. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ImagingOfMesentericIschemia.pdf
27. Dill KE, George E, Rybicki FJ, et al Expert Panel on Vascular and Cardiac Imaging, American College of Radiology Appropriateness Criteria- Imaging for transcatheter aortic valve replacement. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ImagingForTranscatheterAorticValveReplacement.pdf

72198 MRA or MRV of the Pelvis

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73200 CT of the Upper Extremity without Contrast
73201 CT of the Upper Extremity with Contrast
73202 CT of the Upper Extremity without and with Contrast

I. Suspected nonunion of known fracture with pain at fracture site [One of the following]
   A. Failure to demonstrate progressive evidence of healing for 3 or more months
   B. Movement at fracture site by subjective sensation or by radiographic imaging
   C. Old scaphoid fracture on x-ray see XVI

II. Primary or metastatic bone tumor of the upper extremity – known or suspected[1-4] – An x-ray is required prior to imaging a suspected bone tumor; if the x-ray is definitely benign and the lesion is not an osteoid osteoma clinically or radiographically no further imaging is required [One of the following]
   A. X-ray or CT results and suspected (not known) bone tumor [One of the following]
      1. Negative or does not explain the regional symptoms (MRI without contrast)
      2. Suspicious for osteoid osteoma clinically or radiographically (CT)
      3. Indeterminate for malignancy (MRI without and with contrast)
      4. Aggressive appearance on x-ray (MRI without and with contrast)
      5. Pathologic fracture; not definitely benign (MRI without and with contrast)
      6. Incidental finding on prior CT that is not definitely benign (MRI without and with contrast)
   B. Osteosarcoma of the upper extremity (MRI) [One of the following]
      1. Initial staging of primary site
      2. For high grade osteosarcoma of the upper extremity after preoperative chemotherapy
      3. Restaging after completion of treatment
      4. Follow up after treatment
         a. Every 3 months for 2 years
         b. Every 4months for the third year
         c. Every 6 months for the next 2 years (fourth and fifth)
         d. Annually after 5 years
   C. Ewing's sarcoma of the upper extremity [One of the following]
      1. Initial staging of primary site
      2. Restage primary site after completion of primary treatment (usually chemotherapy)
      3. Follow up after surgery, or radiation and chemotherapy
         a. Every 2-3 months for 2 years
         b. Every 4 months for the third year
         c. Every 6 months for years 4 and 5
         d. Annually after year 5
   D. Chondrosarcoma of the upper extremity
      1. Initial staging of primary site
      2. Restaging after completion of treatment
      3. Low grade and intracompartmental [One of the following]

a. Every 6-12 months for 2 years
b. Annually after 2 years as appropriate

4. High grade (grade II, grade III or clear cell or extracompartmental)
   a. Imaging as clinically indicated

E. Chordoma of the upper extremity
1. Initial staging of primary site
2. Restaging after completion of treatment (surgery and/or radiation therapy)
3. Conventional or chondroid chordoma
   a. Imaging of primary site as clinically indicated

F. Giant cell tumor of the bone in the upper extremity (MRI)
1. Initial staging of primary site
2. Restaging after completion of treatment
3. Following completion of therapy image primary site as clinically indicated

G. Osteoid osteoma – CT is the study of choice.
1. Clinical [One of the following]
   a. Bone pain worse at night which is relieved by aspirin
   b. Pain increases with activity
2. Known diagnosis and planning for surgery
3. Known diagnosis and planning for radiofrequency ablation
4. Known diagnosis and post intervention evaluation to establish a new baseline

H. Known primary malignancy other than bone (MRI without contrast) [One of the following]
1. Bone pain in the upper extremity with known malignancy and non diagnostic bone scan
2. Known bone metastases in the upper extremity with pathologic fracture
3. Positive bone scan in the arm with no pain
4. Restaging after completion of treatment

III. Soft tissue mass including soft tissue sarcoma[5-9] (MRI) [One of the following]

A. Prominent calcifications on plain film if MRI cannot be done
B. Soft tissue sarcoma of the extremity [One of the following]
1. Initial staging of primary site
2. Post operative imaging after primary therapy for any stage tumor
3. Surveillance for local recurrence in an asymptomatic individual as clinically appropriate up to 10 years
4. Suspicion of local recurrence

IV. Joint prosthesis[10] [One of the following]

A. Loosening of prosthesis on x-ray with negative aspiration for infection and negative In^{111} white blood cell and sulfur colloid scan of the joint
B. Pain after joint replacement with negative x-ray
C. Pre-operative planning for joint replacement

V. Complex fracture, CT required for treatment planning [One of the following]

A. Comminuted, intra-articular distal radius fracture on x-ray
B. Fracture of the navicular or scaphoid on x-ray
C. Surgical planning of complex intra-articular fractures

VI. Fracture[11] [One of the following] [MRI]
- A. Suspicion of fracture of distal radius
  1. Casting and negative x-ray 10-14 days after injury (There may be a negative x-ray at the time of injury)
- B. Suspected acute fracture of the navicular or scaphoid with negative x-ray at time of injury
- C. Suspected occult fracture of the navicular or scaphoid with a negative initial x-ray and pain or tenderness over the anatomic "snuff box" and no improvement after 10-14 days of casting
- D. Olecranon fracture
- E. All other suspected, occult or insufficiency fractures of the upper extremity including the humerus, ulna, radius, carpal bones, metacarpals, and phalanges with negative x-rays
  1. Pain and negative diagnostic x-ray 10-14 days after the injury or onset of pain (The need for a repeat x-ray is waived if the first film is taken 10-14 days after the injury or onset of pain)
- F. Child abuse

VII. Suspected intra-articular loose body[12] and recent x-ray (MRI) [One of the following]
- A. Joint pain
- B. Locking
- C. Clicking

VIII. Distal radioulnar joint subluxation[11]
- A. Non diagnostic x-ray

IX. Soft tissue abscess with negative ultrasound and tender or warm or erythematous area [One of the following]
- A. Aural temperature >38.3°C or >100.9°F
- B. Leukocytosis, WBC >11,500/cu.mm
- C. ESR >22 mm/hr
- D. CRP >10 mg/L

X. Heterotopic ossification/osteophytosis on x-ray with stiff elbow[12]

XI. CT arthrogram of the shoulder (CT with contrast)[13] [One of the following]
- A. Pain with non contributory x-rays and non specific examination only if MRI is contraindicated
- B. Labral tear with noncontributory x-rays only if MRI is contraindicated
- C. Rotator cuff tear/impingement
  1. Prior shoulder arthroplasty and non contributory x-rays if ultrasound or x-ray arthrogram cannot be done (must document reason that either or both tests cannot be performed)

XII. Labral tear – See XI

XIII. Rotator cuff tear or impingement – See XI

XIV. Shoulder pain – See XI

XV. Kienböck's disease on x-ray[14]

XVI. Old scaphoid fracture on x-ray (either CT or MRI but not both)[14]

References:

1. Aisen AM, Martel W, Braunstein EM, et al. MRI and CT evaluation of primary bone and soft-tissue tumors, AJR, 1986; 146:749-756.16.
2. Roberts CC, Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Metastatic Bone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/MetastaticBoneDisease.pdf.
3. Morrison WB, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Primary Bone Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PrimaryBoneTumors.pdf.
4. Biermann JS, Chow W, Adkins DR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Bone Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bone.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bone Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
5. Blacksin MF, Ha DH, Hameed M, et al. Superficial soft-tissue masses of the extremities, Radio Graphics, 2006; 26:1289-1304.
6. Zoga AC, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Soft Tissue Masses. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SoftTissueMasses.pdf.
7. Von Mehren M, Randall RL, Benjamin RS, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Soft Tissue Sarcoma. http://www.nccn.org/professionals/physician_gls/pdf/sarcoma.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Soft Tissue Sarcoma V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
8. Fitzgerald JJ, Roberts CC, Daffner RH, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Follow-up of Malignant or Aggressive Musculoskeletal Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/FollowupMalignantOrAggressiveMusculoskeletalTumors.pdf.
9. Keiken JP, Lee JKT, Smathers RL, et al. CT of benign soft-tissue masses of the extremities, AJR, 1984, 142:575- 580.
10. Weissman BN, Shah N, Daffner RH, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness criteria – Imaging After Total Knee Arthroplasty. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ImagingAfterTotalKneeArthroplasty.pdf.
11. Rubin MA, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria — Acute Hand and Wrist Trauma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteHandAndWristTrauma.pdf.
12. Hayes CW, Daffner H, Weissman BN, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Chronic Elbow Pain. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ChronicElbowPain.pdf.
13. Wise JN, Daffner RH, Weissman BN, et al, Expert Panel on Musculoskeletal Imaging, American College of Radiology Appropriateness Criteria – Acute Shoulder Pain. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteShoulderPain.pdf.
14. Rubin DA, Weissman BN, Appel M, et al Expert Panel on Musculoskeletal Imaging, American College of Radiology Appropriateness Criteria – Chronic Wrist Pain. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ChronicWristPain.pdf.

73200, 73201, 73202 CT of the Upper Extremity

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73206 CTA of the Upper Extremity

I. Suspected occlusion, stenosis[1] [One of the following]

A. Abnormal pulses: asymmetric, weak or absent
B. Skin changes: poor capillary filling, cyanosis
C. Abnormal Doppler ultrasound
D. Reconstruction surgery planning
E. Thoracic outlet syndrome [One of the following]
    1. Cold extremity or digits
    2. Pallor
    3. Decreased pulses
    4. Decreased blood pressure in one arm
    5. Change in pulse or blood pressure with change in position of arm or head (positive Adson's maneuver or Allen test)
F. Effort thrombosis [One of the following]
    1. Swelling
    2. Cyanosis
    3. Evidence of collateral veins
G. Arteritis (Takayasu's arteritis, giant cell arteritis) [One of the following]
    1. ESR >22 mm/hr
    2. Positive ANA
    3. Positive RF or rheumatoid factor
H. Scleroderma
I. Hypercoagulable state [One of the following]
    1. Personal history of cancer
    2. Factor V Leiden mutation
    3. MTHFR
    4. SLE
    5. Sickle cell disease
    6. Contraceptive medications
    7. Protein C deficiency
    8. Protein S deficiency
    9. Antiphospholipid antibodies
    10. Elevated lipoprotein (a)
    11. Elevated platelet count
    12. Prothrombin 20210 gene mutation
    13. Antithrombin III deficiency
J. Buerger's disease (thromboangiitis obliterans) [Both of the following]
    1. History of smoking
    2. Loss of pulses or decreased pulses in the upper extremity

II. Aneurysm

A. Pulsatile mass by palpation or imaging

III. Venous aneurysm with negative ultrasound
- A. Asymptomatic peripheral mass

IV. Arteriovenous malformation or venous malformation[2] [One of the following]
- A. Hypertrophy of soft tissues of the extremity
- B. Limb length discrepancy
- C. History of Klippel-Trenaunay syndrome of variant
- D. History of Osler Weber Rendu syndrome
- E. History of Parkes-Weber syndrome
- F. Hemorrhage into a limb
- G. Thrill or bruit
- H. Port-wine stain
- I. Dilated veins

V. Upper extremity venous thrombosis[3]
- A. Duplex venous ultrasound including compression is equivocal

References:

1. Stepansky F, Hecht EM, Rivera R, et al. Dynamic MR Angiography of upper extremity vascular disease: pictorial review, Radiographics, 2008. http://radiographics.rsna.org/content/28/1/e28.full.
2. Bogdan MA, Klein MB, Rubin GD, et al. CT Angiography in Complex Upper Extremity Reconstruction. Journal of Hand Surgery (British and European Volume), Vol. 29, No. 5. http://www.drmichaelbogdan.com/publications/bogdan_JHS04.pdf.
3. Desjardins B, Rybicki FJ, Kim HS, et al, Expert Panel on Vascular Imaging. American College of Radiology Appropriateness Criteria – Suspected Upper Extremity Deep Vein Thrombosis. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SuspectedUpperExtremityDeepVeinThrombosis.pdf ..

73206 CTA Upper Extremity

Clinical criteria reviewed/revised: 4/3/14, 7/3/2013, 3/15/13, 5/4/12, 9/3/11, 11/17/10, 9/16/09
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73218 MRI Upper Extremity Other than Joint Including Hand without Contrast
73219 MRI Upper Extremity Other than Joint Including Hand with Contrast
73220 MRI Upper Extremity Other than Joint Including Hand without and with Contrast

I. Suspected fracture with negative x-ray (including occult fracture or insufficiency fracture)[1-3] [One of the following]

A. Suspicion of fracture of distal radius
   1. Casting and negative x-ray 10-14 days after injury (There may be a negative x-ray at the time of injury)
B. Suspected acute fracture of the navicular or scaphoid with negative x-ray at time of injury
C. Suspected occult fracture of the navicular or scaphoid with a negative initial x-ray and pain or tenderness over the anatomic "snuff box" and no improvement after 10-14 days of casting and negative repeat x-ray at 10-14 days after injury
D. Olecranon fracture
E. All other suspected, occult or insufficiency fractures of the upper extremity including the humerus, ulna, radius, carpal bones, metacarpals, and phalanges with negative x-rays
   1. Pain and negative x-ray 10-14 days after the injury or onset of pain (The need for a repeat x-ray is waived if the first film is taken 10-14 days after the injury or onset of pain)
F. Child abuse

II. Suspected soft tissue injury[1-8] [One of the following]

A. Gamekeeper's thumb or injury or skier's thumb (metacarpophalangeal ulnar collateral ligament injury)
   1. Negative x-ray
B. Biceps tendon tear near the shoulder with incomplete resolution with conservative management [Both of the following]
   1. Symptoms [One of the following]
      a. Sudden sharp pain in the upper arm
      b. Pop or snap can be heard
      c. Cramping of upper arm over the biceps with use of the arm
      d. Bruising of the upper arm
      e. Pain or tenderness
      f. Weakness of the shoulder or elbow on examination
      g. Difficulty with pronation and/or supination
      h. Bulge in the upper arm
      i. Defect over the muscle
   2. Conservative management to include NSAIDS or anti-inflammatory medication and physical therapy for at least 4 weeks
C. Biceps tear above the elbow with negative x-ray [One of the following]

1. Swelling in the front of the elbow
2. Bruising near the elbow and in the forearm
3. Weakness in bending of the elbow
4. Weakness in twisting the forearm (supination)
5. Bulge in the upper arm
6. Defect in the muscle near the elbow

D. Collateral ligament tear with negative x-rays
   1. Ulna collateral ligament (medial) at the elbow with pain medially
      a. Symptoms [One of the following]
         i. Tenderness over the medial aspect of the elbow
         ii. Loss of range of motion
         iii. Bruising
         iv. Pain reproduced with a clenched fist
   2. Radial collateral ligament injury at the elbow (lateral) with pain laterally [One of the following]
      a. Tenderness over the lateral aspect of the elbow
      b. Varus instability
      c. Positive chair rise test
      d. Positive pivot shift test
   3. Olecranon bursitis swelling of the posterior elbow with or without pain and no improvement after least 4 weeks of anti-inflammatory medication, ice

E. Flexor tendon injuries [One of the following]
   1. Inability to flex fingers or thumb
   2. Numbness of the fingertip
   3. History of rheumatoid arthritis
   4. History of deep cut of fingers, wrist or forearm
   5. Sports injury "Jersey finger"

III. Tendinitis, tendinopathy or tendinosis[9-13] [One of the following]

A. Lateral epicondylitis or tennis elbow (imaging is rarely required) with negative x-ray, pain along the lateral elbow which increases with activity and decreases with rest [Both of the following]
   1. No improvement with at least 6 weeks of anti-inflammatory medication and home exercise program
   2. No improvement with formal physical therapy program

B. Medial epicondylitis or golfer's elbow with pain on the medial side of the elbow and either decreased grip strength or pain with resisted flexion of the wrist, a negative x-ray and no improvement after at least 4 weeks of anti-inflammatory medication, activity modification or rest, ice and physical therapy

C. Bicipital or biceps tendonitis with incomplete resolution after conservative medical management consisting of treatment with anti-inflammatory medication and physical therapy for at least 4 weeks or findings worsening during trial of conservative management [One of the following]
   1. Findings on exam
      a. Tenderness over the bicipital groove on examination
      b. Positive Yergason's test
      c. Positive Speed's test

d. Pain increases with flexion of the shoulder against resistance
e. Pain with overhead activity

2. Symptoms near the elbow with pain anterior to the elbow
   a. Weakness of the elbow

D. Triceps tendinosis or tendinopathy with tenderness over the triceps tendon posterior to the elbow, a negative x-ray and no improvement after steroid injections or anti-inflammatory medication and physical therapy for at least 4 weeks
E. Olecranon impingement with clicking or locking of the elbow at terminal extension with either a normal x-ray or one that shows osteophytes or loose bodies
F. DeQuervain's tendinitis with no improvement after 4 weeks of conservative therapy consisting of anti-inflammatory medications or injections into the tendon sheath [One of the following]
   1. Pain over the radial side of the wrist
   2. Positive Finkelstein's test

IV. Ulnar nerve entrapment[12,13] with medial elbow pain (imaging is not usually required and a definitive diagnosis is made with nerve conduction studies) [Both of the following]
   A. Symptoms or findings on examination [One of the following]
      1. Distal paresthesias of the forearm and 4th and 5th fingers
      2. Positive Tinel's sign over the medial epicondyle
      3. Atrophy of the hypothenar eminence
      4. Index finger pinch weakness (positive Froment's sign)
      5. Decreased grip strength
      6. Weakness of the intrinsic hand muscles
   B. Conservative management for at least 4 weeks
      1. Activity modification
      2. Night time splinting

V. Evaluation of the intrinsic muscles of the hand [One of the following]
   A. Atrophy of any hand muscles
   B. Motor and sensory deficits of the hand unexplained by physical examination and EMG

VI. Arteriovenous malformation or venous malformation[14-17] [One of the following]
   A. Hypertrophy of soft tissues of the extremity
   B. Limb length discrepancy
   C. History of Klippel-Trenaunay syndrome of variant
   D. History of Osler Weber Rendu syndrome
   E. History of Parkes-Weber syndrome
   F. Hemorrhage into a limb
   G. Pulsating soft tissue mass [One of the following]
      1. Thrill
      2. Bruit
   H. Port-wine stain
   I. Dilated veins

VII. Suspected or known avascular necrosis with pain and a recent x-ray which may be either negative or non-diagnostic or diagnostic of AVN but additional information is needed to determine management (osteonecrosis, AVN, Kienböck's disease)[1] [(A and B) or C]

A. Risk factors and pain [One of the following]
   1. Steroid use
   2. Sickle cell disease
   3. Excessive alcohol use
   4. HIV infection
   5. SLE
   6. Renal transplant
   7. Trauma [One of the following]
      a. Fracture
      b. Dislocation
   8. Coagulopathy
   9. Bisphosphonates
   10. Smoking
   11. Pancreatitis
   12. Gaucher's disease

B. Physical findings [One of the following]
   1. Catching
   2. Locking
   3. Clicking
   4. Grinding
   5. Crepitus
   6. Stiffness
   7. Tenderness
   8. Flexion contractures

C. Clarification of findings on recent x-ray

VIII. Primary or metastatic bone tumor of the upper extremity – known or suspected[18-20] – An x-ray is required prior to imaging a suspected bone tumor; if the x-ray is definitely benign and the lesion is not an osteoid osteoma clinically or radiographically no further imaging is required [One of the following]

A. X-ray or CT results [One of the following] and suspected (not known) bone tumor
   1. Negative or does not explain the regional symptoms (MRI without contrast)
   2. Suspicious for osteoid osteoma clinically or radiographically (CT)
   3. Indeterminate for malignancy (MRI without and with contrast)
   4. Aggressive appearance on x-ray (MRI without and with contrast)
   5. Pathologic fracture; not definitely benign (MRI without and with contrast)
   6. Incidental finding on prior CT that is not definitely benign (MRI without and with contrast)

B. Osteosarcoma of the upper extremity [One of the following]
   1. Initial staging of primary site
   2. For high grade osteosarcoma of the upper extremity after preoperative chemotherapy

3. Restaging after completion of treatment
4. Follow up after treatment [One of the following]
    a. Every 3 months for 2 years
    b. Every 4 months for the third year
    c. Every 6 months for the next 2 years (fourth and fifth)
    d. Annually after 5 years

C. Ewing's sarcoma of the upper extremity [One of the following]
1. Initial staging of primary site
2. Restage primary site after completion of primary treatment (usually chemotherapy)
3. Follow up after treatment [One of the following]
    a. Every 2 months for 2 years
    b. Every 4 months for the third year
    c. Every 6 months for years 4 and 5
    d. Annually after year 5

D. Chondrosarcoma of the upper extremity [One of the following]
1. Initial staging of primary site
2. Restaging after completion of treatment
3. Low grade and intracompartmental [One of the following]
    a. Every 6-12 months for 2 years
    b. Annually after 2 years as appropriate
4. High grade (grade II, grade III or clear cell or extracompartmental)
    a. Imaging as clinically indicated

E. Chordoma of the upper extremity [One of the following]
1. Initial staging of primary site
2. Restaging after completion of treatment
3. Conventional or chondroid chordoma
    a. Imaging of primary site as clinically indicated

F. Giant cell tumor of the bone in the upper extremity [One of the following]
1. Initial staging of primary site
2. Restaging after completion of treatment
3. Following completion of therapy image primary site as clinically indicated

G. Osteoid osteoma with negative CT [One of the following]
1. Clinical [One of the following]
    a. Bone pain worse at night which is relieved by aspirin
    b. Pain increases with activity
2. Known diagnosis and planning for surgery
3. Known diagnosis and planning for radiofrequency ablation
4. Known diagnosis and post intervention evaluation to establish a new baseline

H. Known primary malignancy other than bone [One of the following]
1. Bone pain in the upper extremity with known malignancy and non diagnostic bone scan
2. Known bone metastases in the upper extremity with pathologic fracture
3. Elevated alkaline phosphatase (>140 IU/L) with known malignancy and non diagnostic bone scan
4. Positive bone scan in the upper extremity with no pain

IX. Soft tissue mass including soft tissue sarcoma with negative x-ray (MRI without and with contrast) [One of the following][21-24]
- A. Prominent calcifications on plain film
- B. Soft tissue sarcoma of the extremity [One of the following]
  1. Initial staging of primary site
  2. Post operative imaging after primary therapy for any stage tumor
  3. Surveillance for local recurrence in an asymptomatic individual as clinically appropriate up to 10 years
  4. Suspicion of local recurrence
- C. Suspected ganglion cyst with negative ultrasound, pain and a palpable lump that is solid on transillumination or does not respond to aspiration

X. Child abuse

XI. Soft tissue abscess with negative ultrasound and tender or warm or erythematous area (MRI without and with contrast) [One of the following]
- A. Aural temperature >38.3° C or >100.9°F
- B. Leukocytosis >11,500/cu mm
- C. ESR >22mm/hr
- D. CRP >10

XII. Suspected or known osteomyelitis with bone pain (MRI without and with contrast)[25-30] [One of the following]
- A. Clinical and laboratory findings [One of the following]
  1. ESR >22 mm/hr
  2. Aural temperature >38.3°C or 100.9°F
  3. Leukocytosis, WBC >11,500/cu.mm
  4. C-reactive protein >10 mg/ml
  5. Blood culture positive
  6. X-ray suggestive of osteomyelitis
- B. History of diabetes, dialysis or peripheral vascular disease
- C. History of penetrating injury or surgery near the involved bone
- D. Sinus tract, poor wound or fracture healing
- E. Preoperative evaluation of known osteomyelitis
- F. Positive probe to bone test
- G. Post treatment evaluation
- H. Suspicion of infected prosthesis (nuclear studies)
- I. Chronic wound overlying surgical hardware
- J. Chronic wound overlying a fracture
- K. Exposed bone

XIII. Brachial plexus (MRI without and with contrast)[31,32] [One of the following]
- A. Brachial plexus injury [Both of the following]
  1. Symptoms [One of the following]
     a. Weakness or paralysis of the upper extremity
     b. Sensory loss or numbness of the upper extremity

c. Horner's syndrome
d. Shoulder and/or arm pain
e. Burning or electric sensation in more than one nerve distribution
f. Loss of deep tendon reflexes in the upper extremity
g. EMG showing a neurogenic lesion in muscles supplied by at least 2 cervical levels

2. History [One of the following]
a. Trauma including birth trauma motor vehicle accident, falls, sports injuries, gunshot injury, overuse of back packs
b. Radiation fibrosis
c. History of radiation therapy to the chest, breast or axilla

B. Primary or metastatic tumor [Both of the following]
1. Symptoms [One of the following]
a. Weakness or paralysis of the upper extremity
b. Sensory loss or numbness of the upper extremity
c. Horner's syndrome
d. Shoulder and/or arm pain
e. Burning or electric sensation in more than one nerve distribution
f. Loss of deep tendon reflexes in the upper extremity
g. EMG showing a neurogenic lesion in muscles supplied by at least 2 cervical levels

2. History [One of the following]
a. Known primary tumor
b. Lung cancer especially a Pancoast tumor
c. Lymphoma

C. Schwannoma or neurofibroma
1. Symptoms [One of the following]
a. Palpable mass in the lower neck or supraclavicular fossa
b. Weakness or paralysis of the upper extremity
c. Sensory loss or numbness in the upper extremity
d. Horner's syndrome
e. Shoulder and/or arm pain
f. Burning or electric sensation in more than one nerve distribution
g. Loss of deep tendon reflexes in the upper extremity
h. EMG showing a neurogenic lesion in muscles supplied by at least 2 cervical levels

D. Entrapment [One of the following]
1. Symptoms
a. Pain and paresthesia along the ulna aspect of the forearm, hand and 4th and 5th fingers
b. Symptoms increase with overhead activities

XIV. Osteochondral defect or osteochondritis dessicans [33,34] [One of the following]

A. Positive x-ray for osteochondral defect to stage for stability
B. Catching, or stiffness or locking or instability with negative x-ray
C. Chronic joint pain after trauma despite appropriate treatment and a negative x-ray
D. Effusion or crepitus or tenderness with negative x-ray

References:

1. Daffner RH, Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Stress (Fatigue/Insufficiency) Fracture Including Sacrum, Excluding Other Vertebrae. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/StressFatigueInsufficiencyFractureIncludingSacrumExcludingOtherVertebrae.pdf.
2. Patel DS, Roth M, Kapil N. Stress fractures: diagnosis, treatment, and prevention, Am Fam physician, 2011; 83:39-46.
3. Bruno MA, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Acute Hand and Wrist Trauma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteHandAndWristTrauma.pdf.
4. May DA, Disler DG, Jones EA, et al. Abnormal signal intensity in skeletal muscle at MRI imaging: patterns, pearls and pitfalls, RadioGraphics, 2000; 20:S295-S315.
5. AAOS OrthoInfo. Biceps Tendon Tear at the Shoulder. http://orthoinfo.aaos.org/topic.cfm?topic=a00031.
6. AAOS OrthoInfo. Biceps Tendon Tear at the Elbow. http://orthoinfo.aaos.org/topic.cfm?topic=a00376.
7. Beltran J, Rosenberg ZS. Diagnosis of compressive and entrapment neuropathies of the upper extremity: value of MR imaging, AJR, 1994; 163:525-531.
8. DeSmet AA. Magnetic resonance findings in skeletal muscle tears, Skeletal Radiol, 1993; 22:479-484.
9. Chumbley EM, O'Connor FG, Nirschl RP. Evaluation of overuse elbow injuries, Am Fam Physician, 2000; 6:1691-700. http://www.aafp.org/afp/20000201/691.html.
10. Johnson GW, Cadwallader D, Scheffel SB, et al. Treatment of lateral epicondylitis, Am Fam Physician, 2007; 76:843-848.
11. Lee ML, Rosenwasser MP. Chronic elbow instability, Orthopedic Clin N Amer, 1999; 30:81-89.
12. Steele M, Norvell JG. Tendonitis. http://emedicine.medscape.com/article/809692-overview.
13. Hayes CW, Daffner RH, Weissman BN, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Chronic Elbow Pain. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ChronicElbowPain.pdf.
14. Lee BB, Laredo J, Lee SJ, et al. Congenital vascular malformations: general diagnostic principles, Phlebology, 2007; 22:253-257.
15. Triponis V. Diagnosis and treatment of predominantly venous congenital vascular malformations in the extremities: a survey of 50 cases, Lithuanian Surgery, 2005; 3:184-191.
16. Cohen JM, Weinreb JC, Redman HC. Arteriovenous malformation of the extremities: MR Imaging, RAd, 1986; 158:475-479.
17. Rak KM, Yakes WF, Ray RL, et al. MR Imaging of symptomatic peripheral vascular malformations, AJR, 1992; 159:107-112.
18. Roberts CC, Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Metastatic Bone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/MetastaticBoneDisease.pdf.
19. Morrison WB, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Primary Bone Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PrimaryBoneTumors.pdf.
20. Biermann JS, Chow W, Adkins DR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Bone Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bone.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bone Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
21. Blacksin MF, Ha DH, Hameed M, et al. Superficial soft-tissue masses of the extremities, RadioGraphics,2006;26:1289-1304.
22. Zoga AC, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Soft Tissue Masses. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SoftTissueMasses.pdf.
23. Von Mehren M, Randall RL, Benjamin RS, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Soft Tissue Sarcoma. http://www.nccn.org/professionals/physician_gls/pdf/sarcoma.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Soft Tissue Sarcoma V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
24. Fitzgerald JJ, Roberts CC, Daffner RH, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Follow-up of Malignant or Aggressive Musculoskeletal Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/FollowupMalignantOrAggressiveMusculoskeletalTumors.pdf.
25. British Society for Children's Orthopaedic Surgery. The management of acute bone and joint infection in childhood: A guide to good practice. http://bscos.org.uk/resources/Downloads/childrensinfection_1.pdf.
26. Lazzarini L, Mader JT, Calhoun JH. Osteomyelitis in long bones, J Bone Joint Surg Am, 2004:86:2305-2318.
27. Unger E, Moldofsky P, Gatenby R, et al. Diagnosis of osteomyelitis by MR imaging, AJR, 1988; 150:605-610.
28. Erdman WA, Tamburro F, Jayson HT, et al. Osteomyelitis: characteristics and pitfalls of diagnosis with MR imaging, Radiology, 1991; 180:533-539.
29. Dangman BC, Hoffer FA, Rand FF, et al. Osteomyelitis in Children: gadolinium-enhanced MR imaging, Radiology, 1992; 182:743-747.
30. Hatzenbuehler J, Pulling TJ. Diagnosis and management of osteomyelitis, Am Fam Physician, 20011; 84:1027-1033.
31. Wippold FJ II, Cornelius RS, Aiken AH, et al, Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Plexopathy. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Plexopathy.pdf.
32. Bromberg MB. Brachial plexus syndromes in UpTo Date. http://www.uptodate.com/contents/brachial-plexus-syndromes.
33. Hixon AL and Gibbs LM, Osteochondritis Dissecans: A diagnosis not to miss, Am Fam Physician, 2000; 61:151-156.

34. Luchs JS, Flug JA, Weissman BN, Expert Panel on Musculoskeletal Imaging: American College of Radiology Appropriateness Criteria, Chronic Ankle Pain https://acsearch.acr.org/list

73218, 73219, 73220 MRI Upper Extremity Other than Joint

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73221 MRI Upper Extremity Joint without Gadolinium: Shoulder
73222 MRI Upper Extremity Joint with Gadolinium: Shoulder
73223 MRI Upper Extremity Joint without and with Gadolinium: Shoulder

See also: Wrist and Hand; Elbow

I. Chronic joint pain (longer than 6 months) with negative x-ray (MRI without contrast)[1,2]
   A. Incomplete resolution with after conservative medical management [One of the following]
      1. Continued pain after treatment with anti-inflammatory medication and physical therapy for at least 4 weeks
      2. Symptoms worsening while under treatment

II. Adhesive capsulitis with negative x-rays[2,3] and incomplete resolution with at least 4 weeks of anti-inflammatory medication and physical therapy (imaging is rarely required)
   A. Diffuse shoulder pain with restricted passive range of motion
   B. Positive Apley's scratch test

III. Acromioclavicular arthritis[2]
   A. Superior shoulder pain
   B. Tenderness over the acromioclavicular (AC) joint
   C. Painful cross body adduction test

IV. Suspected intra-articular loose body and recent x-ray (MRI without contrast) [One of the following][1]
   A. Joint pain
   B. Locking
   C. Clicking

V. Suspected or known avascular necrosis (osteonecrosis, AVN) with pain and recent x-ray which may be either negative or non-diagnostic or diagnostic of AVN but additional information is needed to determine management (MRI)[4] [One risk factor and one selection from history or physical finding or clarification of findings on other imaging]
   A. Risk factors and pain [One of the following]
      1. Steroid use
      2. Sickle cell disease
      3. Excessive alcohol use

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4. HIV infection
5. SLE
6. Renal transplant
7. Trauma with fracture or dislocation
8. Coagulopathy
9. Bisphosphonate use
10. Smoking
11. Pancreatitis
12. Gaucher's disease

B. Physical findings [One of the following]
1. Catching
2. Locking
3. Clicking
4. Grinding
5. Crepitus
6. Stiffness
7. Tenderness over the shoulder

VI. Suspected fracture with negative x-ray[5,6] (MRI without contrast) [One of the following]

A. Negative x-ray 10-14 days after the onset of pain (If this is the only x-ray then the need for an initial x-ray is waived)
B. Child abuse
C. Bone scan positive but not specific for fracture
D. Osteoporosis on bone density or long term steroid use

VII. Suspected acute cuff tear with or without acromial spurs on x-ray and with incomplete resolution after conservative medical management consisting of treatment with anti-inflammatory medication and physical therapy for at least 4 weeks or symptoms worsening during trial of conservative management (MRI without contrast) [(One symptom and one finding on examination) or C][7]

A. Symptoms [One of the following]
1. Pain especially with overhead activities such as reaching or combing hair
2. Pain increases when sleeping of the affected side
3. Inability to use the arm or lift the arm

B. Findings on examination [One of the following]
1. Weakness on examination
2. Subacromial tenderness
3. Positive Apley's scratch test
4. Positive Neer sign
5. Positive apprehension test
6. Positive drop arm test
7. Positive empty can sign
8. Positive relocation sign
9. Positive sulcus sign

C. Recurrent pain and finding(s) in B above following surgery

VIII. Suspected chronic rotator cuff tendinitis[2] with or without acromial spurs on x-ray (if performed) and with incomplete resolution after conservative medical management consisting of treatment with anti-inflammatory medication and physical therapy for at least 4 weeks or symptoms or findings worsening during trial of conservative management (MRI without contrast) [(One symptom and one finding on examination) or C]

A. Symptoms [One of the following]
    1. Dull aching in the shoulder, which may interfere with sleep
    2. Severe pain when the arm is actively abducted into an overhead position such as throwing, reaching or combing hair
B. Findings on examination [One of the following]
    1. Weakness on examination
    2. Subacromial tenderness
    3. Positive Apley's scratch test
    4. Positive Neer sign
    5. Positive apprehension test
    6. Positive drop arm test
    7. Positive empty can sign
    8. Positive relocation sign
    9. Positive sulcus sign
C. Recurrent pain and finding(s) in B above following surgery

IX. Suspected labral tear or SLAP lesion or Bankart lesion [One of the following] (MR)[1,8-10]

A. Pain interferes with the smooth functioning of the shoulder
B. Discomfort on forced external rotation at 90 degrees of abduction
C. A "pop" or "click" on forced external rotation
D. Discomfort on forced horizontal adduction of the shoulder
E. Weakness in the rotator cuff muscles on examination
F. Decreased range of motion
G. Pain with overhead activity

X. Bicipital tendonitis (biceps tendonitis)[11-13] with incomplete resolution after conservative medical management consisting of treatment with anti-inflammatory medication and physical therapy for at least 4 weeks or findings worsening during trial of conservative management (MRI without contrast)

A. Findings on exam [One of the following]
    1. Tenderness over the bicipital groove on examination
    2. Positive Yergason's test
    3. Positive Speed's test
    4. Pain increases with flexion of the shoulder against resistance
    5. Pain with overhead activity

XI. Muscle tear (MRI without contrast)

A. Symptoms [One of the following]

1. Pain and swelling over the muscle
2. Bruising over the muscle
3. Bulge
4. Defect in the muscle

XII. Biceps tendon tear[11-13] with incomplete resolution after at least 4 weeks of conservative medical management consisting of anti-inflammatory medication and physical therapy or worsening of symptoms during trial of conservative management (MRI without contrast)

A. Symptoms [One of the following]
   1. Sudden sharp pain in the upper arm
   2. Pop or snap can be heard
   3. Cramping of upper arm over the biceps with use of the arm
   4. Bruising of the upper arm
   5. Pain or tenderness
   6. Weakness of the shoulder or elbow on examination
   7. Difficulty with pronation and/or supination
   8. Bulge in the upper arm
   9. Defect over the muscle

XIII. Rotator cuff impingement syndrome[1,2,14] or shoulder bursitis with or without an x-ray showing either an acromial spur, calcification of the coracoacromial ligament or acromioclavicular arthritis and incomplete resolution after at least 4 weeks of physical therapy and anti-inflammatory medication or symptoms worsening while on conservative management (MRI without contrast) [One of the following]

A. Symptoms
   1. Shoulder pain increased by overhead movements
   2. Pain interfering with sleep when lying on the affected side
   3. Positive Hawkins' test

XIV. Soft tissue mass including soft tissue sarcoma with negative x-ray (MRI without and with contrast) [One of the following][15-19]

A. Prominent calcifications on plain film
B. Soft tissue sarcoma of the extremity [One of the following]
   1. Initial staging of primary site
   2. Post operative imaging after primary therapy for any stage tumor
   3. Surveillance for local recurrence in an asymptomatic individual as clinically appropriate up to 10 years
   4. Suspicion of local recurrence
C. Suspected ganglion cyst with negative ultrasound, pain and a palpable lump that is solid on transillumination or does not respond to aspiration

XV. Child abuse

XVI. Suspected or known osteomyelitis with bone pain (MRI without and with contrast)[20-25] [One of the following]
- A. Clinical and laboratory findings [One of the following]
  1. Aural temperature >38.3°C or 100.9°F
  2. Leukocytosis, WBC >11,500/cu.mm
  3. Blood culture positive
  4. X-ray suggestive of osteomyelitis
  5. ESR >22mm/hr
  6. C-reactive protein >10 mg/ml
- B. History of diabetes, dialysis or peripheral vascular disease
- C. History of penetrating injury or surgery near the involved bone
- D. Sinus tract, poor wound or fracture healing
- E. Preoperative evaluation of known osteomyelitis
- F. Positive probe to bone test
- G. Post treatment evaluation
- H. Suspicion of infected prosthesis (nuclear studies)
- I. Chronic wound overlying surgical hardware
- J. Chronic wound overlying a fracture
- K. Exposed bone

XVII. Arthritis and synovitis with either inadequate response to current treatment or to monitor response to treatment with known rheumatoid or psoriatic arthritis or gout or ankylosing spondylitis (MRI without and with contrast)[26-29]

XVIII. Primary or metastatic bone tumor of the upper extremity – known or suspected[30-32] – An x-ray is required prior to imaging a suspected bone tumor; if the x-ray is definitely benign and the lesion is not an osteoid osteoma clinically or radiographically no further imaging is required [One of the following]
- A. X-ray or CT results [One of the following] and suspected (not known) bone tumor
  1. Negative or does not explain the regional symptoms (MRI without contrast)
  2. Suspicious for osteoid osteoma clinically or radiographically (CT)
  3. Indeterminate for malignancy (MRI without and with contrast)
  4. Aggressive appearance on x-ray (MRI without and with contrast)
  5. Pathologic fracture; not definitely benign (MRI without and with contrast)
  6. Incidental finding on prior CT that is not definitely benign (MRI without and with contrast)
- B. Osteosarcoma of the upper extremity [One of the following]
  1. Initial staging of primary site
  2. For high grade osteosarcoma of the upper extremity after preoperative chemotherapy
  3. Restaging after completion of treatment
  4. Follow-up after treatment [One of the following]
     a. Every 3 months for 2 years
     b. Every 4 months for the third year
     c. Every 6 months for the next 2 years (fourth and fifth)
     d. Annually after 5 years

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C. Ewing's sarcoma of the upper extremity [One of the following]
   1. Initial staging of primary site
   2. Restage primary site after completion of primary treatment (usually chemotherapy)
   3. Follow up after treatment [One of the following]
      a. Every 2 months for 2 years
      b. Every 4 months for the third year
      c. Every 6 months for years 4 and 5
      d. Annually after year 5

D. Chondrosarcoma of the upper extremity [One of the following]
   1. Initial staging of primary site
   2. Restaging after completion of treatment
   3. Low grade and intracompartmental [One of the following]
      a. Every 6-12 months for 2 years
      b. Annually after 2 years as appropriate
   4. High grade (grade II, grade III or clear cell or extracompartmental)
      a. Imaging as clinically indicated

E. Chordoma of the upper extremity [One of the following]
   1. Initial staging of primary site
   2. Restaging after completion of treatment
   3. Conventional or chondroid chordoma
      a. Imaging of primary site as clinically indicated

F. Giant cell tumor of the bone in the upper extremity [One of the following]
   1. Initial staging of primary site
   2. Restaging after completion of treatment
   3. Following completion of therapy image primary site as clinically indicated

G. Osteoid osteoma with negative CT [One of the following]
   1. Clinical [One of the following]
      a. Bone pain worse at night which is relieved by aspirin
      b. Pain increases with activity
   2. Known diagnosis and planning for surgery
   3. Known diagnosis and planning for radiofrequency ablation
   4. Known diagnosis and post intervention evaluation to establish a new baseline

H. Known primary malignancy other than bone [One of the following]
   1. Bone pain in the shoulder with known malignancy and non diagnostic bone scan
   2. Known bone metastases with pathologic fracture in the shoulder
   3. Elevated alkaline phosphatase (>140 IU/L) with known malignancy and non diagnostic bone scan
   4. Positive bone scan in the shoulder with no pain

XIX. Brachial plexus (MRI without and with contrast)[33,34] [One of the following]

A. Brachial plexus injury [Both of the following]
   1. Symptoms [One of the following]
      a. Weakness or paralysis of the upper extremity
      b. Sensory loss or numbness of the upper extremity
      c. Horner's syndrome
      d. Shoulder and/or arm pain
      e. Burning or electric sensation in more than one nerve distribution

f. Loss of deep tendon reflexes in the upper extremity
g. EMG showing a neurogenic lesion in muscles supplied by at least 2 cervical levels

2. History [One of the following]
a. Trauma including birth trauma motor vehicle accident, falls, sports injuries, gunshot injury, overuse of back packs
b. Radiation fibrosis
c. History of radiation therapy to the chest, breast or axilla

B. Primary or metastatic tumor [Both of the following]
1. Symptoms [One of the following]
a. Weakness or paralysis of the upper extremity
b. Sensory loss or numbness of the upper extremity
c. Horner's syndrome
d. Shoulder and/or arm pain
e. Burning or electric sensation in more than one nerve distribution
f. Loss of deep tendon reflexes in the upper extremity
g. EMG showing a neurogenic lesion in muscles supplied by at least 2 cervical levels
2. History [One of the following]
a. Known primary tumor
b. Lung cancer especially a Pancoast tumor
c. Lymphoma

C. Schwannoma or neurofibroma
1. Symptoms [One of the following]
a. Palpable mass in the lower neck or supraclavicular fossa
b. Weakness or paralysis of the upper extremity
c. Sensory loss or numbness in the upper extremity
d. Horner's syndrome
e. Shoulder and/or arm pain
f. Burning or electric sensation in more than one nerve distribution
g. Loss of deep tendon reflexes in the upper extremity
h. EMG showing a neurogenic lesion in muscles supplied by at least 2 cervical levels

D. Entrapment
1. Symptoms [One of the following]
a. Pain and paresthesia along the ulna aspect of the forearm, hand and 4th and 5th fingers
b. Symptoms increase with overhead activities

XX. Septic joint with arthrocentesis contraindicated or not diagnostic [All of the following] (Ultrasound or x-ray guided arthrocentesis is the procedure of choice. MRI without and with contrast.)[1,35]

A. Symptoms [One of the following]
1. Decreased range of motion
2. Acute development of a hot swollen joint (<2 weeks)

B. Laboratory tests [One of the following]
1. Aural temperature >38.3°C or >100.9°F
2. Leukocytosis >11,500/cu mm
3. ESR >22mm/hr

4. CRP >10 mg/ml

XXI. Soft tissue abscess with negative ultrasound and tender or warm or erythematous area (MRI without and with contrast) [One of the following]

A. Aural temperature >38.3°C or >100.9°F
B. Leukocytosis >11,500/cu mm
C. ESR >22mm/hr
D. CRP >10 mg/ml

XXII. Arteriovenous malformation or venous malformation[36-39] [One of the following]

A. Hypertrophy of soft tissues of the extremity
B. Limb length discrepancy
C. History of Klippel-Trenaunay syndrome of variant
D. History of Osler-Weber-Rendu syndrome
E. History of Parkes Weber syndrome
F. Hemorrhage into a limb
G. Pulsating soft tissue mass [One of the following]
    1. Thrill
    2. Bruit
H. Port-wine stain
I. Dilated veins

XXIII. MR arthrogram (with gadolinium) for suspected labral tear or SLAP lesion or Bankart lesion[1,8-10] [One of the following]

A. Pain interferes with the smooth functioning of the shoulder
B. Discomfort on forced external rotation at 90 degrees of abduction
C. A “pop” or “click” on forced external rotation
D. Discomfort on forced horizontal adduction of the shoulder
E. Weakness in the rotator cuff muscles on examination
F. Decreased range of motion
G. Pain with overhead activity
H. Prior rotator cuff repair and recurrent symptoms

XXIV. Osteochondral defect or osteochondritis dessicans[40,41] [One of the following]

A. Positive x-ray for osteochondral defect to stage for stability
B. Catching, or stiffness or locking or instability with negative x-ray
C. Chronic joint pain after trauma despite appropriate treatment and a negative x-ray
D. Effusion or crepitus or tenderness with negative x-ray

References:

1. Wise JN, Daffner RH, Weissman BN, et al. Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Acute Shoulder Pain. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteShoulderPain.pdf.
2. Burbank K, Stevenson JH, Czarnecki GR, et al. Chronic Shoulder Pain: Part I. Evaluation and Diagnosis, Am Fam Physician, 2008; 77:453-460.
3. Ewald A. Adhesive Capsulitis: A Review, Am Fam Physician, 2011; 83:417-422
4. Seeger LL, Daffner RH, Weissman BN, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Avascular Necrosis (Osteonecrosis) of the Hip. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AvascularNecrosisOsteonecrosisHip.pdf.
5. Berger PE, Ofstein RA, Jackson DW, et al. MRI demonstration of radiographically occult fractures: what have we been missing, RadioGraphics, 1989; 9:407-436.
6. Daffner RH, Weissman BN, Appel M, et al. Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Stress (Fatigue/Insufficiency) Fracture, Including Sacrum, Excluding Other Vertebrae. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/StressFatigueInsufficiencyFractureIncludingSacrumExcludingOtherVertebrae.pdf.
7. Pedowitz RA, Yamaguchi K, Ahmad CS, et al. Optimizing the management of rotator cuff problems guideline and evidence report, American Academy of Orthopaedic Surgeons. http://www.aaos.org/research/guidelines/RCP_guideline.pdf.
8. Edwards SL, Lee JA, Bell JE, et al. Nonoperative treatment of superior labrum anterior posterior tears, Am J Sports Med, 2101; 38:1456-1461.
9. Walsworth MK, Doukas WC, Murphy KP, et al. Reliability and diagnostic accuracy of history and physical examination for diagnosing glenoid labral tears, Am J Sports Med, 2008; 36:162-168.
10. Modarresi S, Motamedi D, Jude CM. Superior labral anteroposterior lesions of the shoulder: Part 2, mechanisms and classification, AJR, 2011; 197:604-611.
11. Durham BA, Chambers R. Bicipital tendonitis, Emedicine. http://emedicine.medscape.com/article/96521-overview.
12. Simons SM, Dixon JB. Biceps tendinopathy and tendon rupture. UpToDate online 17.2. http://www.uptodate.com/contents/biceps-tendinopathy-and-tendon-rupture?source=search_result&selectedTitle=1%7E150.
13. AAOS OrthoInfo, Biceps Tendon Tear at the Shoulder. http://orthoinfo.aaos.org/topic.cfm?topic=a00031.
14. Fongemie AE, Buss DD, Rolnick SJ. Management of Shoulder Impingement Syndrome and Rotator Cuff Tears, Am Fam Physician, 1998; 57:667-674.
15. Fitzgerald JJ, Roberts CC, Daffner RH, et al. Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Follow-up of Malignant or Aggressive Musculoskeletal Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/FollowupMalignantOrAggressiveMusculoskeletalTumors.pdf.
16. Blacksin MF, Ha DH, Hameed M, et al. Superficial soft-tissue masses of the extremities, RadioGraphics,2006;26:1289-1304.
17. Zoga AC, Weissman BN, Kransdorf MJ, et al. Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Soft Tissue Masses. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SoftTissueMasses.pdf.
18. Knapp EL, Kransdorf MJ, Letson GD. Diagnostic Imaging Update: Soft Tissue Sarcomas, MD, Authors and Disclosures, Posted: 02/09/2005; Cancer Control. 2005; 12(1):22-26. http://www.moffittcancernetwork.org/CCJRoot/v12n1/pdf/22.pdf.
19. Von Mehren M, Randall RL, Benjamin RS, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Soft Tissue Sarcoma. http://www.nccn.org/professionals/physician_gls/pdf/sarcoma.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Soft Tissue Sarcoma V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
20. Karchevsky M, Schweitzer ME, Morrison WB, et al. MRI findings of septic arthritis and associated osteomyelitis in adults, AJR, 2004; 182:119-122.
21. Unger E, Moldofsky P, Gatenby R, et al. Diagnosis of osteomyelitis by MR imaging, AJR, 1988; 150:605-610.
22. British Society for Children's Orthopaedic Surgery. The management of acute bone and joint infection in childhood A guide to good practice. http://bscos.org.uk/resources/Downloads/childrensinfection_1.pdf.
23. Lazzarini L, Mader JT, Calhoun JH. Osteomyelitis in long bones, J Bone Joint Surg Am, 2004:86:2305-2318.
24. Erdman WA, Tamburro F, Jayson HT, et al. Osteomyelitis: characteristics and pitfalls of diagnosis with MR imaging, Radiology, 1991; 180:533-539.
25. Dangman BC, Hoffer FA, Rand FF, et al. Osteomyelitis in Children: gadolinium-enhanced MR imaging, Radiology, 1992; 182:743-747.
26. Boutry N, Morel M, Flipo R-M, et al. Early rheumatoid arthritis: a review of MRI and sonographic findings, AJR, 2007; 189:1502-1509.
27. Ostergaard M, Edmonds J, McQueen RF, et al. An introduction to the EUKAR-OMERACT rheumatoid arthritis MRI reference image atlas, Ann Rheum Dis, 2005; 64(Suppl I):i3-i7.
28. Hodgson RJ, O'Connor P, Moots R. MRI of rheumatoid arthritis-image Quantitation for the assessment of disease activity, progression and response to therapy, Rheumatology, 2008; 47:13-21.
29. Ostergaard M, Hansen M, Stoltenberg M, et al. New radiographic bone erosions in the wrists of patients with rheumatoid arthritis are detectable with magnetic resonance imaging a median of two years earlier, Arthritis & Rheumatism, 2003; 48:2128-2131.

30. Morrison WB, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Primary Bone Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PrimaryBoneTumors.pdf.
31. Roberts CC, Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Metastatic Bone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/MetastaticBoneDisease.pdf.
32. Biermann JS, Chow W, Adkins DR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Bone Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bone.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bone Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
33. Wippold FJ II, Cornelius RS, Aiken AH, et al, Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Plexopathy. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Plexopathy.pdf.
34. Bromberg MB. Brachial plexus syndromes, UpToDate. http://www.uptodate.com/contents/brachial-plexus-syndromes.
35. Coakley G, Mathews C, Field M, et al. BSR& BHPR, BOA, RCGP and BSAC guidelines for management of the hot swollen joints in adults, Rheumatology, 2006; 45:1039-1041. http://rheumatology.oxfordjournals.org/content/45/8/1039.full.pdf+html.
36. Lee BB, Laredo J, Lee SJ, et al. Congenital vascular malformations: general diagnostic principles, Phlebology, 2007; 22:253-257.
37. Triponis V. Diagnosis and treatment of predominantly venous congenital vascular malformations in the extremities: a survey of 50 cases, Lithuanian Surgery, 2005; 3:184-191.
38. Cohen JM, Weinreb JC, Redman HC. Arteriovenous malformation of the extremities: MR Imaging, RAd, 1986; 158:475-479.
39. Rak KM, Yakes WF, Ray RL, et al. MR Imaging of symptomatic peripheral vascular malformations, AJR, 1992; 159:107-112.
40. Hixon AL and Gibbs LM, Osteochondritis Dissecans: A diagnosis not to miss, Am Fam Physician, 2000; 61:151-156.
41. Luchs JS, Flug JA, Weissman BN, Expert Panel on Musculoskeletal Imaging: American College of Radiology Appropriateness Criteria, Chronic Ankle Pain https://acsearch.acr.org/list.

73221, 73222, 73223 MRI Upper Extremity Joint: Shoulder

Clinical criteria reviewed/revised: 7/28/14, 4/8/14, 10/18/13, 9/23/13, 7/9/13, 7/17/12, 9/12/11, 11/17/10, 11/18/09
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73221 MRI Upper Extremity Joint without Gadolinium: Wrist and Hand
73222 MRI Upper Extremity Joint with Gadolinium: Wrist and Hand
73223 MRI Upper Extremity Joint with and without Gadolinium: Wrist and Hand

See also: Shoulder; Elbow

I. Chronic joint pain (6 months or more) etiology unknown with a negative x-ray (MRI without contrast)[1,2]
   A. Incomplete resolution with conservative medical management [One of the following]
      1. Continued pain after treatment with anti-inflammatory medication and physical therapy for at least 4 weeks
      2. Symptoms worsening while under treatment

II. Suspected intra-articular loose body (MRI without contrast) [One of the following]
   A. Joint pain
   B. Locking
   C. Clicking

III. Suspected or known avascular necrosis with wrist or hand pain (osteonecrosis, AVN including Kienböck's disease) with pain and recent x-ray which may be either negative or non-diagnostic or diagnostic of AVN but additional information is needed to determine management[1,3] [One risk factor and one selection from physical finding or clarification of findings on other imaging]
   A. Risk factors and pain [One of the following]
      1. Steroid use
      2. Sickle cell disease
      3. Excessive alcohol use
      4. HIV infection
      5. SLE
      6. Renal transplant
      7. Trauma [One of the following]
         a. Fracture
         b. Dislocation
      8. Coagulopathy
      9. Bisphosphonate use
      10. Smoking
      11. Gaucher's disease
      12. Pancreatitis

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B. Physical findings [One of the following]
   1. Catching
   2. Locking
   3. Clicking
   4. Grinding
   5. Crepitus
   6. Stiffness
   7. Tenderness
   8. Flexion contractures
C. Clarification of findings on recent x-ray

IV. Suspected injury of wrist ligaments and cartilage including the triangular fibrocartilage complex (TFCC)[3-8] with wrist pain and incomplete resolution with conservative medical management consisting of treatment with anti-inflammatory medication and physical therapy and immobilization for at least 4 weeks or findings worsening while in treatment (MRI without contrast)
A. Physical findings [One of the following]
   1. Clicking
   2. Swelling
   3. Bruising
   4. Decreased grip strength
   5. Pain with movement
   6. Pain or tenderness on palpation

V. Suspected fracture with negative x-ray and pain (MRI without contrast)[3,9,10] [One of the following]
A. Suspicion of fracture of distal radius
   1. Casting and negative x-ray 10-14 days after injury (There may be a negative x-ray at the time of injury)
B. Suspected acute fracture of the navicular or scaphoid with negative x-ray at time of injury
C. Suspected occult fracture of the navicular or scaphoid with a negative initial x-ray and pain or tenderness over the anatomic "snuff box" and no improvement after 10-14 days of casting and repeat x-ray at 10-14 days after injury
D. Comminuted, intra-articular fracture of the distal radius on x-ray for surgical planning
E. All other suspected, occult or insufficiency fractures of the hand and wrist (including the distal ulna, and radius, carpal bones, metacarpals, and phalanges) with negative x-rays 10-14 days after the initial x-ray (The need for a repeat x-ray is waived if the first film is taken 10-14 days after the injury or onset of pain)
F. Child abuse

VI. Evaluation of intrinsic muscles of the hand[11] (MRI without contrast) [One of the following]
A. Atrophy of any hand muscles
B. Motor and sensory deficits of the hand unexplained by PE and EMG

VII. Gamekeeper injury (thumb metacarpal phalangeal collateral ligament injury)[4] with negative or non diagnostic x-rays including abduction stress views of the thumb

VIII. Soft tissue mass including soft tissue sarcoma [One of the following][12-16]
- A. Prominent calcifications on plain film
- B. Soft tissue sarcoma of the extremity [One of the following]
  1. Initial staging of primary site
  2. Post operative imaging after primary therapy for any stage tumor
  3. Surveillance for local recurrence in an asymptomatic individual as clinically appropriate up to 10 years [One of the following]
  4. Suspicion of local recurrence
- C. Suspected ganglion cyst with negative ultrasound, pain and a palpable lump that is solid on transillumination or does not respond to aspiration

IX. Child abuse

X. Suspected or known osteomyelitis with bone pain (MRI without and with contrast)[17-24] [One of the following]
- A. Clinical and laboratory findings [One of the following]
  1. Aural temperature >38.3°C or 100.9°F
  2. Leukocytosis, WBC >11,500/cu.mm
  3. Blood culture positive
  4. X-ray suggestive of osteomyelitis
  5. ESR >22mm/hr
  6. C-reactive protein >10 mg/ml
- B. History of diabetes, dialysis or peripheral vascular disease
- C. History of penetrating injury or surgery near the involved bone
- D. Sinus tract, poor wound or fracture healing
- E. Preoperative evaluation of osteomyelitis
- F. Positive probe to bone test
- G. Post treatment evaluation
- H. Suspicion of infected prosthesis (nuclear studies)
- I. Chronic wound overlying surgical hardware
- J. Chronic wound overlying a fracture
- K. Exposed bone

XI. Arthritis and synovitis with either inadequate response to current treatment or to monitor response to treatment with known rheumatoid or psoriatic arthritis, gout or ankylosing spondylitis (MRI without and with contrast)[25-28]

XII. Primary or metastatic bone tumor of the upper extremity – known or suspected[29-31] – An x-ray is required prior to imaging a suspected bone tumor; if the x-ray is definitely benign and the lesion is not an osteoid osteoma clinically or radiographically no further imaging is required [One of the following]

A. X-ray or CT results [One of the following] and suspected (not known) bone tumor
   1. Negative or does not explain the regional symptoms (MRI without contrast)
   2. Suspicious for osteoid osteoma clinically or radiographically (CT)
   3. Indeterminate for malignancy (MRI without and with contrast)
   4. Aggressive appearance on x-ray (MRI without and with contrast)
   5. Pathologic fracture; not definitely benign (MRI without and with contrast)
   6. Incidental finding on prior CT that is not definitely benign (MRI without and with contrast)

B. Osteosarcoma of the upper extremity [One of the following]
   1. Initial staging of primary site
   2. For high grade osteosarcoma of the upper extremity after preoperative chemotherapy
   3. Restaging after completion of treatment
   4. Follow-up after treatment [One of the following]
      a. Every 3 months for 2 years
      b. Every 4 months for the third year
      c. Every 6 months for the next 2 years (fourth and fifth)
      d. Annually after 5 years

C. Ewing's sarcoma of the upper extremity [One of the following]
   1. Initial staging of primary site
   2. Restage primary site after completion of primary treatment (usually chemotherapy
   3. Follow-up after treatment [One of the following]
      a. Every 2 months for 2 years
      b. Every 4 months for the third year
      c. Every 6 months for years 4 and 5
      d. Annually after year 5

D. Chondrosarcoma of the upper extremity [One of the following]
   1. Initial staging of primary site
   2. Restaging after completion of treatment
   3. Low grade and intracompartmental [One of the following]
      a. Every 6-12 months for 2 years
      b. Annually after 2 years as appropriate
   4. High grade (grade II, grade III or clear cell or extracompartmental)
      a. Imaging as clinically indicated

E. Chordoma of the upper extremity [One of the following]
   1. Initial staging of primary site
   2. Restaging after completion of treatment
   3. Conventional or chondroid chordoma
      a. Imaging of primary site as clinically indicated

F. Giant cell tumor of the bone in the upper extremity [One of the following]
   1. Initial staging of primary site
   2. Restaging after completion of treatment
   3. Following completion of therapy image primary site as clinically indicated

G. Osteoid osteoma with negative CT [One of the following]
   1. Clinical [One of the following]
      a. Bone pain worse at night which is relieved by aspirin
      b. Pain increases with activity
   2. Known diagnosis and planning for surgery
   3. Known diagnosis and planning for radiofrequency ablation
   4. Known diagnosis and post intervention evaluation to establish a new baseline

H. Known primary malignancy other than bone [One of the following]
   1. Bone pain in the wrist and hand with known malignancy and non diagnostic bone scan
   2. Known bone metastases with pathologic fracture in the wrist and hand
   3. Elevated alkaline phosphatase (>140 IU/L) with known malignancy and non diagnostic bone scan
   4. Positive bone scan in the wrist or hand with no pain

XIII. MR arthrogram with a history of injury and pain in the wrist and a recent x-ray that does not explain the symptoms[5-7] (with contrast) [One of the following]
   A. Suspected or known TFCC ligament injury with pain and no response to at least 4 weeks of conservative management as described in IV above and [One of the following]
      1. Clicking during wrist movements
      2. Decreased grip strength
      3. Pain or tenderness over the TFCC with palpation
      4. Positive ulnar carpal sag test
   B. Suspicion of scapholunate ligament disruption
   C. Suspicion of lunotriquetral ligament disruption
   D. Loose body

XIV. Septic joint with arthrocentesis contraindicated or not diagnostic [All of the following] (Ultrasound or x-ray guided arthrocentesis is the procedure of choice. MRI without and with contrast.)[32]
   A. Symptoms [One of the following]
      1. Decreased range of motion
      2. Acute development of a hot swollen joint (<2 weeks)
   B. Laboratory tests [One of the following]
      1. Aural temperature >38.3°C or 100.9°F
      2. Leukocytosis >11,500/cu mm
      3. ESR >22mm/hr
      4. CRP >10mg/ml

XV. Soft tissue abscess with negative ultrasound and tender or warm or erythematous area (MRI without and with contrast) [One of the following]
   A. Aural temperature >38.3°C or 100.9°F
   B. Leukocytosis >11,500/cu mm
   C. ESR >22mm/hr
   D. CRP >10 mg/ml

XVI. Osteochondral defect or osteochondritis dessicans[33,34] [One of the following]

A. Positive x-ray for osteochondral defect to stage for stability
B. Catching, or stiffness or locking or instability with negative x-ray
C. Chronic joint pain after trauma despite appropriate treatment and a negative x-ray
D. Effusion or crepitus or tenderness with negative x-ray

References:

1. Rubin DA, Weissman BN, Appel M, et al. Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Chronic Wrist Pain http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ChronicWristPain.pdf.
2. Palmer T, Toombs JD. Managing joint pain in primary care, J Am Board Fam Pract, 2004; 17:S32-S42.
3. McAlinden PS. The J. Imaging of the wrist, Imaging, 2003; 15:180-192.
4. Bruno MA, Weissman BN, Kransdorf MJ, et al. Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Acute Hand and Wrist Trauma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteHandAndWristTrauma.pdf.
5. Haims AH, Moore AE, Schweitzer ME, et al. MRI in the diagnosis of cartilage injury in the wrist, AJR, 2004; 182:1267-1270.
6. Medical Disability Advisor. Triangular fibro cartilage complex TFCC tears. http://www.mdguidelines.com/triangular-fibrocartilage-complex-tfcc-tears.
7. Triangular Fibrocartilage Complex, Wheeless' Textbook of Orthopaedics. Duke Orthopaedics.http://www.wheelessonline.com/ortho/triangular_fibrocartilage_complex.
8. Ahn AK, Chang D, Plate A-M. Triangular fibro cartilage tears, Bulletin of the NYU Hospital for Joint Disease, 2006; 64:114-118.
9. Phillips TG, Reibach AM, Slomiany WP. Diagnosis and Management of Scaphoid Fractures, American Family Physician, 2004; 70: 869-884. http://www.aafp.org/afp/2004/0901/p879.pdf.
10. Brydie A, Raby N. Early MRI in the management of clinical scaphoid fracture, BJR, 2003; 76:296-300.
11. Andreisek G, Kilgus M, Burg D, et al. MRI of the intrinsic muscles of the hand: spectrum of imaging findings and clinical correlation, AJR, 2005; 185:930-939.
12. Fitzgerald JJ, Roberts CC, Daffner RH, et al. Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Follow-up of Malignant or Aggressive Musculoskeletal Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/FollowupMalignantOrAggressiveMusculoskeletalTumors.pdf.
13. Blacksin MF, Ha DH, Hameed M, et al. Superficial soft-tissue masses of the extremities, RadioGraphics, 2006;26:1289-1304.
14. Zoga AC, Weissman BN, Kransdorf MJ, et al. Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Soft Tissue Masses. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SoftTissueMasses.pdf.
15. Knapp EL; Kransdorf MJ; Letson GD. Diagnostic Imaging Update: Soft Tissue Sarcomas. http://www.moffittcancernetwork.org/CCJRoot/v12n1/pdf/22.pdf.
16. Von Mehren M, Randall RL, Benjamin RS, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Soft Tissue Sarcoma. http://www.nccn.org/professionals/physician_gls/pdf/sarcoma.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Soft Tissue Sarcoma V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
17. Karchevsky M, Schweitzer ME, Morrison WB, et al. MRI findings of septic arthritis and associated osteomyelitis in adults, AJR, 2004; 182:119-122.
18. Unger E, Moldofsky P, Gatenby R, et al. Diagnosis of osteomyelitis by MR imaging, AJR, 1988; 150:605-610.
19. British Society for Children's Orthopaedic Surgery, The management of acute bone and joint infection in childhood: A guide to good practice. http://bscos.org.uk/resources/Downloads/childrensinfection_1.pdf.
20. Lazzarini L, Mader JT, Calhoun JH. Osteomyelitis in long bones, J Bone Joint Surg Am, 2004:86:2305-2318.
21. Erdman WA., Tamburro F, Jayson HT, et al. Osteomyelitis: characteristics and pitfalls of diagnosis with MR imaging, Radiology, 1991; 180:533-539.
22. Dangman BC, Hoffer FA, Rand FF, et al. Osteomyelitis in Children: gadolinium-enhanced MR imaging, Radiology, 1992; 182:743-747.
23. Kan JH, Hilmes MA, Yu C, et al. Value of MRI after recent diagnostic or surgical intervention in children with suspected osteomyelitis, AJR.
24. Kapoor A, Page S, LaValley M, et al. Magnetic resonance imaging for diagnosing for osteomyelitis, A Meta-analysis, Arch Intern Med, 2007; 167:125-132.
25. Boutry N, Morel M, Flipo R-M, et al. Early rheumatoid arthritis: a review of MRI and sonographic findings, AJR, 2007; 189:1502-1509.
26. Ostergaard M, Edmonds J, McQueen RF, et al. An introduction to the EUKAR-OMERACT rheumatoid arthritis MRI reference image atlas, Ann Rheum Dis, 2005; 64(Suppl I):i3-i7.
27. Hodgson RJ, O'Connor P, Moots R. MRI of rheumatoid arthritis-image quantitation for the assessment of disease activity, progression and response to therapy, Rheumatology, 2008; 47:13-21.
28. Ostegaard M, Hansen M, Stoltenberg M, et al. New radiographic bone erosions in the wrists of patients with rheumatoid arthritis are detectable with magnetic resonance imaging a median of two years earlier, Arthritis & Rheumatism, 2003; 48:2128-2131.

29. Morrison WB, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Primary Bone Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PrimaryBoneTumors.pdf.
30. Roberts CC, Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Metastatic Bone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/MetastaticBoneDisease.pdf.
31. Biermann JS, Chow W, Adkins DR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Bone Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bone.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bone Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
32. Coakley G, Mathews C, Field M, et al. BSR& BHPR, BOA, RCGP and BSAC guidelines for management of the hot swollen joints in adults, Rheumatology, 2006; 45:1039-1041. http://rheumatology.oxfordjournals.org/content/45/8/1039.full.pdf+html.
33. Hixon AL and Gibbs LM, Osteochondritis Dissecans: A diagnosis not to miss, Am Fam Physician, 2000; 61:151-156.
Luchs JS, Flug JA, Weissman BN, Expert Panel on Musculoskeletal Imaging: American College of Radiology Appropriateness Criteria, Chronic Ankle Pain http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ChronicAnklePain.pdf.

73221, 73222, 73223 MRI Upper Extremity Joint: Wrist and Hand

Clinical criteria reviewed/revised: 7/28/14, 9/23/13, 7/9/13, 7/15/12, 9/12/11, 11/17/10, 5/26/10, 11/18/09
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73221 MRI Upper Extremity Joint without Gadolinium: Elbow
73222 MRI Upper Extremity Joint with Gadolinium: Elbow
73223 MRI Upper Extremity Joint without and with Gadolinium: Elbow

See also: Shoulder; Wrist and Hand

I. Chronic joint pain (more than 6 months) with negative x-ray[1,2] (MRI without contrast)
   A. Incomplete resolution after conservative medical management [One of the following]
      1. Continued pain after treatment with anti-inflammatory medication and physical therapy for at least 4 weeks
      2. Symptoms worsening while under treatment

II. Suspected intra-articular loose body with recent x-ray (MRI without contrast or MR arthrogram) [One of the following][1]
   A. Joint pain
   B. Locking
   C. Clicking

III. Suspected or known avascular necrosis (osteonecrosis, AVN) with pain and recent x-ray which may be either negative or non-diagnostic or diagnostic of AVN but additional information is needed to determine management[3] [(One risk factor and one selection from physical findings) or C or D]
   A. Risk factors and pain [One of the following]
      1. Steroid use
      2. Sickle cell disease
      3. Excessive alcohol use
      4. HIV infection
      5. SLE
      6. Renal transplant
      7. Trauma with fracture or dislocation
      8. Coagulopathy
      9. Bisphosphonate use
      10. Smoking
      11. Pancreatitis
      12. Gaucher's disease
   B. Physical findings [One of the following]
      1. Catching
      2. Locking
      3. Clicking
      4. Grinding

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5. Crepitus
6. Stiffness
7. Tenderness over the capitulum
8. Flexion contractures

C. Osteochondritis dessicans of the capitellum
1. Pain localized to the lateral side of the elbow which is relieved by rest and not associated with night time symptoms
2. Loss of motion
3. Locking
4. Catching
5. Loss of extension of the elbow

D. Clarification of findings on recent x-ray

IV. Suspected fracture with negative x-ray (MRI without contrast)[1,4,5] [One of the following]

A. Negative x-ray 10-14 days after the onset of pain (if this is the only x-ray, then the need for the initial x-ray is waived)
B. Child abuse
C. Bone scan positive but not specific for fracture
D. Osteoporosis on bone density or long term steroid use

V. Injuries to the elbow[1,2,6-9] (MRI without contrast)

A. Ulnar collateral ligament (medial) at the elbow with pain medially and negative x-rays
1. Symptoms [One of the following]
a. Tenderness over the medial aspect of the elbow
b. Loss of range of motion
c. Bruising
d. Pain reproduced with a clenched fist
e. Valgus instability

B. Radial collateral ligament injury at the elbow (lateral) with pain laterally and negative x-rays [One of the following]
1. Tenderness over the lateral aspect of the elbow
2. Varus instability
3. Positive chair raise test

C. Ulnar nerve injury or entrapment with medial elbow pain [One of the following]
1. Distal paresthesias of the forearm and 4th and 5th fingers
2. Weak grip
3. Hand fatigue
4. Clumsiness of the hand(s)
5. Positive Tinel's sign over the medial epicondyle
6. Atrophy of the hypothenar eminence
7. Index finger pinch weakness

D. Biceps or triceps tendon tear with a negative x-ray [One of the following]
1. Swelling in the front of the elbow
2. Bruising near the elbow and in the forearm
3. Weakness of the biceps muscle on examination

4. Bulge in the upper arm
5. Defect in the muscle near the elbow

VI. Soft tissue mass including soft tissue sarcoma with negative x-ray[10-15] (MRI without and with contrast) [One of the following]

A. Prominent calcifications on plain film
B. Soft tissue sarcoma of the extremity [One of the following]
   1. Initial staging of primary site
   2. Post operative imaging after primary therapy for any stage tumor
   3. Surveillance for local recurrence in an asymptomatic individual as clinically appropriate up to 10 years
   4. Suspicion of local recurrence
C. Suspected ganglion cyst with negative ultrasound, pain and a palpable lump that is solid on transillumination or does not respond to aspiration

VII. Tendinitis, tendinopathy or tendinosis (MRI without contrast)[1,2,16] [One of the following]

A. Lateral epicondylitis or tennis elbow (imaging is rarely required) with negative x-ray, pain along the lateral elbow which increases with activity and decreases with rest [Both of the following]
   1. No improvement with at least 6 weeks of anti-inflammatory medication and home exercise program
   2. No improvement with formal physical therapy program
B. Medial epicondylitis or golfer's elbow with pain on the medial side of the elbow and either decreased grip strength or pain with resisted flexion of the wrist, a negative x-ray and no improvement after at least 4 weeks of anti-inflammatory medication, activity modification or rest, ice and physical therapy
C. Bicipital or biceps tendonitis near the elbow with incomplete resolution after conservative medical management consisting of treatment with anti-inflammatory medication and physical therapy for at least 4 weeks or findings worsening during trial of conservative management [One of the following]
   1. Symptoms near the elbow with pain anterior to the elbow
      a. Weakness of the elbow on flexion
      b. Tenderness over the distal biceps tendon
      c. Flexion contractures may be present in advanced disease (inability to fully extend the elbow)
D. Triceps tendinosis or tendinopathy with tenderness/pain over the triceps tendon posterior to the elbow, a negative x-ray and no improvement after anti-inflammatory medication and physical therapy for at least 4 weeks
E. Olecranon impingement with clicking or locking of the elbow at terminal extension with either a normal x-ray or one that shows osteophytes or loose bodies

VIII. Ulnar nerve entrapment with medial elbow pain and negative x-rays (MRI without contrast)[15] [One of the following]

A. Distal paresthesias of the forearm and 4th and 5th fingers
B. Weak grip

C. Hand fatigue
D. Clumsiness of the hand(s)
E. Positive Tinel's sign over the medial epicondyle
F. Atrophy of the hypothenar eminence
G. Index finger pinch weakness

IX. Child abuse

X. Suspected or known osteomyelitis with bone pain[17-24] (MRI without and with contrast) [One of the following]
A. Clinical and laboratory findings [One of the following]
1. Aural temperature >38.3°C or >100.9°F
2. Leukocytosis, WBC >11,500/cu.mm
3. Blood culture positive
4. X-ray suggestive of osteomyelitis
5. ESR >22mm/hr
6. C-reactive protein >10 mg/ml
B. History of diabetes, dialysis or peripheral vascular disease
C. History of penetrating injury or surgery near the involved bone
D. Sinus tract, poor wound or fracture healing
E. Preoperative evaluation of osteomyelitis
F. Positive probe to bone test
G. Post treatment evaluation
H. Suspicion of infected prosthesis (nuclear studies)
I. Chronic wound overlying surgical hardware
J. Chronic wound overlying a fracture
K. Exposed bone

XI. Arthritis and synovitis with either inadequate response to current treatment or to monitor response to treatment with known rheumatoid or gout or psoriatic arthritis or ankylosing spondylitis[25-28]

XII. Primary or metastatic bone tumor of the upper extremity – known or suspected[29-31] – An x-ray is required prior to imaging a suspected bone tumor; if the x-ray is definitely benign and the lesion is not an osteoid osteoma clinically or radiographically no further imaging is required [One of the following]
A. X-ray or CT results [One of the following] and suspected (not known) bone tumor
1. Negative or does not explain the regional symptoms (MRI without contrast)
2. Suspicious for osteoid osteoma clinically or radiographically (CT)
3. Indeterminate for malignancy (MRI without and with contrast)
4. Aggressive appearance on x-ray (MRI without and with contrast)
5. Pathologic fracture; not definitely benign (MRI without and with contrast)
6. Incidental finding on prior CT that is not definitely benign (MRI without and with contrast)
B. Osteosarcoma of the upper extremity [One of the following]

1. Initial staging of primary site
2. For high grade osteosarcoma of the upper extremity after preoperative chemotherapy
3. Restaging after completion of treatment
4. Follow-up after treatment [One of the following]
    a. Every 3 months for 2 years
    b. Every 4 months for the third year
    c. Every 6 months for the next 2 years (fourth and fifth)
    d. Annually after 5 years

C. Ewing's sarcoma of the upper extremity [One of the following]
1. Initial staging of primary site
2. Restage primary site after completion of primary treatment (usually chemotherapy)
3. Follow up after treatment [One of the following]
    a. Every 2 months for 2 years
    b. Every 4 months for the third year
    c. Every 6 months for years 4 and 5
    d. Annually after year 5

D. Chondrosarcoma of the upper extremity [One of the following]
1. Initial staging of primary site
2. Restaging after completion of treatment
3. Low grade and intracompartmental [One of the following]
    a. Every 6-12 months for 2 years
    b. Annually after 2 years as appropriate
4. High grade (grade II, grade III or clear cell or extracompartmental)
    a. Imaging as clinically indicated

E. Chordoma of the upper extremity [One of the following]
1. Initial staging of primary site
2. Restaging after completion of treatment
3. Conventional or chondroid chordoma
    a. Imaging of primary site as clinically indicated

F. Giant cell tumor of the bone in the upper extremity [One of the following]
1. Initial staging of primary site
2. Restaging after completion of treatment
3. Following completion of therapy image primary site as clinically indicated

G. Osteoid osteoma with negative CT [One of the following]
1. Clinical [One of the following]
    a. Bone pain worse at night which is relieved by aspirin
    b. Pain increases with activity
2. Known diagnosis and planning for surgery
3. Known diagnosis and planning for radiofrequency ablation
4. Known diagnosis and post intervention evaluation to establish a new baseline

H. Known primary malignancy other than bone [One of the following]
1. Bone pain in the elbow with known malignancy and non diagnostic bone scan
2. Known bone metastases with pathologic fracture in the elbow
3. Elevated alkaline phosphatase (>140 IU/L) with known malignancy and non diagnostic bone scan
4. Positive bone scan in the elbow with no pain

XIII. MR arthrogram (MRI with contrast) and non diagnostic x-ray[1] [One of the following]
- A. Suspected loose body (either MR arthrogram or MRI without contrast but not both)
- B. Unstable osteochondral (OCD) injury (either MR arthrogram or MRI wit out contrast but not both)

XIV. Septic joint with arthrocentesis contraindicated or not diagnostic[32] (MRI without and with contrast) (Ultrasound or x-ray guided arthrocentesis is the procedure of choice) [All of the following]
- A. Symptoms [One of the following]
  1. Decreased range of motion
  2. Acute development of a hot swollen joint (< 2 weeks)
- B. Laboratory tests [One of the following]
  1. Aural temperature > 38.3°C or > 100.9°F
  2. Leukocytosis > 11,500/cu mm
  3. ESR > 22mm/hr
  4. CRP > 10 mg/ml

XV. Soft tissue abscess with negative ultrasound and tender or warm or erythematous area [One of the following]
- A. Aural temperature > 38.3°C or > 100.9°F
- B. Leukocytosis > 11,500/cu mm
- C. ESR > 22mm/hr
- D. CRP > 10 mg/ml

XVI. Osteochondral defect or osteochondritis dessicans[17,25] [One of the following]
- A. Positive x-ray for osteochondral defect to stage for stability
- B. Catching, or stiffness or locking or instability with negative x-ray
- C. Chronic joint pain after trauma despite appropriate treatment and a negative x-ray
- D. Effusion or crepitus or tenderness with negative x-ray

References:

1. Hayes CW, Daffner RH, Weissman BN, et al, Expert Panel on Musculoskeletal Imaging, American College of Radiology Appropriateness Criteria – Chronic Elbow Pain. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ChronicElbowPain.pdf.
2. Chumbley EM, O'Connor FG, Nirschl RP. Evaluation of overuse elbow injuries, Am Fam Physician, 2000; 6:1691-700. http://www.aafp.org/afp/20000201/691.html.
3. Baker CL III, Romeo AA, Baker CL Jr. Osteochondritis dissecans of the capitellum, American Journal of Sports Medicine, 2010; 38:1917-1928.
4. Berger PE, Ofstein RA, Jackson DW, et al. MRI demonstration of radiographically occult fractures: what have we been missing? RadioGraphics 1989; 9: 407-436.
5. Daffner RH, Pavlov H. Stress fractures: current concepts, AJR, 1992; 159:245-252.
6. Mackay D, Rangan A, Hide G, et al. The objective diagnosis of early tennis elbow by magnetic resonance imaging, Occupational Medicine, 2003; 53:309-312.
7. Langer P, Fadale P, Hulstyn M. Evolution of the treatment options of ulnar collateral ligament injuries of the elbow, Br J Sports Med, 2006; 40:499-506.
8. Driscoll SWM, Lawton RL, Smith AM. The moving valgus stress test for medial collateral ligament tears of the elbow, Am J Sports Med, 2005; 33:231-239.
9. Lee ML, Rosenwasser MP. Chronic elbow instability, Orthopedic Clin N Amer, 1999; 30:81-89.
10. Blacksin MF, Ha DH, Hameed M, et al. Superficial soft-tissue masses of the extremities, RadioGraphics,2006;26:1289-1304.

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11. Zoga AC, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Soft Tissue Masses. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SoftTissueMasses.pdf.
12. Knapp EL, Kransdorf MJ, Letson D. Diagnostic Imaging Update: Soft tissue sarcomas, Cancer Control, 2005; 12:22-26. http://www.medscape.com/viewarticle/498749.
13. Fitzgerald JJ, Roberts CC, Daffner RH, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Follow-up of Malignant or Aggressive Musculoskeletal Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/FollowupMalignantOrAggressiveMusculoskeletalTumors.pdf.
14. Von Mehren M, Randall RL, Benjamin RS, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Soft Tissue Sarcoma. http://www.nccn.org/professionals/physician_gls/pdf/sarcoma.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Soft Tissue Sarcoma V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
15. British Society for Surgery of the Hand, Evidence for surgical Treatment 1 Wrist ganglion. http://www.bssh.ac.uk/education/guidelines/ganglion.pdf.
16. Steele M, Norvell JG. Tendonitis. http://emedicine.medscape.com/article/809692-overview.
17. Karchevsky M, Schweitzer ME, Morrison WB, et al. MRI findings of septic arthritis and associated osteomyelitis in adults, AJR, 2004; 182:119-122.
18. Unger E, Moldofsky P, Gatenby R, et al. Diagnosis of osteomyelitis by MR imaging, AJR, 1988; 150:605-610.
19. British Society for Children's Orthopaedic Surgery. The management of acute bone and joint infection in childhood: A guide to good practice. http://bscos.org.uk/resources/Downloads/childrensinfection_1.pdf.
20. Lazzarini L, Mader JT, Calhoun JH. Osteomyelitis in long bones, J Bone Joint Surg Am, 2004:86:2305-2318.
21. Erdman WA, Tamburro F, Jayson HT, et al. Osteomyelitis: characteristics and pitfalls of diagnosis with MR imaging, Radiology, 1991; 180:533-539.
22. Dangman BC, Hoffer FA, Rand FF, et al. Osteomyelitis in Children: gadolinium-enhanced MR imaging, Radiology, 1992; 182:743-747.
23. Kan JH, Hilmes MA, Yu C, et al. Value of MRI after recent diagnostic or surgical intervention in children with suspected osteomyelitis, AJR.
24. Kapoor A, Page S, LaValley M, et al. Magnetic resonance imaging for diagnosing for osteomyelitis, A Meta-analysis, Arch Intern Med, 2007; 167:125-132.
25. Boutry N, Morel M, Flipo R-M, et al. Early rheumatoid arthritis: a review of MRI and sonographic findings, AJR, 2007; 189:1502-1509.
26. Ostergaard M, Edmonds J, McQueen RF, et al. An introduction to the EUKAR-OMERACT rheumatoid arthritis MRI reference image atlas, Ann Rheum Dis, 2005; 64(Suppl I):i3-i7.
27. Hodgson RJ, O'Connor P, Moots R, MRI of rheumatoid arthritis-image quantitation for the assessment of disease activity, progression and response to therapy, Rheumatology, 2008; 47:13-21.
28. Ostegaard M, Hansen M, Stoltenberg M, et al. New radiographic bone erosions in the wrists of patients with rheumatoid arthritis are detectable with magnetic resonance imaging a median of two years earlier, Arthritis & Rheumatism, 2003; 48:2128-2131.
29. Morrison WB, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Primary Bone Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PrimaryBoneTumors.pdf.
30. Roberts CC, Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Metastatic Bone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/MetastaticBoneDisease.pdf.
31. Biermann JS, Chow W, Adkins DR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Bone Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bone.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bone Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
32. Coakley G, Mathews C, Field M, et al. BSR& BHPR, BOA, RCGP and BSAC guidelines for management of the hot swollen joints in adults, Rheumatology, 2006; 45:1039-1041. http://rheumatology.oxfordjournals.org/content/45/8/1039.full.pdf+html.
33. Hixon AL and Gibbs LM, Osteochondritis Dissecans: A diagnosis not to miss, Am Fam Physician, 2000; 61:151-156.
34. Luchs JS, Flug JA, Weissman BN, Expert Panel on Musculoskeletal Imaging: American College of Radiology Appropriateness Criteria, Chronic Ankle Pain. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ChronicAnklePain.pdf.

73221, 73222, 73223 MRI Upper Extremity Joint Elbow

Clinical criteria reviewed/revised: 7/25/14, 9/23/13, 7/9/13 7/18/12, 5/17/12, 9/8/11, 11/17/10, 12/09, 1/21/09
Medical Advisory Committee reviewed and approved: 9/17/14, 9/18/13, 6/12/13, 9/19/12, 6/27/12, 9/21/11

73225 MRA of the Upper Extremity

I. Suspected occlusion, stenosis[1] [One of the following]

A. Abnormal pulses: asymmetric, weak or absent
B. Skin changes: poor capillary filling, cyanosis
C. Abnormal Doppler ultrasound
D. Reconstruction surgery planning
E. Thoracic outlet syndrome [One of the following]
    1. Cold extremity or digits
    2. Pallor
    3. Decreased pulses
    4. Decreased blood pressure in one arm
    5. Change in pulse or blood pressure with change in position of arm or head (positive Adson's maneuver or Allen test)
F. Effort thrombosis
    1. Swelling of the upper extremity, face or neck
    2. Cyanosis of the upper extremity, face or neck
    3. Evidence of collateral veins
G. Arteritis (Takayasu's arteritis, giant cell arteritis) [One of the following]
    1. ESR >22mm/hr
    2. Positive ANA
    3. Positive RF or rheumatoid factor
H. Scleroderma
I. Hypercoagulable state [One of the following]
    1. Antiphospholipid antibodies
    2. Behçet's syndrome
    3. Protein C deficiency
    4. Protein S deficiency
    5. Factor V Leiden deficiency
    6. Lupus anticoagulant
    7. Hyperactive platelet syndrome
    8. MRHFR
    9. Anti-cardiolipin antibodies
    10. Elevated homocysteine level
    11. Anti B2 glycoprotein antibodies
    12. Elevated fibrinogen
    13. PTT abnormal
    14. Antithrombin III antibodies
    15. Oral contraceptive use
    16. Hormone replacement
    17. Sickle cell anemia
J. Buerger's disease (thromboangiitis obliterans) [Both of the following]
    1. History of smoking
    2. Loss of pulses or decreased pulses in the upper extremity

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II. Aneurysm[1]
- A. Pulsatile mass by palpation or imaging

III. Venous aneurysm with negative ultrasound
- A. Asymptomatic peripheral mass

IV. Arteriovenous malformation or venous malformation[2-5] [One of the following]
- A. Hypertrophy of soft tissues of the extremity
- B. Limb length discrepancy
- C. History of Klippel-Trenaunay syndrome of variant
- D. History of Osler-Weber-Rendu syndrome
- E. History of Parkes-Weber syndrome
- F. Hemorrhage into a limb
- G. Pulsating soft tissue mass [One of the following]
  1. Thrill
  2. Bruit
- H. Port-wine stain
- I. Dilated veins

V. Upper extremity venous thrombosis[6]
- A. Duplex venous ultrasound including compression is equivocal

References:

1. Stepansky F, Hecht EM, Rivera R, et al. Dynamic MR angiography of upper extremity vascular disease: pictorial review, Radiographics, 2008; 28-e28 published online October 29, 2007. http://radiographics.rsna.org/content/28/1/e28.full..
2. Lee BB, Laredo J, Lee SJ, et al. Congenital vascular malformations: general diagnostic principles, Phlebology, 2007; 22:253-257.
3. Triponis V. Diagnosis and treatment of predominantly venous congenital vascular malformations in the extremities: a survey of 50 cases, Lithuanian Surgery, 2005; 3:184-191.
4. Cohen JM, Weinreb JC, Redman HC. Arteriovenous malformation of the extremities: MR Imaging, Rad, 1986; 158:475-479.
5. Rak KM, Yakes WF, Ray RL, et al. MR Imaging of symptomatic peripheral vascular malformations, AJR, 1992; 159:107-112.
6. Desjardins B, Rybicki FJ, Kim HS, et al, Expert Panel on Vascular Imaging. American College of Radiology Appropriateness Criteria – Suspected Upper Extremity Deep Vein Thrombosis. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SuspectedUpperExtremityDeepVeinThrombosis.pdf.

73225 MRA of the Upper Extremity

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73700 CT of the Lower Extremity without Contrast
73701 CT of the Lower Extremity with Contrast
73702 CT of the Lower Extremity without and with Contrast

I. Suspected nonunion of known fracture[1] – Fracture should be at least 9 months old and show no radiographic progression of healing for 3 months

II. Suspected tarsal coalition with negative or non-diagnostic x-ray and pain which is relieved by rest[2] [One of the following]

A. Painful rigid flatfoot

III. Primary or metastatic bone tumor of the lower extremity – known or suspected[3,4] – An x-ray is required prior to imaging a suspected bone tumor; if the x-ray is definitely benign and the lesion is not an osteoid osteoma clinically or radiographically no further imaging is required [One of the following]

A. X-ray or CT results [One of the following] and suspected (not known) bone tumor
   1. Negative or does not explain the regional symptoms (MRI without contrast)
   2. Suspicious for osteoid osteoma clinically or radiographically (CT)
   3. Indeterminate for malignancy (MRI without and with contrast)
   4. Aggressive appearance on x-ray (MRI without and with contrast)
   5. Pathologic fracture; not definitely benign (MRI without and with contrast)
   6. Incidental finding on prior CT that is not definitely benign (MRI without and with contrast)

B. Osteosarcoma of the lower extremity (MRI) [One of the following]
   1. Initial staging of primary site
   2. For high grade osteosarcoma of the lower extremity after preoperative chemotherapy
   3. Restaging after completion of treatment
   4. Follow up after treatment [One of the following]
      a. Every 3 months for 2 years
      b. Every 4 months for the third year
      c. Every 6 months for the next 2 years (fourth and fifth)
      d. Annually after 5 years

C. Ewing's sarcoma of the lower extremity (MRI) [One of the following]
   1. Initial staging of primary site
   2. Restage primary site after completion of primary treatment (usually chemotherapy)
   3. Follow up after treatment [One of the following]
      a. Every 2 months for 2 years
      b. Every 4 months for the third year
      c. Every 6 months for years 4 and 5
      d. Annually after year 5

D. Chondrosarcoma of the lower extremity (MRI) [One of the following]
   1. Initial staging of primary site
   2. Restaging after completion of treatment
   3. Low grade and intracompartmental [One of the following]

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a. Every 6-12 months for 2 years
b. Annually after 2 years as appropriate

4. High grade (grade II, grade III or clear cell or extracompartmental)
   a. Imaging as clinically indicated

E. Chordoma of the lower extremity (MRI) [One of the following]
   1. Initial staging of primary site
   2. Restaging after completion of treatment
   3. Conventional or chondroid chordoma
      a. Imaging of primary site as clinically indicated
F. Giant cell tumor of the bone in the lower extremity (MRI) [One of the following]
   1. Initial staging of primary site
   2. Restaging after completion of treatment
   3. Following completion of therapy image primary site as clinically indicated
G. Osteoid osteoma with negative CT [One of the following]
   1. Clinical [One of the following]
      a. Bone pain worse at night which is relieved by aspirin
      b. Pain increases with activity
   2. Known diagnosis and planning for surgery
   3. Known diagnosis and planning for radiofrequency ablation
   4. Known diagnosis and post intervention evaluation to establish a new baseline

IV. Soft tissue mass of extremity[5-8] (MRI without and with contrast) [One of the following]

A. Prominent calcifications on plain film if MRI cannot be done
B. Soft tissue sarcoma of the extremity [One of the following]
   1. Initial staging of primary site
   2. Post operative imaging after primary therapy for any stage tumor
   3. Surveillance for local recurrence in an asymptomatic individual as clinically appropriate up to 10 years
   4. Suspicion of local recurrence
C. Suspected ganglion cyst with negative ultrasound, pain and a palpable lump that is solid on transillumination or does not respond to aspiration

V. Joint prosthesis[9] [One of the following]

A. Suspicion of infection with pain [All of the following]
   1. X-rays negative for loosening
   2. Joint aspiration cultures negative for infection
   3. In ^{111} WBC and sulfur colloid scan negative or indeterminate
B. Suspicion of occult fracture, loosening or malposition
   1. Negative x-ray
C. Preoperative planning for joint replacement
D. Positive aspiration for infection

VI. Complex fracture, CT required for therapy planning

VII. Patellofemoral pathology or runner's knee (including patellar tracking disorder) with either negative x-ray or x-ray demonstrating an effusion, degenerative arthritis, or chondrocalcinosis and no improvement with conservative management consisting of physical therapy for at least 6 weeks[10,11] (MRI without contrast) [Both of the following]

This is usually a clinical diagnosis that does not require imaging. X-rays may be required. CT or MRI is rarely necessary.

A. Symptoms and history [One of the following]
    1. Anterior knee pain worsening with activity (e.g., running, standing up from a bent-knee position)
    2. Pain on squatting
    3. History of recurrent patellar dislocations or subluxations
B. Clinical findings [One of the following]
    1. Crepitus
    2. Positive patellar grind test
    3. Pain on palpation of the medial and/or lateral patellar
    4. Positive J sign (patella displaces laterally at full knee extension)
    5. Positive patellar tilt test

VIII. Suspected avascular necrosis (osteonecrosis)[12-14] and MRI is contraindicated and bone scan cannot be performed or is not planned (MRI) [Risk factor and symptoms]

A. Risk factor and pain [One of the following]
    1. Excessive alcohol use
    2. HIV infection
    3. SLE
    4. History of steroid use
    5. Sickle cell disease
    6. Renal transplant
    7. Bisphosphonate use
    8. Coagulopathy
    9. Smoking
B. Hip with non diagnostic x-ray
    1. Pain in the groin or buttocks
    2. Pain increasing with ambulation
    3. Pain with internal rotation
    4. Limited range of motion
C. Knee
    1. Positive x-ray with need for additional characterization of the lesion prior to intervention and non diagnostic x-ray
        a. Pain and/or swelling
        b. Catching or locking or giving way
D. Ankle [Both of the following] (CT arthrogram)
    1. Non-diagnostic x-ray
    2. Pain [One of the following]

a. Swelling
b. Stiffness
c. Weakness
d. Symptoms exacerbated by prolonged standing
e. Joint effusion
f. Instability

IX. Preoperative planning of joint replacement

X. Hip pain[15] [One of the following]
A. Gait abnormality
B. Impaired range of motion
C. Locking or snapping

XI. Ankle impingement syndrome[16] (MR arthrogram; if CT is performed it should be CT arthrogram)

XII. Lisfranc injury or fracture and MRI cannot be done and x-rays are normal or indeterminate[17] (MRI) [One of the following]
A. Acute injury of the foot
B. Pain, swelling and inability to bear weight

XIII. Femoroacetabular impingement syndrome or hip impingement and an x-ray[18-20] [One of the following]
A. Symptoms [One of the following]
1. Pain with prolonged sitting
2. Difficulty getting in and out of a car
3. Pain reproduced by flexion or adduction or internal rotation of the hip when supine.
4. Complaints of anterolateral hip pain
5. Positive FADIR test (flexion-adduction-internal rotation)
B. Radiographic findings suggestive of impingement such as cam lesion or pincer lesion

XIV. Subtalar dislocation[21]

XV. CT arthrogram with x-rays showing a Segond fracture[14]

XVI. Tibial plateau fracture on x-ray[22,23] [One of the following]
A. Focal tenderness
B. Effusion
C. Inability to bear weight

XVII. Osteochondral defect or osteochondritis dessicans[18, 24][One of the following]
A. Positive x-ray for osteochondral defect to stage for stability
B. Catching, or stiffness or locking or instability with negative x-ray
C. Chronic joint pain after trauma despite appropriate treatment and a negative x-ray
D. Effusion or crepitus or tenderness with negative x-ray

References:

1. Schoelles D, Snyder D, Kaczmarek J, et al. The role of bone growth stimulating devices and orthobiologics in healing nonunion fractures, AHRQ Technology Assessment Program. http://www.cms.gov/Medicare/Coverage/DeterminationProcess/downloads/id29TA.pdf.

2. Wise JN, Daffner RH, Weissman BN, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Chronic Foot Pain. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ChronicFootPain.pdf.
3. Morrison WB, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Primary Bone Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PrimaryBoneTumors.pdf.
4. Biermann JS, Chow W, Adkins DR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Bone Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bone.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bone Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
5. Blacksin MF, Ha DH, Hameed M, et al. Superficial soft-tissue masses of the extremities, Radio Graphics, 2006; 26:1289-1304.
6. Zoga AC, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Soft Tissue Masses. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SoftTissueMasses.pdf.
7. Von Mehren M, Randall RL, Benjamin RS, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Soft Tissue Sarcoma. http://www.nccn.org/professionals/physician_gls/pdf/sarcoma.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Soft Tissue Sarcoma V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
8. Fitzgerald JJ, Roberts CC, Daffner RH, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Follow-up of Malignant or Aggressive Musculoskeletal Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/FollowupMalignantOrAggressiveMusculoskeletalTumors.pdf.
9. Weissman BN, Shah N, Daffner RH, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Imaging After Total Knee Arthroplasty. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ImagingAfterTotalKneeArthroplasty.pdf.
10. Dupuy DE, Hangen DH, Zachazewski JE, et al. Kinematic CT of at the patellofemoral joint, AJR, 1997; 169:211-215.
11. Dixit S, DiFiori JP, Burton M, et al. Management of patellofemoral pain syndrome Am Fam Physician, 2007; 75:194-202. http://www.aafp.org/afp/2007/0115/p194.html.
12. Chambers HG, Shea KG, Anderson AF, et al. The diagnosis and treatment of osteochondritis dissecans work group, The diagnosis and treatment of osteochondritis dissecans guideline and evidence report adopted by the American Academy of Orthopedic Surgeons. http://www.aaos.org/research/guidelines/OCD_guideline.pdf.
13. Seeger LL, Daffner RH, Weissman BN, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Avascular Necrosis (Osteonecrosis) of the Hip. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AvascularNecrosisOsteonecrosisHip.pdf.
14. Bennett DL, Nelson JW, Weissman BN, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Non Traumatic Knee Pain. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/NontraumaticKneePain.pdf.
15. Taljanovic MS, Daffner RH, Weissman BN, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Chronic Hip Pain. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ChronicHipPain.pdf.
16. Luchs JS, Flug JA, Weissman BN, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Chronic Ankle Pain. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ChronicAnklePain.pdf.
17. Bennett DL, Daffner RH, Weissman BN, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Acute Trauma to the Foot. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteTraumaFoot.pdf.
18. Banerjee P, McLean CR. Femoroacetabular impingement: a review of diagnosis and management, Curr Rev Musculoskelet Med, 2011; 4:23-32. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3070009/.
19. Kubiak-Langer M, Tannast M, Murphy SB, et al. Range of motion in anterior femoroacetabular impingement, Clin Orthoped and Related Res, 2007; 458:117-124.
20. Beaule PE, Zaragoza E, Motamedi K, et al. Three-dimensional computed tomography of the hip in the assessment of femoroacetabular impingement, J Orthoped Res, 2005; 23:1286-92.
21. McStay CM. Foot Dislocation Workup, Medscape reference. http://emedicine.medscape.com/article/823168-workup#a0720.
22. Tuite MJ, Daffner RH, Weissman BN, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Acute Trauma to the Knee. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteTraumaKnee.pdf.
23. Hixon AL and Gibbs LM, Osteochondritis Dissecans: A diagnosis not to miss, Am Fam Physician, 2000; 61:151-156.
24. Luchs JS, Flug JA, Weissman BN, Expert Panel on Musculoskeletal Imaging: American College of Radiology Appropriateness Criteria, Chronic Ankle Pain. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ChronicAnklePain.pdf.

73700, 73701, 73702 CT of the Lower Extremity

Clinical criteria reviewed/revised: 8/22/14, 9/26/13, 9/10/13, 7/8/13, 7/31/12, 9/2/11, 11/17/10, 1/20/10
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73706 CTA of the Lower Extremity

For aortobifemoral or aortobiiliac runoff study use CPT code 75635.

I. Peripheral vascular disease (PVD, occlusion or stenosis of arteries or bypass grafts of the leg) with abnormal ankle brachial index as defined in A and another one of the following[1-4]

A. ABI (ankle brachial index, ankle systolic BP divided by brachial systolic BP)
   1. Rest ABI <0.90 in symptomatic member
   2. Exercise ABI <0.90 in symptomatic member with rest ABI >0.90
   3. Toe brachial index <0.90 or pulse volume recording evidence of peripheral vascular disease if the ABI >1.30

B. Abnormal pulses

C. Bruit

D. Claudication

E. Diabetic with:
   1. Skin changes
   2. Loss of hair
   3. Poor capillary refill
   4. Thickened nails
   5. Thin skin

F. Arteritis (Takayasu's arteritis, giant cell arteritis) [One of the following]
   1. ESR >22mm/hr
   2. Positive ANA
   3. Positive RF or rheumatoid factor

G. Scleroderma

H. Hypercoagulable state [One of the following]
   1. Antiphospholipid antibodies
   2. Behçet's syndrome
   3. Protein C deficiency
   4. Protein S deficiency
   5. Factor V Leiden deficiency
   6. Lupus anticoagulant
   7. Hyperactive platelet syndrome
   8. MRHFR
   9. Anticardiolipin antibodies
   10. Elevated homocysteine level
   11. Anti B2 glycoprotein antibodies
   12. Elevated fibrinogen
   13. PTT abnormal
   14. Antithrombin III antibodies
   15. Oral contraceptive use
   16. Hormone replacement

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17. Sickle cell anemia

I. Buerger's disease (thromboangiitis obliterans) [Both of the following]
   1. History of smoking
   2. Loss of pulses or decreased pulses in the lower extremity

J. Infrainguinal graft with pain and/or swelling and/or loss of pulse and/or non healing ulcer
   1. ABI (ankle brachial index, ankle systolic BP divided by brachial systolic BP) (catheter angiography) [One of the following]
      a. Rest ABI <0.90 in symptomatic member
      b. Exercise ABI <0.90 in symptomatic member with rest ABI >0.90
      c. Toe brachial index <0.90 or pulse volume recording evidence of peripheral vascular disease if the ABI >1.30

II. Femoral or popliteal artery aneurysm[1]

A. Pulsatile mass

III. Trauma (popliteal)[1]

A. Diminished peripheral pulses
B. Suspected pseudoaneurysm

IV. Fibular transfer graft[5,6]

V. Venous aneurysm [One of the following]

A. Doppler US not diagnostic
B. Asymptomatic peripheral mass

VI. Arteriovenous malformation

VII. Venous malformation

VIII. Deep venous thrombosis

A. Equivocal duplex venous ultrasound including compression

References:

1. Rubin G, Schmidt AJ, Logan LJ, et al. Multi-detector row CT angiography of lower extremity arterial inflow and runoff: initial experience, Radiology, 2001; 221:146-158.
2. Rooke TW, Hirsch AT, Misra S, et al. 2011 ACC/AHA update of the guideline for the management of patients with peripheral arterial disease (updating the 2005 guideline). http://content.onlinejacc.org/article.aspx?articleid=1146931.
3. Dill KE, Rybicki FJ, Desjardins B, et al, Expert Panel on Vascular Imaging. American College of Radiology ACR Appropriateness Criteria – Claudication–Suspected Vascular Etiology. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ClaudicationSuspectedVascularEtiology.pdf. .
4. Koss SA, Yucel EK, Rybicki FJ, et al, Expert Panel on Vascular Imaging. American College of Radiology ACR Appropriateness Criteria – Follow-up of Lower-Extremity Arterial Bypass Surgery. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/FollowUpLowerExtremityArterialBypassSurgery.pdf.
5. Winslow CP, Wax MK. Tissue transfer, fibula. http://www.emedicine.com/ent/topic661.htm.
6. Chow LC, Napoli A, Klein M, et al. Vascular mapping of the leg with multi-detector row CT angiography prior to free-flap transplantation, Radiology, 2005; 237:353-360.

73706 CTA of the Lower Extremity

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73718 MRI of the Lower Extremity Other than Joints without Contrast
73719 MRI of the Lower Extremity Other than Joints with Contrast
73720 MRI of the Lower Extremity Other than Joints without and with Contrast

I. Suspected fracture (including stress and occult fractures) with pain and a negative or non diagnostic x-ray[1-3] (MRI without contrast) [One of the following]
   A. Repeat x-ray 10-14 days after onset of symptoms which is negative or non diagnostic (The first x-ray may be waived if the only x-ray study is taken 10-14 days after the onset of symptoms)
   B. Bone scan positive but not specific for fracture
   C. Osteoporosis on bone density or long term steroid use with sacral pain (insufficiency fracture of the sacrum) [Both of the following]
      1. Negative x-ray
      2. Negative bone scan
   D. Stress or insufficiency fracture of the hip
      1. Normal x-ray

II. Suspected soft tissue injury with negative or non diagnostic x-rays[4-9] (MRI without contrast) [One of the following]
   A. Anterior cruciate ligament injury or tear [One of the following]
      1. Rapid onset of an effusion which may be bloody
      2. Instability of the knee
      3. Positive anterior drawer sign
      4. Positive Lachman's sign
      5. Positive pivot shift test
   B. Posterior cruciate ligament injury or tear with incomplete resolution after a trial of immobilization and physical therapy for at least 4 weeks [One of the following]
      1. Absent tibial step off (tibia should protrude 1 cm beyond femur at 90 degrees of flexion) or positive posterior tibial sag sign (Godfrey test)
      2. Positive posterior drawer sign
      3. Rapid onset of swelling
      4. Positive reverse pivot shift test
   C. Quadriceps tendon tear or rupture with negative or non diagnostic x-ray [One of the following]
      1. Acute knee pain and swelling
      2. Difficulty ambulating
      3. Bruising
      4. Palpable defect in the suprapatellar area
      5. Low lying patella
      6. Limited extension
   D. Hamstring muscle injury
      1. Sudden pain in the back of the thigh

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2. Swelling
3. Bruising
4. Weakness

E. Achilles tendon tear or rupture with negative or non diagnostic x-ray and an equivocal ultrasound [Both of the following]
   1. Symptoms [One of the following]
      a. Posterior heel pain proximal to tendon insertion
      b. Thickening of the tendon
      c. Nodularity of the tendon
      d. Tenderness
      e. Stiffness on weight bearing after prolonged immobility
   2. Findings on examination [One of the following]
      a. Decreased plantar flexor strength
      b. Limited ability to perform repetitive heel raises
      c. Positive arc sign
      d. Positive Thompson test or Simmonds squeeze test
      e. Palpable gap in the tendon

F. Peroneal tendon syndromes with incomplete resolution with NSAIDS (if not contraindicated) for at least 4 weeks and a non diagnostic x-ray (Only one MRI is required to image the entire peroneal tendon) [One of the following]
   1. Tendinitis [One of the following]
      a. Pain and swelling behind and distal to the lateral malleolus
      b. Ankle pain with active eversion and dorsiflexion against resistance
   2. Peroneal tendon subluxation [One of the following]
      a. Snapping along the lateral ankle
      b. Pain along the lateral ankle
      c. Pain with toe walking
      d. Pain and swelling over the posterior lateral ankle
   3. Peroneal tendon tear [One of the following]
      a. Acute injury with pain and swelling inferior and posterior to lateral malleolus
      b. Chronic injury increasing pain inferior and posterior to the lateral malleolus
   4. Ankle sprains with incomplete resolution after conservative management for at least 4 weeks NSAIDS (if not contraindicated)
      a. Physical examination [One of the following]
         i. Swelling and/or bruising
         ii. Tenderness
         iii. Difficulty bearing weight

G. Muscle injury
   1. Defect palpable
   2. Pain on movement with palpable muscle swelling

III. Achilles tendinopathy or tendonitis with incomplete resolution after 6 months of conservative management to consist of anti-inflammatory medication usually NSAIDS and an equivocal ultrasound[6,7] [One of the following]

A. Pain or tenderness proximal to the insertion to the calcaneus
B. Crepitation

IV. Patella tendinopathy [Both of the following]
- A. Symptoms [One of the following]
  1. Pain during activity
  2. Swelling
  3. Thickening of the tendon
  4. Crepitus
  5. Tenderness
- B. Incomplete resolution with at least 3 months of conservative therapy [All of the following]
  1. Activity modification for at least 3 months
  2. Ice
  3. NSAIDS for at least 3 months

V. Suspected tarsal coalition with pain over the site and non diagnostic CT scan[10,11] (MRI without contrast) [One of the following]
- A. Painful rigid flatfoot

VI. Plantar fasciitis[10,12-14] with pain and incomplete resolution after conservative management for at least 6 weeks consisting of stretching exercises, activity modification and NSAIDS or other anti-inflammatory medications unless contraindicated and negative weight bearing x-rays of the foot and heel (MRI without contrast) [One of the following]
- A. Pronated foot
- B. Localized swelling or atrophy of the infracalcaneal heel pad

VII. Os trigonum syndrome with incomplete resolution after a combination of physical therapy and steroid injections[15-17] (MRI without contrast) [All of the following]
- A. X-ray of the ankle that is negative
- B. Symptoms
  1. Pain posterior ankle which may be exacerbated by plantar or dorsiflexion
  2. Swelling posterior ankle
- C. Clinical examination
  1. Tenderness anterior to the Achilles tendon and posterior to the talus
  2. May have a palpable soft tissue thickening
- D. Conservative therapy [Both of the following]
  1. Failure to respond to physical therapy
  2. Failure to respond to steroid injections

VIII. Arteriovenous malformation or venous malformation[18-21] [One of the following]
- A. Hypertrophy of soft tissues of the extremity
- B. Limb length discrepancy
- C. History of Klippel-Trenaunay syndrome of variant
- D. History of Osler-Weber-Rendu syndrome
- E. History of Parkes Weber syndrome
- F. Hemorrhage into a limb

G. Pulsating soft tissue mass [One of the following]
   1. Thrill
   2. Bruit
H. Port-wine stain
I. Dilated veins
   1. Must have negative duplex Doppler evaluation for venous insufficiency

IX. Morton's neuroma with an non diagnostic ultrasound and forefoot pain that radiates to the toes and incomplete resolution with conservative management consisting of shoe modification or orthotics, anti-inflammatory medication or local injection of steroids and/or local anesthetics[10,22] (MRI without and with contrast) [One of the following]
   A. Mulder's sign or click
   B. Pain persists after a series of steroid injections

X. Soft tissue mass including soft tissue sarcoma[23-26](MRI without and with contrast) [One of the following]
   A. Prominent calcifications on plain film if MRI cannot be done
   B. Soft tissue sarcoma of the extremity [One of the following]
      1. Initial staging of primary site
      2. Post operative imaging after primary therapy for any stage tumor
      3. Surveillance for local recurrence in an asymptomatic individual as clinically appropriate up to 10 years
      4. Suspicion of local recurrence
   C. Suspected ganglion cyst with negative ultrasound, pain and a palpable lump that is solid on transillumination or does not respond to aspiration

XI. Tarsal tunnel syndrome, posterior tibial nerve compression with negative x-rays[10,27] [All of the following]
   A. Clinical findings [One of the following]
      1. Aching, burning or tingling, numbness of the sole of the foot, toes or heel
      2. Positive Tinel's sign posterior to medial malleolus
      3. Positive dorsiflexion-eversion test
   B. Incomplete resolution conservative management [(1 and 2) and (3 or 4)]
      1. Rest and non weight bearing
      2. Continued pain after treatment with anti-inflammatory medication for at least 4 weeks unless contraindicated
      3. Injections
      4. Pain worsening during treatment

XII. Child abuse

XIII. Suspected or known osteomyelitis with bone pain[28-32] (MRI with and without contrast) [One of the following]
   A. Clinical and laboratory findings [One of the following]

1. ESR >22 mm/hr
2. Temperature >38.3°C or 100.9°F
3. Leukocytosis, WBC >11,500/cu.mm
4. C-reactive protein >10 mg/ml
5. Blood culture positive
6. X-ray suggestive of osteomyelitis

B. History of diabetes, dialysis or peripheral vascular disease
C. History of penetrating injury or surgery near the involved bone
D. Sinus tract, poor wound or fracture healing
E. Preoperative evaluation of osteomyelitis
F. Positive probe to bone test
G. Post treatment evaluation
H. Suspicion of infected prosthesis (nuclear studies)
I. Chronic wound overlying surgical hardware
J. Chronic wound overlying a fracture
K. Exposed bone

XIV. Primary or metastatic bone tumor of the lower extremity – known or suspected[33-35] – An x-ray is required prior to imaging a suspected bone tumor; if the x-ray is definitely benign and the lesion is not an osteoid osteoma clinically or radiographically no further imaging is required [One of the following]

A. X-ray or CT results [One of the following] and suspected (not known) bone tumor
   1. Negative or does not explain the regional symptoms (MRI without contrast)
   2. Suspicious for osteoid osteoma clinically or radiographically (CT)
   3. Indeterminate for malignancy (MRI without and with contrast)
   4. Aggressive appearance on x-ray (MRI without and with contrast)
   5. Pathologic fracture; not definitely benign (MRI without and with contrast)
   6. Incidental finding on prior CT that is not definitely benign (MRI without and with contrast)

B. Osteosarcoma of the lower extremity (MRI) [One of the following]
   1. Initial staging of primary site
   2. For high grade osteosarcoma of the lower extremity after preoperative chemotherapy
   3. Restaging after completion of treatment
   4. Follow up after treatment [One of the following]
      a. Every 3 months for 2 years
      b. Every 4 months for the third year
      c. Every 6 months for the next 2 years (fourth and fifth)
      d. Annually after 5 years

C. Ewing's sarcoma of the lower extremity [One of the following]
   1. Initial staging of primary site
   2. Restage primary site after completion of primary treatment (usually chemotherapy)
   3. Follow up after treatment [One of the following]
      a. Every 2 months for 2 years
      b. Every 4 months for the third year
      c. Every 6 months for years 4 and 5
      d. Annually after year 5

D. Chondrosarcoma of the lower extremity [One of the following]
   1. Initial staging of primary site
   2. Restaging after completion of treatment
   3. Low grade and intracompartmental [One of the following]
      a. Every 6-12 months for 2 years
      b. Annually after 2 years as appropriate
   4. High grade (grade II, grade III or clear cell or extracompartmental)
      a. Imaging as clinically indicated

E. Chordoma of the lower extremity [One of the following]
   1. Initial staging of primary site
   2. Restaging after completion of treatment
   3. Conventional or chondroid chordoma
      a. Imaging of primary site as clinically indicated

F. Giant cell tumor of the bone in the lower extremity [One of the following]
   1. Initial staging of primary site
   2. Restaging after completion of treatment
   3. Following completion of therapy image primary site as clinically indicated

G. Osteoid osteoma with negative CT [One of the following]
   1. Clinical [One of the following]
      a. Bone pain worse at night which is relieved by aspirin
      b. Pain increases with activity
   2. Known diagnosis and planning for surgery
   3. Known diagnosis and planning for radiofrequency ablation
   4. Known diagnosis and post intervention evaluation to establish a new baseline

H. Known primary malignancy other than bone [One of the following]
   1. Bone pain in the leg with known malignancy and non diagnostic bone scan
   2. Known bone metastases with pathologic fracture in the leg
   3. Positive bone scan in the leg with no pain
   4. Elevated alkaline phosphatase (>140 IU/L) with known malignancy and non diagnostic bone scan

XV. Soft tissue abscess with negative ultrasound and tender or warm or erythematous area (MRI with and without contrast) [One of the following]

A. Aural temperature >38.3°C or >100.9°F
B. Leukocytosis >11,500/cu mm
C. ESR >22mm/hr
D. CRP >10 mg/ml

XVI. Lisfranc injury or fracture and x-rays are normal or indeterminate[4] [One of the following]

A. Acute injury of the foot
B. Pain, swelling and inability to bear weight

XVII. Foreign body with acute injury and penetrating trauma with negative or non-diagnostic x-ray[4]. According to the ACR the next imaging test should be ultrasound of the foot. If the ultrasound and radiographs are negative then MRI without contrast

References:

1. Daffner RH, Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Stress (Fatigue/Insufficiency) Fracture, Including Sacrum, Excluding Other Vertebrae. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/StressFatigueInsufficiencyFractureIncludingSacrumExcludingOtherVertebrae.pdf.
2. Patel DS, Roth M, Kapil N. Stress fractures: diagnosis, treatment, and prevention, Am Fam Physician, 2011; 83:39-46.
3. Ward RJ, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Acute Hip Pain–Suspected Fracture. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteHipPainSuspectedFracture.pdf.
4. Bennett DL, Daffner RH, Weissman BN, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Acute Trauma to the Foot. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteTraumaFoot.pdf.
5. Wilson JJ, Best TM. Common overuse tendon problem: a review and recommendations for treatment, Am Fam Physician, 2005; 72:811-818.
6. Carcia CR, Martin RL, Houck JH, et al. Achilles pain, stiffness and muscle power deficits: Achilles Tendinitis, J Orthop Sports Phys Ther, 2010; 40:A1-A26. http://www.jospt.org/doi/pdf/10.2519/jospt.2010.0305.
7. Sorosky B, Press J, Plastaras C, et al. The practical management of Achilles tendinopathy, Clin J Sport Med, 2004; 14:40-44.
8. Karageanes SJ. Peroneal tendon syndromes treatment and management. http://emedicine.medscape.com/article/91344-treatment.
9. Canadian Paediatric Society. Ankle sprains in the paediatric athlete. http://www.cps.ca/english/statements/HAL/AnkleSprains.htm.
10. Wise JN, Daffner RH, Weissman BN, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Chronic Foot Pain. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ChronicFootPain.pdf.
11. Harris EJ, Vanore JV, Thomas JL, et al. Diagnosis and treatment of pediatric flatfoot, J Foot and Ankle Surg, 2004; 43:341-370.
12. Cole C, Seto C, Gazewood J. Plantar fasciitis: evidence-based review of diagnosis and therapy, Am Fam Physician, 2005; 72:2237-2242.
13. Ostlere S. Imaging the ankle and foot, Imaging, 2003; 15:242-269.
14. Thomas JL, Christensen JC, Kravitz SR, et al. The diagnosis and treatment of heel pain: a clinical practice guideline-revision 2010, Journal of Foot & Ankle Surgery, 2010, 40:329-340.
15. Karasick D, Schweitzer ME. The os trigonum syndrome: imaging features, AJR, 1996; 166:125-129.
16. Robinson P, White LM. Soft tissue and osseous impingement syndromes of the ankle: role of imaging in diagnosis and management, RadioGraphics, 2002; 22:1457-1469.
17. Ostlere S. Imaging of the ankle, 2007; 19:269-298.
18. Lee BB, Laredo J, Lee SJ, et al. Congenital vascular malformations: general diagnostic principles, Phlebology, 2007; 22:253-257.
19. Triponis V. Diagnosis and treatment of predominantly venous congenital vascular malformations in the extremities: a survey of 50 cases, Lithuanian Surgery, 2005; 3:184-191.
20. Cohen JM, Weinreb JC, Redman HC. Arteriovenous malformation of the extremities: MR Imaging, Rad, 1986; 158:475-479.
21. Rak KM, Yakes WF, Ray RL, et al. MR Imaging of symptomatic peripheral vascular malformations, AJR, 1992; 159:107-112.
22. Murphy P. Ultrasound diagnosis of Morton's neuroma, ASUM Ultrasound Bulletin, 2004; 7:21-25. http://www.asum.com.au/newsite/Files/Documents/Journal/v07n2.pdf.
23. Blacksin MF, Ha DH, Hameed M, et al. Superficial soft-tissue masses of the extremities, RadioGraphics, 2006;26:1289-1304.
24. Zoga AC, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Soft Tissue Masses. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SoftTissueMasses.pdf.
25. Fitzgerald JJ, Roberts CC, Daffner RH, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Follow-up of Malignant or Aggressive Musculoskeletal Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/FollowupMalignantOrAggressiveMusculoskeletalTumors.pdf.
26. Von Mehren M, Randall RL, Benjamin RS, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Soft Tissue Sarcoma. http://www.nccn.org/professionals/physician_gls/pdf/sarcoma.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Soft Tissue Sarcoma V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
27. Rosenberg ZS, Beltran J, Bencardino JT. MR imaging of the ankle and foot, RadioGraphics, 2000; 20:S153-S179.
28. Lazzarini L, Mader JT, Calhoun JH. Osteomyelitis in long bones, J Bone Joint Surg Am, 2004:86:2305-2318.
29. Unger E, Moldofsky P, Gatenby R, et al. Diagnosis of osteomyelitis by MR imaging, AJR, 1988; 150:605-610.

30. Erdman WA, Tamburro F, Jayson HT, et al. Osteomyelitis: characteristics and pitfalls of diagnosis with MR imaging, Radiology, 1991; 180:533-539.
31. Dangman BC, Hoffer FA, Rand FF, et al. Osteomyelitis in Children: gadolinium-enhanced MR imaging, Radiology, 1992; 182:743-747.
32. Kransdorf MJ, Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Suspected Osteomyelitis of the Foot in Patients with Diabetes Mellitus. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SuspectedOsteomyelitisFootInPatientsWithDiabetesMellitus.pdf.
33. Morrison WB, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Primary Bone Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PrimaryBoneTumors.pdf.
34. Biermann JS, Chow W, Adkins DR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Bone Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bone.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bone Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
35. Roberts CC, Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Metastatic Bone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/MetastaticBoneDisease.pdf.

73718, 73719, 73720 MRI Lower Extremity Other than Joints

Clinical criteria reviewed/revised: 6/18/14, 9/23/13, 9/9/13, 7/9/13, 6/10/13, 8/1/12, 9/6/11, 11/17/10, 7/21/10, 12/09, 1/21/09
Medical Advisory Committee reviewed and approved: 6/25/14, 10/24/13, 9/18/13, 6/12/13, 9/19/12, 6/27/12, 9/21/11

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73721 MRI Lower Extremity Joint without Gadolinium: Knee
73722 MRI Lower Extremity Joint with Gadolinium: Knee
73723 MRI Lower Extremity Joint without and with Gadolinium: Knee

See also Ankle and Foot; Hip

I. Chronic knee pain/swelling and/or giving way (instability) (more than 3 months) with negative or non diagnostic x-ray and no history of trauma, cancer, or infection and incomplete resolution after at least 4 weeks of consecutive management as described in A.1. below[1,2] (MRI without contrast)
   A. Adult
      1. Incomplete resolution with conservative management [One of the following]
         a. Continued pain after treatment with anti-inflammatory medication and physical therapy for at least 4 weeks
         b. Symptoms worsening while under treatment
   B. Child or adolescent conservative management is waived

II. Suspected intra-articular loose body with recent x-ray[2] (MRI without contrast or MR arthrogram)
   A. Clinical presentation [One of the following]
      1. Joint pain
      2. Locking
      3. Giving way
      4. Clicking

III. Suspected or known avascular necrosis (osteonecrosis, OCD, AVN, osteochondritis dissecans) with pain and recent x-ray[2-5] (MRI without contrast) [(A and B) or C or D]
   A. Risk factors and pain [One of the following]
      1. Steroid use
      2. Sickle cell disease
      3. Excessive alcohol use
      4. HIV infection
      5. SLE
      6. Renal transplant
      7. Trauma [One of the following]
         a. Fracture
         b. Dislocation
      8. Coagulopathy
      9. Bisphosphonates
      10. Smoking

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11. Pancreatitis
12. Gaucher's disease

B. Physical findings and history [One of the following]
   1. Catching
   2. Locking
   3. Snapping
   4. Inability to bear weight
   5. Popping
   6. Swelling and/or effusion
   7. Tenderness
   8. Giving way
   9. Stiffness
   10. Crepitus

C. Child or adolescent with x-rays showing osteochondral injuries such as a osteochondritis dissecans or a loose body or osteochondral defect

D. Adult with avascular necrosis on x-ray if additional information is needed for treatment

IV. Suspected fracture[6-8] (MRI without contrast) [One of the following]

A. X-ray shows no fracture or there is a Segond fracture on x-ray [One of the following]
   1. Focal tenderness
   2. Effusion
   3. Inability to bear weight

B. Tibial plateau fracture on x-ray (CT is the appropriate study per ACR) [One of the following]
   1. Focal tenderness
   2. Effusion
   3. Inability to bear weight

C. Motor vehicle accident (MVA) and suspicion of posterior dislocation

D. Repeat x-ray 10-14 days after onset of symptoms (The first x-ray may be waived if the only x-ray study is taken 10-14 days after the onset of symptoms)

E. Bone scan positive but not specific for fracture

F. Osteoporosis on bone density or long term steroid use

G. Child abuse

V. Knee injuries[9-18] (MRI without contrast) [One of the following]

A. Knee pain secondary to acute injury and negative or non diagnostic x-ray or x-ray showing Segond fracture [One of the following]
   1. Joint effusion
   2. Inability to bear weight
   3. Pain significantly limiting mobility on physical examination
   4. Locked knee
   5. In ability to fully extend the knee
   6. Meniscal tear [One of the following]
      a. Effusion
      b. Locking
      c. Inability to fully extend the knee
      d. Crepitus

e. Buckling and catching
f. Joint line tenderness
g. Positive Apley test
h. Positive Thessaly test

7. Motor vehicle accident with suspected posterior dislocation of the knee

B. Injuries to ligaments [One of the following]
1. Suspected anterior cruciate ligament injury [One of the following]
a. Rapid development of an effusion which may be bloody
b. Instability of the knee
c. Positive anterior drawer sign
d. Positive Lachman's sign
e. Positive pivot shift test
2. Suspected posterior cruciate ligament injury with incomplete resolution after a trial of immobilization and physical therapy for at least 4 weeks [One of the following]
a. Positive posterior drawer sign
b. Absent tibial step off (Tibia should protrude 1 cm beyond femur at 90 degrees of flexion) or positive posterior tibial sag sign (Godfrey test)
c. Positive reverse pivot shift test
d. Rapid onset of swelling
3. Suspected LCL or MCL injury
a. MCL
i. Positive valgus stress test (knee opens medially with stress to tibia)
b. LCL
i. Positive varus stress test

C. Suspected quadriceps tendon injury [One of the following]
1. Acute knee pain and swelling
2. Difficulty ambulating
3. Bruising
4. Palpable defect in the suprapatellar area
5. Low lying patella
6. Limited extension

D. Infrapatellar tendon injury (jumper's knee) or tear with negative or non diagnostic x-ray or x-rays demonstrate an effusion or non-diagnostic ultrasound

VI. Suspected meniscal tear without history of acute injury and a negative or non diagnostic x-ray[16-18] [One of the following]

A. Findings on physical examination and incomplete resolution with conservative management consisting of physical therapy for at least 4 weeks or symptoms worsening with conservative management [One of the following]
1. Positive McMurray's test
2. Positive Apley test
3. Positive Thessaly test
4. Joint line tenderness
5. Effusion
6. Pain with flexion and rotation
7. A sensation of popping, clicking, or snapping

B. Inability to straighten the knee – locked

VII. Tendonitis or tendinosis with pain and tenderness on palpation over the tendon and incomplete resolution after course of conservative management for at least 4 weeks to include anti-inflammatory medications, activity modification and physical therapy[19] (may be a course of home exercises)

VIII. Suspected Baker's cyst or popliteal cyst[2] (ultrasound)

IX. Patellofemoral pathology or runner's knee (including patellar tracking disorder) with either negative x-ray or x-ray demonstrating an effusion, degenerative arthritis, or chondrocalcinosis and incomplete resolution with conservative management consisting of physical therapy for at least 6 weeks[1,2,20,21] (MRI without contrast) [Both of the following]
- A. Symptoms and history [One of the following]
  1. Anterior knee pain or pain described as behind underneath or around the patella
  2. Pain on squatting
  3. Pain when walking up or down stairs
- B. Clinical findings [One of the following]
  1. Positive apprehension test for patella dislocation
  2. Positive Clark's test
  3. Popping or clicking of the patella
  4. Abnormal patella tracking
  5. Positive patella grind test

X. Osteoid osteoma with negative CT scan[25,26] [One of the following]
- A. Clinical [One of the following]
  1. Bone pain worse at night which is relieved by aspirin
  2. Pain increases with activity
- B. Known diagnosis and planning for surgery
- C. Known diagnosis and planning for radiofrequency ablation
- D. Known diagnosis and post intervention evaluation to establish a new baseline

XI. Fitting of implants for total knee arthroplasty (MRI without contrast)

XII. Child abuse

XIII. Suspected or known osteomyelitis[24-28] (MRI without and with contrast) [One of the following]
- A. Clinical and laboratory findings [One of the following]
  1. ESR >22 mm/hr
  2. Aural temperature >38.3°C or >100.9°F
  3. Leukocytosis, WBC >11,500/cu.mm
  4. C-reactive protein >10 mg/ml
  5. Blood culture positive

6. X-ray suggestive of osteomyelitis

B. History of diabetes, dialysis or peripheral vascular disease
C. History of penetrating injury or surgery near the involved bone
D. Sinus tract, poor wound or fracture healing
E. Preoperative evaluation of osteomyelitis
F. Positive probe to bone test
G. Post treatment evaluation
H. Suspicion of infected prosthesis (nuclear studies)
I. Chronic wound overlying surgical hardware
J. Chronic wound overlying a fracture
K. Exposed bone

XIV. Primary or metastatic bone tumor of the lower extremity – known or suspected[29-31] – An x-ray is required prior to imaging a suspected bone tumor; if the x-ray is definitely benign and the lesion is not an osteoid osteoma clinically or radiographically no further imaging is required [One of the following]

A. X-ray or CT results [One of the following] and suspected (not known) bone tumor
   1. Negative or does not explain the regional symptoms (MRI without contrast)
   2. Suspicious for osteoid osteoma clinically or radiographically (CT)
   3. Indeterminate for malignancy (MRI without and with contrast)
   4. Aggressive appearance on x-ray (MRI without and with contrast)
   5. Pathologic fracture; not definitely benign (MRI without and with contrast)
   6. Incidental finding on prior CT that is not definitely benign (MRI without and with contrast
B. Osteosarcoma of the lower extremity [One of the following] (MRI without and with contrast)
   1. Initial staging of primary site
   2. For high grade osteosarcoma of the lower extremity after preoperative chemotherapy
   3. Restaging after completion of treatment
   4. Follow up after treatment [One of the following]
      a. Every 3 months for 2 years
      b. Every 4 months for the third year
      c. Every 6 months for the next 2 years (fourth and fifth)
      d. Annually after 5 years
C. Ewing's sarcoma of the lower extremity (MRI without and with contrast) [One of the following]
   1. Initial staging of primary site
   2. Restage primary site after completion of primary treatment (usually chemotherapy)
   3. Follow up after treatment [One of the following]
      a. Every 2 months for 2 years
      b. Every 4 months for the third year
      c. Every 6 months for the next 2 years (fourth and fifth)
      d. Annually after 5 years
D. Chondrosarcoma of the lower extremity (MRI without and with contrast) [One of the following]
   1. Initial staging of primary site
   2. Restaging after completion of treatment
   3. Low grade and intracompartmental [One of the following]
      a. Every 6-12 months for 2 years

b. Annually after 2 years as appropriate
4. High grade (grade II, grade III, or clear cell or extracompartmental)
a. Imaging as clinically indicated

E. Chordoma of the lower extremity (MRI without and with contrast) [One of the following]
1. Initial staging of primary site
2. Restaging after completion of treatment
3. Conventional or chondroid chordoma
a. Imaging of primary site as clinically indicated

F. Giant cell tumor of the bone in the lower extremity (MRI without and with contrast) [One of the following]
1. Initial staging of primary site
2. Restaging after completion of treatment
3. Following completion of therapy image primary site as clinically indicated

G. Osteoid osteoma with negative CT scan [One of the following]
1. Clinical [One of the following]
a. Bone pain worse at night which is relieved by aspirin
b. Pain increases with activity
2. Known diagnosis and planning for surgery
3. Known diagnosis and planning for radiofrequency ablation
4. Known diagnosis and post intervention evaluation to establish a new baseline

H. Known primary malignancy other than bone (MRI without and with contrast) [One of the following]
1. Bone pain in the knee with known malignancy and non diagnostic bone scan
2. Known bone metastases with pathologic fracture in the knee
3. Elevated alkaline phosphatase (>140 IU/L) with known malignancy and non diagnostic bone scan
4. Positive bone scan in the knee with no pain

XV. Arthritis and synovitis[32-34] with either inadequate response to current treatment or to monitor response to treatment with known rheumatoid or gout or psoriatic arthritis or ankylosing spondylitis (MRI without and with contrast)

XVI. Soft tissue mass including soft tissue sarcoma[35-38] (MRI without and with contrast) [One of the following]

A. Prominent calcifications on plain film
B. Soft tissue sarcoma of the extremity [One of the following]
1. Initial staging of primary site
2. Post operative imaging after primary therapy for any stage tumor
3. Surveillance for local recurrence in an asymptomatic individual as clinically appropriate up to 10 years
4. Suspicion of local recurrence
C. Suspected ganglion cyst with negative ultrasound, pain and a palpable lump that is solid on transillumination or does not respond to aspiration

XVII. Septic joint and arthrocentesis is contraindicated or not diagnostic[39] (Ultrasound or x-ray guided arthrocentesis. MRI without and with contrast if ultrasound is contraindicated or indeterminate) [Both of the following]
- A. Symptoms [One of the following]
  1. Decreased range of motion
  2. Acute development of a hot swollen joint (<2 weeks)
- B. Laboratory tests [One of the following]
  1. ESR >22mm/hr
  2. Aural temperature >38.3°C or >100.9°F
  3. Leukocytosis, WBC count >11,500/ cu. mm
  4. C-reactive protein >10 mg/ml

XVIII. Soft tissue abscess with negative ultrasound and tender or warm or erythematous area (MRI without and with contrast) [One of the following]
- A. Aural temperature >38.3°C or >100.9°F
- B. Leukocytosis >11,500/cu mm
- C. ESR >22mm/hr
- D. C-reactive protein >10 mg/ml

XIX. MR arthrogram – knee pain[2] (MRI with contrast) [One of the following]
- A. Suspected intra-articular loose body [One of the following]
  1. Pre-operative study
  2. Locking
  3. Clicking
- B. Recurrent knee pain after arthroscopic or surgical intervention

XX. Osteochondral defect or osteochondritis dissecans[40,41] [One of the following]
- A. Positive x-ray for osteochondral defect to stage for stability
- B. Catching, or stiffness or locking or instability with negative x-ray
- C. Chronic joint pain after trauma despite appropriate treatment and a negative x-ray
- D. Effusion or crepitus or tenderness with negative x-ray

References:

1. Kiningham R, Desmond J, Fox D, et al. University of Michigan Health System, Guidelines for Clinical Care, Knee Pain or Swelling: acute or chronic. http://almacen-gpc.dynalias.org/publico/Dolor%20de%20rodilla%20Michigan%202002.pdf.
2. Bennett DL, Nelson JW, Weissman BN, et al. Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Nontraumatic Knee Pain. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/NontraumaticKneePain.pdf.
3. Chambers HG, Shea KG, Anderson AF, et al. The diagnosis and treatment of osteochondritis dissecans guideline and evidence report, American Academy of Orthopedic Surgeons. http://www.aaos.org/research/guidelines/OCD_guideline.pdf.
4. Tofferi JK. Avascular necrosis, Medscape reference. http://emedicine.medscape.com/article/333364-overview.,.
5. Jones LC. Osteonecrosis (avascular necrosis of bone), UpToDate. http://www.uptodate.com/contents/osteonecrosis-avascular-necrosis-of-bone?source=search_result&search=osteonecrosis&selectedTitle=1%7E150.
6. Berger PE, Ofstein RA, Jackson DW, et al. MRI demonstration of radiographically occult fractures: what have we been missing? RadioGraphics, 1989; 9:407-436.
7. Anderson MW, Greenspan A. Stress fractures, Radiology, 1996; 199:1-12.
8. Patel DS, Roth M, Kapil N, Stress Fractures: Diagnosis, treatment and prevention, Am Fam Physician, 2011; 83:39-46.
9. Tuite MJ, Daffner RH, Weissman BN, et al. Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Acute Trauma to the Knee. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteTraumaKnee.pdf.
10. Grover M, Evaluating acutely injured patients for internal derangement of the knee, Am Fam Physician, 2012; 85:2476-252.

11. AAOS Ortho Info. Anterior cruciate ligament injuries. http://orthoinfo.aaos.org/topic.cfm?topic=A00549.
12. Cimino F, Volk BS, Setter D. Anterior cruciate ligament injury: Diagnosis, management and prevention, Am Fam Physician, 2010; 82:917-922.
13. Colvin AC, Meislin RJ. Posterior Cruciate ligament injuries in the athlete, diagnosis and treatment, Bull NYU Hosp Jt Dis 2009; 67:45-51.
14. AAOS Ortho Info. Collateral ligament injuries. http://orthoinfo.aaos.org/topic.cfm?topic=a00550.
15. Slaughter AJ, Reynolds KA, Jambhekar K, et al, Clinical orthopedic examination findings in the lower extremity: correlation with imaging studies and diagnostic efficacy, Radiographics, 2014; 34LE41-E55.
16. Malanga GA, Andrus S, Nadler SF, et al. Physical examination of the knee: a review of the original test description and scientific validity of common orthopedic tests, Arch Phys Med Rehabil, 2003; 84:592-603.
17. Katz JN, Brophy RH, Chaisson CE, et al. Surgery versus physical therapy for a meniscal tear and osteoarthritis, N Engl J Med 2013; 368:1675-1684.
18. Meserve BB, Cleland JA, Boucher TR. A meta-analysis examining clinical test utilities for assessing meniscal injury, Clin Rehabil, 20087; 22:143-161
19. Hamilton B, Purdam C. Patellar tendinosis as an adaptive process: a new hypothesis, Br J Sports Med, 2004; 38:758-761.
20. Van Linschoten R, van Middelkoop M, Berger MY, et al. Supervised exercise therapy versus usual care for patellofemoral pain syndrome: an open label randomized controlled trial, BMJ, 2009; 339:b4074.
21. Dixit S, DiFiori JP, Burton M, et al. Management of patellofemoral pain syndrome, Am Fam Physician, 2007; 75:194-202.
22. Cerase A. Priolo F. Skeletal benign bone-forming lesions, Eur J Rad 1998; 27:S91-S97.
23. Kransdorf MJ, Stull MA, Gilkey FW, et al. From the archives of the AFIP, osteoid osteoma, RadioGraphics, 1991; 11:671-696.
24. Unger E, Moldofsky P, Gatenby R, et al. Diagnosis of osteomyelitis by MR imaging, AJR, 1988; 150:605-610.
25. British Society for Children's Orthopaedic Surgery. The management of acute bone and joint infection in childhood: A guide to good practice. http://bscos.org.uk/resources/Downloads/childrensinfection_1.pdf.
26. Lazzarini L, Mader JT, Calhoun JH. Osteomyelitis in long bones, J Bone Joint Surg Am, 2004:86:2305-2318.
27. Erdman WA, Tamburro F, Jayson HT, et al. Osteomyelitis: characteristics and pitfalls of diagnosis with MR imaging, Radiology, 1991; 180:533-539.
28. Dangman BC, Hoffer FA, Rand FF, et al. Osteomyelitis in Children: gadolinium-enhanced MR imaging, Radiology, 1992; 182:743-747.
29. Roberts CC Weissman BN, Appel M, et al. Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Metastatic Bone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/MetastaticBoneDisease.pdf.
30. Morrison WB, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Primary Bone Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PrimaryBoneTumors.pdf.
31. Biermann JS, Chow W, Adkins DR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Bone Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bone.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bone Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
32. Boutry N, Morel M, Flipo R-M, et al. Early rheumatoid arthritis: a review of MRI and sonographic findings, AJR, 2007; 189:1502-1509.
33. Ostergaard M, Edmonds J, McQueen RF, et al. An introduction to the EUKAR-OMERACT rheumatoid arthritis MRI reference image atlas, Ann Rheum Dis, 2005; 64 (Suppl I):i3-i7.
34. Hodgson RJ, O'Connor P, Moots R. MRI of rheumatoid arthritis-image quantitation for the assessment of disease activity, progression and response to therapy, Rheumatology, 2008; 47:13-21.
35. Blacksin MF, Ha DH, Hameed M, et al. Superficial soft-tissue masses of the extremities, RadioGraphics,2006;26:1289-1304.
36. Zoga AC, Weissman BN, Kransdorf MJ, et al. Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Soft Tissue Masses. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SoftTissueMasses.pdf.
37. Knapp EL, Kransdorf MJ, Letson GD. Diagnostic Imaging Update: Soft Tissue Sarcomas. http://www.moffittcancernetwork.org/CCJRoot/v12n1/pdf/22.pdf.
38. Von Mehren M, Lor Randall R, Benjamin RS,, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Soft Tissue Sarcoma. http://www.nccn.org/professionals/physician_gls/pdf/sarcoma.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Soft Tissue Sarcoma V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
39. Coakley G, Mathews C, Field M, et al. BSR& BHPR, BOA, RCGP and BSAC guidelines for management of the hot swollen joints in adults, Rheumatology, 2006; 45:1039-1041. http://rheumatology.oxfordjournals.org/content/45/8/1039.full.pdf+html.
40. Hixon AL and Gibbs LM, Osteochondritis Dissecans: A diagnosis not to miss, Am Fam Physician, 2000; 61:151-156.
41. Luchs JS, Flug JA, Weissman BN, Expert Panel on Musculoskeletal Imaging: American College of Radiology Appropriateness Criteria, Chronic Ankle Pain accessed at https://acsearch.acr.org/list

73721, 73722, 73723 MRI Lower Extremity Joint: Knee

Clinical criteria reviewed/revised: 7/25/14, 9/23/13, 9/10/13, 7/10/13, 7/18/12, 6/2/12, 9/12/11, 11/17/10, 11/18/09
Medical Advisory Committee reviewed and approved: 10/1/14, 6/25/14, 10/24/13, 9/18/13, 6/12/13, 9/19/12, 6/27/12, 9/21/11

73721 MRI Lower Extremity Joint without Gadolinium Hip
73722 MRI Lower Extremity Joint with Gadolinium: Hip
73723 MRI Lower Extremity Joint without and with Gadolinium: Hip

See also: Knee; Ankle and Foot

I. Chronic hip pain (more than 3 months) with negative or non diagnostic x-ray and no history of trauma, cancer, or infection and incomplete resolution after at least 4 weeks of conservative management as described in A.1. below[1-4]
   A. Adult
      1. Incomplete resolution with conservative management [One of the following]
         a. Continued pain after treatment with anti-inflammatory medication and physical therapy for at least 4 weeks
         b. Symptoms worsening while under treatment
   B. Child or adolescent conservative management is waived

II. Suspected intra-articular loose body with recent x-ray[5] (MRI without contrast or MR arthrogram)
   A. Clinical presentation [One of the following]
      1. Joint pain
      2. Locking
      3. Giving way
      4. Clicking

III. Suspected or known avascular necrosis (osteonecrosis, OCD, AVN, osteochondritis dissecans) with pain and recent x-ray[1,6-8] (MRI without contrast) [(A and B) or C]
   A. Risk factors and pain [One of the following]
      1. Steroid use
      2. Sickle cell disease
      3. Excessive alcohol use
      4. HIV infection
      5. SLE
      6. Renal transplant
      7. Trauma [One of the following]
         a. Fracture
         b. Dislocation
      8. Coagulopathy
      9. Bisphosphonates
      10. Smoking
      11. Pancreatitis

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12. Gaucher's disease

B. Physical findings and history [One of the following]
   1. Radiography with a collapsed femoral head
   2. Pain in the hip(s) with a suspicious but non diagnostic x-ray
   3. Hip pain with normal x-ray and a risk factor in A
   4. Stress fracture of the femoral neck
   5. Pain increases with activity
   6. Pain, may be in the groin

C. Clarification of findings on recent x-ray which are not diagnostic of AVN (may show mottling of the femoral head which is suspicious for AVN)

IV. Suspected hip fracture with negative x-ray[9-11]

V. Hip injury[11]

A. Suspected femoral neck fracture with negative x-rays

VI. Gaucher's disease at initial diagnosis and then every 2 years[12,13]

VII. Legg-Calve-Perthes disease[14]

A. Limp
B. Hip, thigh or knee pain

VIII. Slipped capital femoral epiphysis with positive x-ray[15]

IX. Osteoid osteoma with negative CT scan[16] [One of the following]

A. Clinical [Both of the following]
   1. Bone pain worse at night which is relieved by aspirin
   2. Pain increases with activity

B. Known diagnosis and planning for surgery
C. Known diagnosis and planning for radiofrequency ablation
D. Known diagnosis and post intervention evaluation to establish a new baseline

X. Femoroacetabular impingement syndrome or hip impingement and an x-ray that is negative, nondiagnostic or equivocal[17-19] (MR arthrogram, CPT 73722)

A. Symptoms [One of the following]
   1. Hip pain with prolonged sitting
   2. Difficulty getting in and out of a car
   3. Pain reproduced by flexion or adduction or internal rotation of the hip when supine-impingement test
   4. Complaints of anterolateral hip pain
   5. Positive Patrick (FABER) test
   6. Positive FADIR test (flexion-adduction-internal rotation)

XI. Pigmented villonodular synovitis or osteochondromatosis with positive x-rays[1]

XII. Child abuse

XIII. Labral tear[20,21] (MR arthrogram, 73722)

A. Symptoms [One of the following]
   1. Groin pain
   2. Clicking
   3. Instability
   4. Decreased range of motion
   5. Locking
   6. Catching
   7. Positive FADIR test (flexion-abduction-internal rotation)

B. Radiographic findings suggestive of impingement such as cam lesion or pincer lesion

XIV. Soft tissue mass including soft tissue sarcoma[22-26] (MRI without and with contrast) [One of the following]

A. Prominent calcifications on plain film
B. Soft tissue sarcoma of the extremity [One of the following]
   1. Initial staging of primary site
   2. Post operative imaging after primary therapy for any stage tumor
   3. Surveillance for local recurrence in an asymptomatic individual as clinically appropriate up to 10 years
   4. Suspicion of local recurrence
C. Suspected ganglion cyst with negative ultrasound, pain and a palpable lump that is solid on transillumination or does not respond to aspiration

XV. Suspected or known osteomyelitis[27-33] [One of the following]

A. Clinical and laboratory findings [One of the following]
   1. ESR >22 mm/hr
   2. Aural temperature >38.3° C or >100.9°F
   3. Leukocytosis, WBC >11,500/cu.mm
   4. C-reactive protein >10 mg/ml
   5. Blood culture positive
   6. X-ray suggestive of osteomyelitis
B. History of diabetes, dialysis or peripheral vascular disease
C. History of penetrating injury or surgery near the involved bone
D. Sinus tract, poor wound or fracture healing
E. Preoperative evaluation of osteomyelitis
F. Positive probe to bone test
G. Post treatment evaluation
H. Suspicion of infected prosthesis (nuclear studies)
I. Chronic wound overlying surgical hardware
J. Chronic wound overlying a fracture
K. Exposed bone

XVI. Primary or metastatic bone tumor of the lower extremity – known or suspected[16,34,35] – An x-ray is required prior to imaging a suspected bone tumor; if the x-ray is definitely benign and the lesion is not an osteoid osteoma clinically or radiographically no further imaging is required [One of the following]

A. X-ray or CT results [One of the following] and suspected (not known) bone tumor
   1. Negative or does not explain the regional symptoms (MRI without contrast)
   2. Suspicious for osteoid osteoma clinically or radiographically (CT)
   3. Indeterminate for malignancy (MRI without and with contrast)
   4. Aggressive appearance on x-ray (MRI without and with contrast)
   5. Pathologic fracture; not definitely benign (MRI without and with contrast)
   6. Incidental finding on prior CT that is not definitely benign (MRI without and with contrast)

B. Osteosarcoma of the lower extremity [One of the following] (MRI without and with contrast)
   1. Initial staging of primary site
   2. For high grade osteosarcoma of the lower extremity after preoperative chemotherapy
   3. Restaging after completion of treatment
   4. Follow up after treatment [One of the following]
      a. Every 3 months for 2 years
      b. Every 4 months for the third year
      c. Every 6 months for the next 2 years (fourth and fifth)
      d. Annually after 5 years

C. Ewing's sarcoma of the lower extremity (MRI without and with contrast) [One of the following]
   1. Initial staging of primary site
   2. Restage primary site after completion of primary treatment (usually chemotherapy)
   3. Follow up after treatment [One of the following]
      a. Every 2 months for 2 years
      b. Every 4 months for the third year
      c. Every 6 months for the next 2 years (fourth and fifth)
      d. Annually after 5 years

D. Chondrosarcoma of the lower extremity (MRI without and with contrast) [One of the following]
   1. Initial staging of primary site
   2. Restaging after completion of treatment
   3. Low grade and intracompartmental [One of the following]
      a. Every 6-12 months for 2 years
      b. Annually after 2 years as appropriate
   4. High grade (grade II, grade III or clear cell or extracompartmental)
      a. Imaging as clinically indicated

E. Chordoma of the lower extremity (MRI without and with contrast) [One of the following]
   1. Initial staging of primary site
   2. Restaging after completion of treatment
   3. Conventional or chondroid chordoma
      a. Imaging of primary site as clinically indicated

F. Giant cell tumor of the bone in the lower extremity (MRI without and with contrast) [One of the following]
   1. Initial staging of primary site
   2. Restaging after completion of treatment

3. Following completion of therapy image primary site as clinically indicated

G. Osteoid osteoma with negative CT scan [One of the following]
   1. Clinical [One of the following]
      a. Bone pain worse at night which is relieved by aspirin
      b. Pain increases with activity
   2. Known diagnosis and planning for surgery
   3. Known diagnosis and planning for radiofrequency ablation
   4. Known diagnosis and post intervention evaluation to establish a new baseline

H. Known primary malignancy other than bone (MRI without and with contrast) [One of the following]
   1. Bone pain in the hip with known malignancy and non diagnostic bone scan
   2. Known bone metastases with pathologic fracture in the hip
   3. Elevated alkaline phosphatase (>140 IU/L) with known malignancy and non diagnostic bone scan
   4. Positive bone scan in the hip with no pain

XVII. Arthritis and synovitis[36-38] with either inadequate response to current treatment or to monitor response to treatment with known rheumatoid or gout or psoriatic arthritis or ankylosing spondylitis

XVIII. MR arthrogram[20,21] [One of the following]
   A. X-rays consistent with femoroacetabular impingement
   B. Labral tear [One of the following]
      1. Pain
      2. Clicking
      3. Instability
      4. Decreased range of motion
      5. Locking
      6. Catching
      7. Positive FADIR test (flexion-abduction-external rotation)
   C. X-rays positive for a loose body or osteochondral defect
   D. Clinically suspect loose body with negative x-ray

XIX. Septic joint and arthrocentesis is contraindicated or not diagnostic[39] (Ultrasound or x-ray guided arthrocentesis) [Both of the following]
   A. Symptoms [One of the following]
      1. Decreased range of motion
      2. Acute development of a hot swollen joint (<2 weeks)
   B. Laboratory tests [One of the following]
      1. ESR >22 mm/hr
      2. Aural temperature >38.3°C or >100.9°F
      3. Leukocytosis, WBC >11,500/cu.mm
      4. C-reactive protein >10 mg/L

XX. Soft tissue abscess with negative ultrasound and tender or warm or erythematous area [One of the following]

A. Aural temperature >38.3° C or >100.9° F
B. Leukocytosis >11,500/cu mm
C. ESR >22mm/hr
D. C-reactive protein >10 mg/mL

XXI. Osteochondral defect or osteochondritis dissecans [40,41] [One of the following]

A. Positive x-ray for osteochondral defect to stage for stability
B. Catching, or stiffness or locking or instability with negative x-ray
C. Chronic joint pain after trauma despite appropriate treatment and a negative x-ray
D. Effusion or crepitus or tenderness with negative x-ray

References:

1. Taljanovic M, Daffner RH, Weissman BN, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Chronic Hip Pain. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ChronicHipPain.pdf.
2. Bussières AE, Taylor JAM, Peterson C. Diagnostic imaging practice guidelines for musculoskeletal complaints in adults-an evidence-based approach Part 1: lower extremity disorders, J Manipulative Physiol Ther, 2007; 30: 684-717.
3. Fang C, The J. Imaging of the hip, Brit Institute of Radiology, Imaging, 2003; 15:205-216.
4. Adkins SB, Figler RA. Hip pain in athletes, Am Fam Physician, 2000; 61:2109-2118.
5. Kelly BT, Williams RJ, Philippon MJ. Hip arthroscopy: current indications, treatment options and management issues, Am J of Sports Medicine, 2003; 31:1020-1037.
6. Seeger LL, Daffner RH, Weissman BN, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria, Avascular Necrosis of the Hip. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AvascularNecrosisOsteonecrosisHip.pdf.
7. Mitchell MD, Kundel HL, Stenberg ME, et al. Avascular necrosis of the hip: comparison of MR, CT and scintigraphy, AJR, 1986; 147:67-71. http://www.ajronline.org/content/147/1/67.long.
8. Work Loss Data Institute Hip & Pelvis (Acute & Chronic). http://www.ngc.gov/content.aspx?id=33182.
9. Daffner RH, Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Stress (Fatigue/Insufficiency) Fracture, Including Sacrum, Excluding Other Vertebrae. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/StressFatigueInsufficiencyFractureIncludingSacrumExcludingOtherVertebrae.pdf
10. Oka M, Monu JUV. Prevalence and patterns of occult hip fractures and mimics revealed by MRI, AJR, 2004; 182:283-288.
11. National Clinical Guideline Centre, the Royal College of Physicians. The management of hip fractures in adults. http://www.nice.org.uk/nicemedia/live/13489/54918/54918.pdf.
12. Maas M, Hangartner T, Mariani G, et al. Recommendations for the assessment and monitoring of skeletal manifestations in children with Gaucher disease, Skeletal Radiolo, 2008; 37:185-188.
13. Abramowicz MJ, Carton D, De Meirleir L, et al, The Belgian working group on Gaucher disease, Guidelines for diagnosis, treatment and monitoring of Gaucher's disease. http://www.lysomed.be/hcp/documents/BWGGD_Guidelines.pdf
14. Dillman JR, Hernandez RJ. MRI of Legg-Calve-Perthes Disease, AJR, 2009; 193:1394-1407.
15. Tins B, Cassar-Pullicino V, McCall I. The role of pretreatment MRI in established cases of slipped capital femoral epiphysis, Europ J Radiol, 2009; 70:570-578.
16. Morrison WB, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Primary Bone Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PrimaryBoneTumors.pdf.
17. Kuhlman GS, Domb BG. Hip impingement: identifying and treating a common cause of hip pain, Am Fam Physician, 2009; 80:1429-1434. http://www.aafp.org/afp/2009/1215/p1429.pdf.
18. Crawford JR, Villar RN. Current concepts I the management of femoroacetabular impingement, J Bone and Joint Surgery, 2005; 87: 1459-1462.
19. Tannast M, Siebenrock KA, Anderson SE. Femoroacetabular Impingement: Radiographic diagnosis - what the radiologist should know, AJR, 2007; 188:1540-1552.
20. Toomayan GA, Holman WR, Kozlowicz SM, et al. Sensitivity of MR Arthrography in the evaluation of acetabular labral tears, AJR, 2006; 186:449-453.
21. Lewis CL, Sahrmann SA. Acetabular labral tears, Phys Ther, 2006; 86:110-121.
22. Fitzgerald JJ, Roberts CC, Daffner RH, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Follow-up of Malignant or Aggressive Musculoskeletal Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/FollowupMalignantOrAggressiveMusculoskeletalTumors.pdf.
23. Blacksin MF, Ha DH, Hameed M, et al. Superficial soft-tissue masses of the extremities, RadioGraphics,2006;26:1289-1304.

24. Zoga AC, Weissman BN, Kransdorf MJ, et al. Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Soft Tissue Masses. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SoftTissueMasses.pdf.
25. Knapp EL, Kransdorf MJ, Letson D. Diagnostic imaging update: soft tissue sarcomas, Cancer Control, 2005; 12:22-26. http://medgenmed.medscape.com/viewarticle/498749_print.
26. Von Mehren M, Lor Randall R, Benjamin RS, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Soft Tissue Sarcoma. http://www.nccn.org/professionals/physician_gls/pdf/sarcoma.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Soft Tissue Sarcoma V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
27. Concia E, Prandini N, Massari L, et al. Osteomyelitis: clinical update for practical guidelines, Nuclear Medicine Communications, 2006; 27:645-660.
28. Unger E, Moldofsky P, Gatenby R, et al. Diagnosis of osteomyelitis by MR imaging, AJR, 1988; 150:605-610.
29. Kapoor A, Page S, LaValley M, et al. Magnetic resonance imaging for diagnosing foot osteomyelitis, Arch Intern Med, 2007; 167:125-132.
30. British Society for Children's Orthopedic Surgery. The management of acute bone and joint infection in childhood: A guide to good practice. http://bscos.org.uk/resources/Downloads/childrensinfection_1.pdf.
31. Lazzarini L, Mader JT, Calhoun JH. Osteomyelitis in long bones, J Bone Joint Surg Am, 2004:86:2305-2318.
32. Erdman WA, Tamburro F, Jayson HT, et al. Osteomyelitis: characteristics and pitfalls of diagnosis with MR imaging, Radiology, 1991; 180:533-539.
33. Dangman BC, Hoffer FA, Rand FF, et al. Osteomyelitis in Children: gadolinium-enhanced MR imaging, Radiology, 1992; 182:743-747.
34. Roberts CC Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Metastatic Bone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/MetastaticBoneDisease.pdf.
35. Biermann JS, Chow W, Adkins DR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Bone Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bone.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bone Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
36. Boutry N, Morel M, Flipo R-M, et al. Early rheumatoid arthritis: a review of MRI and sonographic findings, AJR, 2007; 189:1502-1509.
37. Ostergaard M, Edmonds J, McQueen RF, et al. An introduction to the EUKAR-OMERACT rheumatoid arthritis MRI reference image atlas, Ann Rheum Dis, 2005; 64 (Suppl I):i3-i7.
38. Hodgson RJ, O'Connor P, Moots R. MRI of rheumatoid arthritis-image quantitation for the assessment of disease activity, progression and response to therapy, Rheumatology, 2008; 47:13-21.
39. Coakley G, Mathews C, Field M, et al. BSR & BHPR, BOA, RCGP and BSAC guidelines for management of the hot swollen joints in adults, Rheumatology, 2006; 45:1039-1041. http://rheumatology.oxfordjournals.org/content/45/8/1039.full.pdf+html.
40. Hixon AL and Gibbs LM, Osteochondritis Dissecans: A diagnosis not to miss, Am Fam Physician, 2000; 61:151-156.
41. Luchs JS, Flug JA, Weissman BN, Expert Panel on Musculoskeletal Imaging: American College of Radiology Appropriateness Criteria, Chronic Ankle Pain accessed at https://acsearch.acr.org/list

73721, 73722, 73723 MRI Lower Extremity Joint Hip

Clinical criteria reviewed/revised: 7/25/14, 9/23/13, 9/8/13, 7/9/13, 7/19/12, 9/13/11, 11/17/10, 11/18/09
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73721 MRI Lower Extremity Joint without Gadolinium: Ankle or Foot
73722 MRI Lower Extremity Joint with Gadolinium: Ankle or Foot
73723 MRI Lower Extremity Joint without and with Gadolinium: Ankle or Foot

See also Knee; Hip

I. Chronic ankle or foot pain (more than 3 months) with negative or non diagnostic x-ray and no history of trauma, cancer, or infection and incomplete resolution after at least 4 weeks of conservative management as described in A.1. below[1-3]
   A. Adult
      1. Incomplete resolution with conservative management [One of the following]
         a. Continued pain after treatment with anti-inflammatory medication and physical therapy for at least 4 weeks
         b. Symptoms worsening while under treatment
   B. Child or adolescent conservative management is waived

II. Suspected intra-articular loose body with recent x-ray[4,5] (MRI without contrast or MR arthrogram)
   A. Clinical presentation [One of the following]
      1. Joint pain
      2. Locking
      3. Clicking
      4. Giving way

III. Suspected or known avascular necrosis (osteonecrosis, AVN) with pain and an x-ray which is either equivocal or negative[1,5] (MRI without contrast) [(A and B) or C]
   A. Risk factors and pain [One of the following]
      1. Steroid use
      2. Sickle cell disease
      3. Excessive alcohol use
      4. HIV infection
      5. SLE
      6. Renal transplant
      7. Trauma [One of the following]
         a. Fracture
         b. Dislocation
      8. Coagulopathy
      9. Bisphosphonates

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10. Smoking
11. Pancreatitis
12. Gaucher's disease

B. Physical findings and/or history [One of the following]
1. Swelling
2. Stiffness
3. Weakness
4. Symptoms exacerbated by prolonged standing
5. Joint effusion
6. Instability
7. Giving way
8. Catching
9. Grinding

C. Clarification of findings on recent x-ray which are not diagnostic of AVN

IV. Suspected fracture (stress, insufficiency, or occult) with negative or non diagnostic x-ray at the onset of pain[6-10] [One of the following]
A. Repeat x-ray 10-14 days after onset of symptoms (The first x-ray may be waived if the only x-ray study is taken 10-14 days after the onset of symptoms) except if a Lisfranc fracture is suspected (See XIII below)
B. Bone scan positive but not specific for fracture
C. Osteoporosis on bone density scan or long term steroid use
D. Child abuse
E. Suspected Lisfranc fracture – See XIII below

V. Tarsal tunnel syndrome, posterior tibial nerve compression, and failure to respond to conservative therapy with injections of steroids or local anesthesia or symptoms worsening during trial of conservative management[11,12]
A. Clinical findings [One of the following]
1. Aching, paresthesias, burning or tingling of the sole of the foot, toes or heel
2. Positive Tinel's sign
3. Positive dorsiflexion eversion test
4. Nerve conduction study (NCS) consistent with compression at tarsal tunnel

VI. Suspected tarsal coalition with pain relieved by rest[11] and non diagnostic x-ray and CT scan (CT) (MRI without contrast if CT cannot be performed or is indeterminate) [One of the following]
A. Rigid flatfoot

VII. Plantar fasciitis with incomplete resolution after at least 6 weeks of activity modification and anti-inflammatory medication with home exercises and/or physical therapy and recent x-ray[1,13-18] [One of the following]
A. Pain on initiation of walking especially along the medial side of the heel
B. Increasing heel pain with prolonged weight bearing
C. Morning heel pain

D. Pronated foot
E. Localized swelling or atrophy of the infracalcaneal heel pad
F. Known rheumatoid arthritis, gout, SLE or seronegative spondyloarthropathies

VIII. Ankle injuries with negative or non diagnostic x-rays[19-27]

A. Achilles tendon tear or rupture with an ultrasound that does not explain the symptoms and a complaint of pain over the Achilles tendon [Both of the following]
    1. Symptoms [One of the following]
        a. Posterior heel pain proximal to tendon insertion
        b. Stiffness on weight bearing after prolong immobility
    2. Findings on examination [Two or more of the following]
        a. Decreased ankle plantar flexor strength
        b. Limited ability to perform repetitive heel raises
        c. Positive arc sign
        d. Positive Thompson test or Simmonds squeeze test
        e. Palpable gap in the tendon
        f. Increased passive ankle dorsiflexion and gentle manipulation
B. Peroneal tendon syndromes and incomplete resolution after NSAIDS (if not contraindicated) for at least 4 weeks and non diagnostic x-ray (Only one MRI is required to image the entire peroneal tendon) [One of the following]
    1. Tendinitis [One of the following]
        a. Pain and swelling posterior to the lateral malleolus
        b. Ankle pain with active eversion and dorsiflexion against resistance
    2. Peroneal tendon subluxation [One of the following]
        a. Snapping along the lateral ankle
        b. Pain along the lateral ankle
        c. Pain with toe walking
        d. Pain and swelling over the posterior lateral ankle
    3. Peroneal tendon tear [One of the following]
        a. Acute injury with pain and swelling inferior and posterior to lateral malleolus
        b. Chronic injury increasing pain inferior and posterior to the lateral malleolus
    4. Ankle sprains with incomplete resolution after conservative management for at least 4 weeks with anti-inflammatory nonsteroidals (unless contraindicated)
        a. Physical examination [One of the following]
            i. Swelling and/or bruising
            ii. Tenderness
            iii. Difficulty bearing weight
C. Anterior tibiofibular ligament injury (may be associated with proximal fracture of the fibula)
    1. Physical examination [One of the following]
        a. Pain with dorsiflexion of the ankle
        b. Point tenderness over the anterior lateral tibiofibular joint
        c. Lateral ankle instability
        d. Positive squeeze test
        e. Positive external rotation stress test
D. Deltoid ligament injury
    1. Pain medial side of joint with history of injury
E. Anterior talofibular ligament (ATFL) injury

1. Findings on physical examination [One of the following]
    a. Pain anterolateral side of joint
    b. Edema anterolateral side of joint
    c. Positive anterior draw test
    d. Limited and painful inversion of the ankle

F. Calcaneofibular ligament injury
    1. Findings on physical examination [One of the following]
        a. Pain on lateral side of joint
        b. Swelling lateral side of joint
        c. Ecchymosis lateral side of joint
        d. Positive talar tilt test

G. Suspected posterior tibial tendon rupture [One of the following]
    1. Pain and tenderness along tendon path (especially posterior to the medial malleolus)
    2. Patient is unable to lift heel off ground when standing on one foot

H. Posterior tibial tendinopathy [One of the following]
    1. Pain and swelling posterior to the medial malleolus
    2. Pain in the medial aspect of the ankle which increases with weight bearing and inversion and plantar flexion against resistance

I. Anterior tibial tendinopathy [One of the following]
    1. Pain over the anterior ankle
    2. Weak dorsiflexion of the foot

IX. Achilles tendinopathy or tendonitis with incomplete resolution after 6 months of conservative management to consist of anti-inflammatory medication, usually NSAIDS (if not contraindicated) [One of the following]
    A. Pain or tenderness proximal to the insertion to the calcaneus
    B. Crepitation

X. Anterior tibial tendinopathy [One of the following]
    A. Pain over the anterior ankle
    B. Weak dorsiflexion of the foot

XI. Osteoid osteoma with negative CT scan[28] [One of the following]
    A. Clinical [One of the following]
        1. Bone pain worse at night which is relieved by aspirin
        2. Pain increases with activity
    B. Known diagnosis and planning for surgery
    C. Known diagnosis and planning for radiofrequency ablation
    D. Known diagnosis and post intervention evaluation to establish a new baseline

XII. Morton's neuroma with negative x-rays and equivocal ultrasound and incomplete resolution with conservative management consisting of shoe modification or orthotics, anti-inflammatory medication or local injection of steroids and/or local anesthetics[11,29-32] (MRI without and with contrast) [One of the following]

A. Mulder's sign or click after a series of steroid and/or local anesthetic injections
B. Numbness, tingling or burning pain that radiates to the toes which persists after a series of steroid and/or local anesthetic injections

XIII. Lisfranc injury with negative or non diagnostic x-rays[33] (MRI without contrast) [One of the following]
A. Inability to bear weight
B. Swelling
C. Pain of the mid-foot
D. Bruising on the dorsum of the foot

XIV. Os trigonum syndrome with negative or non diagnostic x-ray and incomplete resolution with conservative therapy consisting of physical therapy and steroid injections[34,35] [Both of the following]
A. Symptoms [One of the following]
   1. Pain posterior ankle which may be exacerbated by plantar or dorsiflexion
   2. Swelling posterior ankle
B. Clinical examination [One of the following]
   1. Tenderness anterior to the Achilles tendon and posterior to the talus
   2. May have a palpable soft tissue thickening

XV. Child abuse

XVI. Soft tissue mass including soft tissue sarcoma[36-39] (MRI without and with contrast) [One of the following]
A. Prominent calcifications on plain film
B. Soft tissue sarcoma of the extremity [One of the following]
   1. Initial staging of primary site
   2. Post operative imaging after primary therapy for any stage tumor
   3. Surveillance for local recurrence in an asymptomatic individual as clinically appropriate up to 10 years
   4. Suspicion of local recurrence
C. Suspected ganglion cyst with negative ultrasound, pain, and a palpable lump that is solid on transillumination or does not respond to aspiration

XVII. Suspected or known osteomyelitis with pain[40-45] [One of the following]
A. Clinical and laboratory findings [One of the following]
   1. ESR > 22 mm/hr
   2. Aural temperature > 38.3°C or 100.9°F
   3. Leukocytosis, WBC > 11,500 /cu.mm
   4. C-reactive protein > 10 mg/ml
   5. Blood culture positive
   6. X-ray suggestive of osteomyelitis
B. History of diabetes, dialysis or peripheral vascular disease
C. History of penetrating injury or surgery near the involved bone
D. Sinus tract, poor wound or fracture healing

E. Preoperative evaluation of osteomyelitis
F. Positive probe to bone test
G. Post treatment evaluation
H. Suspicion of infected prosthesis (nuclear studies)
I. Chronic wound overlying surgical hardware
J. Chronic wound overlying a fracture
K. Exposed bone

XVIII. Arthritis and synovitis[46-48] with either inadequate response to current treatment or to monitor response to treatment with known rheumatoid or gout or psoriatic arthritis or ankylosing spondylitis

XIX. Primary or metastatic bone tumor of the lower extremity – known or suspected[28,49,50] – An x-ray is required prior to imaging a suspected bone tumor; if the x-ray is definitely benign and the lesion is not an osteoid osteoma clinically or radiographically no further imaging is required [One of the following]

A. X-ray or CT results [One of the following] and suspected (not known) bone tumor
   1. Negative or does not explain the regional symptoms (MRI without contrast)
   2. Suspicious for osteoid osteoma clinically or radiographically (CT)
   3. Indeterminate for malignancy (MRI without and with contrast)
   4. Aggressive appearance on x-ray (MRI without and with contrast)
   5. Pathologic fracture; not definitely benign (MRI without and with contrast)
   6. Incidental finding on prior CT that is not definitely benign (MRI without and with contrast)
B. Osteosarcoma of the lower extremity [One of the following] (MRI without and with contrast)
   1. Initial staging of primary site
   2. For high grade osteosarcoma of the lower extremity after preoperative chemotherapy
   3. Restaging after completion of treatment
   4. Follow up after treatment [One of the following]
      a. Every 3 months for 2 years
      b. Every 4 months for the third year
      c. Every 6 months for the next 2 years (fourth and fifth)
      d. Annually after 5 years
C. Ewing's sarcoma of the lower extremity (MRI without and with contrast) [One of the following]
   1. Initial staging of primary site
   2. Restage primary site after completion of primary treatment (usually chemotherapy)
   3. Follow up after treatment [One of the following]
      a. Every 2 months for 2 years
      b. Every 4 months for the third year
      c. Every 6 months for the next 2 years (fourth and fifth)
      d. Annually after 5 years
D. Chondrosarcoma of the lower extremity (MRI without and with contrast) [One of the following]
   1. Initial staging of primary site
   2. Restaging after completion of treatment
   3. Low grade and intracompartmental [One of the following]

a. Every 6-12 months for 2 years
b. Annually after 2 years as appropriate

4. High grade (grade II, grade III or clear cell or extracompartmental)
   a. Imaging as clinically indicated

E. Chordoma of the lower extremity (MRI without and with contrast) [One of the following]
   1. Initial staging of primary site
   2. Restaging after completion of treatment
   3. Conventional or chondroid chordoma
      a. Imaging of primary site as clinically indicated
F. Giant cell tumor of the bone in the lower extremity (MRI without and with contrast)
   1. Initial staging of primary site
   2. Restaging after completion of treatment
   3. Following completion of therapy image primary site as clinically indicated
G. Osteoid osteoma with negative CT scan [One of the following]
   1. Clinical [One of the following]
      a. Bone pain worse at night which is relieved by aspirin
      b. Pain increases with activity
   2. Known diagnosis and planning for surgery
   3. Known diagnosis and planning for radiofrequency ablation
   4. Known diagnosis and post intervention evaluation to establish a new baseline
H. Known primary malignancy other than bone (MRI without and with contrast) [One of the following]
   1. Bone pain in the ankle or foot with known malignancy and non diagnostic bone scan
   2. Known bone metastases with pathologic fracture in the ankle or foot
   3. Elevated alkaline phosphatase (>140 IU/L) with known malignancy and non diagnostic bone scan
   4. Positive bone scan in the ankle or foot with no pain

XX. MR arthrogram [One of the following]

A. Suspected intra-articular loose body [One of the following]
   1. Pre-operative study
   2. Locking
   3. Clicking
   4. Giving way
B. Anterior tibiofibular ligament injury with non diagnostic MRI and no response to rest, ice, elevation, compression, pain medications such as acetaminophen and exercise for at least 3 weeks

XXI. Septic joint and arthrocentesis is contraindicated or not diagnostic[51] (Ultrasound or x-ray guided arthrocentesis) [Both of the following]

A. Symptoms [One of the following]
   1. Decreased range of motion
   2. Acute development of a hot swollen joint (<2 weeks)
B. Laboratory tests [One of the following]
   1. ESR >22 mm/hr
   2. Aural temperature >38.3° C or >100.9° F

3. Leukocytosis, WBC >11,500/cu.mm
4. C-reactive protein >10 mg/ml

XXII. Soft tissue abscess with negative ultrasound and tender or warm or erythematous area [One of the following]

A. Aural temperature >38.3° C or >100.9° F
B. Leukocytosis >11,500/cu mm
C. ESR >22 mm/hr
D. C-reactive protein >10 mg/ml

XXIII. Osteochondral defect or osteochondritis dessicans [52,53] [One of the following]

A. Positive x-ray for osteochondral defect to stage for stability
B. Catching, or stiffness or locking or instability with negative x-ray
C. Chronic joint pain after trauma despite appropriate treatment and a negative x-ray
D. Effusion or crepitus or tenderness with negative x-ray

References:

1. Luchs JS, Flug JA, Weissman BN, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria, Chronic Ankle Pain. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ChronicAnklePain.pdf.
2. Mizel MS, Hecht PJ, Marymount JV, et al. Evaluation and treatment of chronic ankle pain, J of Bone & Joint Surgery 86, 2004; 622-632.
3. Wukich DK, Tuason DA. Diagnosis and treatment of chronic ankle pain, J of Bone & Joint Surgery, 2010; 92:2002-2016.
4. Ostlere S. Imaging the ankle and foot, Imaging, 2003; 15:242-269.
5. O'Loughlin PF, Heyworth BE, Kennedy JG. Current concepts in the diagnosis and treatment of osteochondral lesions of the ankle, Am J Sports Med, 2010; 38:392-404.
6. Daffner RH, Pavlov H. Stress fractures: current concepts, AJR, 1992; 159:245-252.
7. Berger PE, Ofstein RA, Jackson DW, et al. MRI demonstration of radiographically occult fractures: what have we been missing? RadioGraphics, 1989; 9:407-436.
8. Daffner RH, Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Stress (Fatigue/Insufficiency) Fracture, Including Sacrum, Excluding Other Vertebrae. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/StressFatigueInsufficiencyFractureIncludingSacrumExcludingOtherVertebrae.pdf.
9. Thomas JL, Blitch EL, Chaney DM, et al. Diagnosis and treatment of forefoot disorders. Section 2. Central metatarsalgia, Journal of Foot & Ankle Surgery, 2009; 48:239-250.
10. Patel DS, Roth M, Kapil N. Stress Fractures: Diagnosis, treatment and prevention, Am Fam Physician, 2011; 83:39-46.
11. Wise JN, Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Chronic Foot Pain. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ChronicFootPain.pdf.
12. Persich G. Tarsal tunnel syndrome treatment and management, Medscape reference. http://emedicine.medscape.com/article/1236852-treatment#a1128.
13. Aldridge T. Diagnosing heel pain in adults, Am Fam Physician, 2004; 70:332-338.
14. Tallia AF, Cardone DA. Diagnostic and therapeutic injection of the ankle and foot, Am Fam Physician, 2003; 68:1356-1363.
15. Ahn JM, El-Khoury GY. Radiologic evaluation of chronic foot pain, Am Fam Physician, 2007; 76:975-983.
16. McPoil TG, Martin RL, Cornwall MW, et al. Heel pain – plantar fasciitis: clinical practice guidelines linked to the International Classification of Function, Disability and Health from the Orthopaedic Section of the American Physical Therapy Association, J Orthop Sports Phys Ther. 2008; 38:A1-A18.
17. Cole C, Seto C, Gazewood J. Plantar fasciitis: evidence-based review of diagnosis and therapy, American Family Physician, 2005; 72:2237-2242.
18. Thomas JL, Christensen JC, Kravitz SR, et al. The diagnosis and treatment of heel pain: a clinical practice guideline-revision 2010, Journal of Foot & Ankle Surgery, 2010, 40:329-340.
19. American Academy of Orthopaedic Surgeons (AAOS). The diagnosis and treatment of acute Achilles tendon rupture. http://www.guidelines.gov/content.aspx?id=15487&search=achilles+tendon.
20. Carcia CR, Martin RL, Houck J, et al. Achilles pain, stiffness, and muscle power deficits: Achilles tendinitis: clinical practice guidelines linked to the International Classification of Function, Disability and Health from the Orthopaedic Section of the American Physical Therapy Association, J Orthop Sports Phys Ther. 2010; 40:A1-A26.
21. Wilson JJ, Best TM. Common overuse tendon problem: a review and recommendations for treatment, Am Fam Physician. 2005; 72:811-818.
22. Sorosky B, Press J, Plastaras C, et al. The practical management of Achilles tendinopathy, Clin J Sport Med,2004; 14:40-44.
23. Simpson MR, Howard TM. Tendinopathies of the foot and ankle, Am Fam Physician, 2009; 80:1107-1114.
24. Karageanes SJ. Peroneal tendon syndromes treatment and management. http://emedicine.medscape.com/article/91344-treatment.
25. Canadian Paediatric Society. Ankle sprains in the paediatric athlete. http://www.cps.ca/en/documents/position/ankle-sprains-athlete.
26. Reuss BL. Calcaneofibular ligament injury treatment & management, Medscape reference. http://emedicine.medscape.com/article/85526-treatment.
27. Molis MA. Talofibular ligament injury workup, Medscape reference. http://emedicine.medscape.com/article/86396-overview.
28. Morrison WB, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Primary Bone Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PrimaryBoneTumors.pdf.
29. Quinn TGJ, Jacobson JA, Craig JG, et al. Sonography of Morton's neuromas. AJR, 2000; 174:1723-1728.
30. Thomas JL, Blitch EL, Chaney DM. Diagnosis and treatment of forefoot disorders. Section 3. Morton's intermetatarsal neuroma, J Foot & Ankle Surgery, 2009; 48:251-256.
31. Pibut SM. Morton's neuroma: Cause and treatment, American Academy of Podiatric Sports Medicine. http://www.aapsm.org/neuroma.html.
32. Sharp RJ, Wade CM, Hennessy MS, et al. The role of MRI and ultrasound imaging in Morton's neuroma and the effect of size of lesion on symptoms, J Bone Joint Surg [Br], 2003; 85-B:999-1005.
33. Bennett DL, Daffner RH, Weissman BN, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Acute Trauma to the Foot. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteTraumaFoot.pdf.
34. Karasick D, Schweitzer ME. The os trigonum syndrome: imaging features, AJR, 1996; 166:125-129.

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35. Robinson P, White LM. Soft tissue and osseous impingement syndromes of the ankle: role of imaging in diagnosis and management, RadioGraphics, 2002; 22:1457-1469.
36. Blacksin MF, Ha DH, Hameed M, et al. Superficial soft-tissue masses of the extremities, RadioGraphics,2006;26:1289-1304.
37. Zoga AC, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Soft Tissue Masses. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SoftTissueMasses.pdf.
38. Knapp EL, Kransdorf MJ, Letson D. Diagnostic imaging update: soft tissue sarcomas, Cancer Control, 2005; 12:22-26. http://medgenmed.medscape.com/viewarticle/498749_print.
39. Von Mehren M, Randall RL, Benjamin RS, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Soft Tissue Sarcoma. http://www.nccn.org/professionals/physician_gls/pdf/sarcoma.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Soft Tissue Sarcoma V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
40. Unger E, Moldofsky P, Gatenby R, et al. Diagnosis of osteomyelitis by MR imaging, AJR, 1988; 150:605-610.
41. Kapoor A, Page S, LaValley M, et al. Magnetic resonance imaging for diagnosing foot osteomyelitis, Arch Intern Med, 2007; 167:125-132.
42. British Society for Children's Orthopaedic Surgery. The management of acute bone and joint infection in childhood: A guide to good practice. http://bscos.org.uk/resources/Downloads/childrensinfection_1.pdf.
43. Lazzarini L, Mader JT, Calhoun JH. Osteomyelitis in long bones, J Bone Joint Surg Am, 2004:86:2305-2318.
44. Erdman WA, Tamburro F, Jayson HT, et al. Osteomyelitis: characteristics and pitfalls of diagnosis with MR imaging, Radiology, 1991; 180:533-539.
45. Dangman BC, Hoffer FA, Rand FF, et al. Osteomyelitis in Children: gadolinium-enhanced MR imaging, Radiology, 1992; 182:743-747.
46. Boutry N, Morel M, Flipo R-M, et al. Early rheumatoid arthritis: a review of MRI and sonographic findings, AJR, 2007; 189:1502-1509.
47. Ostergaard M, Edmonds J, McQueen RF, et al. An introduction to the EUKAR-OMERACT rheumatoid arthritis MRI reference image atlas, Ann Rheum Dis, 2005; 64(Suppl I):i3-i7.
48. Hodgson RJ, O'Connor P, Moots R, MRI of rheumatoid arthritis – image quantitation for the assessment of disease activity, progression and response to therapy, Rheumatology, 2008; 47:13-21.
49. Roberts CC, Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology ACR Appropriateness Criteria – Metastatic Bone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/MetastaticBoneDisease.pdf.
50. Biermann JS, Chow W, Adkins DR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Bone Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bone.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bone Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
51. Coakley G, Mathews C, Field M, et al. BSR& BHPR, BOA, RCGP and BSAC guidelines for management of the hot swollen joints in adults, Rheumatology, 2006; 45:1039-1041. http://rheumatology.oxfordjournals.org/content/45/8/1039.full.pdf+html.
52. Hixon AL and Gibbs LM, Osteochondritis Dissecans: A diagnosis not to miss, Am Fam Physician, 2000; 61:151-156.
53. Luchs JS, Flug JA, Weissman BN, Expert Panel on Musculoskeletal Imaging: American College of Radiology Appropriateness Criteria, Chronic Ankle Pain accessed at https://acsearch.acr.org/list

73721, 73722, 73723 MRI Lower Extremity Joint: Ankle or Foot

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73725 MRA of the Lower Extremity

MEDICARE

I. Peripheral vascular disease (PVD, occlusion or stenosis of arteries of the leg)

MRA may be performed instead of a catheter angiogram.
If a catheter angiogram has been performed MRA may be performed in addition if the catheter angiogram did not demonstrate a viable run off vessel for bypass.

References:

1. National Coverage Determination (NCD) for Magnetic Resonance Imaging (220.2). http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&ArticleType=SAD%7cEd&PolicyType=Final&s=---&CntrctrType=1%7c9&KeyWord=%22Magnetic+Resonance+Imaging%22&KeyWordLookUp=Title&KeyWordSearchType=Exact&CptHcpcsCode=73725&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
2. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L32611), Novitas Solutions, Inc., Arkansas. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=3&CntrctrType=1%7c9&KeyWord=73725&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=73725&kq=true&bc=IAAAAAAAAAAA&.
3. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L32611), Novitas Solutions, Inc., Colorado. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=8&CntrctrType=1%7c9&KeyWord=73725&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=73725&kq=true&bc=IAAAAAAAAAAA&.
4. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services, Inc., Connecticut. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=9&CntrctrType=1%7c9&KeyWord=73725&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=73725&kq=true&bc=IAAAAAAAAAAA&.
5. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L31399), Novitas Solutions, Inc., District of Columbia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=10&CntrctrType=1%7c9&KeyWord=73725&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=73725&kq=true&bc=IAAAAAAAAAAA&.
6. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L31399), Novitas Solutions, Inc., Delaware. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=11&CntrctrType=1%7c9&KeyWord=73725&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=73725&kq=true&bc=IAAAAAAAAAAA&.
7. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L29218), First Coast Service Options, Inc., Florida. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=12&CntrctrType=1%7c9&KeyWord=73725&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=73725&kq=true&bc=IAAAAAAAAAAA&.
8. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L32611), Novitas Solutions, Inc., Louisiana. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=23&CntrctrType=1%7c9&KeyWord=73725&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=73725&kq=true&bc=IAAAAAAAAAAA&.
9. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services, Inc., Massachusetts. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=24&CntrctrType=1%7c9&CptHcpcsCode=73725&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
10. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L31399), Novitas Solutions, Inc., Maryland. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=25&CntrctrType=1%7c9&KeyWord=73725&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=73725&kq=true&bc=IAAAAAAAAAAA&.

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11. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services, Inc., Maine. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=26&CntrctrType=1%7c9&CptHcpcsCode=73725&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
12. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L32611), Novitas Solutions, Inc., Mississippi. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=31&CntrctrType=1%7c9&KeyWord=73725&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=73725&kq=true&bc=IAAAAAAAAAAA&.
13. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services, Inc., New Hampshire. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=37&CntrctrType=1%7c9&CptHcpcsCode=73725&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
14. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L31399), Novitas Solutions, Inc., New Jersey. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=38&CntrctrType=1%7c9&KeyWord=73725&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=73725&kq=true&bc=IAAAAAAAAAAA&.
15. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L32611), Novitas Solutions, Inc., New Mexico. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=39&CntrctrType=1%7c9&KeyWord=73725&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=73725&kq=true&bc=IAAAAAAAAAAA&.
16. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services, Inc., New York. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=41&CntrctrType=1%7c9&CptHcpcsCode=73725&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
17. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L32611), Novitas Solutions, Inc., Oklahoma. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=43&CntrctrType=1%7c9&KeyWord=73725&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=73725&kq=true&bc=IAAAAAAAAAAA&.
18. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L31399), Novitas Solutions, Inc., Pennsylvania. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=45&CntrctrType=1%7c9&KeyWord=73725&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=73725&kq=true&bc=IAAAAAAAAAAA&.
19. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services, Inc., Rhode Island. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=47&CntrctrType=1%7c9&CptHcpcsCode=73725&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
20. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L32611), Novitas Solutions, Inc., Texas. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=51&CntrctrType=1%7c9&KeyWord=73725&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=73725&kq=true&bc=IAAAAAAAAAAA&.
21. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L25367), National Government Services, Inc., Vermont. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=55&CntrctrType=1%7c9&CptHcpcsCode=73725&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.

73725 MRA Lower Extremity: MEDICARE

Clinical criteria reviewed/revised 4/30/14, 7/26/13, 7/18/13, 8/5/11, 11/17/10
Medical Advisory Committee reviewed and approved: 9/5/14, 6/27/12, 9/21/11

74150 CT Abdomen without Contrast
74160 CT Abdomen with Contrast
74170 CT Abdomen with and without Contrast

Note: For radiation therapy planning, use 77014.
For CT guided needle placement, biopsy, or drainage, use 77012.
For CT guided tissue ablation, use 77013.

If there is a note next to an indication stating, see CT of the abdomen and pelvis please refer to CPT codes 74176, 74177 and 74178.

I. Complaints associated with abdominal or pelvic pain[1-11] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

II. Evaluation of symptoms after any abdominopelvic surgery[1] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

III. Aneurysm[12-20] (CTA of the abdomen and pelvis)

IV. Obstruction of bowel[21-23] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

V. Known cancer including lymphoma[24-56] (See CT of the abdomen and pelvis. See CPT codes 74176, 74177 and 74178 except for pancreatic cancer, adrenal cancer, lung cancer)

VI. Known or acute suspected pancreatitis or pancreatic pseudocyst[57-59] [One of the following]
   A. Suspected acute pancreatitis with abdominal pain, (This should not be done sooner than 48-72 hours if the diagnosis is clear based on amylase and lipase levels. A scan performed less than 72 hours after presentation may underestimate the extent of the disease) [One of the following]
      1. Initial scan [Both of the following] 48-72 hours after onset of symptoms
         a. Amylase >3 times the upper normal laboratory value
         b. Lipase >3 times the upper normal laboratory value
      2. Initial scan at onset of abdominal pain but serum amylase and lipase are not >3 times normal but with severe abdominal pain and epigastric pain that increases rapidly in severity and persists without any relief
      3. Follow up scan 7-21 after onset of symptoms with a confirmed diagnosis
   B. Known pancreatitis with any of the following allows for repeat exams if present [One of the following]
      1. Hemodynamic instability

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a. Falling hematocrit
b. Falling blood pressure
2. Aural temperature > 38.3°C or > 100.9°F
3. White blood cell count or leukocytosis of >12,000 cells/mm^3
4. White blood cell count < 4000 cells/mm^3
5. Retroperitoneal air on prior CT
6. Positive blood culture
7. Signs of peritonitis (rebound, or guarding or tenderness)
8. Poor oxygen saturation, signs of ARDS (adult respiratory distress syndrome)
9. Signs of renal failure rising BUN and creatinine

C. Suspected pancreatic pseudocyst [Both of the following]
1. History [One of the following]
a. Acute pancreatitis with onset at least 4 wks earlier
b. Pancreatitis secondary to trauma (time irrelevant)
c. Chronic pancreatitis
2. Clinical findings [One of the following]
a. Abdominal/back pain
b. Abdominal tenderness
c. Abdominal mass

D. Evaluation of known pancreatic pseudocyst [One of the following]
1. Periodic evaluation for change in size
2. New or worsening clinical findings such as recurrent abdominal pain, rising amylase or lipase, fever

VII. Chronic pancreatitis with history or recurrent pancreatitis[60, 61] (not helpful for early diagnosis; only confirmation of diagnosis and surgical planning)

VIII. Pancreatic cancer or mass[32-35] [One of the following] (Following initial diagnosis, see CT of the abdomen and pelvis)

A. Symptoms [One of the following]
1. Weight loss (see XIX below)
2. Mid-epigastric pain radiating to the back

B. Elevated tumor markers [One of the following]
1. CA19-9 >40 IU/L
2. CEA > 2.5 (non-smoker) or >5.0 in a smoker

C. Prior imaging with dilatation of the bile duct and/or pancreatic duct (US, ERCP, MRCP)
D. Pancreatic mass on recent prior imaging and request for “pancreatic protocol”
E. Initial staging of pancreatic cancer if not already performed
F. Painless jaundice (see XV below)
G. Follow up of known pancreatic cancer [One of the following]
1. Immediately following surgery
2. Following completion of chemotherapy
3. Every 3-6 months for 2 years
4. After 2 years annually

IX. Known or suspected adrenal disease or mass including adrenal carcinoma[47, 62-66] [One of the following]

Note: With suspected pheochromocytoma, if meets criteria see CT of the abdomen and pelvis, 74176, 74177, or 74178, since an uncommon presentation of pheochromocytoma is extra-adrenal, including the bladder

A. Suspected pheochromocytoma or paraganglioma [One of the following]
   1. Fractionated metanephrines in plasma > 3-4 times the upper laboratory limit
   2. 24 hour urinary total metanephrine >1800µg
   3. Clonidine suppression test positive (plasma norepinephrine is > 500pg/ml or > 2.96nmol/L or < 50% decrease in plasma norepinephrine) if fractionated metanephrines are above normal but less than 4 times the upper limit of normal
   4. Suspicion of pheochromocytoma in individual with MEN2, von Hippel-Lindau syndrome and neurofibromatosis type 1 (NF-1) if the blood and urine tests are not abnormal

B. Follow up after treatment of pheochromocytoma or paraganglioma [One of the following]
   1. 3-12 months after resection up to 1 year
   2. 6-12 months for 2nd and 3rd years
   3. Annually for years 4-10
   4. Rising blood pressure
   5. Rising plasma or urinary metanephrines

C. Suspected Cushing's syndrome [One of the following]
   1. 24 hr urine free cortisol >100mcg/24hr
   2. No suppression by dexamethasone

D. Suspected aldosteronoma or primary aldosteronism or Conn's syndrome [One of the following]
   1. Hypertension that is drug resistant (need for >3 drugs)
   2. Spontaneous (<3.5 mEq/L) or severe diuretic-induced (<3mEq/L) hypokalemia
   3. Plasma aldosterone to rennin ratio >10 when aldosterone is measured in ng/dL
   4. 24 hour urinary aldosterone excretion test >14µg/day

E. Incidental finding on other imaging such as CT or MRI scan performed for other purposes (CT or MRI of the chest or heart), or US with no history of malignancy [One of the following]
   1. No dedicated abdominal CT or MRI performed
   2. Screening is negative for hypercortisolism, aldosteronism (if hypertensive) and pheochromocytoma
      a. Follow up CT scan
         i. Benign appearing adenoma <4m or myelolipoma on prior scan
            01. Repeat scan 6-12 months after initial dedicated scan
               a. No change in size or < 1cm increase in size then no further imaging
               b. Enlarging (>1cm increase in size in one year) repeat CT
         ii. Benign appearing adenoma 4-6 cm in size
            01. Repeat scan in 3-6 months
               a. No change in size or < 1cm increase in size repeat 6-12 months
         iii. Enlarging (>1cm increase in size in one year) no repeat imaging (see NCCN guidelines

F. Adrenal carcinoma can be functioning or non functioning
   1. Localized disease after surgery
      a. Image every 3-12 months for 5 years
   2. Metastatic disease image every 3 months

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G. Metastatic disease
   1. Personal history of malignancy (most common in lung, breast, gastric, and renal carcinomas)

X. Splenomegaly with LUQ pain

XI. Complex or solid abdominal or liver mass on recent ultrasound

XII. New palpable abdominal mass[69]

XIII. New renal mass suspected or detected on prior imaging[28] (For renal cell cancer, see XL below) [One of the following]
   A. Clarification of findings on prior imaging with "renal protocol"
   B. Cystic or solid mass detected on ultrasound
      1. Simple cyst confirmed on prior CT to be simple cyst or Bosniak class I cyst – no further imaging is indicated
   C. Bosniak class II cyst on prior CT (or MRI)
      1. CT may be certified every 6 months for 3 years and if stable no further imaging

XIV. Evaluation of painless jaundice[34]
   A. Painless jaundice for more than 3 months with one or more of the following and elevated bilirubin with either direct bilirubin >.2 or total bilirubin >1.9
      1. Unintentional weight loss
      2. Fatigue
      3. Anorexia

XV. Fever of unknown origin (FUO)[70,71] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

XVI. Abdominal and pelvic trauma[72,74] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

XVII. Cryptorchidism (undescended testicle) (MRI of the abdomen and pelvis unless contraindicated, and then See CT of the abdomen and pelvis is appropriate)[75-77]

XVIII. Weight loss[78] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

XIX. Hematuria[3] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

XX. CT enterography[9,79,80] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

XXI. Suspected or known neuroendocrine tumor including carcinoid, pheochromocytoma, paraganglioma, islet cell tumor of the pancreas, poorly differentiated or high grade or aggressive small cell tumor other than lung[47, 81, 82] (For carcinoid, pheochromocytoma, paraganglioma and poorly differentiated or high grade or anaplastic small cell carcinoma other than lung, see CT of the abdomen and pelvis, CPT codes 74176, 74177, and 74178) [One of the following]
- A. Carcinoid – See CT of the abdomen and pelvis, 74176, 74177, 74178
- B. Islet cell tumor of the pancreas [One of the following]
  1. Gastrinoma or Zollinger-Ellison syndrome [One of the following]
     a. Elevated serum gastrin >100pg/m
     b. Positive secretin test
  2. Insulinoma
     a. Elevated serum insulin >2.0ng/ml
  3. Glucagonoma
     a. Elevated serum glucagon>100pg/ml
  4. VIPoma
     a. Elevated vasoactive intestinal polypeptide (VIP) >75pg/ml
  5. Somatostatinoma
     a. Elevated somatostatin
- C. Restaging after completion of treatment for any islet cell tumor to establish a new baseline
- D. Follow up of asymptomatic individual with documented islet cell tumor [One of the following]
  a. 3-12 months after resection then
  b. Every 6-12 months for years 2-10
- E. Pheochromocytoma – See CT of the abdomen and pelvis, 74176, 74177 or 74178
- F. Poorly differentiated or high grade or anaplastic small cell carcinoma other than lung – See CT of the abdomen and pelvis, 74176, 74177 or 74178

XXII. Evaluation of cirrhosis and portal hypertension[83,84] [One of the following]
- A. Hepatitis B or C
  1. Ultrasound demonstrating a liver mass >1 cm
- B. Cirrhosis
  1. Planned TIPS (transjugular intrahepatic portosystemic shunt – relatively non-invasive procedure for portal hypertension)

XXIII. Screening for hepatoma or hepatocellular carcinoma and known carrier of either hepatitis B or hepatitis C or documented cirrhosis[47,85-90] (for known hepatoma see LI below) [One of the following]
- A. Elevated or rising AFP repeat CT or MRI of the liver every 3 months
- B. Awaiting liver transplant may be certified every 3 months

XXIV. Small-cell lung cancer[49] [One of the following]
- A. Initial staging may be approved along with PET/CT for initial staging
- B. Rising CEA (non smoker >2.5; smoker >5.0)
- C. Rising liver function tests

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D. Surveillance with no clinical or radiographic evidence of disease [One of the following]
   1. Every 3-4 months for 2 years
   2. Every 6 months for years 3-5
   3. Annually after 5 years
E. Change on recent chest x-ray

XXV. Follow up of renal abscess

XXVI. Pyelonephritis not responding to treatment[91] (See CT abdomen and pelvis CPT codes 74176, 74177 or 74178)

XXVII. Abscess[1,5,9] (In some cases, CT of the abdomen and pelvis may be the appropriate study)

XXVIII. Suspected abdominal wall hernia[92-94] with negative ultrasound [One of the following]
A. Abdominal pain or discomfort [One of the following]
   1. Worsened by straining or lifting
   2. Worsened by prolonged standing
B. Visible or palpable mass [One of the following]
   1. More prominent in upright position
   2. More prominent with Valsalva maneuver
C. Strangulation [All of the following]
   1. Colicky pain abdominal pain
   2. Palpable mass
   3. Signs of intestinal obstruction
D. After abdominal surgery with incisional pain associated with bulge or suspected defect

XXIX. Suspected or known dissection of the aorta[95,96] (CTA of the abdomen and pelvis)

XXX. Crohn's disease and inflammatory bowel disease[9,79, 80] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

XXXI. Appendicitis[6,7] (In children and pregnant women, ultrasound as the initial study except for follow up of known appendicitis with suspected complications. If this is not possible then See CT of the abdomen and pelvis [CPT code 74176, 74177, or 74178]. MRI abdomen [74181, 74182, or 74183] in pregnant women)

XXXII. Diverticulitis, suspected or known in a patient with lower abdominal pain and/or mass[4,5] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

XXXIII. Kidney or renal stones[2] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

XXXIV. Abdominal distention on physical examination (CT of the abdomen and pelvis, 74176, 74177, or 74178)

XXXV. Evaluation of elevated liver function tests[97,98] [One of the following]
- A. Ultrasound not diagnostic [One of the following]
  1. Direct bilirubin >0.2
  2. Total bilirubin >1.9
  3. Alkaline phosphatase > 147IU/L
  4. Gamma GT or GET >30 IU/L
  5. AST >30 IU/L
  6. ALT > 30 IU/L

XXXVI. Soft tissue mass[99] (not a hernia of the abdominal wall)
- A. Abdominal x-ray non-diagnostic

XXXVII. Unilateral leg edema[100] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

XXXVIII. Renal cell carcinoma or kidney cancer[29, 50] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)
- A. Initial staging
- B. Active surveillance for pT1a tumor
  1. Abdominal CT within 6 months of the initial staging CT then annually
- C. Follow up of ablative techniques for pT1a
  1. 3-6 months after ablation
  2. Annually for 5 years
- D. Partial or radial nephrectomy for pT1a and pT1b
  1. Scan 3-12 months after surgery to establish a new baseline
  2. If the initial post operative scan is negative then annually for 3 years for partial nephrectomy and after 12 months at the provider's discretion for radical nephrectomy if the initial post op scan is negative
- E. Radical nephrectomy for stage II or III
  1. 3-6 months after surgery
  2. 3-6 months for 3 years
  3. Annually for 5 years
  4. Additional follow up as clinically indicated
- F. Stage IV or medically or surgically unresectable disease or relapse
  1. Every 6-16 weeks

XXXIX. Breast cancer[39] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

XL. Cervical cancer[41] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

XLI. Colon cancer[25,42] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

XLII. Rectal cancer[43] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

XLIII. Ovarian cancer, fallopian tube cancer and primary peritoneal cancer[44] (See CT of the abdomen and pelvis, 74176, 74177, or 74178,)

XLIV. Esophageal cancer[45] [One of the following]
- A. Initial staging
- B. After preoperative or definitive chemoradiation
  1. No PET/CT performed after completion of chemoradiation
- C. Clinical recurrence

XLV. Gastric (stomach) cancer[46] [One of the following]
- A. Initial staging
- B. Following completion of treatment (CT abdomen and pelvis CPT codes 74176, 74177, 74178)
- C. Clinical recurrence

XLVI. Carcinoid[47] (See CT abdomen and pelvis, CPT codes 74176, 74177, 74178)

XLVII. Islet cell tumor of the pancreas [One of the following][47]
- A. Gastrinoma or Zollinger-Ellison syndrome [One of the following]
  1. Elevated serum gastrin >100pg/m
  2. Positive secretin test
- B. Insulinoma
  1. Elevated serum insulin >2.0ng/ml
- C. Glucagonoma
  1. Elevated serum glucagon>100pg/ml
- D. VIPoma
  1. Elevated vasoactive intestinal polypeptide (VIP) >75pg/ml
- E. Somatostatinoma
  1. Elevated somatostatin
- F. Follow up of asymptomatic individual with documented islet cell tumor [One of the following]
  1. 3-12 months after resection then
  2. Every 6-12 months for 10 years

XLVIII. Poorly differentiated or high-grade or anaplastic small or large cell carcinoma other than lung[47] [One of the following]
- A. Initial staging
- B. Surveillance following treatment of resectable disease [One of the following]
  1. Every 3 months for a year
  2. Every 6 months after 1 year
- C. Surveillance following treatment of unresectable or metastatic disease
  1. Every 3 months

XLIX. Hepatoma or hepatocellular carcinoma[51] [One of the following]
- A. Initial staging
- B. Following treatment every 3-6 months for 2 years
- C. After 2 years every 6-12 months
- D. New onset of rising AFP

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E. Surveillance **awaiting liver transplant** may be performed every 3 months

L. Gallbladder cancer[51] [One of the following]
- A. Found incidentally at surgery
  1. T1b or greater initial staging (No imaging for T1a with negative margins if found incidentally at surgery)
  2. Repeat CT scan every 6 months after treatment for 2 years if stable
- B. Mass on prior ultrasound, CT or MRI
  1. Initial staging if not already performed
  2. Repeat CT scan every 6 months after treatment for 2 years if stable
- C. Jaundice
  1. Initial staging if not already performed
  2. Repeat CT scan every 6 months after treatment for 2 years if stable

LI. Cholangiocarcinoma[51] [One of the following]
- A. Initial staging of either intra or extrahepatic cholangiocarcinoma if not already performed
- B. After Completion of therapy
  1. Every 6 months for 2 years

LII. Hodgkin's lymphoma[52] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

LIII. Soft tissue of the abdomen, pelvis or retroperitoneum[53, 99] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

LIV. Testicular cancer[54] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

LV. Anal cancer[37] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

LVI. Bladder cancer[38] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

LVII. New bone lesion suspicious for a metastatic lesion with no known cancer[101] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)

LVIII. Malignant mesothelioma[102] (See CT of the abdomen and pelvis, 74176, 74177, or 74178)
- A. Initial staging

LIX. Evaluation of congenital anomalies of the abdomen

LX. Ocular melanoma[103, 104]
- A. Initial staging
- B. Surveillance imaging after completion of therapy CT of the abdomen every 6 months for 2 years then annually for another 3 years

LXI. Non-Hodgkin's lymphoma[34,35,61] (Follicular lymphoma, marginal zone lymphoma, MALT lymphoma, mantle cell lymphoma, diffuse large B-cell lymphoma, Burkitt's lymphoma, peripheral T-cell lymphoma, mycosis fungoides, hairy cell leukemia, post-transplant lymphoproliferative disorders, CLL/SLL) (CT of the abdomen and pelvis, 74176, 74177, or 74178)

LXII. Prostate cancer (see CT or MRI of the pelvis)

References:

1. Yaghmai V, Rosen MP, Lalani T, et al, Expert Panel of Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Acute (Nonlocalized) Abdominal Pain and Fever or Suspected Abdominal Abscess. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteAbdominalPainFeverSuspectedAbdominalAbscess.pdf.
2. Coursey CA, Casalino DD, Remer EM, et al, Expert Panel on Urologic Imaging. American College of Radiology Appropriateness Criteria – Acute Onset Flank Pain–Suspicion of Stone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteOnsetFlankPainSuspicionStoneDisease.pdf.
3. Ramchandani P, Kisler T, Francis IR, et al, Expert Panel on Urologic Imaging. American College of Radiology Appropriateness Criteria – Hematuria. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Hematuria.pdf.
4. Miller FH, Rosen MP, Lalani T, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Left Lower Quadrant Pain–Suspected Diverticulitis. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/LeftLowerQuadrantPainSuspectedDiverticulitis.pdf.
5. Rafferty J, Shellito P, Hyman NH, et al. Standards Committee of American Society of Colon and Rectal Surgeons. Practice Parameters for Sigmoid Diverticulitis, Dis Colon Rectum, 2006; 49:939-944.
6. Smith MP, Katz DS, Rosen MP, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Right Lower Quadrant Pain–Suspected Appendicitis. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/RightLowerQuadrantPainSuspectedAppendicitis.pdf.
7. Weyant MJ, Eachempati SR, Maluccio MA, et al. Interpretation of computed tomography does not correlate with laboratory or pathologic findings in surgically confirmed acute appendicitis, Surgery, 2000; 128:145-152.
8. Knutson D, Greenberg G, Cronau H, Management of Crohn's Disease—a practical approach, American Family Physician. http://www.aafp.org/afp/2003/0815/p707.html.
9. Fidler JL, Rosen MP, Blake MA, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Crohn Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/CrohnDisease.pdf.
10. Carter MJ, Lobo AJ, Travis SPL, on behalf of the IBD Section of the British Society of Gastroenterology, Gut, 2005; 53 (Suppl V):v1-v16.
11. ACS Surgery Principles & Practice 6th Edition Chapter 43, Acute Abdominal Pain (pages 475-483).
12. Mehard WB, Heiken JP, Sicard GA, High-attenuating crescent in abdominal aortic aneurysm wall at CT: A sign of acute or impending rupture, Radiology, 1994; 192:359-362.
13. Lederle FA, Wilson SE, Johnson GR, et al. Immediate repair compared with surveillance of small abdominal aortic aneurysms, N Eng J Med, 2002; 346:1437-1444.
14. Stavropoulos SW, Charagundla SR, Imaging techniques for detection and management of endoleaks after endovascular aortic aneurysm repair, Radiology, 2007; 243:641-655.
15. Hirsch AT, Haskal AJ, Hertzer NR, et al. ACC/AHA 2005 guidelines for the management of patients with peripheral arterial disease(lower extremity, renal, mesenteric and abdominal aortic): a collaborative report from the American Association for Vascular Surgery/Society for Vascular Surgery, Society for Cardiovascular Angiography and Intervention, Society for Vascular Medicine and Biology, Society of Interventional Radiology and the ACC/AHA Task Force on Practice Guidelines (writing committee to develop guidelines for the management of patients with peripheral arterial disease), J Am Coll Cardiol, 2006; 47:1-192.
16. Fattori R, Russo V. Degenerative aneurysm of the descending aorta. Endovascular Treatment, European Association for Cardio-thoracic Surgery, Multimedia Manual of Cardiothoracic Surgery 2007. http://mmcts.ctsnetjournals.org/cgi/reprint/2007/1217/mmcts.2007.002824.pdf.
17. Horton KM, Smith C, Fishman EK, MDCT and 3D CT angiography of splanchnic artery aneurysms, AJR, 2007; 189:641-647.
18. Macari M, Chandarana H, Balthazar E, et al. Intestinal ischemia versus intramural hemorrhage: CT evaluation, AJR, 2002; 180:177-184.
19. Wiesner W, Khurana BJ, et al. CT of acute bowel ischemia, Radiology, 2003; 226:635-650.
20. U.S. Preventive Services Task Force, Screening for abdominal aortic aneurysm recommendation statement. http://www.uspreventiveservicestaskforce.org/uspstf05/aaascr/aaars.htm.
21. Furukawa A, Yamasaki M, Furuichi K, et al. Helical CT in the diagnosis of small bowel obstruction, RadioGraphics, 2001; 21:341-355.
22. Katz DS, Baker ME, Rosen MP, et al, Expert Panel on Gastrointestinal Imaging. American college of Radiology Appropriateness Criteria – Suspected Small-Bowel Obstruction. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SuspectedSmallBowelObstruction.pdf.

23. Diaz JJ, Bokhari F, Mowery NT, et al. Practice management guidelines for small bowel obstruction, EAST Practice Parameter Workgroup for management of small bowel obstruction. http://www.east.org/Content/documents/practicemanagementguidelines/small-bowl-obstruction.pdf.
24. Leyendecker JR, Clingan MJ, Remer EM, et al, Expert Panel on Urologic Imaging. American College of Radiology Appropriateness Criteria – Pretreatment Staging of Invasive Bladder Cancer. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PretreatmentStagingInvasiveBladderCancer.pdf.
25. Desch CE, Benson AB, Somerfield MR, et al. Colorectal cancer surveillance: 2005 update of an American Society of Clinical Oncology Practice Guideline, JCO, 2005; 23:8512-8519.
26. Pfister DG, Johnson DH, Azzoli CG, et al. American Society of Clinical Oncology treatment of unresectable non-small-cell lung cancer guideline: Update 2003, JCO, 2004; 22:320-353.
27. Casalino DD, Remer EM, Bishoff JT, et al, Expert Panel on Urologic Imaging. American College of Radiology Appropriateness Criteria – Post-treatment Follow-up of Renal Cell Carcinoma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PostTreatmentFollowUpRenalCellCarcinoma.pdf.
28. Israel GM, Casalino DD, Remer EM, et al, Expert Panel on Urologic Imaging. American College of Radiology Appropriateness Criteria – Indeterminate Renal Masses. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/IndeterminateRenalMasses.pdf.
29. Casalino DD, Remer EM, Bishoff J, et al, Expert Panel on Urologic Imaging. American College of Radiology Appropriateness Criteria – Renal Cell Carcinoma Staging. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/RenalCellCarcinomaStaging.pdf.
30. Ng AK, Constine LS, Advani R, et al, Expert Panel on Radiation Oncology. American College of Radiology Appropriateness Criteria – Follow-up of Hodgkin's Lymphoma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Oncology/FollowUpHodgkinsLymphoma.pdf.
31. Lalwani N, Dubinsky T, Javitt MC, et al, Expert Panel on Women's Imaging and Radiation Oncology-Gynecology. American College of Radiology Appropriateness Criteria – Pretreatment Evaluation and Follow-Up of Endometrial Cancer. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Oncology/PretreatmentEvaluationAndFollowUpEndometrialCancer.pdf.
32. Zeman RK, Cooper C, Zeiberg AS, et al, TNM Staging of Pancreatic Carcinoma Using Helical CT, AJR, 1997; 169:459-464.
33. Tempero MA, Malafa MP, Behrman SW et al., National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014 Pancreatic Adenocarcinoma. http://www.nccn.org/professionals/physician_gls/pdf/pancreatic.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Pancreatic Adenocarcinoma V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
34. Lalani T, Couto CA, Rosen MP, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Jaundice. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Jaundice.pdf.
35. 2006 Update of ASCO recommendations for the use of tumor markers in gastrointestinal cancer. http://jop.ascopubs.org/content/2/6/314.full.pdf+html.
36. Scottish Intercollegiate Guidelines Network, Management of patients with lung cancer, a national clinical guideline, 2005. http://www.sign.ac.uk/pdf/sign80.pdf.
37. Benson AB III, Venook AP, Bekaii-Saab T, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Anal Carcinoma. http://www.nccn.org/professionals/physician_gls/pdf/anal.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Anal Carcinoma V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
38. Clark PE, Spiess PE, Agarwal N, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version1.2014. Bladder Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bladder.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bladder Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
39. Gradishar WJ, Anderson BO, Blair SL, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Breast Cancer. http://www.nccn.org/professionals/physician_gls/pdf/breast.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Breast Cancer V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
40. Nabors LB, Ammirati M, Bierman PJ, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2013. Central Nervous System Cancers. http://www.nccn.org/professionals/physician_gls/pdf/cns.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Central Nervous System Cancers V2.2013. ©2013 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
41. Koh WJ, Greer BE, Abu-Rustum NR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Cervical Cancer. http://www.nccn.org/professionals/physician_gls/pdf/cervical.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Cervical Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.

42. Benson AB III, Venook AP, Bekaii-Saab T, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Colon Cancer. http://www.nccn.org/professionals/physician_gls/pdf/colon.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Colon Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
43. Benson AB III, Venook AP, Bekaii-Saab T, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Rectal Cancer. http://www.nccn.org/professionals/physician_gls/pdf/rectal.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Rectal Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
44. Morgan RJ, Armstrong DK, Alvarez RD, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Ovarian Cancer. http://www.nccn.org/professionals/physician_gls/pdf/ovarian.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Ovarian Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
45. Ajani JA, Bentrem DJ, Besh S, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2013. Esophageal and Esophagogastric Junction Cancers. http://www.nccn.org/professionals/physician_gls/pdf/esophageal.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Esophageal and Esophagogastric Junction Cancers V2.2013. ©2013 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
46. Ajani JA, Bentrem DJ, Besh S, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2013. Gastric Cancer. http://www.nccn.org/professionals/physician_gls/pdf/gastric.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Gastric Cancer V2. 2013. ©2013 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
47. Kulke MH, Shah MH, Benson AB III, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Neuroendocrine Tumors. http://www.nccn.org/professionals/physician_gls/pdf/neuroendocrine.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Neuroendocrine Tumors V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
48. Ettinger DS, Akerley W, Borghaei H, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2013. Non-Small Cell Lung Cancer. http://www.nccn.org/professionals/physician_gls/pdf/nscl.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Non-Small Cell Lung Cancer V2.2013. ©2013 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
49. Kalemkerian GP, Akerley W, Bogner P, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Small Cell Lung Cancer. http://www.nccn.org/professionals/physician_gls/pdf/sclc.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Small Cell Lung Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
50. Motzer RJ, Jonasch E, Agarwal JN, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Kidney Cancer. http://www.nccn.org/professionals/physician_gls/pdf/kidney.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Kidney Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
51. Benson AB III, D'Angelica MI, Abrams TA, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Hepatobiliary Cancers. http://www.nccn.org/professionals/physician_gls/pdf/hepatobiliary.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Hepatobiliary Cancers V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
52. Hoppe RT, Advani RH, Ai WZ, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Hodgkin Lymphoma. http://www.nccn.org/professionals/physician_gls/pdf/hodgkins.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Hodgkin's Lymphomas V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.

53. Von Mehren M, Lor- Randall R, Benjamin RS, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Soft Tissue Sarcoma. http://www.nccn.org/professionals/physician_gls/pdf/sarcoma.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Soft Tissue Sarcoma V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
54. Motzer RJ, Jonasch E, Agarwal N, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Testicular Cancer. http://www.nccn.org/professionals/physician_gls/pdf/testicular.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Testicular Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
55. Sturgeon, Practice Guidelines for tumor marker use in the clinic, Clinical Chemistry, 2002; 48:1151-1159.
56. Vachani C, Patient guide to tumor markers. http://www.oncolink.org/treatment/article.cfm?id=296&s=42&c=7.
57. AGA Institute technical review on acute pancreatitis, Gastroenterology, 2007; 132:20022-2044.
58. Baker ME, Nelson RC, Rosen MP, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Acute Pancreatitis. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcutePancreatitis.pdf.
59. Sutton PA, Humes DJ, Purcel G, et al. The role of routine assays of serum amylase and lipase for the diagnosis of acute abdominal pain, Ann R Coll Surg Engl, 2009; 91:381-384.
60. Ammann RW. Diagnosis and management of chronic pancreatitis: current knowledge, Swiss Med Wkly 2006; 136: 166-174.
61. High-Yield Imaging Gastrointestinal Gore Levine, 1st Edition, Copyright 2010, Chronic Pancreatitis, pages 704-706.
62. Remer EM, Casalino DD, Bishoff JT, et al, Expert Panel on Urologic Imaging. American College of Radiology Appropriateness Criteria – Incidentally Discovered Adrenal Mass. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/IncidentallyDiscoveredAdrenalMass.pdf.
63. Grumbach MM, Biller BMK, Braunstein GD, et al. Management of the Clinically Unapparent Adrenal Mass (incidentaloma), NIH Consensus and State-of-the-Science Statements, 2002, 19(2). http://consensus.nih.gov/2002/2002AdrenalIncidentalomasos021PDF.pdf.
64. Allolio and Fassnacht, Clinical Review: Adrenocortical carcinoma: clinical update. http://jcem.endojournals.org/content/91/6/2027.full.pdf+html.
65. Zeiger MA, Thompson GB, Duh Q-Y, et al. American Association of Clinical Endocrinologists and American Association of Endocrine Surgeons Medical Guidelines for the Management of Adrenal Incidentalomas, Endocrine Practice. 2009; 15:(Suppl 1): 1-18.
66. Grossman E, Goldstein DS, Hoffman A et al, Glucagon and clonidine testing in the diagnosis of pheochromocytoma, Hypertension, 1991; 17:733-741.
67. Blake MA, McDermott S, Rosen MP, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Suspected Liver Metastases. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SuspectedLiverMetastases.pdf.
68. Nelson RC, Kamel IR, Baker ME, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Liver Lesion Characterization. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/LiverLesionInitialCharacterization.pdf.
69. Jung AJ, Yee J, Rosen MP, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Palpable Abdominal Mass. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PalpableAbdominalMass.pdf.
70. Mourad O, Palda V, Detsky AS, A comprehensive evidence-based approach to fever of unknown origin, Arch Intern Med, 2003; 163:545-551.
71. Roth AR, Basello GM. Approach to the adult patient with fever of unknown origin, Am Fam Physician, 2003; 68:2223-2229
72. Sudakoff GS, ,Rosen MP, Rybicki FJ, et al, Expert Panel on Vascular Imaging and Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Blunt Abdominal Trauma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/BluntAbdominalTrauma.pdf.
73. Management of genitourinary trauma, The East Practice Management Guidelines Work Group. http://www.east.org/Content/documents/practicemanagementguidelines/genitourinary-trauma.pdf.
74. .Salim A, Sangthong B, Martin M, et al. Whole body imaging in blunt multisystem trauma patients without obvious signs of injury, results of a prospective study, Arch Surg, 2006; 141:468-475.
75. Kier R, McCarthy S, Rosenfield AT, et al. Nonpalpable testes in young boys: evaluation with MR imaging, Radiology, 1988; 169:429-433.
76. Fritsch PJ, Hricak H, Kogan BA, et al. Undescended testis: Value of MR imaging, Radiology, 1987; 164:169-173.
77. Friedland GW, Chang P, The role of imaging in the management of the impalpable undescended testis, AJR, 1988; 151:1107-1111.
78. Bouras EP, Lange SM, Scolapio JS. Rational approach to patients with unintentional weight loss, Mayo Clin Proc, 2001; 76:923-929.
79. Paulsen SR, Huprich JE, Fletcher JG, et al. CT Enterography as a diagnostic tool in evaluating small bowel disorders: Review of clinical experience with over 700 cases, RadioGraphics, 2006; 26:641-662.
80. Booya F, Fletcher JG, Huprich JE, et al. Active Crohn's disease: CT findings and interobserver agreement for enteric phase CT Enterography, Radiology, 2006; 241:787-795.
81. Oberg k, Knigg U, Kwekkeboom D, et al. Neuroendocrine gastro-entero-pancreatic tumors: ESMO clinical practice guidelines for diagnosis, treatment and follow-up. http://annonc.oxfordjournals.org/content/23/suppl_7/vii124.full.pdf+html.
82. Oberg K. Pancreatic endocrine tumors, Semin Oncol, 2010, 37:594-618.
83. Murray KF, Carithers RL Jr, AASLD practice guidelines: evaluation of the patient for liver transplantation, Hepatology, 2010; 41(6):1-26.

84. Boyer TD, Haskal ZJ. AASLD practice guideline, The role of transjugular intrahepatic portosystemic shunt in the management of portal hypertension, Hepatology, 2005; 41(2):386-400.
85. Arguedas MR, Chen VK, Eloubeidi MA, et al. Screening for Hepatocellular Carcinoma in patients with Hepatitis C Cirrhosis: A Cost-Utility Analysis The American Journal of Gastroenterology, 2003; 98(3):679-690.
86. Ryder SD. Guidelines for the diagnosis and treatment of hepatocellular carcinoma (HCC) in adults, GUT, 2003; 52(Suppl III):iii1-iii8.
87. Lok AS, McMahon BJ. Chronic hepatitis B. Hepatology, 2007: 45:507-509.
88. Bruix J, Sherman M. Management of hepatocellular carcinoma: An update, Hepatology, 2010. http://www.aasld.org/practiceguidelines/Documents/Bookmarked%20Practice%20Guidelines/HCCUpdate2010.pdf.
89. Sato T, Tateishi R, Yoshida H, et al. Ultrasound surveillance for early detection of hepatocellular carcinoma among patients with chronic hepatitis C Hepatol Int. 2009 Aug 6. [Epub ahead of print].
90. Thompson Coon J, Rogers G, Hewson P, et al. Surveillance of cirrhosis for hepatocellular carcinoma: systematic review and economic analysis. Health Technol Asess. 2007 Sep; 11(34):1-206.
91. Nikolaidis P, Casalino DD, Remer EM, et al, Expert Panel on Urology. American College of Radiology Appropriateness Criteria – Acute Pyelonephritis. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcutePyelonephritis.pdf.
92. Aguirre DA, Santosa AC, Casola G, et al. Abdominal wall hernias: imaging features, complications and diagnostic pitfalls at multi-detector row CT, RadioGraphics, 2005; 25:1501-1530.
93. Miller PA, Mezwa DG, Feczko PJ, et al. Imaging of abdominal hernias, RadioGraphics, 1995; 15:333-347.
94. Zarvan NP, Lee FT, Yandow DR, et al. Abdominal hernias: CT findings, AJR, 1995; 164:1391-1395.
95. Jacobs JE, Latson LA, Abbara S, et al, Expert Panel on Cardiovascular Imaging. American College of Radiology Appropriateness Criteria- Acute Chest Pain–Suspected Aortic Dissection. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteChestPainSuspectedAorticDissection.pdf.
96. Erbel R, Alfonso F, Boileau C, et al. Diagnosis and management of aortic dissection : recommendations of the task force on aortic dissection, European Society of Cardiology, European Heart Journal, 2001, 22:1642-1682.
97. Gibney PT. Mildly elevated liver transaminase levels in the asymptomatic patient. Am Fam Physician 2005; 71:1105-10.
98. Bayard M, Holt J, Boroughs E. Nonalcoholic fatty liver disease Am Fam Physician 2006 Jun 1;73(11):1961-8.
99. Zoga AC, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Soft Tissue Masses. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SoftTissueMasses.pdf.
100. Ely JW, Osheroff JA, Chambliss ML, et al. Approach to leg edema of unclear etiology, JABFM, 2006, 19:148-160.
101. Biermann JS, Chow W, Adkins DR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Bone Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bone.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bone Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
102. Ettinger DS, Krug LM, Akerley W, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Malignant Pleural Mesothelioma. http://www.nccn.org/professionals/physician_gls/pdf/mpm.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Malignant Pleural Mesothelioma V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
103. Merseyside and Cheshire Cancer Network, NHS, Ocular melanoma liver metastasis pathway, http://www.mccn.nhs.uk/fileuploads/File/Ocular%20Melanoma%20Liver%20Metastasis%20Pathway.pdf.
104. Diener-West M, Reynolds SM, Agugliaro DJ, et al, Screening for metastasis from choroidal melanoma: the collaborative ocular melanoma study group report 23, J Clin Onc, 2004; 22:2438-2444.
105. Zelenetz AD, Gordon WG, Wierda WG, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Non-Hodgkin's Lymphomas. http://www.nccn.org/professionals/physician_gls/pdf/nhl.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Non-Hodgkin's Lymphomas V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.

74150, 74160, 74170 CT Abdomen

Clinical criteria reviewed/revised: 10/25/14, 11/20/13, 8/16/13, 7/19/13, 6/10/13, 3/19/13, 2/24/13, 8/9/12, 6/7/12, 8/28/11, 11/17/10, 1/20/10
Medical Advisory Committee reviewed and approved: 10/1/14, 8/28/14, 12/16/13, 9/18/13, 6/12/13, 9/19/12, 6/27/12, 9/21/11

74150 CT of the Abdomen without Contrast
74160 CT of the Abdomen with Contrast
74170 CT of the Abdomen with and without Contrast

MEDICARE[1-3] AL

Note: For radiation therapy planning, use 77014.
For CT guided needle placement, biopsy, or drainage, use 77012.
For CT guided tissue ablation, use 77013.

I. Abdominal or pelvic pain (CT of the abdomen and pelvis)

II. Jaundice or abnormal liver function tests with normal US

III. Suspected renal or kidney tumor

IV. Follow-up of metastases (CT of the abdomen and pelvis)

V. Trauma (CT of the abdomen and pelvis)

VI. Renal stones (CT of the abdomen and pelvis)

VII. Pancreatitis

VIII. Appendicitis (CT of the abdomen and pelvis)

IX. Diverticulitis (CT of the abdomen and pelvis)

X. Abscess (CT of the abdomen and pelvis)

XI. Colitis (CT of the abdomen and pelvis)

XII. Pancreatic pseudocyst

XIII. Splenomegaly

XIV. Hepatomegaly

XV. Ascites (CT of the abdomen and pelvis)

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XVI. Staging of known tumors including suspected metastases (CT of the abdomen and pelvis)

XVII. History of malignancy including follow-up or suspicion of metastatic disease (CT of the abdomen and pelvis)

XVIII. Response to chemotherapy or radiation therapy (CT of the abdomen and pelvis)

XIX. Evaluation of lymphoma (CT of the abdomen and pelvis)

XX. Evaluation of lymphadenopathy (CT of the abdomen and pelvis)

XXI. Evaluation of abdominal mass (CT of the abdomen and pelvis)

XXII. Known or suspected primary malignancy

XXIII. Follow-up to surgery (CT of the abdomen and pelvis)

XXIV. Evaluation of known or suspected abdominal or pelvic mass

XXV. Evaluation of known or suspected abdominal or pelvic inflammatory processes

XXVI. Evaluation of known or suspected abdominal or pelvic fluid collection (CT of the abdomen and pelvis)

XXVII. Bowel obstruction (CT of the abdomen and pelvis)

XXVIII. Hematuria (CT of the abdomen and pelvis)

XXIX. Abdominal aortic aneurysm (CT of the abdomen and pelvis)

XXX. Aortic dissection (CT of the abdomen and pelvis)

XXXI. Clarification of findings from other imaging studies or abnormal laboratory findings

XXXII. Evaluation of known or suspected abdominal or pelvic vascular structures

XXXIII. Evaluation of known or suspected congenital abnormalities of the abdomen or pelvis

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XXXIV. Treatment planning for radiation therapy – CPT code 77014 is the correct code for this indication

References:

1. Local Coverage Determination (LCD) for Radiology: Computed Tomography of the Abdomen and Pelvis (L30048), Cahaba Government Benefit Administrators, LLC, Alabama. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=2&CntrctrType=1%7c9&KeyWord=74150&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74150&kq=true&bc=IAAAAAAAAAAA&.
2. Local Coverage Determination (LCD) for Radiology: Computed Tomography of the Abdomen and Pelvis (L30048), Cahaba Government Benefit Administrators, LLC, Georgia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=14&CntrctrType=1%7c9&KeyWord=74150&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74150&kq=true&bc=IAAAAAAAAAAA&.
3. Local Coverage Determination (LCD) for Radiology: Computed Tomography of the Abdomen and Pelvis (L30048), Cahaba Government Benefit Administrators, LLC, Tennessee. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=50&CntrctrType=1%7c9&KeyWord=74150&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74150&kq=true&bc=IAAAAAAAAAAA&.

74150, 74160, 74170 CT Abdomen: MEDICARE AL

Critical criteria reviewed/revised: 7/26/14, 7/26/13, 8/9/12
Medical Advisory Committee reviewed and approved: 9/5/14, 9/18/13, 9/19/12

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74174 CTA of the Abdomen and Pelvis with Contrast Material(s), Including Noncontrast Images, If Performed, and Image Postprocessing

Note: For evaluation of PVD, the appropriate CPT code is 75635 (CTA abdominal aorta with runoff) rather than either CTA abdomen or CTA pelvis.

I. Intestinal angina (or chronic mesenteric ischemia)[1-6]

A. Recurrent acute episodes of abdominal pain [All of the following]
   1. Postprandial epigastric pain, occasionally radiates to the back
   2. Weight loss
   3. Fear of eating

II. Acute mesenteric ischemia with abdominal pain and bleeding [One of the following][5,6]

A. Acute mesenteric ischemia is being considered (life-threatening condition)

III. Evaluation of renal or liver transplant donor[1,7,8]

IV. Aortic aneurysm or aneurysm of the pelvic arteries (including mycotic aneurysm)[1,9-14] [One of the following]

A. Patient with Marfan's or Ehlers-Danlos syndrome
B. Turner's syndrome
C. Asymptomatic patient with any segment dilated to twice the adjacent normal diameter
D. Known AAA [One of the following]
   1. Periodic follow-up of an asymptomatic known AAA will be according to the following schedule if there is an inadequate ultrasound and there has not been a surgical repair. [One of the following]
      a. 2.5-2.9 cm every 5 years
      b. 3.0-3.4 cm every 3 years
      c. 3.5-3.9 cm every 2 years
      d. 4.0-4.4 cm every year
      e. 4.5-4.9 cm every 6 months
      f. 5.0-5.5 cm every 3-6 months
   2. New onset of pain (must submit a copy of the ultrasound report)
E. Postoperative evaluation following endovascular repair (stent graft) [One of the following]
   1. 1 month after repair
   2. 3 months after repair
   3. 6 months after repair
   4. Annually after repair
   5. Suspicion of endoleak
F. Aneurysm of any other intra abdominal artery detected on other imaging

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G. Vascular insufficiency of the bowel (suspicion of) [Both of the following]
   1. Abdominal pain often starting as periumbilical and often out of proportion to exam findings
   2. Other clinical findings [One of the following]
      a. Leukocytosis, WBC >11,500/cu.mm
      b. Stool positive for occult blood
      c. Nausea, vomiting or diarrhea
      d. History of abdominal angina (pain after eating for approximately 3 hours)
H. Preoperative planning for surgical or endovascular repair

V. Peripheral arterial vascular disease[1,15, 16]

Note: For evaluation of PVD, unlike with MRA studies, the appropriate CPT code is 75635 (CTA abdominal aorta with runoff) rather than either CTA abdomen or CTA pelvis or CTA of the extremities.

VI. Suspected or known dissection of the aorta[1,17-21] [One of the following]

A. Unequal blood pressure in the arms
B. Rapid onset of "ripping, tearing, searing" severe chest or upper back or abdominal pain
C. Syncope and chest pain
D. Shortness of breath
E. CVA or stroke
F. Loss of pulses
G. New aortic insufficiency murmur
H. Marfan's syndrome
I. Recent aortic manipulation (such as catheter angiography)
J. Family history of aortic disease
K. Follow up of known dissection [One of the following]
   1. 1 month after repair
   2. 3 months after repair
   3. 6 months after repair
   4. 12 months after repair
   5. Annually after 12 months
L. New symptoms after repair [One of the following]
   1. See A-J above

VII. Evaluation of the hepatic arteries and veins (including portal vein)[1,22-24] [One of the following]

A. Evaluation of portal and hepatic veins prior to or following TIPS (transjugular intrahepatic portosystemic shunt)
B. Evaluation of portal and hepatic veins prior to or following surgical intervention for portal hypertension
C. Evaluation of hepatic vasculature prior to and following embolization procedure
D. Evaluation of hepatic vasculature prior to planned hepatectomy
E. Evaluation of liver donor
F. Suspected hepatic vein thrombosis or Budd Chiari syndrome [One of the following]
   1. Ascites
   2. Hepatomegaly

3. Inadequate Doppler ultrasound of hepatic veins

G. Possible portal vein thrombosis with negative or inadequate Doppler study of the portal vein [One of the following]
   1. Hypercoagulable state
   2. Abdominal malignancy

H. Preoperative evaluation for pancreatic cancer

VIII. Evaluation of abdominal veins other than hepatic and portal veins[1] [One of the following]

A. Nephrotic syndrome
B. Suspicion of iliac vein thrombus
C. Suspicion of inferior vena cava thrombus
D. Renal vein thrombosis
E. Mesenteric vein thrombosis

IX. Vasculitis and collagen vascular disease[1,25,26] [One of the following]

A. History of collagen vascular disease
B. Blue toe syndrome
C. Claudication
D. Non healing vascular ulcers of the lower extremity
E. History of suspicion of polyarteritis nodosa
F. Known or suspected Takayasu's arteritis
G. Henoch-Schönlein purpura

X. Suspected pelvic AVM[1,27] [One of the following]

A. Pulsatile pelvic mass
B. Incidental finding on prior imaging including ultrasound
C. Pelvic pain

XI. Planning for transcatheter aortic valve implantation (TAVI) or transcatheter aortic valve replacement (TAVR)[28, 29]

XII. Preoperative planning of breast reconstruction using a tissue flap[30] (CTA of the abdomen and pelvis)

References:

1. American College of Radiology (ACR), North American Society for Cardiovascular Imaging (NASCI), Society for Pediatric Radiology (SPR). ACR-NASCI-SPR practice guideline for the performance of pediatric and adult body magnetic resonance angiography (MRA), [online publication]. http://www.guidelines.gov/content.aspx?id=32520&search=abdominal+aortic+aneurysm.
2. Shih MP, Hagspiel. CTA and MRA in mesenteric ischemia: part 1, role in diagnosis and differential diagnosis, AJR, 2007; 188:452-461.
3. Shih MP, Angle JF, Leung DA, et al. CTA and MRA in mesenteric ischemia: part 2, normal findings and complications after surgical and endovascular treatment, AJR, 2007; 188: 462-471.
4. American Gastroenterological Association medical position statement: guidelines on intestinal ischemia, Gastroenterology, 2000; 118:951-953.
5. Theodoropoulou A, Koutroubakis IE. Ischemic colitis: Clinical practice in diagnosis and treatment World J Gastroenterol 2008 December 28; 14(48): 7302-7308.
6. Sreenarasimhaiah J. Diagnosis and management of intestinal ischaemic disorders BMJ. 2003 June 21; 326(7403): 1372–1376.

7. Lee SS, et al. Hepatic arteries in potential donors for living related liver transplantation: evaluation with multi-detector row CT angiography, Radiology, 2003; 227:391-399.
8. Lim JS, Kim M-J, Kim JH, et al. Preoperative MRI of potential living-donor-related liver transplantation using a single dose of gadobenate dimeglumine. AJR, 2005; 185:424-431.
9. Desjardins B, Rybicki FJ, Dill KE, et al. Expert Panel on Vascular Imaging. American College of Radiology ACR Appropriateness Criteria – Pulsatile Abdominal Mass, Suspected Abdominal Aortic Aneurysm. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PulsatileAbdominalMassSuspectedAAA.pdf.
10. Brady AR, Thompson SG, Fowkes GR, et al. Abdominal aortic aneurysm expansion: Risk factors and time intervals for surveillance, Circulation, 2004; 110:16-21.
11. Lindholt JS, Vammen S, Juul S, et al. Optimal interval screening and surveillance of abdominal aortic aneurysms, Eur J Endovasc Surg,2000; 20:369-373.
12. Mehard WB, Heiken JP, Sicard GA. High-attenuating crescent in abdominal aortic aneurysm wall at CT: A sign of acute or impending rupture. Radiology, 1994; 192:359-362.
13. Lederle FA, Wilson SE, Johnson GR, et al. Immediate repair compared with surveillance of small abdominal aortic aneurysms. N Eng J Med, 2002; 346:1437-1444.
14. Stavropoulos SW, Charagundla SR. Imaging techniques for detection and management of endoleaks after endovascular aortic aneurysm repair. Radiology, 2007; 243:641-655.
15. Rooke TW, Hirsch AT, Misra S, et al. 2011 ACC/AHA Update of the guideline for the management of patients with peripheral arterial disease (updating the 2005 guideline). http://content.onlinejacc.org/article.aspx?articleid=1146931.
16. Dill KE, Rybicki FJ, Desjardins B, et al. Expert Panel on Vascular Imaging. American College of Radiology ACR Appropriateness Criteria – Claudication–Suspected Vascular Etiology. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ClaudicationSuspectedVascularEtiology.pdf.
17. Jacobs JE, Latson LA, Abbara S, et al. Expert Panel on Cardiovascular Imaging. American College of Radiology ACR Appropriateness Criteria – Acute Chest Pain–Suspected Aortic Dissection. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteChestPainSuspectedAorticDissection.pdf.
18. Demehri S, Rybicki FJ, Dill KE, et al. Expert Panel on Cardiovascular Imaging. American College of Radiology ACR Appropriateness Criteria – Blunt Chest Trauma Suspected Aortic Injury. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/BluntChestTraumaSuspectedAorticInjury.pdf.
19. Erbel R, Alfonso F, Boileau C, et al. Diagnosis and management of aortic dissection : recommendations of the task force on aortic dissection, European Society of Cardiology, European Heart Journal, 2001, 22:1642-1682. Hagan PG, Nienaber CA, Isselbacher EM, et al. The International Registry of Acute Aortic Dissection (IRAD): new insights into an old disease, JAMA, 2000; 283: 897-903.
20. Von Kodolitsch Y, Schwartz AG, Nienaber CA. Clinical prediction of acute aortic dissection. Arch Intern Med 2000; 160: 2971-82.
21. Hiratzka LR, Bakris GL, Beckman JA, et al. 2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/SVM Guidelines for the diagnosis and management of patients with thoracic aortic disease. Circulation, 2010; 121:e266-369.
22. Nghiem HV, Winter TC III, Mountford MC, et al. Evaluation of the portal venous system before liver transplantation: value of phase-contrast MR angiography, AJR, 1995; 164:871-878.
23. DeLeve LD, Garcia-Tsao F. American Association for the study of liver diseases, Vascular disorders of the liver, Hepatology, 2009; 49:1729-1764.
24. Boyer T, Askal Z, American Association for the Study of Liver Disease (AASLD). ASSLD practice guidelines: the role of transjugular intrahepatic protosystemic shunt (TIPS) in the management of portal hypertension, Hepatology, 2010; 51:1-16.
25. Hunder GGF. Classification and approach to the vasculitides in adults, Up to Date. http://www.uptodate.com/contents/classification-of-and-approach-to-the-vasculitides-in-adults?source=search_result&search=vasculitis&selectedTitle=1%7E150.
26. Kalva SP, Rybicki FJ, Dill KE, et al, Expert Panel on Vascular Imaging, American College of Radiology Appropriateness Criteria-Nontraumatic aortic disease http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/NontraumaticAorticDisease.pdf.
27. Candamio MJD, Lee VS, Rofsky, et al. Pelvic arteriovenous malformation: gadolinium-enhanced three dimensional MR angiography findings, European Radiology, 2000; 10:1257-1260.
28. Achenbach S, Delgado V, Hausleiter J, et al. SCCT expert consensus document on computed tomography imaging before transcatheter aortic valve implantation (RAVI)/transcatheter aortic valve replacement (TAVR), J Cardiovasc Computed Tomography, 2012; 6:366-380.
29. Dill KE, George E, Rybicki FJ, et al Expert Panel on Vascular and Cardiac Imaging, American College of Radiology Appropriateness Criteria- Imaging for transcatheter aortic valve replacement, http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ImagingForTranscatheterAorticValveReplacement.pdf.
30. Clavero JA, Masia J, Larranaga J, et al. MDCT in the preoperative planning of abdominal perforator surgery for postmastectomy breast reconstruction, AJR, 2008; 191:670-676.

74174 CTA Abdomen and Pelvis

Clinical criteria reviewed/revised: 5/29/14, 4/3/14, 10/17/13, 7/23/13, 6/09/13, 7/17/12, 6/18/12, 8/2/11
Medical Advisory Committee reviewed and approved: 8/29/14, 9/18/13, 9/19/2012; 9/21/11

74175 CTA of the Abdomen

Note: For evaluation of PVD, the appropriate CPT code is 75635 (CTA abdominal aorta with runoff) rather than either CTA abdomen or CTA pelvis.

I. Renovascular hypertension, suspected renal artery stenosis[1-7] [One of the following] (MRA if there is decreased renal function)
   A. Severe hypertension (>90 diastolic) with [One of the following]
      1. Progressive renal insufficiency (MRA)
      2. Refractoriness to aggressive medical therapy
   B. Malignant or accelerated hypertension
   C. Acute worsening of previously stable hypertension
   D. Hypertension (> 100) in adult <35 years old
   E. New onset significant hypertension (>90 diastolic) after age 50
   F. Hypertension in a patient with:
      1. Diffuse atherosclerosis or
      2. Incidentally detected asymmetry of kidney size
   G. Hypertension with an acute elevation in plasma creatinine concentration unexplained or after therapy with an ACE inhibitor
   H. Abdominal bruit
   I. Recurring acute pulmonary edema with significant hypertension)
   J. Hypokalemia (<3.5 mmol/L) with normal or elevated plasma renin (>1 ng/ml/Hr) levels in the absence of diuretic therapy
   K. Children with hypertension (MRA)
   L. Hypertension and documented neurofibromatosis

II. Intestinal angina (mesenteric ischemia)[1,8-12] (CTA of the abdomen and pelvis, 74174)

III. Acute mesenteric ischemia with abdominal pain and bleeding[8-12] (CTA of the abdomen and pelvis, 74174)

IV. Evaluation of renal or liver transplant donor[1,13,14]

V. Aortic aneurysm (including mycotic aneurysm)[1,15-24] (CTA of the abdomen and pelvis, 74174)

VI. Peripheral arterial vascular disease[1,22-24]
   Note: For evaluation of PVD, unlike with MRA studies, the appropriate CPT code is 75635 (CTA abdominal aorta with runoff) rather than either CTA abdomen or CTA pelvis or CTA of the extremities.

VII. Suspected dissection of the aorta[1,15,25-29] (CTA of the abdomen and pelvis, 74174)

VIII. Evaluation of the hepatic arteries and veins (including portal vein)[1,13,30-32] [One of the following]
- A. Evaluation of portal and hepatic veins prior to or following TIPS (transjugular intrahepatic portosystemic shunt)
- B. Evaluation of portal and hepatic veins prior to or following surgical intervention for portal hypertension
- C. Evaluation of hepatic vasculature prior to and following embolization procedure
- D. Evaluation of hepatic vasculature prior to planned hepatectomy
- E. Evaluation of liver donor
- F. Suspected hepatic vein thrombosis or Budd-Chiari syndrome [One of the following]
  1. Ascites
  2. Hepatomegaly
  3. Inadequate Doppler ultrasound of hepatic veins
- G. Possible portal vein thrombosis with negative or inadequate Doppler study of the portal vein
  1. Hypercoagulable state
- H. Preoperative evaluation for pancreatic cancer

IX. Evaluation of abdominal veins other than hepatic and portal veins[1] [One of the following]
- A. Nephrotic syndrome
- B. Suspicion of iliac vein thrombus
- C. Suspicion of inferior vena cava thrombus
- D. Renal vein thrombosis – See XII
- E. Mesenteric vein thrombosis

X. Vasculitis and collagen vascular disease[1,33] (CTA of abdomen and pelvis, 74174)

XI. Pancreatic cancer – preoperative evaluation of abdominal vessels[1]
- A. Documentation of pancreatic mass on prior CT or MRI

XII. Suspected renal vein thrombosis (Ultrasound)[1] [One of the following]
- A. Nephrotic syndrome
- B. Proteinuria- 3 grams or more in 24 hours
- C. Lupus nephritis
- D. Hypercoagulable state [One of the following]
  1. Antiphospholipid antibodies
  2. Behçet's syndrome
  3. Protein C deficiency
  4. Protein S deficiency
  5. Factor V Leiden deficiency
  6. Lupus anticoagulant
  7. Hyperactive platelet syndrome

8. MRHFR
9. Anti-cardiolipin antibodies
10. Elevated homocysteine level
11. Anti B2 glycoprotein antibodies
12. Elevated fibrinogen
13. PTT abnormal
14. Antithrombin III antibodies
15. Oral contraceptive use
16. Hormone replacement
17. Sickle cell anemia

XIII. Preoperative planning of breast reconstruction using a tissue flap[34] (CTA of the abdomen and pelvis)

References:

1. American College of Radiology (ACR), North American Society for Cardiovascular Imaging (NASCI), Society for Pediatric Radiology (SPR), ACR-NASCI-SPR practice guideline for the performance of pediatric and adult body magnetic resonance angiography (MRA), [online publication]. http://www.guidelines.gov/content.aspx?id=32520&search=abdominal+aortic+aneurysm.
2. Pilleul F, Beuf O. Abdominal arteries should be evaluated by 3D contrast-enhanced MRA as the first step, Acta Radiologica, 2002; 43(5): 544-542.
3. Boudeqijn G, Vasbinder C, Nelemans PJ, et al. Diagnostic tests for renal artery stenosis in patients suspected of having renovascular hypertension, Annals of Int Med, 2001; 135(6):401-411.
4. Leung DA, Hagspiel KD, Angle JF, et al. MR angiography of the renal arteries, Radiol Clin N Am, 2002: 40:847-865.
5. Qanadli SD, Soulez G, Therasse E, et al. Detection of renal artery stenosis, AJR, 2001; 177:1123-1129.
6. Harvin HJ, Casalino DD, Remer EM, et al. Expert Panel on Urologic Imaging. American College of Radiology ACR Appropriateness Criteria – Renovascular Hypertension. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/RenovascularHypertension.pdf.
7. Chobanian AV, Bakris GL, Black HR, et al. Seventh report of the joint national committee on prevention, detection, evaluation and treatment of high blood pressure, Hypertension, 2003; 42(6):1206-1252.
8. Shih MP, Hagspiel KD. CTA and MRA in mesenteric ischemia: part 1, role in diagnosis and differential diagnosis, AJR, 2007; 188:452-461.
9. Shih MP, Angle JF, Leung DA, et al. CTA and MRA in mesenteric ischemia: part 2, normal findings and complications after surgical and endovascular treatment, AJR, 2007; 188: 462-471.
10. American Gastroenterological Association medical position statement: guidelines on intestinal ischemia, Gastroenterology, 2000; 118:951-953.
11. Theodoropoulou A, Koutroubakis IE. Ischemic colitis: Clinical practice in diagnosis and treatment World J Gastroenterol 2008 December 28; 14(48): 7302-7308.
12. Sreenarasimhaiah J. Diagnosis and management of intestinal ischaemic disorders BMJ. 2003 June 21; 326(7403): 1372–1376.
13. Lee SS, Kim TK, Byun JH, et al. Hepatic arteries in potential donors for living related liver transplantation: evaluation with multi–detector row CT angiography, Radiology, 2003; 227:391-399.
14. Lim JS, Kim M-J, Kim JH, et al. Preoperative MRI of potential living-donor-related liver transplantation using a single dose of gadobenate dimeglumine. AJR, 2005; 185:424-431.
15. Fleming C, Whitlock EP, Beil TL. Screening for abdominal aortic aneurysm: a best-evidence systematic review for the U.S. Preventive Services Task Force. http://www.uspreventiveservicestaskforce.org/uspstf05/aaascr/aaarev.pdf.
16. Desjardins B, Rybicki FJ, Dill KE, et al. Expert Panel on Vascular Imaging. American College of Radiology ACR Appropriateness Criteria – Pulsatile Abdominal Mass, Suspected Abdominal Aortic Aneurysm. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PulsatileAbdominalMassSuspectedAAA.pdf.
17. Brady AR, Thompson SG, Fowkes GR, et al. Abdominal aortic aneurysm expansion: Risk factors and time intervals for surveillance, Circulation, 2004; 90:16-21.
18. Lindholt JS, Vammen S, Juul S, et al. Optimal interval screening and surveillance of abdominal aortic aneurysms, Eur J Endovasc Surg,2000; 20:369-373.
19. Mehard WB, Heiken JP, Sicard GA. High-attenuating crescent in abdominal aortic aneurysm wall at CT: A sign of acute or impending rupture. Radiology, 1994; 192:359-362.
20. Lederle FA, Wilson SE, Johnson GR, et al. Immediate repair compared with surveillance of small abdominal aortic aneurysms. N Eng J Med, 2002; 346:1437-1444.

21. Stavropoulos SW, Charagundla SR. Imaging techniques for detection and management of endoleaks after endovascular aortic aneurysm repair. Radiology, 2007; 243:641-655.
22. Frykberg RG, Zagonis T, Armstrong DG, et al. Diabetic foot disorders: a clinical practice guideline (2006 revision), Journal of Foot and Ankle Surgery, 2006; 45(5):S1-S66.
23. Rooke TW, Hirsch AT, Misra S, et al. 2011 ACC/AHA update of the guideline for the management of patients with peripheral arterial disease (updating the 2005 guideline). http://content.onlinejacc.org/article.aspx?articleid=1146931.
24. Dill KE, Rybicki FJ, Desjardins B, et al. Expert Panel on Cardiovascular Imaging. American College of Radiology ACR Appropriateness Criteria – Claudication–Suspected Vascular Etiology. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ClaudicationSuspectedVascularEtiology.pdf.
25. Jacobs JE, Latson LA, Abbara S, et al. Expert Panel on Cardiovascular Imaging. American College of Radiology ACR Appropriateness Criteria – Acute Chest Pain–Suspected Aortic Dissection. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteChestPainSuspectedAorticDissection.pdf.
26. Demehri S, Rybicki FJ, Dill KE, et al. Expert Panel on Cardiovascular Imaging. American College of Radiology ACR Appropriateness Criteria – Blunt Chest Trauma–Suspected Aortic Injury. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/BluntChestTraumaSuspectedAorticInjury.pdf.
27. Erbel R, Alfonso F, Boileau C, et al. Diagnosis and management of aortic dissection: recommendations of the task force on aortic dissection, European Society of Cardiology, European Heart Journal, 2001, 22:1642-1682.
28. Von Kodolitsch Y, Schwartz AG, Nienaber CA. Clinical prediction of acute aortic dissection. Arch Intern Med 2000; 160: 2971-82.
29. Hiratzka LR, Bakris GL, Beckman JA, et al. 2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/SVM Guidelines for the diagnosis and management of patients with thoracic aortic disease. Circulation, 2010; 121:e266-369.
30. Nghiem HV, Winter TC III, Mountford MC, et al. Evaluation of the portal venous system before liver transplantation: value of phase-contrast MR angiography, AJR, 1995; 164:871-878.
31. DeLeve LD, Garcia-Tsao F. American Association for the Study of Liver Diseases (AASLD), Vascular disorders of the liver, Hepatology, 2009; 49:1729-1764.
32. Boyer T, Askal Z. American Association for the Study of Liver Diseases (AASLD). AASLD practice guidelines: the role of transjugular intrahepatic protosystemic shunt (TIPS) in the management of portal hypertension, Hepatology, 2010; 51:1-16.
33. Kalva SP, Rybicki FJ, Dill KE, et al, Expert Panel on Vascular Imaging, American College of Radiology Appropriateness Criteria-Nontraumatic aortic disease http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/NontraumaticAorticDisease.pdf.
34. Clavero JA, Masia J, Larranaga J, et al. MDCT in the preoperative planning of abdominal perforator surgery for postmastectomy breast reconstruction, AJR, 2008; 191:670-676.

74175 CTA of the Abdomen

Clinical criteria reviewed/revised 5/29/14, 4/3/14, 7/23/13, 7/18/12, 10/12/11, 8/21/11, 11/17/10, 5/26/10, 1/21/10, 12/09
Medical Advisory Committee reviewed and approved: 8/29/14, 9/18/13, 9/19/12, 9/21/11

74176 CT Abdomen and Pelvis without Contrast
74177 CT Abdomen and Pelvis with Contrast
74178 CT Abdomen One or Both Body Regions without and with Contrast

Note: For radiation therapy planning use 77014.
For CT guided needle placement, biopsy or drainage use 77012.
For CT guided tissue ablation use 77013.

I. Complaints associated with abdominal or pelvic pain[1-11] [One of the following]

A. Abdominal pain persisting and one of the following:
   1. Aural temperature >38.3°C or >100.9°F
   2. WBC >11,500/cu.mm
   3. Rebound
   4. Guarding
   5. Lipase and/or amylase > 3 times normal
   6. KUB suggesting bowel obstruction

B. Obstructive uropathy or hydronephrosis with negative ultrasound [One of the following]
   1. Pain in flank, radiating toward the groin
   2. Hematuria

C. Diverticulitis with left lower quadrant pain [One of the following]
   1. Aural temperature >38.3°C or >100.9°F
   2. Leukocytosis, WBC >11,500/cu.mm
   3. Diverticulosis by prior imaging study
   4. Rebound

D. Abscess [One of the following]
   1. Acute non localized abdominal pain
      a. Aural temperature >38.3°C or >100.9°F
      b. Leukocytosis, WBC >11,500/cu.mm
      c. Rebound
   2. Follow up during or after treatment [One of the following]
      a. Condition unimproved or worsening while on treatment
      b. Routine follow-up study after treatment, including evaluation for removal of drain

E. Appendicitis (In children and pregnant women, ultrasound is the initial study except for follow up of known appendicitis with suspected complications. If this is not possible then CT of the abdomen and pelvis. MRI abdomen [74181, 74182, or 74183] in pregnant women)
   1. Right lower quadrant pain [One of the following]
      a. Aural temperature >38.3°C or >100.9°F
      b. Leukocytosis, WBC >11,500/cu.mm
      c. Rebound

F. Crohn's disease and inflammatory bowel disease (suspected) [One of the following]
   1. Suspected Crohn's disease [One of the following]

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a. Abdominal pain and diarrhea for more than 6 weeks
b. Aural temperature >38.3°C or >100.9°F
c. Perianal fistula or fissure
d. Enterovesical fistula
e. Enterovaginal fistula
f. Enterocutaneous fistula
g. Children with unexplained anemia, growth failure, and abdominal pain

2. Complications of known Crohn's disease [One of the following]
a. Mass on abdominal, pelvic or rectal exam
b. Aural temperature >38.3°C or >100.9°F
c. Leukocytosis, WBC >11,500/cu.mm
d. Guarding
e. Rebound
f. Follow-up during or after treatment [One of the following]
i. Condition unimproved or worsening after drainage and IV antibiotics for at least two days
ii. Condition unimproved or worsening after IV Abx Rx >1 wk
iii. Routine follow-up study after treatment, including evaluation for removal of drain
g. Fistula
h. Small bowel obstruction
i. Perianal fistula
j. Stricture or stenosis

3. Any evidence of clinical deterioration while on steroids or immunosuppressives

G. Ulcerative colitis with bloody mucoid stools [One of the following]
1. Diarrhea
2. Pain
3. Tenesmus

II. Evaluation of symptoms after any abdominopelvic surgery[1] [One of the following]

A. Any intra-abdominal surgery
1. Acute non localized abdominal pain
a. Aural temperature >38.3°C or >100.9°F
b. Leukocytosis, WBC >11,500/cu.mm
c. Rebound

B. Follow up after percutaneous drainage of intra-abdominal, retroperitoneal or pelvic abscess

III. Aneurysm[12-20] (including mycotic aneurysm) [One of the following]

A. Patient with Marfan's or Ehlers-Danlos syndrome
B. Turner's syndrome
C. Pulsatile abdominal mass
D. Known AAA [One of the following]
1. Periodic follow-up of an asymptomatic known AAA will be according to the following schedule if there is an inadequate ultrasound and there has not been a surgical repair [One of the following]
a. 2.5-2.9 cm every 5 years

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b. 3.0-3.4 cm every 3 years
c. 3.5-3.9 cm every year
d. 4.0-4.4 cm every year
e. 4.5-4.9 cm every 6 months
f. 5.0-5.5 cm every 3-6 months

2. New onset of pain

E. Postoperative evaluation following repair including surgery or endovascular repair (stent graft) (CTA) [One of the following]
1. 1 month after repair
2. 3 months after repair
3. 6 months after repair
4. Annually after repair
5. Suspicion of endoleak

F. Aneurysm of any other intra-abdominal artery detected on other imaging

G. Vascular insufficiency of the bowel (suspicion of) [Both of the following]
1. Abdominal pain
2. Other clinical findings [One of the following]
a. Leukocytosis, WBC >11,500/cu.mm
b. Stool positive for occult blood
c. Nausea, vomiting or diarrhea
d. History of abdominal angina (pain after eating for approximately 3 hours)

H. Planning for endovascular or surgical repair of documented aortic aneurysm

I. Screening for aneurysm (Ultrasound is first study for screening. CT, CTA, MRI or MRA should only be used if the aorta cannot be visualized adequately on US, and this must be documented with a faxed copy of the US report.) [One of the following]
1. Pulsatile mass with nondiagnostic ultrasound
2. History of first-degree relative with an abdominal aortic aneurysm and non interpretable ultrasound
3. Male age 65-75 with a smoking history
4. Pulsatile mass on abdominal, vaginal or rectal examination

IV. Small bowel obstruction[21-23] [One of the following]

A. Abdominal distention on exam
B. Constipation or obstipation (no stool or gas for 24-48 hours)
C. Borborygmus, loud bowel sounds, high pitched tinkling sounds
D. Colicky abdominal pain
E. Tympani
F. High pitched bowel sounds
G. Abdominal mass
H. Nausea and vomiting
I. X-ray demonstrating or suggesting small bowel obstruction
J. Incomplete or intermittent small bowel obstruction

V. Pancreatitis with abdominal pain or pancreatic pseudocyst[57-59] [One of the following]

A. Suspected acute pancreatitis with abdominal pain, (This should not be done sooner than 48-72 hours if the diagnosis is clear based on amylase and lipase levels. A scan performed less than 72 hours after presentation may underestimate the extent of the disease) [One of the following]
   1. Initial scan [Both of the following] 48-72 hours after onset of symptoms
      a. Amylase >3 times the upper normal laboratory value
      b. Lipase >3 times the upper normal laboratory value
   2. Initial scan at onset of abdominal pain but serum amylase and lipase are not >3 times normal but with severe abdominal pain and epigastric pain that increases rapidly in severity and persists without any relief
   3. Follow up scan 7-21 after onset of symptoms with a confirmed diagnosis

B. Known pancreatitis with any of the following allows for repeat exams if present [One of the following]
   1. Hemodynamic instability
      a. Falling hematocrit
      b. Falling blood pressure
   2. Aural temperature > 38.3°C or > 100.9°F
   3. White blood cell count or leukocytosis of >12,000 cells/mm^3
   4. White blood cell count < 4000 cells/mm^3
   5. Retroperitoneal air on prior CT
   6. Positive blood culture
   7. Signs of peritonitis (rebound, or guarding or tenderness)
   8. Poor oxygen saturation, signs of ARDS (adult respiratory distress syndrome)
   9. Signs of renal failure rising BUN and creatinine

C. Suspected pancreatic pseudocyst [Both of the following]
   1. History [One of the following]
      a. Acute pancreatitis with onset at least 4 wks earlier
      b. Pancreatitis secondary to trauma (time irrelevant)
      c. Chronic pancreatitis
   2. Clinical findings [One of the following]
      a. Abdominal/back pain
      b. Abdominal tenderness
      c. Abdominal mass

D. Evaluation of known pancreatic pseudocyst [One of the following]
   1. Periodic evaluation for change in size
   2. New or worsening clinical findings such as recurrent abdominal pain, rising amylase or lipase, aural temperature >38.3°C or >100.9°F

VI. Chronic pancreatitis with history of recurrent pancreatitis and abdominal pain and no definitive diagnosis with ultrasound or endoscopic ultrasound[60, 61] (not helpful for early diagnosis; only confirmation of diagnosis and surgical planning)

VII. Pancreatic cancer or mass[31-34] [One of the following]

A. Symptoms [One of the following]
   1. Weight loss (see XVIII)

2. Midepigastric pain which may radiate to the back

B. Elevated tumor markers [One of the following]
   1. CA19-9 (>35Ku/L)
   2. CEA >2.5 in nonsmoker
   3. CEA >5.0 in a smoker
C. Prior imaging with dilatation of the bile duct and/or pancreatic duct (US, ERCP, MRCP)
D. Pancreatic mass on recent prior imaging and request for "pancreatic protocol"
E. Initial staging of pancreatic cancer if not already performed
F. Painless jaundice – See XV below
G. Follow up of known pancreatic cancer [One of the following]
   1. Immediately following surgery
   2. Following completion of chemotherapy
   3. Every 3-6 months for 2 years
   4. Annually after 2 years

VIII. Adrenal disease or mass including adrenal carcinoma[45, 62-66] [One of the following]

A. Suspected pheochromocytoma or paraganglioma [One of the following]
   1. Fractionated metanephrines in plasma > 3-4 times the upper laboratory limit
   2. 24 hour urinary total metanephrine >1800µg
   3. Clonidine suppression test positive (plasma norepinephrine is > 500pg/ml or > 2.96nmol/L or < 50% decrease in plasma norepinephrine) if fractionated metanephrines are above normal but less than 4 times the upper limit of normal
   4. Suspicion of pheochromocytoma in individual with MEN2, von Hippel-Lindau syndrome and neurofibromatosis type 1 (NF-1) if the blood and urine tests are not abnormal
B. Follow up after treatment of pheochromocytoma or paraganglioma [One of the following]
   1. 3-12 months after resection up to 1 year
   2. 6-12 months for 2nd and 3rd years
   3. Annually for years 4-10
   4. Rising blood pressure or serum markers (metanephrines, urine VMA)
C. Suspected Cushing's syndrome [One of the following]
   1. 24 hr urine free cortisol > 100mcg/24hr
   2. No suppression by dexamethasone
D. Suspected aldosteronoma or primary aldosteronism or Conn's syndrome [One of the following]
   1. Hypertension that is drug resistant (need for >3 drugs)
   2. Spontaneous (<3.5 mEq/L) or severe diuretic-induced (<3mEq/L) hypokalemia
   3. Plasma aldosterone to rennin ratio >10 when aldosterone is measured in ng/dL
   4. 24 hour urinary aldosterone excretion test >14µg/day
E. Incidental finding on other imaging such as CT or MRI scan performed for other purposes (CT or MRI of the chest or heart), or US with no history of malignancy [One of the following]
   1. No dedicated abdominal CT or MRI performed previously
   2. Screening is negative for hypercortisolism, aldosteronism (if hypertensive) and pheochromocytoma
      a. Follow up CT scan
         i. Benign appearing adenoma <4m or myelolipoma on prior scan

01. Repeat scan 6-12 months after initial dedicated scan
    a. No change in size or < 1cm increase in size then no further imaging
    b. Enlarging (>1cm increase in size in one year) repeat CT

ii. Benign appearing adenoma 4-6 cm in size
01. Repeat scan in 3-6 months
    a. No change in size or < 1cm increase in size repeat 6-12 months
    b. Enlarging (>1cm increase in size in one year) no repeat imaging (see NCCN guidelines)

F. Adrenal carcinoma can be functioning or non functioning with tissue diagnosis
1. Localized disease after surgery
    a. Image every 3-12 months for 5 years

G. Metastatic disease
1. Personal history of malignancy (most common but not limited to lung, breast, gastric and renal carcinomas)

IX. Splenomegaly with LUQ pain

X. Complex or solid abdominal or liver mass on recent ultrasound[67, 68]

XI. New palpable abdominal mass[69]

XII. New renal mass suspected or detected on prior imaging[27] (For renal cell cancer, see XXXVI below) [One of the following]

A. Clarification of findings on prior ultrasound or CT and request is for "renal protocol" (CT of the abdomen, CPT code 74150 or 74160 or 74170)
B. Cystic or solid mass detected on ultrasound
1. Simple cyst confirmed on prior CT to be simple cyst or Bosniak class I cyst – no further imaging is indicated

C. Bosniak class II cyst on prior CT (or MRI) (CT of the abdomen, CPT code 74150 or 74160 or 74170)
1. CT may be certified every 6 months for 3 years and if stable no further imaging

XIII. Evaluation of painless jaundice[33]

A. Painless jaundice for more than 3 months with one or more of the following and elevated bilirubin with either direct bilirubin >.2 or total bilirubin >1.9
1. Unintentional weight loss
2. Fatigue
3. Anorexia

XIV. Fever of unknown origin (FUO)[70, 71] with aural temperature >38.3°C or >100.9°F on several occasions over at least three weeks [One of the following]

A. Uncertain diagnosis after lab studies [All of the following]
1. Three blood cultures
2. Urine culture
3. Tuberculin skin test
4. HIV antibody assay and HIV viral load for patients at high risk

5. Chest x-ray

B. Associated night sweats

XV. Abdominal and pelvic trauma[72-74] (stable outpatient only) [One of the following]

A. Initial evaluation if stable and if not already done in the emergency department
B. Hematuria >35 RBC/HPF if stable
C. Follow-up for known/suspected intra-abdominal injury
   1. Periodic assessment
   2. New or worsening symptoms or findings

XVI. Weight loss[75] of 10 pounds more than 5% body weight in a year or less

XVII. Hematuria[3]

XVIII. CT enterography[9,76, 77] [One of the following]

A. Bowel obstruction
B. Celiac disease
C. Polyposis syndromes
D. Small bowel tumor
E. Suspected Crohn's disease [One of the following]
   1. Abdominal pain and diarrhea for more than 6 weeks
   2. Aural temperature >38.3°C or >100.9°F
   3. Perianal fistula or fissure
   4. Enterovesical fistula
   5. Enterovaginal fistula
   6. Enterocutaneous fistula
   7. Children with unexplained anemia, growth failure, and abdominal pain
F. Known Crohn's disease [One of the following]
   1. Mass on abdominal, pelvic or rectal exam
   2. Aural temperature >38.3°C or >100.9°F
   3. Leukocytosis, WBC >11,500/cu.mm
   4. Guarding
   5. Rebound
   6. Follow-up during or after treatment [One of the following]
   7. Condition unimproved or worsening after drainage and IV antibiotics for at least two days
   8. Condition unimproved or worsening after IV Abx Rx >1 wk
   9. Routine follow-up study after treatment, including evaluation for removal of drain
   10. Fistula
   11. Small bowel obstruction
   12. Perianal fistula
   13. Stricture or stenosis
   14. Any evidence of clinical deterioration while on steroids or immunosuppressives

XIX. Neuroendocrine tumor including carcinoid, pheochromocytoma, paraganglioma, islet cell tumor of the pancreas, poorly differentiated or high grade or aggressive small cell tumor other than lung[45, 78-81] [One of the following]

A. Carcinoid [One of the following]
   1. New diagnosis [One of the following]
      a. Elevated urine 5HIAA >15mg/24hr
      b. Elevated chromogranin A (CgA) >39ng/L
      c. Elevated substance P >270 ng/L or pg/mL
      d. Elevated gastrin >100pg/mL
      e. Elevated serotonin >330mcmol/L
   2. Known diagnosis post resection [One of the following]
      a. 3-12 months post resection
      b. Every 6-12 months for years 2-10
      c. Repeat scan if rising tumor markers such as 5HIAA, chromogranin, serotonin, gastrin or substance P as indicated in 1 a-e above

B. Islet cell tumor of the pancreas initial [One of the following]
   1. Gastrinoma or Zollinger-Ellison syndrome [One of the following]
      a. Elevated serum gastrin >100pg/m
      b. Positive secretin test
   2. Insulinoma [One of the following]
      a. Elevated serum C peptide
      b. Fasting blood glucose of <40mg/dL
      c. Elevated serum insulin >2.0ng/ml
   3. Glucagonoma [One of the following]
      a. Elevated serum glucagon >100pg/ml
   4. VIPoma
      a. Elevated vasoactive intestinal polypeptide (VIP) >70pg/ml
   5. Somatostatinoma
      a. Elevated somatostatin

C. Restaging after completion of treatment for any islet cell tumor to establish a new baseline

D. Surveillance of islet cell tumors [One of the following]
   1. 3-12 months after resection then
   2. Every 6-12 months for years 2-10
   3. Repeat scan if rising tumor markers as indicated above

E. Pheochromocytoma
   1. Suspected pheochromocytoma or paraganglioma [One of the following]
      a. Fractionated metanephrines in plasma > 3-4 times the upper laboratory limit
      b. 24 hour urinary total metanephrine >1800µg
      c. Clonidine suppression test positive (plasma norepinephrine is > 500pg/ml or > 2.96nmol/L or < 50% decrease in plasma norepinephrine) if fractionated metanephrines are above normal but less than 4 times the upper limit of normal
      d. Suspicion of pheochromocytoma in individual with MEN2, von Hippel-Lindau syndrome and neurofibromatosis type 1 (NF-1) if the blood and urine tests are not abnormal
   2. Follow up after treatment of pheochromocytoma or paraganglioma [One of the following]
      a. 3-12 months after resection up to 1 year

b. 6-12 months for 2nd and 3rd years
c. Annually for years 4-10
d. Rising blood pressure or serum markers (metanephrines, urine VMA)

XX. Evaluation of cirrhosis and portal hypertension[82, 83] [One of the following]

A. Hepatitis B or C
   1. Ultrasound demonstrating a liver mass >1cm
B. Cirrhosis
   1. Planned TIPS (transjugular intrahepatic portosystemic shunt – relatively noninvasive procedure for portal hypertension)

XXI. Screening for or hepatocellular carcinoma and either known carrier of hepatitis B or C or documented cirrhosis[48,84-89] (See CT of the abdomen, CPT codes 74150, 74160 or 74170)

XXII. Follow-up of known renal abscess or complicated pyelonephritis[90]

XXIII. Abscess[1,5,9] [One of the following]

A. Suspected [Both of the following]
   1. Abdominal pain
   2. Other clinical findings [One of the following]
      a. Mass on abdominal, pelvic or rectal exam
      b. Aural temperature >38.3°C or >100.9°F
      c. Leukocytosis, WBC >11,500/cu.mm
      d. Rebound nor guarding
B. Follow up during or after treatment [One of the following]
   1. Condition unimproved or worsening under treatment
   2. Routine follow-up study after treatment including evaluation for removal of drain

XXIV. Abdominal or pelvic hernia and negative ultrasound[91-93] [One of the following]

A. Abdominal pain or discomfort [One of the following]
   1. Worsened by straining or lifting
   2. Worsened by prolonged standing
B. Visible or palpable mass [One of the following]
   1. More prominent in upright position
   2. More prominent with Valsalva maneuver
C. Strangulation [All of the following]
   1. Colicky pain abdominal pain
   2. Palpable mass
   3. Signs of intestinal obstruction
D. After abdominal surgery with incisional pain associated with bulge or suspected defect

XXV. Dissection of the aorta[94-98] (CTA) [One of the following]

A. Unequal blood pressure in the arms
B. Rapid onset of “ripping, tearing, searing” severe chest or upper back or abdominal pain
C. Syncope and chest pain

D. Shortness of breath
E. CVA or stroke
F. Loss of pulses
G. New aortic insufficiency murmur
H. Marfan's syndrome
I. Recent aortic manipulation (such as catheter angiography)
J. Family history of aortic disease
K. Follow up of known dissection [One of the following]
    1. 1 month after repair
    2. 3 months after repair
    3. 6 months after repair
    4. 12 months after repair
    5. Annually after 12 months
L. New symptoms after repair [One of the following]
    1. See A-J above

XXVI. Crohn's disease and inflammatory bowel disease[8, 77] (For children and women of childbearing age, consider MRI enterography) [One of the following]

A. Suspected Crohn's disease [One of the following]
    1. Aural temperature >38.3°C or >100.9°F
    2. Diarrhea
    3. Weight loss
    4. Fatigue
    5. Abdominal pain
    6. Perianal fistula or fissure
    7. Enterovesical fistula
    8. Enterovaginal fistula
    9. Enterocutaneous fistula
    10. Right lower quadrant tenderness
B. Complications of Crohn's disease [One of the following]
    1. Suspected abscess, fistula or stricture
        a. Clinical findings [One of the following]
            i. Mass on abdominal, pelvic or rectal exam
            ii. Aural temperature >38.3°C or >100.9°F
            iii. Leukocytosis, WBC >11,500/cu.mm
            iv. Abdominal tenderness
            v. Guarding
            vi. Rebound
            vii. Diarrhea
    2. Follow-up during or after treatment [One of the following]
        a. Condition unimproved or worsening under treatment
        b. Routine follow-up study after treatment, including evaluation for removal of drain

XXVII. Appendicitis[6,7] (In children and pregnant women, ultrasound as the initial study except for follow up of known appendicitis with suspected complications. If this is not possible then see CT of the abdomen and study [CPT code 74176, 74177 or 74178]. MRI abdomen [74181, 74182 or 74183] in pregnant women).
- A. Right lower quadrant pain [One of the following]
  1. Aural temperature >38.3°C or >100.9°F
  2. Leukocytosis, WBC >11,500/cu.mm
  3. Rebound

XXVIII. Diverticulitis, suspected or known in a patient with lower abdominal pain and/or mass[4,5] [Both of the following]
- A. Lower abdominal pain or mass
- B. Other clinical findings [One of the following]
  1. Aural temperature >38.3°C or >100.9°F
  2. Leukocytosis, WBC >11,500/cu.mm
  3. Diverticulosis by prior imaging study
  4. Rebound

XXIX. Kidney or renal stones[2] [One of the following]
- A. Flank pain
- B. Hematuria or blood in the urine
- C. Aural temperature >38.3°C or >100.9°F, chills
- D. Known renal stone for follow up
- E. Hydronephrosis or obstruction on other imaging (such as prior ultrasound or nuclear medicine study)

XXX. Evaluation of elevated liver function tests and non-diagnostic ultrasound[99, 100]
- A. Laboratory findings [One of the following]
  1. Direct bilirubin >0.2
  2. Total bilirubin >1.9
  3. Alkaline phosphatase >147IU/L
  4. Gamma GT or GGT >51 IU/L
  5. AST >40 IU/L
  6. ALT >56 IU/L

XXXI. Soft tissue mass of the abdominal wall not a hernia[101]
- A. Abdominal x-ray non-diagnostic

XXXII. Unilateral leg edema[102] with venous Doppler excluding venous insufficiency or varicose veins [One of the following]
- A. Acute unilateral edema [One of the following]
  1. D-dimer <500 ng/ml and low suspicion of deep venous thrombosis
  2. No evidence of ruptured Baker's cyst or injury to the gastrocnemius muscle
- B. Chronic unilateral edema
  1. No evidence of reflex sympathetic dystrophy

XXXIII. Renal cell cancer[28,46, 47] [One of the following]

A. Initial staging
B. Active surveillance for pT1a tumor
   1. Abdominal CT within 6 months of the initial staging CT then annually
C. Follow up of ablative techniques for pT1a
   1. 3-6 months after ablation
   2. Annually for 5 years
D. Partial or radial nephrectomy for pT1a and pT1b
   1. Scan 3-12 months after surgery to establish a new baseline
   2. If the initial post operative scan is negative then annually for 3 years for partial nephrectomy and after 12 months at the provider's discretion for radical nephrectomy if the initial post op scan is negative
E. Radical nephrectomy for stage II or III
   1. 3-6 months after surgery
   2. 3-6 months for 3 years
   3. Annually for 5 years
   4. Additional follow up as clinically indicated
F. Stage IV or medically or surgically unresectable disease or relapse
   1. Every 6-16 weeks

XXXIV. Breast cancer[37] [One of the following]

A. Initial staging [One of the following]
   1. Clinical stage I–IIB [One of the following]
      a. Alkaline phosphatase >140 U/L
      b. Total bilirubin >1.9 mg/L
      c. GGT >42IU/L
      d. AST >40IU/L
      e. Palpable abdominal mass
      f. Abdominal pain
   2. Clinical stage IIIA or higher
B. Stage IV or known or suspected recurrent disease
   1. Initial staging or restaging (recurrence)
   2. Establish new baseline after treatment
   3. Evidence of progression of disease such as increasing dyspnea, unexplained weight loss, elevated liver function tests, rising tumor markers such as but not limited to CEA, CA 15-3, CA27.29, hypercalcemia, new or worsening disease on physical examination
      a. Before starting any new therapy
      b. Chemotherapy every 2-4 cycles
      c. Endocrine therapy every 2-6 months
      d. Concern for progression of disease as described above

XXXV. Cervical cancer[39] [One of the following]

A. Initial staging
B. Restaging after completion of therapy
C. When clinically indicated

XXXVI. Colon cancer[25,40] [One of the following]

A. Initial staging
B. Restaging after completion of treatment
C. Follow-up (Routine CT scans are not recommended beyond 5 years) [One of the following]
    1. Annually for up to 5 years with node negative disease (colon and rectal)
    2. Rising CEA (colon and rectal)
    3. If the CT is negative with elevated CEA repeat in 3 months until either disease is identified or CEA level stabilizes
    4. Colon cancer stage IV treated for cure with no evidence of disease
        a. Every 3-6 months for 2 years
        b. Every 6-12 months for 3 years

XXXVII. Rectal cancer[41] [One of the following]

A. Initial staging
B. Follow-up after treatment is complete to establish new baseline
C. Follow-up (Routine CT scans are not recommended beyond 5 years) [One of the following]
    1. Annually for up to 5 years if high risk of recurrence (lymphatic or venous invasion or poorly differentiated tumors)
    2. Rising CEA
        a. If the CT is negative with elevated CEA repeat in 3 months until either disease is identified or CEA level stabilizes

XXXVIII. Ovarian cancer, fallopian tube cancer and primary peritoneal cancer[42] [One of the following]

A. Initial staging
B. Following treatment and stable
C. Rising CA-125 with or without prior chemotherapy
D. Clinical relapse with or without prior chemotherapy

XXXIX. Esophageal cancer[43] [One of the following]

A. Initial staging
B. Prior to chemoradiation if PET/CT not done
C. Clinical recurrence

XL. Gastric (stomach) cancer[44] [One of the following]

A. Initial staging
B. Following completion of treatment for restaging
C. Clinical recurrence

XLI. Carcinoid[45] [One of the following]

A. Initial staging
B. Following completion of therapy to establish a new baseline
C. Surveillance [One of the following]
    1. Carcinoid tumors larger than 2 cm or with incomplete resection and are stable with no evidence of disease (CT of the abdomen and pelvis)
    2. Every 3-12 months after resection every 6-12 months

3. Every 6-12 months thereafter

Abnormal laboratory tests suggesting recurrence as listed in A 1-5 above

XLII. Islet cell tumor of the pancreas[45] [One of the following]

A. Initial staging
B. Following completion of therapy to establish a new baseline
C. Surveillance with no evidence of disease [One of the following]
   1. 3-12 months after resection
   2. Every 6-12 months thereafter for 10 years
D. Clinical evidence of recurrence [One of the following]
   1. Gastrinoma or Zollinger-Ellison syndrome [One of the following]
      a. Positive secretin test
      b. May also present with reflux and peptic ulcers
      c. Prominent gastric folds on endoscopy
   2. Insulinoma [One of the following]
      a. Elevated serum C peptide
      b. Fasting blood glucose of <40mg/dL
   3. Glucagonoma [One of the following]
      a. Elevated serum glucagon>100pg/ml
      b. Weight loss
   4. VIPoma
      a. Elevated vasoactive intestinal polypeptide (VIP) >70pg/ml
   5. Somatostatinoma
      a. Elevated somatostatin
   6. Surveillance of any neuroendocrine tumor [One of the following]
      a. 3-6 months after resection
      b. Every 6-12 months for 10 years
   7. Monitoring during treatment
      a. Every 3 months during treatment with chemotherapy or biological therapy

XLIII. Poorly differentiated or high grade or anaplastic small cell carcinoma other than lung[45] [One of the following]

A. Initial staging
B. Following completion of treatment to establish a new baseline
C. Surveillance following treatment of resectable disease [One of the following]
   1. Every 3 months for a year
   2. Every 6 months after 1 year
D. Surveillance following treatment of unresectable or metastatic disease
   1. Every 3 months

XLIV. Hepatoma or hepatocellular carcinoma[48] (See CT of the abdomen) [One of the following]

A. Initial staging
B. Following treatment one time and then every 3-6 months for 2 years
C. After 2 years every 6-12 months
D. New onset of rising AFP

E. Surveillance awaiting liver transplant may be performed every 3 months

XLV. Gallbladder cancer[48] [One of the following]

A. Initial staging
B. Postoperative scan to establish a new baseline
C. Repeat CT scan every 6 months for 2 years

XLVI. Cholangiocarcinoma[48] [One of the following]

A. Initial staging
B. Completion of therapy then every 6 months for 2 years

XLVII. Hodgkin's lymphoma[29,49] [One of the following]

A. Initial staging including CNS lymphoma
B. Restaging while on treatment should be done with PET/CT
C. After treatment with radiation therapy restage with either CT or PET/CT if last PET scan was positive
D. Follow-up
    1. 3 months after completion of radiation therapy treatment
    2. Then every 6-12 months for 2 years
E. Clinical or laboratory evidence of recurrence

XLVIII. Non-Hodgkin's lymphoma[50] (follicular lymphoma, marginal zone lymphoma, MALT lymphoma, mantle cell lymphoma, diffuse large B-cell lymphoma, Burkitt's lymphoma, peripheral T-cell lymphoma, mycosis fungoides, hairy cell leukemia, post-transplant lymphoproliferative disorders, CLL/SLL) [One of the following]

A. Initial staging in addition to PET/CT if not already done
B. Follow up after completion of treatment to establish a new baseline
C. Diffuse Large B cell lymphoma stage I and II
    1. Repeat all positive scans after completing chemotherapy and before radiation therapy
    2. Repeat all positive scans after completing radiation therapy
D. Diffuse Large B cell lymphoma stage III and IV
    1. Restage after 2-4 cycles of chemotherapy
    2. Restage after completing chemotherapy
    3. Relapse or refractory disease restage as clinically indicated
E. Surveillance
    1. Not more frequently than every 6 months for the first 2 years
F. Clinical or laboratory evidence of recurrence
G. For CLL/SLL CT may be needed prior to initiation of therapy

XLIX. Soft tissue sarcoma[51, 101] [One of the following]

A. Myxoid/round cell liposarcoma, epithelioid sarcoma, angiosarcoma leiomyosarcoma, rhabdomyosarcoma or extremity or trunk/head and neck sarcoma [One of the following]
    1. Initial staging
    2. Surveillance imaging after treatment
        a. Stage II-IV or non resectable primary

i. Imaging of primary site and/or metastatic disease
01. Every 3-6 months for up to 3 years
02. Every 6 months for years 4 and 5
03. Annually

B. Retroperitoneal/intra-abdominal (includes desmoid, aggressive fibromatosis and other sarcomas) [One of the following]
1. Initial staging
2. Follow-up if the initial site is abdomen, pelvis or retroperitoneum [One of the following]
a. Following completion of treatment to establish a new baseline (one time)
b. Every 3-6 months for 2-3 years
c. Every 6 months for next 2 years
d. Annually after 4-5 years

C. GIST (gastrointestinal stromal tumor) [One of the following]
1. Initial staging
2. Restaging after surgery every 3-6 months for 3-5 years
3. After 5 years annually

L. Testicular cancer[54] [One of the following]

A. Pure seminoma (CT of the abdomen and pelvis for initial staging) [One of the following]
1. Initial staging
2. Follow up after treatment to establish a new baseline
3. Surveillance of Stage IA and IB tumors not treated with chemotherapy or radiation therapy [One of the following]
a. Every 6 months for 1-2 years
b. Every 6-12 months for year 3
c. Annually for years 4 and 5
4. Stage 1A and IB tumors treated with single agent
a. Annual CT of the abdomen and pelvis for 1-3 years
5. Stage IA, IB and I S treated with radiation
a. Annual CT of the abdomen and pelvis for 3 years
6. Stage IIA and IIB following completion of radiation and/or chemotherapy [One of the following]
a. Every 6-12 months for 1-2 years
b. Annually for year 3
7. Stage IS repeat CT scan of the abdomen and pelvis (stage IS is persistent elevation of tumor (LDH< AFP and beta HCG) markers following orchiectomy)
8. Stage IIC and III after chemotherapy
a. Following completion of chemotherapy
b. If either no residual mass or mass $\leq$ 3cm on scan done for 8a
i. Image as clinically indicated
c. If residual mass >3m on scan performed for 8a
i. PET scan 6 weeks or more following completion of chemotherapy
01. Above PET scan negative image as clinically indicated
02. Above PET scan positive then CT abdomen/pelvis 3-6 months after radical pelvic lymph node dissection (RPLND)

d. CT scan performed after completion of chemotherapy 8a shows progressive enlargement of mass or rising tumor markers image after completion of chemotherapy and as clinically indicated

B. Non seminoma (CT of the abdomen and pelvis for initial staging) [One of the following]
1. Initial staging
2. Stage IA, IB **if surveillance only** (no chemotherapy and/or radiation) [One of the following]
a. Every 3-4 months for 1st year
b. Every 4-6 months for 2nd year
c. Every 6-12 months for 3rd and 4th year
d. Annually for 5th year
e. 6th year and after every 12-24 months
3. Stage IB, IIA and IIB after chemotherapy
a. Following completion of therapy to establish a new baseline
b. Then as clinically indicated
4. Stage IB, IIA and IIB after chemotherapy ± RPLND
a. Follow up after treatment to establish a new baseline (restaging)
b. Restaging scan shows complete response
i. Every 6 months for a year
ii. Every 6-12 months for year 2
iii. Annually years 3-5
iv. Then as clinically indicated

LI. Anal cancer[35] [One of the following]
A. Initial staging
B. Restage after completion of each course of therapy (primary or secondary including surgery and/or radiation and/or chemotherapy)
C. Annually for 3 years

LII. Bladder cancer [24, 36] [One of the following]
A. Initial staging if muscle invasion on biopsy
B. Following completion of treatment
1. Every 3-6 months for 2 years

LIII. New bone lesion suspicious for a metastatic lesion with no known cancer[52] [Both of the following]
A. X-ray demonstrating a bone lesion suspicious for a metastatic lesion
B. 40 years of age or older

LIV. Endometrial cancer[30, 53] [One of the following]
A. Incomplete surgical staging
B. Follow up as clinically indicated

LV. Uterine sarcoma[53] [One of the following]
A. Known or suspected extra uterine disease
B. Surveillance [One of the following]
1. Every 3-6 months for 3 years

2. Every 6 months for next 2 years
3. Annually

LVI. Malignant mesothelioma[103]

A. Initial staging

LVII. TAVR (transcatheter aortic valve replacement) planning[105-106]

LVIII. Evaluation of congenital anomalies of the abdomen and pelvis

LIX. Pheochromocytoma[45] [One of the following]

A. Suspected pheochromocytoma or paraganglioma [One of the following]
   1. Fractionated metanephrines in plasma > 3-4 times the upper laboratory limit
   2. 24 hour urinary total metanephrine >1800µg
   3. Clonidine suppression test positive (plasma norepinephrine is > 500pg/ml or > 2.96nmol/L or < 50% decrease in plasma norepinephrine) if fractionated metanephrines are above normal but less than 4 times the upper limit of normal
   4. Suspicion of pheochromocytoma in individual with MEN2, von Hippel-Lindau syndrome and neurofibromatosis type 1 (NF-1) if the blood and urine tests are not abnormal
B. Follow up after treatment of pheochromocytoma or paraganglioma [One of the following]
   1. 3-12 months after resection up to 1 year
   2. 6-12 months for 2nd and 3rd years
   3. Annually for years 4-10
   4. Rising blood pressure or serum markers (metanephrines, urine VMA)

LX. Renal pelvic and ureteral carcinoma[36]

A. Initial staging
B. Stage pT0 or pT1 every 3-12 months
C. pT2, pT3 or pT4 restage at completion of a course of treatment and then as clinically indicated

LXI. Primary or metastatic bone tumor of the pelvis–known or suspected[107-109] An x-ray is required prior to imaging a suspected bone tumor ; if the x-ray is definitely benign and the lesion is not an osteoid osteoma clinically or radiographically no further imaging is required [One of the following]

A. X-ray results or CT results and suspected (not known) bone tumor [One of the following]
   1. Negative or does not explain the regional symptoms (MRI without contrast)
   2. Suspicious for osteoid osteoma clinically or radiographically (CT)
   3. Indeterminate for malignancy (MRI without and with contrast)
   4. Aggressive appearance on x-ray (MRI without and with contrast)
   5. Pathologic fracture; not definitely benign (MRI without and with contrast)
   6. Incidental finding on prior CT that is not definitely benign (MRI without and with contrast)
B. Osteosarcoma of the pelvis (MRI) [One of the following]
   1. Initial staging of primary site
   2. For high grade osteosarcoma of the pelvis after preoperative chemotherapy
   3. Restaging after completion of treatment
   4. Follow up after treatment[One of the following]

a. Every 3 months for 2 years
b. Every 4months for the third year
c. Every 6 months for the next 2 years (fourth and fifth)
d. Annually after 5 years

C. Ewing's sarcoma of the pelvis (MRI) [One of the following]
1. Initial staging of primary site
2. Restage primary site after completion of primary treatment (usually chemotherapy)
3. Follow up after surgery, or radiation and chemotherapy [One of the following]
a. Every 2-3 months for 2 years
b. Every 4 months for the third year
c. Every 6 months for years 4 and 5
d. Annually after year 5

D. Chondrosarcoma of the pelvis (MRI) [One of the following]
1. Initial staging of primary site
2. Restaging after completion of treatment
3. Low grade and intracompartmental [One of the following]
a. Every 6-12 months for 2 years
b. Annually after 2 years as appropriate
4. High grade (grade II, grade III or clear cell or extracompartmental)
a. Imaging as clinically indicated

E. Chordoma of the pelvis (MRI) [One of the following]
1. Initial staging of primary site
2. Restaging after completion of treatment (surgery and/or radiation therapy)
3. Conventional or chondroid chordoma
a. Imaging of primary site as clinically indicated

F. Giant cell tumor of the bone in the pelvis (MRI) [One of the following]
1. Initial staging of primary site
2. Restaging after completion of treatment
3. Following completion of therapy image primary site as clinically indicated

G. Known primary malignancy other than bone [One of the following]
1. Bone pain in the pelvis with known malignancy and non diagnostic bone scan
2. Known bone metastases with pathologic fracture in the pelvis
3. Elevated alkaline phosphatase (>140 IU/L) with known malignancy and non diagnostic bone scan
4. Positive bone scan in the pelvis, abdomen or retroperitoneum with no pain

LXII. Prostate Cancer[110] (See CT or MRI of the pelvis except for the indications below)

A. Failed treatment [One of the following]
1. Radical prostatectomy
a. PSA fails to fall to undetectable levels
b. Initial undetectable PSA after radical prostatectomy that increases on 2 or more determinations
2. Radiation therapy
a. PSA rise by 2 ng/mL or more above the lowest post treatment PSA
3. Androgen deprivation therapy and rising PSA

LXIII. Melanoma (skin not ocular)[111] [One of the following]

A. Initial staging in addition to PET/CT [One of the following]
   1. Stage III or higher including stage III in transit
   2. Stage I or II if there are specific signs and/or symptoms of systemic disease

B. Follow up
   1. Stage IIB–IV with no signs or symptoms of disease every 4 - 12 months for 5 years
   2. Any new signs or symptoms of disease

LXIV. Adrenal carcinoma can be functioning or non functioning with tissue diagnosis

1. Localized disease after surgery
   a. Image every 3 – 12 months for 5 years
2. Metastatic disease image every 3 months

References:

1. Yaghmai V, Rosen MP, Lalani T, et al, Expert Panel of Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Acute (Nonlocalized) Abdominal Pain and Fever or Suspected Abdominal Abscess. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteAbdominalPainFeverSuspectedAbdominalAbscess.pdf.
2. Coursey CA, Casalino DD, Remer EM, et al, Expert Panel on Urologic Imaging. American College of Radiology Appropriateness Criteria – Acute Onset Flank Pain–Suspicion of Stone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteOnsetFlankPainSuspicionStoneDisease.pdf.
3. Ramchandani P, Kisler T, Francis IR, et al, Expert Panel on Urologic Imaging. American College of Radiology Appropriateness Criteria – Hematuria. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Hematuria.pdf.
4. Miller FH, Rosen MP, Lalani T, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Left Lower Quadrant Pain Suspected Diverticulitis. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/LeftLowerQuadrantPainSuspectedDiverticulitis.pdf.
5. Rafferty J, Shellito P, Hyman NH, et al. Standards Committee of American Society of Colon and Rectal Surgeons. Practice Parameters for Sigmoid Diverticulitis, Dis Colon Rectum, 2006; 49:939-944.
6. Smith MP, Katz DS, Rosen MP, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Right Lower Quadrant Pain–Suspected Appendicitis. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/RightLowerQuadrantPainSuspectedAppendicitis.pdf.
7. Weyant MJ, Eachempati SR, Maluccio MA, et al. Interpretation of computed tomography does not correlate with laboratory or pathologic findings in surgically confirmed acute appendicitis. Surgery, 2000; 128:145-152.
8. Knutson D, Greenberg G, Cronau H. Management of Crohn's Disease—a practical approach, American Family Physician. http://www.aafp.org/afp/2003/0815/p707.html.
9. Fidler JL, Rosen MP, Blake MA, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Crohn Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/CrohnDisease.pdf.
10. Carter MJ, Lobo AJ, Travis SPL, on behalf of the IBD Section of the British Society of Gastroenterology. Gut, 2005; 53 (Suppl V):v1-v16.
11. ACS Surgery Principles & Practice 6th Edition Chapter 43, Acute Abdominal Pain, pages 475-4830.
12. Chaikof EL, Brewster DC, Dalman RL, et al, The care of patients with an abdominal aortic aneurysm: The Society for vascular surgery practice guidelines, J VAsc Surgery, 2009; 50: 2S-49S, .
13. Lederle FA, Wilson SE, Johnson GR, et al. Immediate repair compared with surveillance of small abdominal aortic aneurysms. N Engl J Med, 2002; 346:1437-1444.
14. Stavropoulos SW, Charagundla SR. Imaging techniques for detection and management of endoleaks after endovascular aortic aneurysm repair, Radiology, 2007; 243:641-655.
15. Hirsch AT, Haskal ZJ, Hertzer NR, et al. ACC/AHA 2005 Practice Guidelines for the Management of Patients With Peripheral Arterial Disease (Lower Extremity, Renal, Mesenteric, and Abdominal Aortic): Executive Summary. A Collaborative Report From the American Association for Vascular Surgery/Society for Vascular Surgery, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine and Biology, Society of Interventional Radiology, and the ACC/AHA Task Force on Practice Guidelines (Writing Committee to Develop Guidelines for the Management of Patients With Peripheral Arterial Disease), Circulation, 2006; 113:1474-1547.
16. Desjardins B, Rybicki FJ, Dill KE et al, Expert panel on vascular imaging, American College of Radiology Appropriateness criteria-pulsatile abdominal mass, suspected abdominal aortic aneurysm, http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PulsatileAbdominalMassSuspectedAAA.pdf.
17. Horton KM, Smith C, Fishman EK. MDCT and 3D CT angiography of splanchnic artery aneurysms, AJR, 2007; 189:641-647.
18. Macari M, Chandarana H, Balthazar E, et al. Intestinal ischemia versus intramural hemorrhage: CT evaluation, AJR, 2002; 180:177-184.
19. Wiesner W, Khurana B, Ji H, et al. CT of acute bowel ischemia, Radiology, 2003; 226:635-650.

20. U.S. Preventive Services Task Force. Screening for abdominal aortic aneurysm recommendation statement. http://www.uspreventiveservicestaskforce.org/uspstf05/aaascr/aaars.htm.
21. Furukawa A, Yamasaki M, Furuichi K, et al. Helical CT in the diagnosis of small bowel obstruction, RadioGraphics, 2001; 21:341-355.
22. Katz DS, Baker ME, Rosen MP, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Suspected Small-Bowel Obstruction. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SuspectedSmallBowelObstruction.pdf.
23. Diaz JJ, Bokhari F, Mowery NT, et al. Practice management guidelines for small bowel obstruction, EAST Practice Parameter Workgroup for Management of Small Bowel Obstruction. http://www.east.org/Content/documents/practicemanagementguidelines/small-bowl-obstruction.pdf.
24. Leyendecker JR, Clingan MJ, Remer EM, et al, Expert Panel on Urologic Imaging. American College of Radiology Appropriateness Criteria – Pretreatment Staging of Invasive Bladder Cancer. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PretreatmentStagingInvasiveBladderCancer.pdf.
25. Desch CE, Benson AB, Somerfield MR, et al. Colorectal cancer surveillance: 2005 update of an American Society of Clinical Oncology Practice Guideline. JCO, 2005; 23:8512-8519.
26. Casalino DD, Remer EM, Bishoff JT, et al, Expert Panel on Urologic Imaging. American College of Radiology Appropriateness Criteria – Post-treatment Follow-up of Renal Cell Carcinoma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PostTreatmentFollowUpRenalCellCarcinoma.pdf.
27. Israel GM, Casalino DD, Remer EM, et al, Expert Panel on Urologic Imaging. American College of Radiology Appropriateness Criteria – Indeterminate Renal Masses. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/IndeterminateRenalMasses.pdf.
28. Casalino DD, Remer EM, Bishoff J, et al, Expert Panel on Urologic Imaging. American College of Radiology Appropriateness Criteria – Renal Cell Carcinoma Staging. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/RenalCellCarcinomaStaging.pdf.
29. Chul F, Hodgson, Advani R et al, Expert Panel on Radiation Oncology. American College of Radiology Appropriateness Criteria – Follow-Up of Hodgkin's Lymphoma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Oncology/FollowUpHodgkinsLymphoma.pdf.
30. Lalwani N, Dubinsky T, Javitt MC, et al, Expert Panel on Women's Imaging and Radiation Oncology-Gynecology. American College of Radiology Appropriateness Criteria – Pretreatment Evaluation and Follow-up of Endometrial Cancer. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Oncology/PretreatmentEvaluationAndFollowUpEndometrialCancer.pdf.
31. Zeman RK, Cooper C, Zeiberg AS, et al. TNM Staging of Pancreatic Carcinoma Using Helical CT, AJR, 1997; 169:459-464.
32. Tempero MA, Malafa MP, Behrman SW et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014 Pancreatic Adenocarcinoma. http://www.nccn.org/professionals/physician_gls/pdf/pancreatic.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Pancreatic Adenocarcinoma V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
33. Lalani T, Couto CA, Rosen MP, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Jaundice. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Jaundice.pdf.
34. 2006 Update of ASCO recommendations for the use of tumor markers in gastrointestinal cancer. http://jop.ascopubs.org/content/2/6/314.full.pdf+html.
35. Benson AB III, Venook AP, Bekaii-Saab T, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Anal Carcinoma. http://www.nccn.org/professionals/physician_gls/pdf/anal.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Anal Carcinoma V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
36. Clark PE, Spiess PE, Agarwal N, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version1.2014. Bladder Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bladder.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bladder Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
37. Gradishar WJ, Anderson BO, Blair SL, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Breast Cancer. http://www.nccn.org/professionals/physician_gls/pdf/breast.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Breast Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
38. Nabors LB, Ammirati M, Bierman PJ, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2013. Central Nervous System Cancers. http://www.nccn.org/professionals/physician_gls/pdf/cns.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Central Nervous System Cancers V2.2013.
39. Koh WJ, Greer BE, Abu-Rustum NR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Cervical Cancer. http://www.nccn.org/professionals/physician_gls/pdf/cervical.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Cervical Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.

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40. Benson AB III, Venook AP, Bekaii-Saab T, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Colon Cancer. http://www.nccn.org/professionals/physician_gls/pdf/colon.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Colon Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
41. Benson AB III, Venook AP, Bekaii-Saab T, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Rectal Cancer. http://www.nccn.org/professionals/physician_gls/pdf/rectal.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Rectal Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
42. Morgan RJ, Armstrong DK, Alvarez RD, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Ovarian Cancer. http://www.nccn.org/professionals/physician_gls/pdf/ovarian.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Ovarian Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
43. Ajani JA, Bentrem DJ, Besh S, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2013. Esophageal and Esophagogastric Junction Cancers. http://www.nccn.org/professionals/physician_gls/pdf/esophageal.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Esophageal and Esophagogastric Junction Cancers V2.2013. ©2013 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
44. Ajani JA, Bentrem DJ, Besh S, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2013. Gastric Cancer. http://www.nccn.org/professionals/physician_gls/pdf/gastric.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Gastric Cancer V2.2013. ©2013 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
45. Kulke MH, Shah MH, Benson AB III, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Neuroendocrine Tumors. http://www.nccn.org/professionals/physician_gls/pdf/neuroendocrine.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Neuroendocrine Tumors V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
46. Motzer RJ, Jonasch E, Agarwal JN, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Kidney Cancer. http://www.nccn.org/professionals/physician_gls/pdf/kidney.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Kidney Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
47. Donat SM, Diaz M, Bishoff JT, et al, Follow up for clinically localized renal neoplasms: AUA guideline, http://www.auanet.org/common/pdf/education/clinical-guidance/Renal-Cancer-Followup.pdf.
48. Benson AB III, D'Angelica MI, Abrams TA, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Hepatobiliary Cancers. http://www.nccn.org/professionals/physician_gls/pdf/hepatobiliary.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Hepatobiliary Cancers V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
49. Hoppe RT, Advani RH, Ai WZ, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Hodgkin Lymphoma. http://www.nccn.org/professionals/physician_gls/pdf/hodgkins.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Hodgkin's Lymphomas V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
50. Zelenetz AD, Gordon WG, Wierda WG, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Non-Hodgkin's Lymphomas. http://www.nccn.org/professionals/physician_gls/pdf/nhl.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Non-Hodgkin's Lymphomas V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.

51. Von Mehren M, Lor- Randall R, Benjamin RS, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Soft Tissue Sarcoma. http://www.nccn.org/professionals/physician_gls/pdf/sarcoma.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Soft Tissue Sarcoma V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
52. Biermann JS, Chow W, Adkins DR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Bone Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bone.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bone Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
53. Koh W-J, Greer BE, Abu-Rustum NR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Uterine Neoplasms. http://www.nccn.org/professionals/physician_gls/pdf/uterine.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Uterine Neoplasms V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
54. Motzer RJ, Jonasch E, Agarwal N, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Testicular Cancer. http://www.nccn.org/professionals/physician_gls/pdf/testicular.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Testicular Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
55. Sturgeon, Practice Guidelines for tumor marker use in the clinic, Clinical Chemistry, 2002; 48:1151-1159.
56. Vachani C, Patient guide to tumor markers. http://www.oncolink.org/treatment/article.cfm?id=296&s=42&c=7.
57. AGA Institute technical review on acute pancreatitis. Gastroenterology, 2007; 132: 20022-2044.
58. Baker ME, Nelson RC, Rosen MP, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Acute Pancreatitis. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcutePancreatitis.pdf.
59. Sutton PA, Humes DJ, Purcel G, et al. The role of routine assays of serum amylase and lipase for the diagnosis of acute abdominal pain, Ann R Coll Surg Engl, 2009; 91:381-384.
60. Ammann RW. Diagnosis and management of chronic pancreatitis: current knowledge. Swiss Med Wkly 2006; 136: 166-174.
61. High-Yield Imaging Gastrointestinal Gore Levine. 1st Edition, Copyright 2010, Chronic Pancreatitis, pages 704-706.
62. Remer EM, Casalino DD, Bishoff JT, et al, Expert Panel on Urologic Imaging. American College of Radiology Appropriateness Criteria – Incidentally Discovered Adrenal Mass. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/IncidentallyDiscoveredAdrenalMass.pdf.
63. Grumbach MM, Shaw EB, Biller BMK, et al. Management of the clinically Unapparent Adrenal Mass (incidentaloma), NIH Consensus and State-of-the-Science Statements, 2002, 19(2). http://consensus.nih.gov/2002/2002AdrenalIncidentalomasos021PDF.pdf.
64. Allolio B, Fassnacht M. Clinical Review: Adrenocortical carcinoma: clinical update. http://jcem.endojournals.org/content/91/6/2027.full.pdf+html.
65. Grossman E, Goldstein DS, Hoffman A et al, Glucagon and clonidine testing in the diagnosis of pheochromocytoma, Hypertension, 1991; 17:733-74.
66. Zeiger MA, Thompson GB, Duh Q-Y, et al. American Association of Clinical Endocrinologists and American Association of Endocrine Surgeons Medical Guidelines for the Management of Adrenal Incidentalomas, Endocrine Practice, 2009; 15(Suppl 1): 1-18.
67. Blake MA, McDermott S, Rosen MP, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Suspected Liver Metastases. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SuspectedLiverMetastases.pdf.
68. Nelson, RC, Kame IR, Baker ME, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Liver Lesion Characterization. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/LiverLesionInitialCharacterization.pdf.
69. Jung AJ, Yee J, Rosen MP, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Palpable Abdominal Mass. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PalpableAbdominalMass.pdf.
70. Roth AR, Basello GM. Approach to the adult patient with fever of unknown origin, Am Fam Physician, 2003; 68:2223-2229.
71. Mourad O, Palda V, Detsky AS, A comprehensive evidence-based approach to fever of unknown origin, Arch Intern Med, 2003; 163:545-551.
72. Sudakoff GS, Rosen MP, Rybicki FJ, et al, Expert Panel on Vascular Imaging and Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Blunt Abdominal Trauma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/BluntAbdominalTrauma.pdf.
73. Management of genitourinary trauma, The East Practice Management Guidelines Work Group. http://www.east.org/Content/documents/practicemanagementguidelines/genitourinary-trauma.pdf.
74. Salim A, Sangthong B, Martin M, et al. Whole body imaging in blunt multisystem trauma patients without obvious signs of injury, results of a prospective study. Arch Surg, 2006; 141:468-475.
75. Bouras EP, Lange SM, Scolapio JS. Rational approach to patients with unintentional weight loss. Mayo Clin Proc, 2001; 76:923-929.
76. Paulsen SR, Huprich JE, Fletcher JG, et al. CT Enterography as a diagnostic tool in evaluating small bowel disorders: Review of clinical experience with over 700 cases. RadioGraphics, 2006; 26:641-662.

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77. Booya F, Fletcher JG, Huprich JE, et al. Active Crohn's disease: CT findings and interobserver agreement for enteric phase CT Enterography. Radiology, 2006; 241:787-795.
78. Oberg K. Pancreatic endocrine tumors, Semin Oncol, 2010, 37:594-618.
79. Owen NJ, Sohaib SAA, Peppercorn PD, et al. MRI of pancreatic neuroendocrine tumors, BJR, 2001; 74: 968-973.
80. Herwick S, Miller FH, Keppke AL. MRI of islet cell tumors of the pancreas, AJR, 2006; 187: W472-W480.
81. Oberg k, Knigg U, Kwekkeboom D, et al. Neuroendocrine gastro-entero-pancreatic tumors: ESMO clinical practice guidelines for diagnosis, treatment and follow-up. http://annonc.oxfordjournals.org/content/23/suppl_7/vii124.full.pdf+html.
82. Murray KF, Carithers RL Jr. AASLD practice guidelines: evaluation of the patient for liver transplantation. Hepatology, 2010; 41(6):1-26.
83. Boyer TD, Haskal ZJ. AASLD practice guideline The role of transjugular intrahepatic portosystemic shunt in the management of portal hypertension, Hepatology, 2005; 41(2):386-400.
84. Arguedas MR, Chen VK, Eloubeidi MA, et al. Screening for Hepatocellular Carcinoma in patients with Hepatitis C Cirrhosis: A Cost-Utility Analysis The American Journal of Gastroenterology, 2003; 98(3):679-690.
85. Ryder SD. Guidelines for the diagnosis and treatment of hepatocellular carcinoma (HCC) in adults, GUT, 2003; 52 (Suppl III):iii1-iii8.
86. Lok AS, McMahon BJ. Chronic hepatitis B, Hepatology, 2007: 45:507-509.
87. Bruix J, Sherman M. Management of hepatocellular carcinoma: An update. Hepatology, 2010. http://www.aasld.org/practiceguidelines/Documents/Bookmarked%20Practice%20Guidelines/HCCUpdate2010.pdf.
88. Sato T, Tateishi R, Yoshida H, et al. Ultrasound surveillance for early detection of hepatocellular carcinoma among patients with chronic hepatitis. C Hepatol Int. 2009 Aug 6. [Epub ahead of print].
89. Thompson Coon J, Rogers G, Hewson P, et al. Surveillance of cirrhosis for hepatocellular carcinoma: systematic review and economic analysis. Health Technol Assess. 2007 Sep; 11(34):1-206.
90. Nikolaidis P, Casalino DD, Remer EM, et al, Expert Panel on Urology. American College of Radiology Appropriateness Criteria, Acute pyelonephritis. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcutePyelonephritis.pdf.
91. Aguirre DA, Santosa AC, Casola G, et al. Abdominal wall hernias: imaging features, complications and diagnostic pitfalls at multi-detector row CT, RadioGraphics, 2005; 25:1501-1530.
92. Miller PA, Mezwa DG, Feczko PJ, et al. Imaging of abdominal hernias, RadioGraphics, 1995; 15:333-347.
93. Zarvan NP, Lee FT, Yandow DR, et al. Abdominal hernias: CT findings, AJR, 1995; 164:1391-1395.
94. Hiratzka LF, Bakris GL, Beckman JA, et al. 2010 ACCF/AHA/ACR/ASA/SCA/SCAI/SIR/STS/SVM Guidelines for the diagnosis and management of patients with thoracic aortic disease: Executive Summary, JACC, 2010; 55:1509-1544.
95. Jacobs JE, Latson LA, Abbara S, et al, Expert Panel on Cardiac Imaging. American College of Radiology Appropriateness Criteria – Acute Chest Pain – Suspected Aortic Dissection. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteChestPainSuspectedAorticDissection.pdf.
96. Demehri S, Rybicki FJ, Dill KE, et al, Expert Panel on Vascular Imaging. American College of Radiology Appropriateness Criteria – Blunt Chest Trauma Suspected Aortic Injury. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/BluntChestTraumaSuspectedAorticInjury.pdf.
97. Erbel R, Alfonso F, Boileau C, et al. Diagnosis and management of aortic dissection: recommendations of the task force on aortic dissection, European Society of Cardiology, European Heart Journal, 2001, 22:1642-1682.
98. Mulder S, Spilde P, Morrison J, et al. Health Care Guideline: Diagnosis and treatment of chest pain and acute coronary syndrome (ACS), Institute for Clinical Systems Improvement, Sixth Edition, 2010. Accessed August 28, 2011.
99. Giboney PT. Mildly elevated liver transaminase levels in the asymptomatic patient, Am Fam Physician 2005; 71:1105-10.
100. Bayard M, Holt J, Boroughs E. Nonalcoholic fatty liver disease Am Fam Physician 2006 Jun 1;73(11):1961-8.
101. Zoga AC, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Soft Tissue Masses. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SoftTissueMasses.pdf.
102. Ely JW, Osheroff JA, Chambliss ML, et al. Approach to leg edema of unclear etiology, JABFM, 2006, 19:148-160.
103. Ettinger DS, Krug LM, Akerley W, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Malignant Pleural Mesothelioma. http://www.nccn.org/professionals/physician_gls/pdf/mpm.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Malignant Pleural Mesothelioma V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
104. Leipsic J, Wood, D, Manders D, et al. The evolving role of MDCT in transcatheter aortic valve replacement: a radiologists' perspective, AJR, 2009; 193:214-219.
105. Leipsic J, Gurvich R, LaBounty TM, et al. Multidetector computed tomography in transcatheter aortic valve implantation, JACC: Cardiovascular imaging, 2011; 4:416-429.
106. Ardies L, Vancauwenberghe TH, De Beule T, et al. MCDT imaging before transcutaneous aortic valve implantation: rationale and measurements, JBR-BTR, 2011; 94:315-318.
107. Morrison WB, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Primary Bone Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PrimaryBoneTumors.pdf.
108. Roberts CC, Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Metastatic Bone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/MetastaticBoneDisease.pdf.

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109. Biermann JS, Chow W, Adkins DR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Prostate Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bone.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Prostate Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
110. Mohler JL, Kantoff PW, Armstrong, et al, National Comprehensive Cancer Network (NCCN) Guideline Version 1.2014. Prostate Cancer. http://www.nccn.org/professionals/physician_gls/pdf/prostate.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Prostate Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
111. Coit DG, Thompson JA, Andtbacka R, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Melanoma. http://www.nccn.org/professionals/physician_gls/pdf/melanoma.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Melanoma V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.

74176, 74177, 74178 CT Abdomen and Pelvis

Clinical criteria reviewed/revised: 9/18/14, 11/20/13, 10/15/13, 8/12/13, 7/25/13, 6/11/13, 4/15/13, 8/9/12, 7/3/12, 8/28/11, 11/17/10, 1/20/11
Medical Advisory Committee reviewed and approved: 10/1/14, 8/28/14,12/16/13, 9/18/13, 6/12/13, 9/19/12, 6/27/12, 9/21/11

74176 CT of the Abdomen and Pelvis without Contrast
74177 CT of the Abdomen and Pelvis with Contrast
74178 CT of the Abdomen and Pelvis with and without Contrast

MEDICARE[1-3] AL

Note: For radiation therapy planning, use 77014.
For CT guided needle placement, biopsy, or drainage, use 77012.
For CT guided tissue ablation, use 77013.

I. Abdominal or pelvic pain

II. Jaundice or abnormal liver function tests with normal US

III. Suspected renal or kidney tumor

IV. Follow-up of metastases

V. Trauma

VI. Renal stones

VII. Pancreatitis

VIII. Appendicitis (CT of the abdomen and pelvis)

IX. Diverticulitis (CT of the abdomen and pelvis)

X. Abscess (CT of the abdomen and pelvis)

XI. Colitis (CT of the abdomen and pelvis)

XII. Pancreatic pseudocyst

XIII. Splenomegaly

XIV. Hepatomegaly

XV. Ascites (CT of the abdomen and pelvis)

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XVI. Staging of known tumors including suspected metastases (CT of the abdomen and pelvis)

XVII. History of malignancy including follow-up or suspicion of metastatic disease (CT of the abdomen and pelvis)

XVIII. Response to chemotherapy or radiation therapy

XIX. Evaluation of lymphoma

XX. Evaluation of lymphadenopathy

XXI. Evaluation of abdominal mass

XXII. Known or suspected primary malignancy

XXIII. Follow-up to surgery

XXIV. Evaluation of known or suspected abdominal or pelvic mass

XXV. Evaluation of known or suspected abdominal or pelvic inflammatory processes

XXVI. Evaluation of known or suspected abdominal or pelvic fluid collection

XXVII. Bowel obstruction

XXVIII. Hematuria

XXIX. Abdominal aortic aneurysm

XXX. Aortic dissection

XXXI. Clarification of findings from other imaging studies or abnormal laboratory findings

XXXII. Evaluation of known or suspected abdominal or pelvic vascular structures

XXXIII. Evaluation of known or suspected congenital abnormalities of the abdomen or pelvis

XXXIV. Treatment planning for radiation therapy – CPT code 77014 is the correct code for this indication

XXXV. Staging of known tumors including suspected metastases

XXXVI. History of malignancy including follow-up or suspicion of metastatic disease (CT of the abdomen and pelvis)

References:

1. Local Coverage Determination (LCD) for Radiology: Computed Tomography of the Abdomen and Pelvis (L30048), Cahaba Government Benefit Administrators, LLC, Alabama. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=2&CntrctrType=1%7c9&KeyWord=74176&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74176&kq=true&bc=IAAAAAAAAAAA&.
2. Local Coverage Determination (LCD) for Radiology: Computed Tomography of the Abdomen and Pelvis (L30048), Cahaba Government Benefit Administrators, LLC, Georgia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=14&CntrctrType=1%7c9&KeyWord=74176&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74176&kq=true&bc=IAAAAAAAAAAA&.
3. Local Coverage Determination (LCD) for Radiology: Computed Tomography of the Abdomen and Pelvis (L30048), Cahaba Government Benefit Administrators, LLC, Tennessee. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=50&CntrctrType=1%7c9&KeyWord=74176&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74176&kq=true&bc=IAAAAAAAAAAA&.

74176, 74177, 74178 CT Abdomen and Pelvis: MEDICARE AL, GA, TN

Critical criteria reviewed/revised: 9/12/13, 7/26/13, 8/9/12
Medical Advisory Committee reviewed and approved: 8/29/14, 9/18/13, 9/19/12

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74181 MRI of the Abdomen without Gadolinium
74182 MRI of the Abdomen with Gadolinium
74183 MRI of the Abdomen without and with Gadolinium

I. New hepatic, renal, pancreatic or other abdominal mass seen on US or CT that requires characterization[1-3]

II. Known or suspected adrenal disease or mass including adrenal carcinoma[28, 42-45] [One of the following]

A. Suspected pheochromocytoma or paraganglioma [One of the following]
1. Fractionated metanephrines in plasma > 3-4 times the upper laboratory limit
2. 24 hour urinary total metanephrine >1800µg
3. Clonidine suppression test positive (plasma norepinephrine is > 500pg/ml or > 2.96nmol/L or < 50% decrease in plasma norepinephrine) if fractionated metanephrines are above normal but less than 4 times the upper limit of normal
4. Suspicion of pheochromocytoma in individual with MEN2, von Hippel-Lindau syndrome and neurofibromatosis type 1 (NF-1) if the blood and urine tests are not abnormal

B. Follow up after treatment of pheochromocytoma or paraganglioma [One of the following]
1. 3-12 months after resection up to 1 year
2. 6-12 months for 2nd and 3rd years
3. Annually for years 4-10
4. Rising blood pressure or serum markers (metanephrines, urine VMA)

C. Suspected Cushing's syndrome [One of the following]
1. 24 hr urine free cortisol > 100mcg/24hr
2. No suppression by dexamethasone

D. Suspected aldosteronoma or primary aldosteronism or Conn's syndrome [One of the following]
1. Hypertension that is drug resistant (need for >3 drugs)
2. Spontaneous (<3.5 mEq/L) or severe diuretic-induced (<3mEq/L) hypokalemia
3. Plasma aldosterone to rennin ratio >10 when aldosterone is measured in ng/dL
4. 24 hour urinary aldosterone excretion test >14µg/day

E. Incidental finding on other imaging such as CT or MRI scan performed for other purposes (CT or MRI of the chest or heart), or US with no history of malignancy [One of the following]
1. No dedicated abdominal CT or MRI performed previously
2. Screening is negative for hypercortisolism, aldosteronism (if hypertensive) and pheochromocytoma
   a. Follow up CT scan
      i. Benign appearing adenoma <4m or myelolipoma on prior scan
         01. Repeat scan 6-12 months after initial dedicated scan
            a. No change in size or < 1cm increase in size then no further imaging
            b. Enlarging (>1cm increase in size in one year) repeat CT
      ii. Benign appearing adenoma 4-6 cm in size
         01. Repeat scan in 3-6 months

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a. No change in size or < 1cm increase in size repeat 6-12 months
b. Enlarging (>1cm increase in size in one year) no repeat imaging (see NCCN guidelines)

F. Adrenal carcinoma can be functioning or non functioning with tissue diagnosis
1. Localized disease after surgery
a. Image every 3-12 months for 5 years
2. Metastatic disease image every 3 months

G. Metastatic disease
1. Personal history of malignancy (most common but not limited to lung, breast, gastric and renal carcinomas)

III. Hemochromatosis[46-48] [One of the following]

A. Elevated iron saturation
B. Elevated serum ferritin
C. Known hemochromatosis and need to measure iron content of the liver without a biopsy to monitor therapy

IV. Evaluation of cirrhosis and portal hypertension[49-51] (CT) [One of the following]

A. Hepatitis B or C
1. Ultrasound demonstrating a liver mass >1 cm

B. Cirrhosis
1. Planned TIPS (transjugular intrahepatic portosystemic shunt – relatively non-invasive procedure for portal hypertension)

V. Screening for hepatoma or hepatocellular carcinoma with hepatitis B[33, 52-57]

A. Hepatitis B or C may be repeated at 90 day intervals
B. Elevated or rising AFP repeat CT or MRI of the liver every 3 months
C. Awaiting liver transplant may be certified every 3 months

VI. Known or suspected pancreatitis or pancreatic pseudocyst[58-60] (CT) [One of the following]

A. Suspected acute pancreatitis with abdominal pain, (This should not be done sooner than 48-72 hours if the diagnosis is clear based on amylase and lipase levels. A scan performed less than 72 hours after presentation may underestimate the extent of the disease) [One of the following]
1. Initial scan [Both of the following] 48-72 hours after onset of symptoms
a. Amylase >3 times the upper normal laboratory value
b. Lipase >3 times the upper normal laboratory value
2. Initial scan at onset of abdominal pain but serum amylase and lipase are not >3 times normal but with severe abdominal pain and epigastric pain that increases rapidly in severity and persists without any relief
3. Follow up scan 7-21 after onset of symptoms with a confirmed diagnosis

B. Known pancreatitis with one of the following allows for repeat exams if present
1. Hemodynamic instability
a. Falling hematocrit
b. Falling blood pressure
2. Aural temperature >38.3°C or >100.9°F

3. Retroperitoneal air on prior CT
4. Positive blood culture
5. Signs of peritonitis (rebound tenderness)
6. Poor oxygen saturation, signs of ARDS (adult respiratory distress syndrome)
7. Signs of renal failure rising BUN and creatinine or oliguria
8. Initial clinical state unimproved after 5 days of therapy

C. Suspected pancreatic pseudocyst [Both of the following]
   1. History [One of the following]
      a. Acute pancreatitis with onset at least 4 wks earlier
      b. Pancreatitis secondary to trauma (time irrelevant)
      c. Chronic pancreatitis
   2. Clinical findings [One of the following]
      a. Abdominal/back pain
      b. Abdominal tenderness
      c. Abdominal mass

D. Evaluation of known pancreatic pseudocyst [One of the following]
   1. Periodic evaluation for change in size
   2. New or worsening clinical findings such as recurrent abdominal pain, rising amylase or lipase, aural temperature >38.3°C or >100.9°F

VII. Chronic pancreatitis with history of recurrent pancreatitis and abdominal pain and no definitive diagnosis with ultrasound or endoscopic ultrasound[61, 62] (not helpful for early diagnosis; only confirmation of diagnosis and surgical planning)

VIII. Pancreatic cancer or mass[14-17] (Following initial diagnosis, See CT of the abdomen and pelvis) [One of the following]

A. Symptoms [One of the following]
   1. Weight loss
   2. Mid-epigastric pain which may radiate to the back

B. Elevated tumor markers [One of the following]
   1. CA19-9 (>35Ku/L)
   2. CEA >2.5 in non-smoker
   3. CEA >5.0 in a smoker

C. Prior imaging with dilatation of the bile duct and/or pancreatic duct (US, ERCP, MRCP) Pancreatic mass on recent prior imaging and request for “pancreatic protocol”

D. Initial staging of pancreatic cancer if not already performed

E. Painless jaundice (See XVIII below)

F. Follow up immediately after completion of treatment

G. Follow up [One of the following]
   1. Following surgery
   2. Following completion of chemotherapy
   3. Every 3-6 months for 2 years
   4. Annually after 2 years

IX. MR Cholangiopancreatography[63,64] (MRCP) [One of the following]

A. Suspected obstruction to flow of bile [One of the following]
   1. Biliary duct dilatation on US or other imaging
   2. Jaundice direct bilirubin >0.4 mg/dL
   3. Acalculous cholecystitis
B. Pancreatitis with abdominal pain which may radiate to the back [One of the following]
   1. Amylase >3 times the upper normal laboratory value
   2. Lipase >3 times the upper normal laboratory value
   3. Recurrent or chronic without obvious cause
   4. Occurring after trauma, surgery or instrumentation (including prior cholecystectomy or ERCP)
   5. Acute biliary pancreatitis
C. Evaluation of pseudocyst detected on prior imaging (The status of the pancreatic duct is a key determinant of how a pseudocyst is treated. If the pancreatic duct is intact, percutaneous drainage is likely to be effective. If the duct is disrupted percutaneous drainage will not provide definitive therapy and will convert the pseudocyst to a fistula.)
D. Tumor
   1. Evaluation of pancreatic or biliary ducts with known tumors of the pancreas, liver or suspected tumors of the biliary or pancreatic ducts on prior imaging
   2. Biliary cystadenoma or cystadenocarcinoma
E. Chronic pancreatitis with history of recurrent pancreatitis and abdominal pain which may radiate to the back [One of the following]
   1. Pathological secretin test
   2. Abnormal glucose tolerance test
   3. Steatorrhea
   4. Pancreatic calcifications on other imaging study
   5. Recurrent or persistent pseudocysts
F. Unsuccessful ERCP
G. Suspected congenital anomaly of the pancreaticobiliary tract such as but not limited to pancreas divisum, choledochal cyst, aberrant ducts
H. Altered biliary tract anatomy that precludes ERCP such as biliary enteric anastomosis, or gastrectomy

X. Suspected or known neuroendocrine tumor including carcinoid, pheochromocytoma, paraganglioma, islet cell tumor of the pancreas, poorly differentiated or high grade or aggressive small cell tumor other than lung[28, 65-67] (For carcinoid, pheochromocytoma, paraganglioma, and poorly differentiated or high grade or anaplastic small cell carcinoma other than lung (see XLV), see CT of the abdomen and pelvis, CPT codes 74176, 74177, and 74178) [One of the following]
A. Carcinoid [One of the following]
   1. New diagnosis [One of the following]
      a. Elevated urine 5HIAA >15 mg/24 hr
      b. Elevated chromogranin A (CgA) >39 ng/L
      c. Elevated substance P >270 ng/L or pg/mL
      d. Elevated gastrin >100 pg/mL
      e. Elevated serotonin >330 mcmol/L

2. Known diagnosis post resection [One of the following]
    a. 3-12 months post resection
    b. Repeat scan if rising tumor markers such as 5HIAA, chromogranin, serotonin, gastrin or substance P

B. Islet cell tumor of the pancreas initial or suspected recurrence [One of the following]
1. Gastrinoma or Zollinger-Ellison syndrome [One of the following]
    a. Elevated serum gastrin >100 pg/m
    b. Positive secretin test
2. Insulinoma [One of the following]
    a. Elevated serum C peptide
    b. Fasting blood glucose of <40mg/dL
    c. Elevated serum insulin >2.0ng/ml
3. Glucagonoma [One of the following]
    a. Elevated serum glucagon >100pg/ml
4. VIPoma
    a. Elevated vasoactive intestinal polypeptide (VIP) >70 pg/ml
5. Somatostatinoma
    a. Elevated somatostatin

C. Restaging after completion of treatment for any islet cell tumor to establish a new baseline
D. Surveillance of islet cell tumors [One of the following]
1. 3-12 months after resection then
2. Every 6-12 months for years 2-10
3. Repeat scan if rising tumor markers as indicated above in A-B

E. Pheochromocytoma
1. Suspected pheochromocytoma or paraganglioma [One of the following]
    a. Fractionated metanephrines in plasma > 3-4 times the upper laboratory limit
    b. 24 hour urinary total metanephrine >1800µg
    c. Clonidine suppression test positive (plasma norepinephrine is > 500pg/ml or > 2.96nmol/L or < 50% decrease in plasma norepinephrine) if fractionated metanephrines are above normal but less than 4 times the upper limit of normal
    d. Suspicion of pheochromocytoma in individual with MEN2, von Hippel-Lindau syndrome and neurofibromatosis type 1 (NF-1) if the blood and urine tests are not abnormal
2. Follow up after treatment of pheochromocytoma or paraganglioma [One of the following]
    a. 3-12 months after resection up to 1 year
    b. 6-12 months for 2nd and 3rd years
    c. Annually for years 4-10
    d. Rising blood pressure or serum markers (metanephrines, urine VMA)

XI. Aneurysm[68-76] (CTA of the abdomen and pelvis) [One of the following]

A. Patient with Marfan's or Ehlers-Danlos syndrome
B. Turner's syndrome
C. Pulsatile abdominal mass
D. Known AAA [One of the following]
1. Periodic follow-up of an asymptomatic known AAA will be according to the following schedule if there is an inadequate ultrasound and there has not been a surgical repair [One of the following]
    a. 2.5-2.9 cm every 5 years

b. 3.0-3.4 cm every 3 years
c. 3.5-3.9 cm every 2 years
d. 4.0-4.4 cm every year
e. 4.5-4.9 cm every 6 months
f. 5.0-5.5 cm every 3-6 months

2. New onset of pain

E. Postoperative evaluation following repair including surgery or endovascular repair (stent graft) [One of the following]
1. 1 month after repair
2. 3 months after repair
3. 6 months after repair
4. Annually after repair
5. Suspicion of endoleak

F. Aneurysm of one other intraabdominal artery detected on other Imaging
G. Vascular insufficiency of the bowel (suspicion of) [Both of the following]
1. Abdominal pain often starting as periumbilical and often out of proportion to exam findings
2. Other clinical findings [One of the following]
a. Leukocytosis, WBC >11,500/cu.mm
b. Stool positive for occult blood
c. Nausea, vomiting or diarrhea
d. History of abdominal angina (pain after eating for approximately 3 hours)

H. Planning for endovascular or surgical repair
I. Screening for aneurysm (Ultrasound screening is the appropriate study. CT, CTA, MRI, or MRA should only be used if the aorta cannot be visualized adequately on US and this must be documented with the US report.) [One of the following]
1. Pulsatile mass with non diagnostic ultrasound
2. History of first degree relative with an abdominal aortic aneurysm and non interpretable ultrasound
3. Male age 65-75 with a history of smoking
4. Pulsatile mass on abdominal, vaginal, or rectal examination

XII. Suspected dissection of the aorta[77,78] [One of the following]

A. Unequal blood pressure in the arms
B. Rapid onset of “ripping, tearing, searing” severe chest or upper back or abdominal pain
C. Syncope and chest pain
D. Shortness of breath
E. CVA or stroke
F. Loss of pulses
G. New aortic insufficiency murmur
H. Marfan's syndrome
I. Recent aortic manipulation (such as catheter angiography)
J. Family history of aortic disease
K. Follow up of known dissection [One of the following]
1. 1 month after repair
2. 3 months after repair
3. 6 months after repair
4. 12 months after repair

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5. Annually after 12 months

L. New symptoms after repair [One of the following]
   1. See A-J above

XIII. Soft tissue mass of the abdominal wall[79] (CT)

A. Abdominal x-ray non-diagnostic

XIV. MR Enterography[80-82] [One of the following]

A. Bowel obstruction
B. Celiac disease
C. Polyposis syndromes
D. Small bowel tumor
   1. Abdominal pain and diarrhea for more than 6 weeks
   2. Aural temperature >38.3°C or >100.9°F
   3. Perianal fistula or fissure
   4. Enterovesical fistula
   5. Enterovaginal fistula
   6. Enterocutaneous fistula
   7. Children with unexplained anemia, growth failure, and abdominal pain
E. Suspected Crohn's disease [One of the following]
   1. Abdominal pain and diarrhea for more than 6 weeks
   2. Aural temperature >38.3°C or >100.9°F
   3. Perianal fistula or fissure
   4. Enterovesical fistula
   5. Enterovaginal fistula
   6. Enterocutaneous fistula
   7. Children with unexplained anemia, growth failure, and abdominal pain
F. Known Crohn's disease [One of the following]
   1. Mass on abdominal, pelvic or rectal exam
   2. Aural temperature >38.3°C or >100.9°F
   3. Leukocytosis, WBC >11,500/cu.mm
   4. Guarding
   5. Rebound
   6. Follow-up during or after treatment [One of the following]
   7. Condition unimproved or worsening after drainage and IV antibiotics for at least two days
   8. Condition unimproved or worsening after IV Abx Rx >1 wk
   9. Routine follow-up study after treatment, including evaluation for removal of drain
   10. Fistula
   11. Small bowel obstruction
   12. Perianal fistula
   13. Stricture or stenosis
   14. Any evidence of clinical deterioration while on steroids or immunosuppressives

XV. Evaluation of painless jaundice demonstrated by either direct bilirubin >.2 or total bilirubin >1.9 (MRI without and with contrast including MRCP)

XVI. Unilateral leg edema with venous Doppler excluding venous insufficiency or varicose veins[83] [One of the following]

A. Acute unilateral edema [One of the following]
   1. D-dimer <500 ng/ml and low suspicion of deep venous thrombosis
   2. No evidence of ruptured Baker's cyst or injury to the gastrocnemius muscle
B. Chronic unilateral edema
   1. No evidence of reflex sympathetic dystrophy

XVII. New renal mass suspected or detected prior imaging (For renal cell cancer, see XXI below)[3] (CT) [One of the following]

A. Initial evaluation of mass seen on prior imaging ultrasound or CT and request is for "renal protocol" (CT of the abdomen, CPT code 74150 or 74160 or 74170 is the appropriate test)
B. Cystic or solid mass detected on ultrasound
   1. Simple cyst confirmed on prior CT to be simple cyst or Bosniak class I cyst – no further imaging is indicated
C. Bosniak Class II cyst on prior CT (or MRI) (CT of the abdomen, CPT code 74150)
   1. Every 6 months for 3 years and if stable no further imaging

XVIII. Renal cell or kidney cancer[7,31] (CT) [One of the following]

A. Initial staging
B. Active surveillance for pT1a tumor
   1. Abdominal CT within 6 months of the initial staging CT then annually
C. Follow up of ablative techniques for pT1a
   1. 3-6 months after ablation
   2. Annually for 5 years
D. Follow up partial or radial nephrectomy for pT1a and pT1b
   1. scan 3-12 months after surgery to establish a new baseline
   2. If the initial post operative scan is negative then annually for 3 years
E. Follow up radical nephrectomy for stage II or III
   1. 3-6 months after surgery
   2. 3-6 months for 3 years
   3. Annually for 5 years
   4. Additional follow up as clinically indicated
F. Follow up stage IV or medically or surgically unresectable disease or relapse
G. Every 6-16 weeks

XIX. Breast cancer[21] [One of the following]

A. Initial staging [One of the following]
   1. Clinical stage I–IIB [One of the following]
      a. Alkaline phosphatase >140 U/L
      b. Total bilirubin >1.9 mg/L
      c. GGT >42IU/L
      d. AST >40IU/L
      e. Palpable abdominal mass
      f. Abdominal pain
   2. Clinical stage IIIA or higher

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B. Stage IV or known or suspected recurrent disease
   1. Initial staging or restaging (recurrence)
   2. Establish new baseline after treatment
   3. Evidence of progression of disease such as increasing dyspnea, unexplained weight loss, elevated liver function tests, rising tumor markers such as CEA, CA 15-3, CA27.29, hypercalcemia, new or worsening disease on physical examination
      a. Before starting any new therapy
      b. Chemotherapy every 2-4 cycles
      c. Endocrine therapy every 2-6 months

C. Concern for progression of disease as described above

XX. Cervical cancer[22] (CT) [One of the following]

A. Initial staging for clinical stage IB2 or higher
B. Symptoms or examination findings suspicious for recurrence

XXI. Colon cancer[23] (CT) [One of the following]

A. Initial staging
B. Follow-up (Routine CT scans are not recommended beyond 5 years) [One of the following]
   1. Annually for up to 5 years with node negative disease (colon and rectal)
   2. Rising CEA (colon and rectal)
   3. If the CT is negative with elevated CEA repeat in 3 months until either disease is identified or CEA level stabilizes
   4. Colon cancer stage IV treated for cure with no evidence of disease
      a. Every 3-6 months for 2 years
   5. Every 6-12 months for 3 years

XXII. Rectal cancer[24] (CT) [One of the following]

A. Initial staging
B. Follow-up after treatment is complete to establish new baseline
C. Follow-up (Routine CT scans are not recommended beyond 5 years) [One of the following]
   1. Annually for up to 5 years if high risk of recurrence (lymphatic or venous invasion or poorly differentiated tumors)
   2. Rising CEA
      a. If the CT is negative with elevated CEA repeat in 3 months until either disease is identified or CEA level stabilizes

XXIII. Ovarian cancer, fallopian tube cancer and primary peritoneal cancer[25] (CT) [One of the following]

A. Initial staging
B. Following treatment and stable
C. Rising CA-125 with or without prior chemotherapy
D. Clinical relapse with or without prior chemotherapy

XXIV. Esophageal cancer[26] (CT) [One of the following]

A. Initial staging
B. Prior to chemoradiation if PET/CT not done

C. Clinical recurrence

XXV. Gastric (stomach) cancer[27] (CT) [One of the following]

A. Initial staging
B. Following completion of treatment for restaging
C. Clinical recurrence

XXVI. Carcinoid[28] (CT) [One of the following]

A. Suspected carcinoid [One of the following]
   1. Elevated urine 5HIAA >15mg/24hr
   2. Elevated chromogranin A (CgA) >39ng/L
   3. Elevated substance P >270 ng/L or pg/mL
   4. Elevated gastrin >100pg/mL
   5. Elevated serotonin >330mcmol/L
B. Initial staging if not already done
C. Following completion of therapy to establish a new baseline
D. Surveillance [One of the following]
   1. Carcinoid tumors larger than 2 cm or with incomplete resection and are stable with no evidence of disease (CT of the abdomen and pelvis)
   2. Every 3-12 months after resection
   3. Every 6-12 months thereafter
   4. Abnormal laboratory tests suggesting recurrence as listed in A 1-5 above

XXVII. Islet cell tumor of the pancreas[28] (CT) [One of the following]

A. Initial staging
B. Following completion of therapy to establish a new baseline
C. Surveillance with no evidence of disease [One of the following]
   1. 3-12 months after resection then
   2. Every 6-12 months for 10 years
D. Clinical evidence of recurrence [One of the following]
   1. Gastrinoma or Zollinger-Ellison syndrome [One of the following]
      a. Positive secretin test
      b. May also present with reflux and peptic ulcers
      c. Prominent gastric folds on endoscopy
   2. Insulinoma [One of the following]
      a. Elevated serum C peptide
      b. Fasting blood glucose of <40 mg/dL
   3. Glucagonoma [One of the following]
      a. Elevated serum glucagon >100 pg/ml
      b. Weight loss
   4. VIPoma
      a. Elevated vasoactive intestinal polypeptide (VIP) >70 pg/ml
   5. Somatostatinoma
      a. Elevated somatostatin
E. Monitoring during treatment
   1. Every 3 months during treatment with chemotherapy or biological therapy

XXVIII. Hepatoma or hepatocellular carcinoma[33] (CT) [One of the following]

A. Initial staging
B. Following treatment (surgical or embolotherapy) one time and then every 3-6 months for 2 years
C. After 2 years every 6-12 months
D. New onset of rising AFP

XXIX. Gallbladder cancer[33] (CT) [One of the following]

A. Found incidentally at surgery
    1. T1b or greater initial staging (No imaging for T1a with negative margins if found incidentally at surgery.)
    2. Repeat CT scan every 6 months after treatment for 2 years if stable
B. Mass on prior ultrasound, CT or MRI
    1. Initial staging
    2. Repeat CT scan every 6 months after treatment for 2 years if stable
C. Jaundice
    1. Initial staging
D. Repeat CT scan every 6 months after treatment for 2 years if stable

XXX. Cholangiocarcinoma[33] (CT) [One of the following]

A. Initial staging
B. Completion of therapy then every 6 months for 2 years

XXXI. Hodgkin's lymphoma[42] (CT) [One of the following]

A. Initial staging including CNS lymphoma
B. Restaging while on treatment should be done with PET/CT
C. After treatment with radiation therapy restage with either CT or PET/CT if last PET scan was positive
D. Follow-up
    1. 3 months after completion of radiation therapy treatment
    2. Then every 6-12 months for 2 years
    3. Clinical or laboratory evidence of recurrence

XXXII. Non-Hodgkin's lymphoma[43] (follicular lymphoma, marginal zone lymphoma, MALT lymphoma, mantle cell lymphoma, diffuse large B-cell lymphoma, Burkitt's lymphoma, peripheral T cell lymphoma, mycosis fungoides, hairy cell leukemia, post-transplant lymphoproliferative disorders, CLL/SLL) (CT) [One of the following]

A. Initial staging in addition to PET/CT if not already done
B. Follow up after completion of treatment to establish a new baseline
C. Diffuse large B cell lymphoma stage I and II
    1. Repeat all positive scans after completing chemotherapy and before radiation therapy
    2. Repeat all positive scans after completing radiation therapy
D. Diffuse large B cell lymphoma stage III and IV
    1. Restage after 2-4 cycles of chemotherapy
    2. Restage after completing chemotherapy

3. Relapse or refractory disease restage as clinically indicated

E. Surveillance
   1. Not more frequently than every 6 months for the first 2 years and not more frequently than annually thereafter

F. Clinical or laboratory evidence of recurrence

G. For CLL/SLL CT may be needed prior to initiation of therapy

XXXIII. Soft tissue sarcoma[36] [One of the following]

A. Myxoid/round cell liposarcoma, epithelioid sarcoma, angiosarcoma leiomyosarcoma, rhabdomyosarcoma or extremity or trunk/head and neck sarcoma [One of the following]
   1. Initial staging
   2. Surveillance imaging after treatment
      a. Stage II-IV or non resectable primary
         i. Imaging of primary site and/or metastatic disease
            01. Every 3-6 months for up to 3 years
            02. Every 6 months for years 4 and 5
            03. Annually

B. Retroperitoneal/intra-abdominal (includes desmoid, aggressive fibromatosis and other sarcomas) [One of the following]
   1. Initial staging
   2. Follow-up if the initial site is abdomen, pelvis or retroperitoneum [One of the following]
      a. Following completion of treatment to establish a new baseline (one time)
      b. Every 3-6 months for 2-3 years
      c. Every 6 months for next 2 years
      d. Annually after 4-5 years

C. GIST (gastrointestinal stromal tumor) [One of the following]
   1. Initial staging
   2. Restaging after surgery
   3. Surveillance
      a. Every 3-6 months for 3-5 years
      b. After 5 years annually

XXXIV. Endometrial cancer[38] [One of the following]

A. Incomplete surgical staging

B. Follow up as clinically indicated

XXXV. Uterine sarcoma[38] (CT, if MRI is not adequate for the diagnosis) [One of the following]

A. Known or suspected extrauterine disease

B. Surveillance [One of the following]
   1. Every 3-6 months for 3 years
   2. Then every 6 months for next 2 years
   3. Annually after 2 years

XXXVI. Testicular cancer[39] [One of the following]

A. Pure seminoma (CT of the abdomen and pelvis for initial staging) [One of the following]

1. Initial staging
2. Follow up after treatment to establish a new baseline
3. Surveillance of stage IA and IB tumors not treated with chemotherapy or radiation therapy [One of the following]
    a. Every 6 months for 1-2 years
    b. Every 6-12 months for year 3
    c. Annually for years 4 and 5
4. Stage 1A and IB tumors treated with single agent
    a. Annual CT of the abdomen and pelvis for 1-3 years
5. Stage IA, IB and I S treated with radiation
    a. Annual CT of the abdomen and pelvis for 1-3 years
6. Stage IIA and IIB following completion of radiation therapy or chemotherapy [One of the following]
    a. Every 6-12 months for 1-2 years
    b. Annually for year 3
7. Stage IS repeat CT scan of the abdomen and pelvis (stage IS is persistent elevation of tumor (LDH< AFP and beta HCG) markers following orchiectomy)
8. Stage IIC and III after chemotherapy [One of the following]
    a. Following completion of chemotherapy
    b. If either no residual mass or mass ≤ 3cm on scan done for 8a
        i. Image as clinically indicated
    c. If residual mass >3m on scan performed for 8a
        i. PET scan 6 weeks or more following completion of chemotherapy
            01. Above PET scan negative image as clinically indicated
            02. Above PET scan positive then CT abdomen/pelvis 3-6 months after radical pelvic lymph node dissection (RPLND)
    d. CT scan performed after completion of chemotherapy 8a shows progressive enlargement of mass or rising tumor markers image after completion of chemotherapy and as clinically indicated

B. Non seminoma (CT of the abdomen and pelvis for initial staging) [One of the following]
1. Initial staging
2. Stage IA, IB if surveillance only (no chemotherapy and/or radiation) [One of the following]
    a. Every 3-4 months for 1st year
    b. Every 4-6 months for 2nd year
    c. Every 6-12 months for 3rd and 4th year
    d. Annually for 5th year
    e. 6th year and after every 12-24 months
3. Stage IB, IIA and IIB after chemotherapy
    a. Following completion of therapy to establish a new baseline
    b. Then as clinically indicated
4. Stage IB, IIA and IIB after chemotherapy ± RPLND [One of the following]
    a. Follow up after treatment to establish a new baseline (restaging)
    b. Restaging scan shows complete response [One of the following]
        i. Every 6 months for a year
        ii. Every 6-12 months for year 2
        iii. Annually years 3-5
        iv. Then as clinically indicated

XXXVII. Anal cancer[19] [One of the following]
- A. Initial staging
- B. Restaging after completion of treatment
- C. Surveillance after first post treatment scan [One of the following]
  1. Annual CT scan of the abdomen and pelvis for three years if stable
  2. Annually for abdominoperineal resection

XXXVIII. Bladder cancer[20] [One of the following]
- A. Initial staging if muscle invasion on biopsy
- B. Following completion of treatment
  1. Every 3-6 months for 2 year

XXXIX. New bone lesion suspicious for a metastatic lesion with no known cancer (CT) [Both of the following]
- A. X-ray demonstrating a bone lesion suspicious for a metastatic lesion
- B. 40 years of age or older

XL. Malignant mesothelioma[84]
- A. Initial staging

XLI. Evaluation of elevated liver function tests and non diagnostic ultrasound[85-87]
- A. Laboratory findings [One of the following]
  1. Direct bilirubin >0.2
  2. Total bilirubin >1.9
  3. Alkaline phosphatase >147 IU/L
  4. Gamma GT or GGT >51 IU/L
  5. AST >40 IU/L
  6. ALT > 56 IU/L

XLII. Non-small cell lung cancer[29] [One of the following]
- A. Initial staging may be approved along with PET/CT for initial staging
- B. Rising tumor markers or liver function tests
- C. Surveillance with no clinical or radiographic evidence of disease [One of the following]
  1. Every 6-12 months for 2 years
  2. Annually after 2 years

XLIII. Small-cell lung cancer[30] [One of the following]
- A. Initial staging may be approved along with PET/CT for initial staging
- B. Rising CEA
- C. Rising liver function tests
- D. Surveillance with no clinical or radiographic evidence of disease [One of the following]
  1. Every 3-4 months for 2 years
  2. Every 6 months for years 3-5
  3. Annually after 5 years
- E. Change on recent chest x-ray

XLIV. Poorly differentiated or high grade or anaplastic small cell carcinoma other than lung[37] [One of the following]
- A. Initial staging
- B. Follow up after treatment to establish a new baseline
- C. Surveillance following treatment of resectable disease [One of the following]
  1. Every 3 months for a year
  2. Every 6 months after 1 year
- D. Surveillance following treatment of unresectable or metastatic disease
  1. Every 3 months

XLV. Appendicitis (In children and pregnant women, ultrasound as the initial study except for follow up of known appendicitis with suspected complications. If this is not possible then CT of the abdomen and pelvis is the appropriate study [CPT code 74176, or 74177 or 74178]. MRI abdomen [CPT code 74181, 74182 or 74183] in pregnant women)

XLVI. Primary or metastatic bone tumor of the pelvis–known or suspected[89-91] An x-ray is required prior to imaging a suspected bone tumor ; if the x-ray is definitely benign and the lesion is not an osteoid osteoma clinically or radiographically no further imaging is required (CT) [One of the following]
- A. X-ray results or CT results and suspected (not known) bone tumor [One of the following]
  1. Negative or does not explain the regional symptoms (MRI without contrast)
  2. Suspicious for osteoid osteoma clinically or radiographically (CT)
  3. Indeterminate for malignancy (MRI without and with contrast)
  4. Aggressive appearance on x-ray (MRI without and with contrast)
  5. Pathologic fracture; not definitely benign (MRI without and with contrast)
  6. Incidental finding on prior CT that is not definitely benign (MRI without and with contrast)
- B. Osteosarcoma of the pelvis (MRI) [One of the following]
  1. Initial staging of primary site
  2. For high grade osteosarcoma of the pelvis after preoperative chemotherapy
  3. Restaging after completion of treatment
  4. Follow up after treatment
     a. Every 3 months for 2 years
     b. Every 4months for the third year
     c. Every 6 months for the next 2 years (fourth and fifth)
     d. Annually after 5 years
- C. Ewing's sarcoma of the pelvis (MRI) [One of the following]
  1. Initial staging of primary site
  2. Restage primary site after completion of primary treatment (usually chemotherapy)
  3. Follow up after surgery, or radiation and chemotherapy
     a. Every 2-3 months for 2 years
     b. Every 4 months for the third year
     c. Every 6 months for years 4 and 5
     d. Annually after year 5
- D. Chondrosarcoma of the pelvis (MRI) [One of the following]

1. Initial staging of primary site
2. Restaging after completion of treatment
3. Low grade and intracompartmental [One of the following]
    a. Every 6-12 months for 2 years
    b. Annually after 2 years as appropriate
4. High grade (grade II, grade III or clear cell or extracompartmental)
    a. Imaging as clinically indicated

E. Chordoma of the pelvis (MRI) [One of the following]
1. Initial staging of primary site
2. Restaging after completion of treatment (surgery and/or radiation therapy)
3. Conventional or chondroid chordoma
    a. Imaging of primary site as clinically indicated

F. Giant cell tumor of the bone in the pelvis (MRI) [One of the following]
1. Initial staging of primary site
2. Restaging after completion of treatment
3. Following completion of therapy image primary site as clinically indicated

G. Known primary malignancy other than bone [One of the following]
1. Bone pain in the pelvis with known malignancy and non diagnostic bone scan
2. Known bone metastases with pathologic fracture in the pelvis
3. Elevated alkaline phosphatase (>140 IU/L) with known malignancy and non diagnostic bone scan
4. Positive bone scan in the pelvis, abdomen or retroperitoneum with no pain

XLVII. Prostate cancer[92] (See CT or MRI of the pelvis except for the indications below) [One of the following]

A. Failed treatment [One of the following]
1. Radical prostatectomy
    a. PSA fails to fall to undetectable levels
    b. Initial undetectable PSA after radical prostatectomy that increases on 2 or more determinations
2. Radiation therapy
    a. PSA rise by 2 ng/mL or more above the lowest post treatment PSA
3. Androgen deprivation therapy

XLVIII. Planning for stereotactic or gamma knife surgery

XLIX. Indeterminate liver mass on ultrasound or CT[93]

References:

1. Koenraad J, Mortelé KJ, Ros PR. Cystic focal liver lesions in the adult: differential CT and MR imaging features, RadioGraphics, 2001; 21:895-910.
2. Garcia-Eulate R, Hussain N, Heller T. CT and MRI of hepatic abscess in patients with chronic granulomatous disease, AJR, 2006; 187:482-490.
3. Beer AJ, Dobritz M, Zantl N. Comparison of 16-MDCT and MRI for characterization of kidney lesions, AJR, 2006; 186:1639-1650.
4. Leyendecker JR, Clingan MJ, Remer EM, et al. American College of Radiology Appropriateness Criteria – Pretreatment Staging of Invasive Bladder Cancer. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PretreatmentStagingInvasiveBladderCancer.pdf.
5. Desch CE, Benson AB, Somerfield MR, et al. Colorectal cancer surveillance: 2005 update of an American Society of Clinical Oncology Practice Guideline, JCO, 2005; 23:8512-8519.
6. Pfister DG, Johnson DH, Azzoli CG, et al. American Society of Clinical Oncology treatment of unresectable non-small-cell lung cancer guideline: Update 2003, JCO, 2004; 22:320-353.
7. Casalino DD, Remer EM, Bisdhoff JT,et al, Expert Panel on Urologic Imaging. American College of Radiology Appropriateness Criteria – Post-treatment Follow-up of Renal Cell Carcinoma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PostTreatmentFollowUpRenalCellCarcinoma.pdf.
8. Israel GM, Casalino DD, Remer EM, et al. Expert Panel on Urologic Imaging. American College of Radiology Appropriateness Criteria – Indeterminate Renal Masses. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/IndeterminateRenalMasses.pdf.
9. Casalino DD, Remer EM, Bishoff J, et al, Expert Panel on Urologic Imaging, American College of Radiology Appropriateness Criteria – Renal Cell Carcinoma Staging. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/RenalCellCarcinomaStaging.pdf.
10. Grumbach MM, Biller BMK, Braunstein GD, et al. Management of the Clinically Unapparent Adrenal Mass (Incidentaloma), NIH Consensus and State-of-the-Science Statements, 2002, 19(2). http://consensus.nih.gov/2002/2002AdrenalIncidentalomasos021PDF.pdf.
11. Israel GM, Krinsky GA. MR imaging of the kidneys and adrenal glands, Radiol Clin N Am, 2003; 41:145-159.
12. Ng AK, Constine LS, Advani R, et al. Expert Panel on Radiation Oncology. American College of Radiology Appropriateness Criteria – Follow-up of Hodgkin's Lymphoma. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Oncology/FollowUpHodgkinsLymphoma.pdf.
13. Lelwani J, Dubinsky T Javitt MC, et al. Expert Panel on Women's Imaging and Radiation Oncology–Gynecology. American College of Radiology Appropriateness Criteria – Pretreatment Evaluation and Follow-up of Endometrial Cancer. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Oncology/PretreatmentEvaluationAndFollowUpEndometrialCancer.pdf.
14. Zeman RK, Cooper C, Zeiberg AS, et al. TNM Staging of Pancreatic Carcinoma Using Helical CT, AJR, 1997; 169:459-464.
15. Tempero MA, Malafa MP, Behrman SW et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014 Pancreatic Adenocarcinoma. http://www.nccn.org/professionals/physician_gls/pdf/pancreatic.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Pancreatic Adenocarcinoma V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
16. Lalani T, Couto CA, Rosen MP, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Jaundice. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/Jaundice.pdf.
17. 2006 Update of ASCO recommendations for the use of tumor markers in gastrointestinal cancer. http://jop.ascopubs.org/content/2/6/314.full.pdf+html.
18. Scottish Intercollegiate Guidelines Network. Management of patients with lung cancer, a national clinical guideline, 2005. http://www.sign.ac.uk/pdf/sign80.pdf.
19. Benson AB III, Venook AP, Bekaii-Saab T, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014 Panel Members. Anal Carcinoma. http://www.nccn.org/professionals/physician_gls/pdf/anal.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Anal Carcinoma V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
20. Clark PE, Spiess PE, Agarwal N, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version1.2014. Bladder Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bladder.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bladder Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
21. Gradishar WJ, Anderson BO, Blair SL, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Breast Cancer, http://www.nccn.org/professionals/physician_gls/pdf/breast.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Breast Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.

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22. Koh WJ, Greer BE, Abu-Rustum NR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Cervical Cancer. http://www.nccn.org/professionals/physician_gls/pdf/cervical.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Cervical Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
23. Benson AB III, Venook AP, Bekaii-Saab T, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Colon Cancer. http://www.nccn.org/professionals/physician_gls/pdf/colon.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Colon Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
24. Benson AB III, Venook AP, Bekaii-Saab T, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Rectal Cancer. http://www.nccn.org/professionals/physician_gls/pdf/rectal.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Rectal Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
25. Morgan RJ, Armstrong DK, Alvarez RD, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Ovarian Cancer. http://www.nccn.org/professionals/physician_gls/pdf/ovarian.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Ovarian Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
26. Ajani JA, Bentrem DJ, Besh S, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2013. Esophageal and Esophagogastric Junction Cancers. http://www.nccn.org/professionals/physician_gls/pdf/esophageal.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Esophageal and Esophagogastric Junction Cancers V2.2013. ©2013 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
27. Ajani JA, Bentrem DJ, Besh S, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2013. Gastric Cancer. http://www.nccn.org/professionals/physician_gls/pdf/gastric.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Gastric Cancer V2. 2013. ©2013 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
28. Kulke MH, Shah MH, Benson AB III, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Neuroendocrine Tumors. http://www.nccn.org/professionals/physician_gls/pdf/neuroendocrine.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Neuroendocrine Tumors V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
29. Ettinger DS, Akerley W, Borghaei H, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2013. Non-Small Cell Lung Cancer. http://www.nccn.org/professionals/physician_gls/pdf/nscl.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Non-Small Cell Lung Cancer V2.2013. ©2013 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
30. Kalemkerian GP, Akerley W, Bogner P, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Small Cell Lung Cancer. http://www.nccn.org/professionals/physician_gls/pdf/sclc.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Small Cell Lung Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
31. Motzer RJ, Jonasch E, Agarwal JN, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2014. Kidney Cancer. http://www.nccn.org/professionals/physician_gls/pdf/kidney.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Kidney Cancer V3.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
32. Donat SM, Diaz M, Bishoff JT, et al, Follow up for clinically localized renal neoplasms: AUA guideline, http://www.auanet.org/common/pdf/education/clinical-guidance/Renal-Cancer-Followup.pdf.
33. Benson AB III, D'Angelica MI, Abrams TA, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Hepatobiliary Cancers. http://www.nccn.org/professionals/physician_gls/pdf/hepatobiliary.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Hepatobiliary Cancers V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.

34. Hoppe RT, Advani RH, Ai WZ, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2014. Hodgkin Lymphoma. http://www.nccn.org/professionals/physician_gls/pdf/hodgkins.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Hodgkin's Lymphomas V2.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
35. Zelenetz AD, Gordon WG, Wierda WG, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Non-Hodgkin's Lymphomas. http://www.nccn.org/professionals/physician_gls/pdf/nhl.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Non-Hodgkin's Lymphomas V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
36. Von Mehren M, Lor- Randall R, Benjamin RS, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Soft Tissue Sarcoma. http://www.nccn.org/professionals/physician_gls/pdf/sarcoma.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Soft Tissue Sarcoma V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
37. Motzer RJ, Jonasch E, Agarwal N, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Testicular Cancer. http://www.nccn.org/professionals/physician_gls/pdf/testicular.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Testicular Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
38. Biermann JS, Chow W, Adkins DR, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Bone Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bone.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bone Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
39. Koh W-J, Greer BE, Abu-Rustum NR, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Uterine Neoplasms. http://www.nccn.org/professionals/physician_gls/pdf/uterine.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Uterine Neoplasms V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
40. Sturgeon C. Practice Guidelines for tumor marker use in the clinic, Clinical Chemistry, 2002; 48:1151-1159.
41. Vachani C. Patient guide to tumor markers. http://www.oncolink.org/treatment/article.cfm?id=296&s=42&c=7.
42. Remer EM, Casalino DD, Bishoff JT, et al. Expert Panel on Urologic Imaging. American College of Radiology Appropriateness Criteria – Incidentally Discovered Adrenal Mass. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/IncidentallyDiscoveredAdrenalMass.pdf.
43. Grumbach MM, Biller BMK, Braunstein GD, et al. Management of the Clinically Unapparent Adrenal Mass (incidentaloma), NIH Consensus and State-of-the-Science Statements, 2002, 19(2). http://consensus.nih.gov/2002/2002AdrenalIncidentalomasos021PDF.pdf
44. Allolio B, Fassnacht M. Clinical Review: Adrenocortical carcinoma: clinical update. http://jcem.endojournals.org/content/91/6/2027.full.pdf+html.
45. Grumbach MM, Biller BMK, Braunstein GD, et al. Management of the Clinically Unapparent Adrenal Mass (incidentaloma), NIH Consensus and State-of-the-Science Statements, 2002, 19(2). http://consensus.nih.gov/2002/2002AdrenalIncidentalomasos021PDF.pdf.
46. Alustiza JM, Artetxe J, Castiella A, et al. MR quantification of hepatic iron concentration, Radiology, 2004; 230:479-484.
47. Mortele KJ, Ros PR. Imaging of diffuse liver disease, Semin Liver Dis, 2001; 21:195-212.
48. Queiroz-Andrade M, Blasbalg R, Ortega CD, et al. MR Imaging findings of iron overload, Radiographics, 2009; 29:1575-1589.
49. Gupta AA, Kim DC, Krinsky GA, et al. CT and MRI of cirrhosis and its mimics, AJR, 2004; 183:1595-1601.
50. Murray KF, Carithers RL Jr. AASLD practice guidelines: evaluation of the patient for liver transplantation. Hepatology, 2010; 41(6):1-26.
51. Boyer TD, Haskal ZJ. AASLD practice guideline The role of transjugular intrahepatic portosystemic shunt in the management of portal hypertension, Hepatology, 2005; 41(2):386-400.
52. Arguedas MR, Chen VK, Eloubeidi MA, et al. Screening for Hepatocellular Carcinoma in patients with Hepatitis C Cirrhosis: A Cost-Utility Analysis, The American Journal of Gastroenterology, 2003; 98(3):679-690.
53. Ryder SD. Guidelines for the diagnosis and treatment of hepatocellular carcinoma (HCC) in adults, GUT, 2003; 52 (Suppl III):iii1-iii8.
54. Lok AS, McMahon BJ. Chronic hepatitis B, Hepatology, 2007: 45:507-509.
55. Bruix J, Sherman M. Management of hepatocellular carcinoma: An update. Hepatology, 2010. http://www.aasld.org/practiceguidelines/Documents/Bookmarked%20Practice%20Guidelines/HCCUpdate2010.pdf.
56. Sato T, Tateishi R, Yoshida H, et al. Ultrasound surveillance for early detection of hepatocellular carcinoma among patients with chronic hepatitis. C Hepatol Int. 2009 Aug 6. [Epub ahead of print.].
57. Thompson Coon J, Rogers G, Hewson P, et al. Surveillance of cirrhosis for hepatocellular carcinoma: systematic review and economic analysis. Health Technol Assess. 2007 Sep; 11(34):1-206.
58. AGA Institute technical review on acute pancreatitis. Gastroenterology, 2007; 132:2022-2044.

59. Baker ME, Nelson RC, Rosen MP,, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Acute Pancreatitis. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcutePancreatitis.pdf.
60. Sutton PA, Humes DJ, Purcel G, et al. The role of routine assays of serum amylase and lipase for the diagnosis of acute abdominal pain, Ann R Coll Surg Engl, 2009; 91:381-384.
61. Ammann RW. Diagnosis and management of chronic pancreatitis: current knowledge. Swiss Med Wkly 2006; 136: 166-174.
62. Mayerle J, Hoffmeister A, Werner J, et al, Clinical Practice guideline, chronic pancreatitis- definition, etiology, investigation and treatment, Dtsch Arztebl Int, 2013; 110:387-393.
63. Sahani DV, Kadavigere R, Blake M, et al. Intraductal papillary mucinous neoplasm of pancreas: multi-detector row CT with 2D curved reformations—correlation with MRCP, Radiology, 2006; 238:560-569.
64. Vitellas KM, Keogan MT, Spritzer CE, et al. MR cholangiopancreatography of bile and pancreatic duct abnormalities with emphasis on the single-shot fast spin-echo technique, Radiographics, 2000; 20:939-957.
65. Owen NJ, Sohaib SAA, Peppercorn PD, et al. MRI of pancreatic neuroendocrine tumors, BJR, 2001; 74:968-973.
66. Herwick S, Miller FH, Keppke AL. MRI of islet cell tumors of the pancreas, AJR, 2006; 187:W472-W480.
67. Oberg K. Pancreatic endocrine tumors, Semin Oncol, 2010, 37:594-618.
68. Lederle FA, Wilson SE, Johnson GR, et al. Immediate repair compared with surveillance of small abdominal aortic aneurysms. N Eng J Med, 2002; 346:1437-1444.
69. Starvropoulos SW, Charagundla SR. Imaging techniques for detection and management of endoleaks after endovascular aortic aneurysm repair, Radiology, 2007; 243:641-655.
70. Hirsch AT, Haskal ZJ, Hertzer NR, et al. ACC/AHA 2005 Practice Guidelines for the Management of Patients With Peripheral Arterial Disease (Lower Extremity, Renal, Mesenteric, and Abdominal Aortic): Executive Summary. A Collaborative Report From the American Association for Vascular Surgery/Society for Vascular Surgery, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine and Biology, Society of Interventional Radiology, and the ACC/AHA Task Force on Practice Guidelines (Writing Committee to Develop Guidelines for the Management of Patients With Peripheral Arterial Disease), Circulation, 2006; 113:1474-1547.
71. Desjardins B, Rybicki FJ, Dill KE et al, Expert panel on vascular imaging, American College of Radiology Appropriateness criteria-pulsatile abdominal mass, suspected abdominal aortic aneurysm, http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PulsatileAbdominalMassSuspectedAAA.pdf.
72. Horton KM, Smith C, Fishman EK. MDCT and 3D CT angiography of splanchnic artery aneurysms, AJR, 2007; 189:641-647.
73. Macari M, Chandarana H, Balthazar E, et al. Intestinal ischemia versus intramural hemorrhage: CT evaluation, AJR, 2002; 180:177-184.
74. Wiesner W, Khurana B, Ji H, et al. CT of acute bowel ischemia, Radiology, 2003; 226:635-650.
75. U.S. Preventive Services Task Force. Screening for abdominal aortic aneurysm recommendation statement. http://www.uspreventiveservicestaskforce.org/uspstf05/aaascr/aaars.htm.
76. Desjardins B, Rybicki FJ, Dill KE et al, Expert panel on vascular imaging, American College of Radiology Appropriateness criteria-pulsatile abdominal mass, suspected abdominal aortic aneurysm, http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PulsatileAbdominalMassSuspectedAAA.pdf.
77. Demehri S, Rybicki FJ, Dill KE, et al, Expert Panel on Cardiovascular Imaging. American College of Radiology Appropriateness Criteria – Blunt Chest Trauma Suspected Aortic Injury. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/BluntChestTraumaSuspectedAorticInjury.pdf.
78. Erbel R, Alfonso F, Boileau C, et al. Diagnosis and management of aortic dissection: recommendations of the task force on aortic dissection, European Society of Cardiology, European Heart Journal, 2001, 22:1642-1682.
79. Zoga AC, Weissman BN, Kransdorf MJ, et al. Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Soft Tissue Masses. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SoftTissueMasses.pdf.
80. Lee SS, Kim A-Y, Yang S-K, et al. Crohn's Disease of the small bowel: comparison of CT enterography, MR enterography and small-bowel follow-through as diagnostic techniques.
81. Leyendecker JR, Bloomfeld RS, DiSantis DJ, et al. MR enterography in the management of patients with Crohn's disease, RadioGraphics, 2009; 29:1827-1846.
82. Siddiki HA, Fidler JL, Fletcher JG, et al. Prospective Comparison of State-of-the-Art MR Enterography and CT Enterography in Small-Bowel Crohn's Disease, AJR, 2009; 193:113-121.
83. Ely JW, Osheroff JA, Chambliss ML, et al. Approach to leg edema of unclear etiology, JABFM, 2006, 19:148-160.
84. Ettinger DS, Krug LM, Akerley W, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Malignant Pleural Mesothelioma. http://www.nccn.org/professionals/physician_gls/pdf/mpm.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Malignant Pleural Mesothelioma V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
85. Giboney PT. Mildly elevated liver transaminase levels in the asymptomatic patient. Am Fam Physician 2005; 71:1105-10.
86. Bayard M, Holt J, Boroughs, E. Nonalcoholic fatty liver disease Am Fam Physician 2006 Jun 1;73(11):1961-8.
87. Limbi JK, Hyde GM. Evaluation of abnormal liver function tests, Postgrad Med J, 2003; 79:307-312. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1742736/pdf/v079p00307.pdf.
88. Smith MP, Katz DS, Rosen MP, et al, Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Right Lower Quadrant Pain–Suspected Appendicitis. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/RightLowerQuadrantPainSuspectedAppendicitis.pdf.

89. Morrison WB, Weissman BN, Kransdorf MJ, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Primary Bone Tumors. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PrimaryBoneTumors.pdf.
90. Roberts CC, Weissman BN, Appel M, et al, Expert Panel on Musculoskeletal Imaging. American College of Radiology Appropriateness Criteria – Metastatic Bone Disease. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/MetastaticBoneDisease.pdf.
91. Biermann JS, Chow W, Adkins DR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2014. Bone Cancer. http://www.nccn.org/professionals/physician_gls/pdf/bone.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bone Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
92. Mohler JL, Kantoff PW, Armstrong, et al, National Comprehensive Cancer Network (NCCN) Guideline Version 1.2014. Prostate Cancer. http://www.nccn.org/professionals/physician_gls/pdf/prostate.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Prostate Cancer V1.2014. ©2014 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
93. Nelson RC, Kamel IR, Baker ME, et al. Expert Panel on Gastrointestinal Imaging. American College of Radiology Appropriateness Criteria – Liver Lesion Characterization. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/LiverLesionInitialCharacterization.pdf

74181, 74182, 74183 MRI of the Abdomen

Clinical criteria reviewed/revised: 9/16/14, 11/20/13, 10/21/13, 7/31/13, 6/6/13, 5/20/13, 7/3/12, 8/31/11, 11/17/11, 1/20/10
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74185 MRA of the Abdomen without or with Gadolinium

I. Renovascular hypertension, suspected renal artery stenosis[1-7] [One of the following]
- A. Severe hypertension (>90 diastolic) with [One of the following]
  1. Progressive renal insufficiency or
  2. Refractoriness to aggressive medical therapy
- B. Malignant or accelerated hypertension
- C. Acute worsening of previously stable hypertension
- D. Significant hypertension (>90 diastolic) in adult <35 years old
- E. New onset significant hypertension (>90 diastolic) after age 50
- F. Hypertension in a patient with:
  1. Diffuse atherosclerosis or
  2. Incidentally detected asymmetry of kidney size
- G. Hypertension with an acute elevation in plasma creatinine concentration unexplained or after therapy with an ACE inhibitor
- H. Abdominal bruit
- I. Recurring acute pulmonary edema with significant hypertension
- J. Hypokalemia (<3.5 mmol/L) with normal or elevated plasma renin (>1 ng/ml/Hr) levels in the absence of diuretic therapy
- K. Children with hypertension [MRA]
- L. Hypertension and documented neurofibromatosis

II. Intestinal angina or chronic mesenteric ischemia[1,2,8-12]
- A. Recurrent acute episodes of abdominal pain [All of the following]
  1. Postprandial epigastric pain, occasionally radiates to the back
  2. Weight loss
  3. Pain after eating

III. Acute mesenteric ischemia[11,12] [One of the following]
- A. Acute mesenteric ischemia is being considered (life-threatening condition)
- B. Isolated right-sided colon involvement suggesting superior mesenteric artery occlusion

IV. Evaluation of renal or liver transplant donor[1,13-14]

V. Aortic aneurysm or aneurysm of the pelvic arteries (including mycotic aneurysm)[1,2,15-21] [One of the following]
- A. Patient with Marfan's or Ehlers-Danlos syndrome
- B. Turner's syndrome
- C. Asymptomatic patient with any segment dilated to twice the adjacent normal diameter
- D. Known AAA with no surgical repair [One of the following]

1. Periodic follow-up of an asymptomatic known AAA will be according to the following schedule if there is an inadequate ultrasound and there has not been a surgical repair. [One of the following]
   a. 2.5-2.9 cm every 5 years
   b. 3.0-3.4 cm every 3 years
   c. 3.5-3.9 cm every 2 years
   d. 4.0-4.4 cm every year
   e. 4.5-4.9 cm every 6 months
   f. 5.0-5.5 cm every 3-6 months
2. New onset of pain (must submit a copy of the ultrasound report)

E. Postoperative evaluation following repair including endovascular repair (stent graft)
1. 1 month after repair
2. 3 months after repair
3. 6 months after repair
4. Annually after repair
5. Suspicion of endoleak

F. Aneurysm of any intra-abdominal artery detected on other imaging

G. Vascular insufficiency of the bowel (suspicion of) [Both of the following]
1. Abdominal pain often starting as periumbilical and often out of proportion to findings on exam
2. Other clinical findings [One of the following]
   a. Leukocytosis, WBC >11,500/cu.mm
   b. Stool positive for occult blood
   c. Nausea, vomiting or diarrhea
   d. History of abdominal angina (pain after eating for approximately 3 hours)

H. Preoperative planning for surgical or endovascular repair

I. Screening for abdominal aortic aneurysm (Ultrasound screening. CTA should only be used if the aorta cannot be visualized adequately on US, and this must be documented with the US report. MRA may be used to screen with documentation of an inadequate US and a reason why CTA is contraindicated.) [One of the following]
1. Pulsatile mass with nondiagnostic ultrasound
2. History of first degree relative with an abdominal aortic aneurysm and non interpretable ultrasound
3. Male age 65-75 with a history of smoking
4. Pulsatile mass on abdominal, vaginal or rectal examination

VI. Peripheral arterial vascular disease with abnormal ankle brachial index as defined in A and one additional of the following[1,2,24-27]

A. Note: For evaluation of PVD, if meets criteria for MRA abdomen, MRA lower extremity (one only) should be certified. An MRA of the pelvis or another lower extremity should NOT be certified. ABI (ankle brachial index, ankle systolic BP divided by brachial systolic BP)
1. Rest ABI <0.90 in symptomatic member
2. Exercise ABI <0.90 in symptomatic member with rest ABI >0.90
3. Toe brachial index <0.90 or pulse volume recording evidence of peripheral vascular disease if the ABI >1.30

B. Abnormal pulses

C. Bruit
D. Claudication
E. Diabetic with: [One of the following]
    1. Skin changes
    2. Loss of hair
    3. Poor capillary refill
    4. Thickened nails
    5. Thin skin
F. Arteritis (Takayasu's arteritis, giant cell arteritis) [One of the following]
    1. ESR >22 mm/hr
    2. Positive ANA
    3. Positive RF or rheumatoid factor
G. Scleroderma
H. Hypercoagulable state [One of the following]
    1. Antiphospholipid antibodies
    2. Behçet's syndrome
    3. Protein C deficiency
    4. Protein S deficiency
    5. Factor V Leiden deficiency
    6. Lupus anticoagulant
    7. Hyperactive platelet syndrome
    8. MRHFR
    9. Anticardiolipin antibodies
    10. Elevated homocysteine level
    11. Anti B2 glycoprotein antibodies
    12. Elevated fibrinogen
    13. PTT abnormal
    14. Antithrombin III antibodies
    15. Oral contraceptive use
    16. Hormone replacement
    17. Sickle cell anemia
I. Buerger's disease (thromboangiitis obliterans) [Both of the following]
    1. History of smoking
    2. Loss of pulses or decreased pulses in the lower extremity
J. Known atherosclerotic occlusive disease when catheter angiography fails to demonstrate an occult runoff vessel suitable for vascular bypass

VII. Evaluation of the hepatic arteries and veins (including portal vein)[1,13,33-35] [One of the following]

A. Evaluation of portal and hepatic veins prior to or following TIPS (transjugular intrahepatic portosystemic shunt)
B. Evaluation of portal and hepatic veins prior to or following surgical intervention for portal hypertension
C. Evaluation of hepatic vasculature prior to and following embolization procedure
D. Evaluation of hepatic vasculature prior to planned hepatectomy
E. Evaluation of liver donor

F. Suspected hepatic vein thrombosis or Budd-Chiari syndrome [One of the following]
   1. Ascites
   2. Hepatomegaly
   3. Inadequate Doppler ultrasound of hepatic veins
G. Possible portal vein thrombosis with negative or inadequate Doppler study of the portal vein [One of the following]
   1. Hypercoagulable state
   2. Abdominal malignancy
H. Preoperative evaluation for pancreatic cancer

VIII. Evaluation of abdominal veins other than hepatic and portal veins[1,25-27]

A. Nephrotic syndrome
B. Suspicion of iliac vein thrombus
C. Suspicion of inferior vena cava thrombus
D. Renal vein thrombosis (See X)
E. Mesenteric vein thrombosis

IX. Suspected or known dissection of the aorta[1,15,28-32]

A. Unequal blood pressure in the arms
B. Rapid onset of “ripping, tearing, searing” severe chest or upper back or abdominal pain
C. Syncope and chest pain
D. Shortness of breath
E. CVA or stroke
F. Loss of pulses
G. New aortic insufficiency murmur
H. Marfan's syndrome
I. Recent aortic manipulation (such as catheter angiography)
J. Family history of aortic disease
K. Follow up of known dissection [One of the following]
   1. 1 month after repair
   2. 3 months after repair
   3. 6 months after repair
   4. 12 months after repair
   5. Annually after 12 months
L. New symptoms after repair [One of the following]
   1. See A-J above

X. Suspected renal vein thrombosis[1] [One of the following]

A. Nephrotic syndrome
B. Proteinuria – 3 grams or more in 24 hours
C. Lupus nephritis
D. Hypercoagulable state [One of the following]
   1. Antiphospholipid antibodies
   2. Behçet’s syndrome
   3. Protein C deficiency
   4. Protein S deficiency

5. Factor V Leiden deficiency
6. Lupus anticoagulant
7. Hyperactive platelet syndrome
8. MRHFR
9. Anticardiolipin antibodies
10. Elevated homocysteine level
11. Anti B2 glycoprotein antibodies
12. Elevated fibrinogen
13. PTT abnormal
14. Antithrombin III antibodies
15. Oral contraceptive use
16. Hormone replacement
17. Sickle cell anemia

XI. Vasculitis and collagen vascular disease[1]

A. History of collagen vascular disease
B. Blue toe syndrome
C. Claudication
D. Non healing vascular ulcers of the lower extremity
E. History of suspicion of polyarteritis nodosa
F. Known or suspected Takayasu's arteritis
G. Henoch-Schönlein purpura

XII. Vasculitis and collagen vascular disease[1,36]

XIII. Preoperative planning of breast reconstruction using a tissue flap[37] (CTA of the abdomen and pelvis)

References:

1. American College of Radiology (ACR), North American Society for Cardiovascular Imaging (NASCI), Society for Pediatric Radiology (SPR). ACR-NASCI-SPR practice guideline for the performance of pediatric and adult body magnetic resonance angiography (MRA), [online publication]. http://www.guidelines.gov/content.aspx?id=32520&search=abdominal+aortic+aneurysm.
2. Pilleul F, Beuf O. Abdominal arteries should be evaluated by 3D contrast – enhanced MRA as the first step, Acta Radiologica, 2002; 43(5): 544-542.
3. Boudeqijn G, Vasbinder C, Nelemans PJ, et al. Diagnostic tests for renal artery stenosis in patients suspected of having renovascular hypertension. Annals of Int Med, 2001; 135(6):401-411.
4. Leung DA, Hagspiel KD, Angle JF, et al. MR angiography of the renal arteries, Radiol Clin N Am, 2002: 40:847-865.
5. Qanadli SD, Soulez G, Therasse E, et al. Detection of renal artery stenosis, AJR, 2001; 177:1123-1129.
6. Harvin HJ, Casalino DD, Remer EM, et al, Expert Panel on Urologic Imaging. American College of Radiology ACR Appropriateness Criteria – Renovascular Hypertension. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/RenovascularHypertension.pdf. Accessed June 14, 2012.
7. Chobanian AV, Bakris GL, Black HR, et al. Seventh report of the joint national committee on prevention, detection, evaluation and treatment of high blood pressure. Hypertension, 2003; 42(6):1206-1252.
8. Shih MP, Hagspiel KD. CTA and MRA in mesenteric ischemia: Part 1. Role in diagnosis and differential diagnosis, AJR, 2007; 188:452-461.
9. Shih MP, Angle JF, Leung DA, et al. CTA and MRA in mesenteric ischemia: Part 2. Normal findings and complications after surgical and endovascular treatment, AJR, 2007; 188: 462-471.
10. American Gastroenterological Association medical position statement: guidelines on intestinal ischemia, Gastroenterology, 2000; 118:951-953.
11. Theodoropoulou A, Koutroubakis IE. Ischemic colitis: Clinical practice in diagnosis and treatment World J Gastroenterol 2008 December 28; 14(48): 7302-7308.

12. Sreenarasimhaiah J. Diagnosis and management of intestinal ischaemic disorders, BMJ, 2003 June 21; 326(7403): 1372–1376.
13. Lee SS, Kim TK, Byun JH, et al. Hepatic arteries in potential donors for living related liver transplantation: evaluation with multi-detector row CT angiography, Radiology, 2003; 227:391-399.
14. Lim JS, Kim M-J, Kim JH, et al. Preoperative MRI of potential living-donor-related liver transplantation using a single dose of gadobenate dimeglumine. AJR, 2005; 185:424-431.
15. Fleming C, Whitlock EP, Beil TL. Screening for abdominal aortic aneurysm: a best-evidence systematic review for the U.S. Preventive Services Task Force, http://www.uspreventiveservicestaskforce.org/uspstf05/aaascr/aaarev.pdf.
16. Desjardins B, Rybicki FJ, Dill KE, et al, Expert Panel on Vascular Imaging. American College of Radiology ACR Appropriateness Criteria – Pulsatile Abdominal Mass, Suspected Abdominal Aortic Aneurysm. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/PulsatileAbdominalMassSuspectedAAA.pdf.
17. Brady AR, Thompson SG, Fowkes GR, et al. Abdominal aortic aneurysm expansion: Risk factors and time intervals for surveillance, Circulation, 2004; 90:16-21.
18. Lindholt JS, Vammen S, Juul S, et al. Optimal interval screening and surveillance of abdominal aortic aneurysms, Eur J Endovasc Surg,2000; 20:369-373.
19. Mehard WB, Heiken JP, Sicard GA. High-attenuating crescent in abdominal aortic aneurysm wall at CT: A sign of acute or impending rupture, Radiology, 1994; 192:359-362.
20. Lederle FA, Wilson SE, Johnson GR, et al. Immediate repair compared with surveillance of small abdominal aortic aneurysms, N Eng J Med, 2002; 346:1437-1444.
21. Stavropoulos SW, Charagundla SR. Imaging techniques for detection and management of endoleaks after endovascular aortic aneurysm repair, Radiology, 2007; 243:641-655.
22. Frykberg RG, Zagonis T, Armstrong DG, et al. Diabetic foot disorders: a clinical practice guideline (2006 revision), Journal of Foot and Ankle Surgery, 2006; 45(5):S1-S66.
23. Rooke TW, Hirsch AT, Misra S, et al. 2011 ACC/AHA update of the guideline for the management of patients with peripheral arterial disease (updating the 2005 guideline). http://content.onlinejacc.org/article.aspx?articleid=1146931.
24. Dill KE, Rybicki FJ, Desjardins B, et al, Expert Panel on Vascular Imaging. American College of Radiology ACR Appropriateness Criteria – Claudication–Suspected Vascular Etiology. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/ClaudicationSuspectedVascularEtiology.pdf.
25. Nghiem HV, Winter TC III, Mountford MC, et al. Evaluation of the portal venous system before liver transplantation: value of phase-contrast MR angiography, AJR, 1995; 164:871-878.
26. DeLeve LD, Valla D-C, Garcia-Tsao F. American Association for the Study of Liver Diseases (AASLD) Practice Guidelines: Vascular disorders of the liver, Hepatology, 2009; 49:1729-1764.
27. Boyer TD, Haskal ZJ. American Association for the Study of Liver Disease (AASLD) Practice Guidelines: The role of transjugular intrahepatic portosystemic shunt (TIPS) in the management of portal hypertension, Hepatology, 2010; 51:1-16.
28. Jacobs JE, Latson LA, Abbara S, et al, Expert Panel on Cardiovascular Imaging. American College of Radiology ACR Appropriateness Criteria – Acute Chest Pain–Suspected Aortic Dissection. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/AcuteChestPainSuspectedAorticDissection.pdf.
29. Demehri S, Rybicki FJ, Dill KE, et al, Expert Panel on Cardiovascular Imaging. American College of Radiology Appropriateness Criteria – Blunt Chest Trauma–Suspected Aortic Injury. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/BluntChestTraumaSuspectedAorticInjury.pdf.
30. Erbel R, Alfonso F, Boileau C, et al. Diagnosis and management of aortic dissection: recommendations of the task force on aortic dissection, European Society of Cardiology, European Heart Journal, 2001, 22:1642-1682.
31. Von Kodolitsch Y, Schwartz AG, Nienaber CA. Clinical prediction of acute aortic dissection. Arch Intern Med 2000; 160: 2971-82.
32. Hiratzka LR, Bakris GL, Beckman JA, et al. 2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/SVM Guidelines for the diagnosis and management of patients with thoracic aortic disease. Circulation, 2010; 121:e266-369.
33. Nghiem HV, Winter TC III, Mountford MC, et al. Evaluation of the portal venous system before liver transplantation: value of phase-contrast MR angiography, AJR, 1995; 164:871-878.
34. DeLeve LD, Garcia-Tsao F. American Association for the Study of Liver Diseases (AASLD), Vascular disorders of the liver, Hepatology, 2009; 49:1729-1764.
35. Boyer T, Askal Z. American Association for the Study of Liver Diseases (AASLD). AASLD practice guidelines: the role of transjugular intrahepatic portosystemic shunt (TIPS) in the management of portal hypertension, Hepatology, 2010; 51:1-16.
36. Kalva SP, Rybicki FJ, Dill KE, et al, Expert Panel on Vascular Imaging, American College of Radiology Appropriateness Criteria-Nontraumatic aortic disease http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/NontraumaticAorticDisease.pdf.
37. Clavero JA, Masia J, Larranaga J, et al. MDCT in the preoperative planning of abdominal perforator surgery for postmastectomy breast reconstruction, AJR, 2008; 191:670-676.

74185 MRA of the Abdomen

Clinical criteria reviewed/revised: 10/25/14, 7/23/13 6/18/12, 8/21/11, 11/07/10, 5/26/10, 12/09, 9/16/09
Medical Advisory Committee reviewed and approved: 8/29/14, 9/18/13, 9/19/12, 6/27/12, 9/21/11

74261 Virtual Colonoscopy Diagnostic without Contrast
74262 Virtual Colonoscopy Diagnostic with Contrast

MEDICARE

I. Evaluation of patients who have had an incomplete fiberoptic colonoscopy despite adequate preparation this episode or past episode
   - A. Failed colonoscopy [One of the following]
     1. Obstructing lesion
     2. Suspected obstructing neoplasm
     3. Abnormal anatomy [One of the following]
        - a. Scarring with obstruction from
          - i. Prior surgery
          - ii. Radiation
          - iii. Diverticulosis
          - iv. Spasm
          - v. Tortuous colon
          - vi. Diverticulitis
     4. Extrinsic compression of the colon which does not allow passage of the colonoscope
   - B. Fiberoptic colonoscopy contraindicated [One of the following]
     1. Recent myocardial infarction
     2. Frail individual
     3. Bleeding disorder or uncorrectable coagulopathy
     4. Contraindication to sedation
     5. Long term anticoagulation which cannot be stopped
     6. Contraindication to anesthesia severe COPD or prior adverse reaction to anesthesia
   - C. Evaluation of submucosal abnormality detected on colonoscopy or other imaging
   - D. Prior colonoscopy with a complication such as perforation
   - E. Preoperative cancer staging and determination of colonic wall invasion

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Medicare References:

1. Local Coverage Determination (LCD): Computed Tomographic Colonography (L29118), Florida. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&ArticleType=SAD%7cEd&PolicyType=Final&s=All&CntrctrType=1%7c9&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
2. Local Coverage Determination (LCD) for Radiology: Computed Tomographic (CT) Colonography (L30896), Cahaba Government Benefit Administrators, LLC, Alabama. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=2&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
3. Local Coverage Determination (LCD) for Radiology. Computed Tomographic (CT) Colonography (L30896), Cahaba Government Benefit Administrators, LLC, Georgia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=14&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
4. Local Coverage Determination (LCD) for Computed Tomographic (CT) Colonography (L25233), National Government Services, Inc., Illinois. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=19&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
5. Local Coverage Determination (LCD) for CT Colonography (Virtual Colonoscopy [VC]) (L30300), Wisconsin Physicians Service Insurance Corporation, Indiana. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=20&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&
6. Local Coverage Determination (LCD) for CT Colonography (Virtual Colonoscopy [VC]) (L30300), Wisconsin Physicians Service Insurance Corporation, Iowa. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=17&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
7. Local Coverage Determination (LCD) for CT Colonography (Virtual Colonoscopy [VC]) (L30300), Wisconsin Physicians Service Insurance Corporation, Kansas. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=21&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
8. Local Coverage Determination (LCD) for Virtual Colonoscopy (CT Colonography) (L31833), CGS Administrators LLC, Kentucky. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=22&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
9. Local Coverage Determination (LCD) for Computed Tomographic (CT) Colonography (L25233), National Government Services, Inc., Maine. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=26&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
10. Local Coverage Determination (LCD) for Computed Tomographic (CT) Colonography (L25233), National Government Services, Inc., Massachusetts. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=24&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
11. Local Coverage Determination (LCD) for CT Colonography (Virtual Colonoscopy [VC]) (L30300), Wisconsin Physicians Service Insurance Corporation, Michigan. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=27&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
12. Local Coverage Determination (LCD) for Computed Tomographic (CT) Colonography (L25233), National Government Services, Inc., Minnesota. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=28&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
13. Local Coverage Determination (LCD) for CT Colonography (Virtual Colonoscopy [VC]) (L30300), Wisconsin Physicians Service Insurance Corporation, Missouri. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=29&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
14. Local Coverage Determination (LCD) for CT Colonography (Virtual Colonoscopy [VC]) (L30300), Wisconsin Physicians Service Insurance Corporation, Nebraska. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=36&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
15. Local Coverage Determination (LCD) for Computed Tomographic (CT) Colonography (L25233), National Government Services, Inc., New Hampshire. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=37&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.

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16. Local Coverage Determination (LCD) for Computed Tomographic (CT) Colonography (L25233), National Government Services, Inc., New York. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=41&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
17. Local Coverage Determination (LCD) for Virtual Colonoscopy (CT Colonography) (L31798), Palmetto GBA, North Carolina. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=34&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
18. Local Coverage Determination (LCD) for Virtual Colonoscopy (CT Colonography) (L31833), CGS Administrators, LLC, Ohio. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=42&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
19. Local Coverage Determination (LCD) for Computed Tomographic (CT) Colonography (L25233), National Government Services, Inc., Rhode Island. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=47&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
20. Local Coverage Determination (LCD) for Virtual Colonoscopy (CT Colonography) (L31798), Palmetto GBA, South Carolina. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=48&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
21. Local Coverage Determination (LCD) for Radiology. Computed Tomographic (CT) Colonography (L30896), Cahaba Government Benefit Administrators, LLC, Tennessee. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=50&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
22. Local Coverage Determination (LCD) for Computed Tomographic (CTColonography) (L25233), National Government Services, Inc., Vermont. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=55&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&
23. Local Coverage Determination (LCD) for Virtual Colonoscopy (CT Colonography) (L31798), Palmetto GBA, Virginia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=53&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
24. Local Coverage Determination (LCD) for Virtual Colonoscopy (CT Colonography) (L31798), Palmetto GBA, West Virginia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=58&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&
25. Local Coverage Determination (LCD) for Computed Tomographic (CT) Colonography (L25233), National Government Services, Inc., Wisconsin. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=57&CntrctrType=1%7c9&KeyWord=74261&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=74261&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
26. National Coverage Determination (NCD) for Colorectal Cancer Screening Tests (210.3). http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=National&NCSelection=NCD&KeyWord=Colorectal+Cancer+Screening+Tests&KeyWordLookUp=Title&KeyWordSearchType=Exact&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.

74261, 74262 Virtual Colonoscopy Diagnostic: MEDICARE

Clinical Criteria Review/Revised: 5/27/14, 7/29/13, 09/06/12
Medical Advisory Committee reviewed and approved: 8/29/14, 9/19/12, 9/21/11

74263 Virtual Colonoscopy (Screening)

MEDICARE[1]

CT colonoscopy is not a covered benefit.

However, in the case of an incomplete optical colonoscopy or comorbidities that contraindicate the use of optical colonoscopy, a diagnostic CT colonoscopy may be covered.

References:

1. National Coverage Determination (NCD) for colorectal screening tests (210.3). http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=National&NCSelection=NCD&KeyWord=Colorectal+cancer+screening+tests&KeyWordLookUp=Title&KeyWordSearchType=And&kq=true&bc=IAAAAAAAAAAA&.

74263 Virtual Colonoscopy Screening: MEDICARE

Critical criteria reviewed/revised: 7/29/13, 5/1/12, 9/2/11, 11/17/10
Medical Advisory Committee reviewed and approved: 8/29/14, 9/19/12, 9/21/11

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75557 Cardiac MRI for Morphology and Function without Contrast
75559 Cardiac MRI for Morphology and Function without Contrast; with Stress Imaging
75561 Cardiac MRI for Morphology and Function without Contrast Followed by Contrast Material and Further Sequences
75563 Cardiac MRI for Morphology and Function without Contrast Followed by Contrast Material and Further Sequences; with Stress Imaging

I. Known coronary artery disease (75559 and 75563) [One of the following]

A. Assessment of myocardial viability prior to coronary revascularization
   1. Documentation of regional left ventricular dysfunction and a nuclear stress test showing a fixed defect in the same region as the demonstrated left ventricular dysfunction and in the same region under consideration for a revascularization procedure

B. Recent myocardial infarction
   1. Documentation of a myocardial infarction within the last four weeks AND
   2. Documentation of a heart catheterization since the myocardial infarction showing no obstructive stenosis

C. Assessment of a recent cardiac catheterization or coronary CT angiogram
   1. Either of these studies revealed any stenosis of unclear clinical significance and that further imaging may alter management

II. Suspected coronary disease (75559 and 75563)

A. Evaluation of chest pain or shortness of breath [One of the following]
   1. A recent cardiac catheterization was performed and one or more coronary arteries were not identified
   2. No imaging stress test, cardiac catheterization or coronary CT angiogram has been performed
      a. Intermediate risk on the pretest probability assessment AND
      b. Unable to exercise or the electrocardiogram shows Wolff-Parkinson-White syndrome, complete left bundle branch block, ventricular paced rhythm, or 1 mm or more ST-J depression with horizontal or downsloping ST segments 80 msec after the J point

III. Ventricular structure and function [One of the following]

A. Assessment of congenital heart disease
   1. No cardiac magnetic resonance imaging study has been performed for this indication within the last year

B. Assessment of acute myocardial infarction
   1. An echocardiogram was performed after the myocardial infarction and was uninterpretable

C. Assessment of congestive heart failure
   1. An echocardiogram was performed for this indication and was uninterpretable

D. Assessment of left ventricular ejection fraction
   1. An unexplained change in ejection fraction on recent cardiac imaging by another modality
E. Cardiomyopathy
   1. Any of the following confirmed diagnoses are present [One of the following]
      a. Cardiac sarcoid (known or suspected)
      b. Cardiac amyloid
      c. Hypertrophic cardiomyopathy
   2. Cardiotoxic chemotherapy administration
      a. An echocardiogram or MUGA scan was performed and was uninterpretable
F. Arrhythmogenic right ventricular dysplasia
   1. Any of the following documented findings leads to clinical suspicion of this diagnosis [One of the following]
      a. Greater than 1000 ventricular premature contractions per day
      b. Ventricular tachycardia
      c. Family history of this disorder
      d. Epsilon waves on the electrocardiogram
G. Assessment of elevated troponin
   1. Cardiac catheterization was performed and no obstructive coronary artery disease was identified

IV. Valvular function

A. An echocardiogram was performed for this indication and was uninterpretable

V. Intra-cardiac structures [One of the following]

A. Radiofrequency ablation planning [One of the following]
   1. No cardiac CT has been performed for this indication
   2. Cardiac CT was performed but was uninterpretable
B. Assessment of a cardiac mass
   1. Mass has been documented by echocardiography, cardiac catheterization or cardiac CT

VI. Extra-cardiac structures [One of the following]

A. Assessment of aortic dissection [One of the following]
   1. No cardiac CT has been performed for this indication
   2. A cardiac CT was performed, but was uninterpretable
B. Assessment of pericardial disease
   1. An echocardiogram has been performed for this indication AND
   2. A cardiac CT was not performed or was performed and was uninterpretable

References:

1. Hendel, RC, Patel MR, Kramer CM, et al. ACCF/ACR/SCCT/SCMR/ASNC/NASCI/SCAI/SIR 2006 Appropriateness Criteria for Cardiac Computed Tomography and Cardiac Magnetic Resonance Imaging: A Report of the American College of Cardiology Foundation Quality Strategic Directions Committee Appropriateness Criteria Working Group, American College of Radiology, Society of Cardiovascular Computed Tomography, Society for Cardiovascular Magnetic Resonance, American Society of Nuclear Cardiology, North American Society for Cardiac Imaging, Society for Cardiovascular Angiography and Interventions, and Society of Interventional Radiology. J Am Coll Cardiol 2006 48: 1475-1497.

Medicare LCD References:

2. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L31399). Novitas Solutions, Inc. Delaware. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&ArticleType=Ed%7cKey%7cSAD%7cFAQ&PolicyType=Both&s=11&CntrctrType=1%7c9&CptHcpcsCode=75557&kq=true&bc=IAAAAAAAAAAA&.
3. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L31399). Novitas Solutions, Inc. District of Columbia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&ArticleType=Ed%7cKey%7cSAD%7cFAQ&PolicyType=Both&s=10&CntrctrType=1%7c9&CptHcpcsCode=75557&kq=true&bc=IAAAAAAAAAAA&.
4. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L31399). Novitas Solutions, Inc. Maryland. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&ArticleType=Ed%7cKey%7cSAD%7cFAQ&PolicyType=Final&s=25&CntrctrType=1%7c9&CptHcpcsCode=75557&kq=true&bc=IAAAAAAAAAAA&.
5. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L31399). Novitas Solutions, Inc. New Jersey. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&ArticleType=Ed%7cKey%7cSAD%7cFAQ&PolicyType=Final&s=38&CntrctrType=1%7c9&CptHcpcsCode=75557&kq=true&bc=IAAAAAAAAAAA&.
6. Local Coverage Determination (LCD) for Magnetic Resonance Angiography (MRA) (L31399). Novitas Solutions, Inc. Pennsylvania.http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&ArticleType=Ed%7cKey%7cSAD%7cFAQ&PolicyType=Both&s=45&CntrctrType=1%7c9&CptHcpcsCode=75557&kq=true&bc=IAAAAAAAAAAA&.

Clinical Criteria Reviewed/Revised: 5/27/14, 9/5/13, 7/29/13, 8/12/12, 9/2/11
Medical Advisory Committee Reviewed and Approved: 8/29/17, 9/18/13, 9/19/12, 9/21/11

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75571 Coronary Artery Calcium Scoring

MEDICARE AL

This test is considered to be not medically necessary for Medicare beneficiaries

References:

1. Local Coverage Determination (LCD) for Radiology: Computed Tomography Angiography of the Heart and Coronary Vessels (L30047). Cahaba Government Benefit Administrators, LLC, Alabama. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=2&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
2. Local Coverage Determination (LCD) for Computed Cardiac Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Connecticut. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=9&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
3. Local Coverage Determination (LCD) for Computed Tomographic Angiography of the Chest, Heart and Coronary Arteries (L29117). First Coast Service Options, Inc., Florida. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=12&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
4. Local Coverage Determination (LCD) for Computed Coronary Tomography Angiography (L30288). Wisconsin Physician Services Insurance Corporation, Iowa. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=17&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
5. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Illinois. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=19&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
6. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L32790). Wisconsin Physician Services Insurance Corporation, Indiana. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=20&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
7. Local Coverage Determination (LCD) for Computed Coronary Tomography Angiography (L30288). Wisconsin Physician Services Insurance Corporation, Kansas. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=21&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
8. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L31830). CGS Administrators, LLC, Kentucky. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=22&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
9. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Massachusetts. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=24&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
10. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Maine. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=26&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.

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11. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L32790). Wisconsin Physician Services Insurance Corporation, Michigan. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=27&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
12. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Minnesota. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=28&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
13. Local Coverage Determination (LCD) for Computed Coronary Tomography Angiography (L30288). Wisconsin Physician Services Corporation, Missouri. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=29&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
14. Local Coverage Determination (LCD) for Cardiac Computed Tomography & Angiography (CCTA) (L31699). Palmetto GBA, North Carolina. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=34&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
15. Local Coverage Determination (LCD) for Computed Coronary Tomography Angiography (L30288). Wisconsin Physician Services Corporation, Nebraska. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=36&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
16. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., New Hampshire. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=37&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
17. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., New York. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=41&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
18. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L31830). CGS Administrators, LLC, Ohio. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=42&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
19. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Rhode Island. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=47&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
20. Local Coverage Determination (LCD) for Cardiac Computed Tomography & Angiography (CCTA) (L31699). Palmetto GBA, South Carolina. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=48&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
21. Local Coverage Determination (LCD) for Cardiac Computed Tomography & Angiography (CCTA) (L31699). Palmetto GBA, Virginia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=53&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
22. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Vermont. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=55&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
23. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Wisconsin. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=57&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
24. Local Coverage Determination (LCD) for Cardiac Computed Tomography & Angiography (CCTA) (L31699). Palmetto GBA, West Virginia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=58&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
25. Local Coverage Determination (LCD) for Radiology: Computed Tomographic Angiography of the Heart and Coronary Vessels (L30047). Cahaba Government Benefit Administrators, LLC, Georgia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=14&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.

26. Local Coverage Determination (LCD) for Radiology: Computed Tomographic Angiography of the Heart and Coronary Vessels (L30047). Cahaba Government Benefits Administrators, LLC, Tennessee. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=50&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.

75571 Coronary Artery Calcium Scoring: MEDICARE AL

Clinical criteria reviewed/revised: 5/27/14, 10/11/13, 7/29/13, 9/6/12
Medical Advisory Committee reviewed and approved: 8/29/14, 9/19/12

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75572 CT Heart Structure and Morphology with Contrast

MEDICARE AL

I. Cardiac CT for structure and morphology [One of the following]
- A. Evaluation of native or prosthetic valve, cardiac mass, or pericardial mass
  - 1. A prior cardiac CT angiogram, cardiac MRI or echocardiogram was performed for this indication and was uninterpretable
- B. Coronary vein mapping
  - 1. Biventricular pacemaker placement is planned
- C. Coronary artery bypass graft localization
  - 1. Thoracic or cardiac surgery is planned
- D. Pulmonary vein evaluation
  - 1. Radiofrequency ablation for atrial fibrillation is planned
- E. Left ventricular function evaluation
  - 1. Congestive heart failure or a myocardial infarction within the last four weeks AND
    - a. An echocardiogram, cardiac MRI, or MUGA was performed but was uninterpretable
- F. Quantitative right ventricular function evaluation
  - 1. An echocardiogram, cardiac MRI, or MUGA was performed but was uninterpretable
- G. Suspected arrhythmogenic right ventricular dysplasia (ARVD)
  - 1. AVRD is suspected because of documentation of greater than 1000 ventricular premature contractions/day, ventricular tachycardia, family history of ARVD, or Epsilon waves on the electrocardiogram AND either
    - a. No cardiac MRI has been performed and there is a contraindication to MRI
    - b. A cardiac MRI was performed and was uninterpretable

References:

1. Taylor AJ, Cequeira M, Hodgson JM, Mark D, Min J, O'Gara P, Rubin GD. ACCF/SCCT/ACR/AHA/ASE/ASNC/SCAI/SCMR 2010 appropriate use criteria for cardiac computed tomography: a report of the American College of Cardiology Foundation Appropriate Use Criteria Task Force, the Society of Cardiovascular Computed Tomography, the American College of Radiology, the American Heart Association, the American Society of Echocardiography, the American Society of Nuclear Cardiology, the Society for Cardiovascular Angiography and Interventions, and the Society for Cardiovascular Magnetic Resonance. J Am Coll Cardiol. 210: 56; 1864-1894.
2. ACCF/ACR/SCCT/SCMR/ASNC/NASCI/SCAI/SIR Appropriateness Criteria for Cardiac Computed Tomography and Cardiac Magnetic Resonance Imaging. Journal of the American College of Cardiology Vol. 48, No. 7, 2006.
3. Local Coverage Determination (LCD) for Computed Cardiac Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Connecticut. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=9&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
4. Local Coverage Determination (LCD) for Computed Tomographic Angiography of the Chest, Heart and Coronary Arteries (L29117). First Coast Service Options, Inc., Florida. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=12&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
5. Local Coverage Determination (LCD) for Computed Coronary Tomography Angiography (L30288). Wisconsin Physician Services Insurance Corporation, Iowa. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=17&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
6. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Illinois. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=19&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
7. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L32790). Wisconsin Physician Services Insurance Corporation, Indiana. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=20&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
8. Local Coverage Determination (LCD) for Computed Coronary Tomography Angiography (L30288). Wisconsin Physician Services Insurance Corporation, Kansas. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=21&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
9. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L31830). CGS Administrators, LLC, Kentucky. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=22&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
10. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Massachusetts. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=24&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
11. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Maine. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=26&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
12. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L32790). Wisconsin Physician Services Insurance Corporation, Michigan. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=27&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
13. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Minnesota. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=28&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
14. Local Coverage Determination (LCD) for Computed Coronary Tomography Angiography (L30288). Wisconsin Physician Services Corporation, Missouri. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=29&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.

15. Local Coverage Determination (LCD) for Cardiac Computed Tomography & Angiography (CCTA) (L31699). Palmetto GBA, North Carolina. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=34&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
16. Local Coverage Determination (LCD) for Computed Coronary Tomography Angiography (L30288). Wisconsin Physician Services Corporation, Nebraska. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=36&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
17. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., New Hampshire. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=37&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
18. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., New York. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=41&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
19. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L31830). CGS Administrators, LLC, Ohio. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=42&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
20. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Rhode Island. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=47&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
21. Local Coverage Determination (LCD) for Cardiac Computed Tomography & Angiography (CCTA) (L31699). Palmetto GBA, South Carolina. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=48&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
22. Local Coverage Determination (LCD) for Cardiac Computed Tomography & Angiography (CCTA) (L31699). Palmetto GBA, Virginia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=53&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
23. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Vermont. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=55&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
24. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Wisconsin. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=57&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
25. Local Coverage Determination (LCD) for Cardiac Computed Tomography & Angiography (CCTA) (L31699). Palmetto GBA, West Virginia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=58&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
26. Local Coverage Determination (LCD) for Radiology: Computed Tomography Angiography of the Heart and Coronary Vessels (L30047). Cahaba Government Benefit Administrators, LLC, Alabama. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=2&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
27. Local Coverage Determination (LCD) for Radiology: Computed Tomographic Angiography of the Heart and Coronary Vessels (L30047). Cahaba Government Benefit Administrators, LLC, Georgia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=14&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
28. Local Coverage Determination (LCD) for Radiology: Computed Tomographic Angiography of the Heart and Coronary Vessels (L30047). Cahaba Government Benefits Administrators, LLC, Tennessee. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=50&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.

75572 CT Heart Structure and Morphology with Contrast: MEDICARE AL

Clinical criteria reviewed/revised: 5/29/14, 10/13/13, 7/29/13, 8/2/12, 9/2/11, 4/11/11
Medical Advisory Committee reviewed and approved: 8/29/14, 10/24/13, 9/18/13, 9/19/12, 9/21/11

75573 CT Heart Structure and Morphology in Congenital Heart Disease with Contrast

MEDICARE AL

I. Cardiac CT for congenital heart disease (75573) [One of the following]
   A. Coronary artery anomaly evaluation
   B. Thoracic arteriovenous anomaly evaluation
      1. A cardiac MRI or chest CT angiogram was performed and suggested congenital heart disease
   C. Complex congenital heart disease evaluation

References:

1. Taylor AJ, Cequeira M, Hodgson JM, Mark D, Min J, O'Gara P, Rubin GD. ACCF/SCCT/ACR/AHA/ASE/ASNC/SCAI/SCMR 2010 appropriate use criteria for cardiac computed tomography: a report of the American College of Cardiology Foundation Appropriate Use Criteria Task Force, the Society of Cardiovascular Computed Tomography, the American College of Radiology, the American Heart Association, the American Society of Echocardiography, the American Society of Nuclear Cardiology, the Society for Cardiovascular Angiography and Interventions, and the Society for Cardiovascular Magnetic Resonance. J Am Coll Cardiol. 210: 56; 1864-1894.
2. ACCF/ACR/SCCT/SCMR/ASNC/NASCI/SCAI/SIR Appropriateness Criteria for Cardiac Computed Tomography and Cardiac Magnetic Resonance Imaging. Journal of the American College of Cardiology Vol. 48, No. 7, 2006.
3. Local Coverage Determination (LCD) for Computed Cardiac Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Connecticut. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=9&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
4. Local Coverage Determination (LCD) for Computed Tomographic Angiography of the Chest, Heart and Coronary Arteries (L29117). First Coast Service Options, Inc., Florida. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=12&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
5. Local Coverage Determination (LCD) for Computed Coronary Tomography Angiography (L30288). Wisconsin Physician Services Insurance Corporation, Iowa. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=17&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
6. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Illinois. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=19&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
7. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L32790). Wisconsin Physician Services Insurance Corporation, Indiana. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=20&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
8. Local Coverage Determination (LCD) for Computed Coronary Tomography Angiography (L30288). Wisconsin Physician Services Insurance Corporation, Kansas. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=21&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
9. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L31830). CGS Administrators, LLC, Kentucky. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=22&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.

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10. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Massachusetts. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=24&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
11. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Maine. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=26&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
12. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L32790). Wisconsin Physician Services Insurance Corporation, Michigan. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=27&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
13. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Minnesota. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=28&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
14. Local Coverage Determination (LCD) for Computed Coronary Tomography Angiography (L30288). Wisconsin Physician Services Corporation, Missouri. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=29&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
15. Local Coverage Determination (LCD) for Cardiac Computed Tomography & Angiography (CCTA) (L31699). Palmetto GBA, North Carolina. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=34&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
16. Local Coverage Determination (LCD) for Computed Coronary Tomography Angiography (L30288). Wisconsin Physician Services Corporation, Nebraska. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=36&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
17. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., New Hampshire. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=37&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
18. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., New York. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=41&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
19. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L31830). CGS Administrators, LLC, Ohio. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=42&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
20. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Rhode Island. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=47&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
21. Local Coverage Determination (LCD) for Cardiac Computed Tomography & Angiography (CCTA) (L31699). Palmetto GBA, South Carolina. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=48&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
22. Local Coverage Determination (LCD) for Cardiac Computed Tomography & Angiography (CCTA) (L31699). Palmetto GBA, Virginia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=53&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
23. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Vermont. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=55&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.

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24. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Wisconsin. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=57&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
25. Local Coverage Determination (LCD) for Cardiac Computed Tomography & Angiography (CCTA) (L31699). Palmetto GBA, West Virginia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=58&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
26. Local Coverage Determination (LCD) for Radiology: Computed Tomography Angiography of the Heart and Coronary Vessels (L30047). Cahaba Government Benefit Administrators, LLC, Alabama. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=2&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
27. Local Coverage Determination (LCD) for Radiology: Computed Tomographic Angiography of the Heart and Coronary Vessels (L30047). Cahaba Government Benefit Administrators, LLC, Georgia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=14&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
28. Local Coverage Determination (LCD) for Radiology: Computed Tomographic Angiography of the Heart and Coronary Vessels (L30047). Cahaba Government Benefits Administrators, LLC, Tennessee. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=50&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.

75573 CT Heart Structure and Morphology in Congenital Heart Disease with Contrast: MEDICARE AL

Clinical criteria reviewed/revised: 5/29/14, 10/13/13, 7/29/13, 8/2/12, 9/2/11, 4/11/11
Medical Advisory Committee reviewed and approved: 8/29/14, 9/18/13, 9/19/12, 9/21/11

75574 CTA Coronary Arteries and Structure and Morphology with Function and with Contrast

MEDICARE AL

I. Patients with low pretest probability of disease are not usually studied unless a prior exercise stress test demonstrated a presumed false positive or non diagnostic result

II. The presence of risk factors alone is not a covered indication for this study

III. Routine follow up for myocardial infarction, CABG or PTCA in the absence of symptoms or clinical indications is not covered (annual testing in the absence of individualized clinical indications)

IV. Occupational fitness evaluation is not covered

V. Known CAD with a change in symptoms

VI. Determination of the extent of ischemia or scar to assess myocardial viability (risk stratification after acute myocardial infarction

VII. Prior to high risk surgery and intermediate risk for CAD

VIII. Condition that would likely result in a non diagnostic or inaccurate standard exercise stress test

IX. Use of medication that makes a standard exercise stress test inaccurate

X. Evaluation of documented silent ischemia in order to evaluate subsequent medical management

XI. Evaluation of newly diagnosed congestive heart failure

XII. Evaluation of hypertrophic or dilated cardiomyopathy

XIII. Abnormal or non diagnostic standard exercise stress test or imaging stress test

XIV. Ventricular wall motion abnormality on other imaging and there is a need for perfusion imaging

XV. Assessment of functional capacity

XVI. Viability

XVII. Assessment of congenital anomalies of the coronary arteries

XVIII. Post-transplant cardiac disease
   A. Assessment of coronary arteriopathy
   B. Ventricular dysfunction with post transplant rejection

XIX. Following reperfusion (CABG, PTCA or thrombolysis to determine effectiveness of the intervention) when the beneficiary is symptomatic

XX. Abnormal EKG with a high likelihood of CAD based on multiple risk factors or strongly suggestive symptoms

XXI. Evaluation prior to non coronary cardiac surgery (valve surgery or ascending aortic surgery)

XXII. Chest pain syndrome and high degree of suspicion that CAD is present

XXIII. Known CAD with recurrent symptoms

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References:

1. Local Coverage Determination (LCD) for Computed Cardiac Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Connecticut. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=9&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
2. Local Coverage Determination (LCD) for Computed Tomographic Angiography of the Chest, Heart and Coronary Arteries (L29117). First Coast Service Options, Inc., Florida. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=12&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
3. Local Coverage Determination (LCD) for Computed Coronary Tomography Angiography (L30288). Wisconsin Physician Services Insurance Corporation, Iowa. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=17&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
4. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Illinois. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=19&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
5. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L32790). Wisconsin Physician Services Insurance Corporation, Indiana. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=20&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
6. Local Coverage Determination (LCD) for Computed Coronary Tomography Angiography (L30288). Wisconsin Physician Services Insurance Corporation, Kansas. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=21&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
7. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L31830). CGS Administrators, LLC, Kentucky. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=22&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
8. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Massachusetts. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=24&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
9. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Maine. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=26&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
10. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L32790). Wisconsin Physician Services Insurance Corporation, Michigan. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=27&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
11. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Minnesota. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=28&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
12. Local Coverage Determination (LCD) for Computed Coronary Tomography Angiography (L30288). Wisconsin Physician Services Corporation, Missouri. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=29&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
13. Local Coverage Determination (LCD) for Cardiac Computed Tomography & Angiography (CCTA) (L31699). Palmetto GBA, North Carolina. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=34&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
14. Local Coverage Determination (LCD) for Computed Coronary Tomography Angiography (L30288). Wisconsin Physician Services Corporation, Nebraska. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=36&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.

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15. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., New Hampshire. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=37&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
16. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., New York. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=41&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
17. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L31830). CGS Administrators, LLC, Ohio. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=42&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
18. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Rhode Island. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=47&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
19. Local Coverage Determination (LCD) for Cardiac Computed Tomography & Angiography (CCTA) (L31699). Palmetto GBA, South Carolina. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=48&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
20. Local Coverage Determination (LCD) for Cardiac Computed Tomography & Angiography (CCTA) (L31699). Palmetto GBA, Virginia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=53&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
21. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Vermont. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=55&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
22. Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA) (L25907). National Government Services, Inc., Wisconsin. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=57&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
23. Local Coverage Determination (LCD) for Cardiac Computed Tomography & Angiography (CCTA) (L31699). Palmetto GBA, West Virginia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=58&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
24. Local Coverage Determination (LCD) for Radiology: Computed Tomography Angiography of the Heart and Coronary Vessels (L30047). Cahaba Government Benefit Administrators, LLC, Alabama. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=2&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
25. Local Coverage Determination (LCD) for Radiology: Computed Tomographic Angiography of the Heart and Coronary Vessels (L30047). Cahaba Government Benefit Administrators, LLC, Georgia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=14&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.
26. Local Coverage Determination (LCD) for Radiology: Computed Tomographic Angiography of the Heart and Coronary Vessels (L30047). Cahaba Government Benefits Administrators, LLC, Tennessee. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&PolicyType=Final&s=50&CntrctrType=1%7c9&CptHcpcsCode=75571&kq=true&bc=IAAAAAAAAAAA&.

75574 CTA Coronary Arteries Structure and Morphology: MEDICARE AL

Clinical criteria reviewed/revised: 5/29/14, 10/10/13, 8/2/12, 9/2/11, 4/11/11
Medical Advisory Committee reviewed and approved: 8/29/14, 10/24/13, 9/18/13, 9/19/12, 9/21/11

75635 CTA of the Abdominal Aorta and Bilateral Iliofemoral Lower Extremity Runoff

I. Peripheral arterial vascular disease with abnormal ankle brachial index[1,2] as defined in A [AND one additional of the following]
   A. Note: For evaluation of PVD, if meets criteria for MRA abdomen, MRA lower extremity (one only) should be certified. An MRA of the pelvis or another lower extremity should NOT be certified. ABI (ankle brachial index, ankle systolic BP divided by brachial systolic BP)
      1. Rest ABI <0.90 in symptomatic member
      2. Exercise ABI <0.90 in symptomatic member with rest ABI >0.90
      3. Toe brachial index <0.90 or pulse volume recording evidence of peripheral vascular disease if the ABI >1.30
   B. Abnormal pulses
   C. Bruit
   D. Claudication
   E. Diabetic with [One of the following]
      1. Skin changes
      2. Loss of hair
      3. Poor capillary refill
      4. Thickened nails
      5. Thin skin
   F. Arteritis (Takayasu's arteritis, giant cell arteritis) [One of the following]
      1. ESR >22 mm/hr
      2. Positive ANA
      3. Positive RF or rheumatoid factor
   G. Scleroderma
   H. Hypercoagulable state [One of the following]
      1. Antiphospholipid antibodies
      2. Behçet's syndrome
      3. Protein C deficiency
      4. Protein S deficiency
      5. Factor V Leiden deficiency
      6. Lupus anticoagulant
      7. Hyperactive platelet syndrome
      8. MRHFR
      9. Anti-cardiolipin antibodies
      10. Elevated homocysteine level
      11. Anti B2 glycoprotein antibodies
      12. Elevated fibrinogen
      13. PTT abnormal
      14. Antithrombin III antibodies
      15. Oral contraceptive use

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16. Hormone replacement
17. Sickle cell anemia

I. Buerger's disease (thromboangiitis obliterans) [Both of the following]
   1. History of smoking
   2. Loss of pulses or decreased pulses in the lower extremity

J. Known atherosclerotic occlusive disease when catheter angiography fails to demonstrate an occult runoff vessel suitable for vascular bypass

II. Aneurysm of the aorta, or iliac or femoral or popliteal arteries[2,3] [One of the following]

A. Patient with Marfan's or Ehlers-Danlos syndrome
B. Turner's syndrome
C. Asymptomatic patient with any segment dilated to twice the adjacent normal diameter
D. Known AAA [One of the following]
   1. Periodic follow-up of an asymptomatic known AAA will be according to the following schedule if there is an inadequate ultrasound and there has not been a surgical repair
      a. 2.5-2.9 cm every 5 years
      b. 3.0-3.4 cm every 3 years
      c. 3.5-3.9 cm every 2 years
      d. 4.0-4.4 cm every year
      e. 4.5-4.9 cm every 6 months
      f. 5.0-5.5 cm every 3-6 months
   2. New onset of pain
E. Postoperative evaluation following repair including endovascular repair (stent graft) [One of the following]
   1. 1 month after repair
   2. 3 months after repair
   3. 6 months after repair
   4. Annually after repair
   5. Suspicion of endoleak
F. Aneurysm of any intraabdominal or peripheral artery detected on other imaging
G. Vascular insufficiency of the bowel [Both of the following]
   1. Abdominal pain often starting as periumbilical and often out of proportion to findings on exam
   2. Other clinical findings [One of the following]
      a. WBC >11,500/cu.mm
      b. Stool positive for occult blood
      c. Nausea, vomiting or diarrhea
      d. History of abdominal angina (pain after eating for approximately 3 hours)
H. Planning for endovascular or surgical repair

References:

1. Rooke TW, Hirsch AT, Misra S, et al. 2011 ACC/AHA update of the guideline for the management of patients with peripheral arterial disease (updating the 2005 guideline). http://content.onlinejacc.org/article.aspx?articleid=1146931.
2. Dill KE, Rybicki FJ, Desjardins B, et al. Expert Panel on Cardiovascular Imaging. American College of Radiology Appropriateness Criteria – Claudication–Suspected Vascular Etiology. http://www.acr.org/Search?q=ClaudicationSuspectedVascularEtiology.pdf.
3. Upchurch GR, Schaub TA. Abdominal aortic aneurysm, Am Fam Physician, 2006; 73:1198-1204. http://www.aafp.org/afp/2006/0401/p1198.html.

75635 CTA of the Abdominal Aorta and Bilateral Iliofemoral Lower Extremity Runoff

Clinical criteria reviewed/revised: 5/29/14, 7/29/13, 7/17/12, 9/3/11, 11/17/10, 5/26/10, 11/18/09
Medical Advisory Committee reviewed and approved: 8/29/14, 6/12/13, 9/19/12, 9/21/11

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76380 CT Limited or Localized Follow-up Study

I. Prior positive CT or other imaging study that is being followed either at intervals to assess therapy or to clarify a finding. This is commonly used for sinus imaging and must meet the criteria for 70486, but may be used for MRI or CT of the chest and abdomen and must meet the corresponding criteria (See 71250-71270 or 74177-74178, 74160-74170, 72193-72194)

Clinical criteria reviewed/revised:5/29/14, 7/30/13, 8/13/2012, 8/17/11, 11/17/10, 12/8/09, 1/21/09
Medical Advisory Committee reviewed and approved: 9/5/14, 9/19/12, 9/21/11

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76390 MR Spectroscopy

MEDICARE

This is considered to be a non-covered benefit by Medicare.

Reference:

1. National Coverage Determination (NCD) for Magnetic Resonance Spectroscopy (220.2.1). http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&KeyWord=Magnetic+Resonance+Spectroscopy&KeyWordLookUp=Title&KeyWordSearchType=Exact&kq=true&bc=IAAAAAAAAAAA&. Accessed August 9, 2012.

76390 MR Spectroscopy: MEDICARE

Clinical criteria reviewed/revised: 5/29/14, 7/31/13, 8/9/12, 10/25/11, 11/17/10
Medical Advisory Committee reviewed and approved: 9/5/14, 9/19/12, 9/21/11

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76498 Unlisted Magnetic Resonance Procedure (e.g. Diagnostic, Interventional)

Requests for this procedure are redirected to the nearest 70000 series code that corresponds to the procedure being requested.

76498 Unlisted Magnetic Resonance Procedure (e.g. Diagnostic, Interventional)

Clinical criteria reviewed/revised: 5/29/14, 12/16/13
Medical Advisory Committee reviewed and approved: 9/5/14, 12/16/13

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77058 MRI of the Breast Unilateral
77059 MRI of the Breast Bilateral

MEDICARE[1-11]

Medicare does not cover screening breast MRI even in women with a high genetic risk of breast cancer

I. Beneficiary with new diagnosis of breast cancer

II. To detect local tumor recurrence in beneficiary with a personal history of breast cancer and scarring from prior biopsies, radiation or surgery that results in uninterpretable mammography and ultrasound

III. To localize the site of primary occult breast cancer in beneficiary with adenocarcinoma suggestive of breast cancer discovered as axillary node metastasis or distant metastasis without focal findings on physical examination or on mammography/ultrasonography

IV. Indeterminate breast imaging
   A. Beneficiary with indeterminate diagnostic mammogram and sonogram

V. Confirm rupture of implants

References:

1. Local Coverage Determination (LCD) for Breast Imaging Mammography/Breast Echography (Sonography)/Breast MRI/Ductography (L26890), Connecticut, National Government Services, Inc. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=9&CntrctrType=1%7c9&KeyWord=77058&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=77058&kq=true&bc=IAAAAAAAAAAA&.
2. Local Coverage Determination (LCD) for Breast Imaging Mammography/Breast Echography (Sonography)/Breast MRI/Ductography (L31856), Kentucky, CGS Administrators, LLC. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=22&CntrctrType=1%7c9&KeyWord=77058&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=77058&kq=true&bc=IAAAAAAAAAAA&.
3. Local Coverage Determination (LCD) for Breast Imaging Mammography/Breast Echography (Sonography)/Breast MRI/Ductography (L26890), Maine, National Government Services, Inc. http://www.cms.gov/medicare-coverage-database/details/lcd-details.aspx?LCDId=26890&ContrId=291&ver=74&ContrVer=1&SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=26&CntrctrType=1%7c9&KeyWord=77058&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=77058&kq=true&bc=IAAAABAAAAAAAA%3d%3d&.
4. Local Coverage Determination (LCD) for Breast Imaging Mammography/Breast Echography (Sonography)/Breast MRI/Ductography (L26890), New Hampshire, National Government Services, Inc. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=37&CntrctrType=1%7c9&KeyWord=77058&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=77058&kq=true&bc=IAAAAAAAAAAA&.
5. Local Coverage Determination (LCD) for Breast Imaging Mammography/Breast Echography (Sonography)/Breast MRI/Ductography (L26890), New York, National Government Services, Inc. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=41&CntrctrType=1%7c9&KeyWord=77058&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=77058&kq=true&bc=IAAAAAAAAAAA&.

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6. Local Coverage Determination (LCD) for Breast Imaging Mammography/Breast Echography (Sonography)/Breast MRI/Ductography (L31856), Ohio, CGS Administrators, LLC. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=42&CntrctrType=1%7c9&KeyWord=77058&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=77058&kq=true&bc=IAAAAAAAAAAA&.
7. Local Coverage Determination (LCD) for Breast Imaging Mammography/Breast Echography (Sonography)/Breast MRI/Ductography (L26890), Rhode Island, National Government Services, Inc. . http://www.cms.gov/medicare-coverage-database/details/lcd-details.aspx?LCDId=26890&ContrId=295&ver=74&ContrVer=1&SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=47&CntrctrType=1%7c9&KeyWord=77058&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=77058&kq=true&bc=IAAAABAAAAAAAA%3d%3d&
8. Local Coverage Determination (LCD) for Breast Imaging Mammography/Breast Echography (Sonography)/Breast MRI/Ductography (L26890), Vermont, Local Coverage Determination (LCD) for Breast Imaging Mammography/Breast Echography (Sonography)/Breast MRI/Ductography (L26890). National Government Services, Inc. http://www.cms.gov/medicare-coverage-database/details/lcd-details.aspx?LCDId=26890&ContrId=294&ver=74&ContrVer=1&SearchType=Advanced&CoverageSelection=Both&NCSelection=NCD&PolicyType=Final&s=55&CntrctrType=1%7c9&KeyWord=77058&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=77058&kq=true&bc=IAAAABAAAAAAAA%3d%3d&
9. Local Coverage Determination (LCD) for Breast Imaging Mammography/Breast Echography (Sonography)/Breast MRI/Ductography (L26890), National Government Services, Inc, Illinois, http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&ArticleType=SAD%7cEd&PolicyType=Final&s=19&CntrctrType=1%7c9&CptHcpcsCode=77058&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
10. Local Coverage Determination (LCD) for Breast Imaging Mammography/Breast Echography (Sonography)/Breast MRI/Ductography (L26890), National Government Services, Inc, Minnesota, http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&ArticleType=SAD%7cEd&PolicyType=Final&s=28&CntrctrType=1%7c9&CptHcpcsCode=77058&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
11. Local Coverage Determination (LCD) for Breast Imaging Mammography/Breast Echography (Sonography)/Breast MRI/Ductography (L26890), National Government Services, Inc, Wisconsin http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&ArticleType=SAD%7cEd&PolicyType=Final&s=57&CntrctrType=1%7c9&CptHcpcsCode=77058&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.

77058, 77059 MRI Breast: Medicare

Clinical criteria reviewed/revised: 6/23/14, 10/11/13, 9/13/13, 8/14/13, 8/20/12, 7/27/11, 11/17/10
Medical Advisory Committee reviewed and approved: 9/17/14, 9/19/12, 9/21/11

77084 MRI, Bone Marrow Blood Supply

I. Marrow reconversion [One of the following]
- A. Severe anemia's, especially thalassemia
- B. X-ray findings of:
  1. Expansion of medullary flat bones
  2. Bilateral paraspinal masses (particularly in the thorax)
  3. Pleural-based masses

II. Marrow infiltration or replacement [One of the following]
- A. Leukemia
- B. Lymphoma
- C. Metastasis
- D. Primary bone tumors
- E. Plasmacytoma
- F. Multiple myeloma

III. Myeloid depletion
- A. Untreated aplastic anemia

IV. Bone marrow ischemia [One of the following]
- A. Trauma
- B. Sickle cell anemia
- C. Endogenous (Cushing's syndrome) and exogenous corticosteroid excess
- D. Dysbaric osteonecrosis (generally called "the bends")
- E. Alcoholism
- F. Gaucher's disease

V. Marrow response after radiation therapy

Clinical criteria reviewed/revised: 6/3/14, 8/19/13, 8/14/12, 8/11/11, 11/17/10, 12/09, 1/21/09
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78459 PET Myocardial – Metabolic
78491 PET Myocardial Perfusion Imaging, Rest or Stress
78492 PET Myocardial Perfusion Imaging Rest and Stress

MEDICARE AL

78491 and 78492 are also referred to as a rubidium study stress test. This test may be used instead of myocardial perfusion imaging but not in addition unless the myocardial perfusion study was inconclusive (equivocal, technically uninterpretable or discordant with the beneficiary's other clinical data).

78459 is only to be certified for indication VIII (viability) below.

I. Non-diagnostic nuclear or echo stress testing

A. Cardiac catheterization is not planned AND
B. Any of the following results were present on the nuclear or echo stress testing
   1. Normal treadmill electrocardiogram with reversible perfusion abnormality or wall motion abnormality including transient ischemic dilatation
   2. Equivocal
   3. Positive treadmill electrocardiogram with normal imaging
   4. Technically uninterpretable

II. Evaluation prior to non-cardiac surgery [One of the following]

A. With current cardiac symptoms
   1. Prior documentation of coronary artery disease (See section III)
   2. No prior documentation of coronary artery disease (See section VI)
B. Without current cardiac symptoms
   1. Intermediate or high risk non-cardiac surgery
      a. Inability to reach four mets on treadmill exercise stress testing
      b. If able to reach four mets on treadmill exercise stress testing, one of the following must be documented
         i. Creatinine 2.0 or greater
         ii. Diabetes
         iii. Congestive heart failure
         iv. Known coronary artery disease

III. Evaluation of known coronary artery disease[1-5] [One of the following]

A. Recent hospitalization for acute myocardial infarction, acute coronary syndrome, or unstable angina
   1. No cardiac catheterization, imaging stress test or cardiac CT angiogram during or since the hospitalization
   2. Recurrent chest pain or shortness of breath since discharge

3. Percutaneous coronary intervention or coronary artery bypass surgery during the hospitalization
    a. No nuclear or echo stress test was performed since the revascularization
    b. A nuclear or echo stress test was performed, but new chest pain or shortness of breath has developed since that study

B. No recent hospitalization for acute myocardial infarction, acute coronary syndrome, or unstable angina
    1. New chest pain or shortness of breath
    2. No new chest pain or shortness of breath [One of the following]
        a. Coronary artery bypass surgery or percutaneous coronary intervention was performed in the last two years and no imaging stress test has been performed after the revascularization
        b. No coronary artery bypass surgery or percutaneous coronary intervention was performed in the last two years and documentation of a prior abnormal imaging stress test, cardiac catheterization, cardiac CT angiogram, percutaneous coronary intervention or bypass surgery, carotid stenosis or stroke, peripheral artery disease, aortic aneurysm, diabetes, or coronary calcification on CT scan [One of the following]
            i. No cardiac catheterization, cardiac CT angiogram, or imaging stress test was performed in the past
            ii. Cardiac catheterization, cardiac CT angiogram, or imaging stress test was performed two or more years ago
        c. Prior documentation of congenital coronary arterial anomalies by cardiac catheterization or cardiac CT angiography and no imaging stress test has been performed since those studies

IV. To assess myocardial viability in patients with severe left ventricular dysfunction as a technique to determine candidacy for a revascularization procedure

V. Clinical suspicion of cardiac sarcoid in patients unable to undergo MRI scanning:

A. Patients with pacemakers
B. Patients with automatic implanted cardioverter-defibrillators (AICDs)
C. Patients with other metal implants

VI. Evaluation of newly diagnosed congestive heart failure

A. No heart catheterization, imaging stress test or cardiac CT angiogram was performed since the diagnosis of congestive heart failure

VII. Evaluation of newly diagnosed cardiomyopathy

A. The ejection fraction is less than 50 percent and no heart catheterization, imaging stress test or cardiac CT angiogram was performed since the new diagnosis of cardiomyopathy

VIII. Evaluation of suspected coronary artery disease symptoms [One of the following]

A. Evaluation of documented ventricular tachycardia

B. Evaluation of chest pain equivalent [One of the following]
   1. Pre-test probability assessment – high risk
   2. Pre-test probability assessment – low or intermediate risk
      a. Pharmacologic stress test
      b. Electrocardiogram demonstrates Wolff-Parkinson-White syndrome, complete left bundle branch block, right bundle branch block, atrial fibrillation, left ventricular hypertrophy intraventricular conduction delay, ventricular paced rhythm, or one mm or more ST-J depression with horizontal or downsloping ST segments for 80 msec after the J point
      c. Currently taking digoxin/Lanoxin®
      d. Routine exercise stress test documents
         i. One mm or more ST-J depression with horizontal or downsloping ST segments for 80 msec after the J point
         ii. Ventricular tachycardia, multifocal premature ventricular contractions or triplets
         iii. Heart block
         iv. Drop in systolic blood pressure of 10 mmHg or more
         v. Inability to attain 85 percent of the maximum predicted heart rate
         vi. Chest pain

C. Evaluation of syncope [One of the following]
   1. Diabetes
   2. ATP* risk calculation 10 percent or more and no imaging stress test has been performed in the last two years

IX. Congenital anomalies of the coronary arteries

X. Viability

A. Follow up myocardial perfusion scan within 48 hours of an abnormal myocardial perfusion scan to determine if a perfusion defect noted on the initial study is scar or viable myocardium is included in 78452 by CPT code definition and a second MPI code is not appropriate
B. Recent documented myocardial infarction to determine extent of disease or scar

XI. Post transplant cardiac disease

A. Assessment of coronary arteriopathy

Rule 1: Determination of pretest probability for coronary disease based on chest pain

Pre-Test Probability of CAD by Age, Gender, and Symptoms					
Age- Years	Gender	Typical/Definite Angina Pectoris	Atypical/Probable Angina Pectoris	Non-anginal Chest Pain	Asymptomatic
30-39	Men	Intermediate	Intermediate	Low	Very low
	Women	Intermediate	Very low	Very low	Very low
40-49	Men	High	Intermediate	Intermediate	Low
	Women	Intermediate	Low	Very low	Very low
50-59	Men	High	Intermediate	Intermediate	Low
	Women	Intermediate	Intermediate	Low	Very low

≥60	Men	High	Intermediate	Intermediate	Low
	Women	High	Intermediate	Intermediate	Low

High: Greater than 90% pre-test probability	Intermediate: Between 10% and 90% pre-test probability	Low: Between 5% and 10% pre-test probability	Very Low: Less than 5% pre-test probability

Typical angina (definite): 1) Substernal chest pain or discomfort that is 2) provoked by exertion or emotional stress and 3) relieved by rest and/or nitroglycerin.
Atypical angina (probable): Chest pain or discomfort that lacks one of the characteristics of definite or typical angina.
Non-anginal chest pain: Chest pain or discomfort that meets one or none of the typical angina characteristics.

References:

1. Hendel RC, Berman DS, Di Carli MF, et al. ACCF/ASNC/ACR/AHA/ASE/SCCT/SCMR/SNM 2009 Appropriate Use Criteria for Cardiac Radionuclide Imaging, J Am Coll Cardiol, 2009; 53(23):2201-29.
2. Brindis RG, Douglas PS, Hendel RC, et al. ACCF/ASNC appropriateness criteria for single-photon emission computed tomography myocardial perfusion imaging (SPECT MPI): a report of the American College of Cardiology Foundation Quality Strategic Directions Committee Appropriateness Criteria Working Group and the American Society of Nuclear Cardiology, J Am Coll Cardiol, 2005; 46(8):1587-605.
3. Klocke FJ, Baird MG, Bateman TM, et al. ACC/AHA/ASNC guidelines for the clinical use of cardiac radionuclide imaging—executive summary: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (ACC/AHA/ASNC Committee to Revise the 1995 Guidelines for the Clinical Use of Radionuclide Imaging). Circulation, 2003; 108.
4. Gibbons RJ, Balady GJ, Bricker JT, et al. ACC/AHA 2002 guideline update for exercise testing: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Update the 1997 Exercise Testing Guidelines). J Am Coll Cardiol, 2002; 40(8):1531-40.
5. Fleisher LA, Beckman JA, Brown KA, et al. ACC/AHA 2007 guidelines on perioperative cardiovascular evaluation and care for noncardiac surgery: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines on Perioperative Cardiovascular Evaluation for Noncardiac Surgery): developed in collaboration with the American Society of Echocardiography, American Society of Nuclear Cardiology, Heart Rhythm Society, Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine and Biology, and Society for Vascular Surgery. Circulation. 2007; 116(17):e418-99.

Medicare NCD and LCD References:

6. Local Coverage Determination (LCD) for Radiology: PET for Myocardial Perfusion Imaging (MPI) and Myocardial Viability (MV) (L32838), Cahaba Government Benefit Administrators, LLC, Alabama. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=2&CntrctrType=1|9&CptHcpcsCode=78459&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
7. Local Coverage Determination (LCD) for Radiology: PET for Myocardial Perfusion Imaging (MPI) and Myocardial Viability (MV) (L32838), Cahaba Government Benefit Administrators, LLC, Georgia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=14&CntrctrType=1|9&CptHcpcsCode=78459&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&
8. Local Coverage Determination (LCD) for Radiology: PET for Myocardial Perfusion Imaging (MPI) and Myocardial Viability (MV) (L32838) Tennessee. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=50&CntrctrType=1|9&CptHcpcsCode=78459&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&
9. National Coverage Determination (NCD) for PET for Perfusion of the Heart (220.6.1). http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=National&NCSelection=NCD&KeyWord=PET+for+Perfusion+of+the+Heart&KeyWordLookUp=Title&KeyWordSearchType=Exact&kq=true&bc=IAAAAAAAAAAA&.

10. National Coverage Determination (NCD) for PET for Perfusion of the Heart (220.6.1). http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=National&NCSelection=NCD&KeyWord=PET+for+Perfusion+of+the+Heart&KeyWordLookUp=Title&KeyWordSearchType=Exact&kq=true&bc=IAAAAAAAAAAA&.
11. National Coverage Determination (NCD) for FDG PET for Myocardial Viability (220.6.8). http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=National&NCSelection=NCD&KeyWord=FDG+PET+for+Myocardial+Viability&KeyWordLookUp=Title&KeyWordSearchType=Exact&kq=true&bc=IAAAAAAAAAAA&.

78459, 78491, 78492 PET Myocardial: MEDICARE AL

Clinical criteria reviewed/revised: 7/13/14, 8/21/13, 5/22/13, 3/5/2013
Medical Advisory Committee reviewed and approved: 9/17/14, 9/18/13, 6/12/13

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78459 PET Myocardial – Metabolic
78491 PET Myocardial Perfusion Imaging, Rest or Stress
78492 PET Myocardial Perfusion Imaging Rest and Stress

MEDICARE

78491 and 78492 are also referred to as a rubidium study stress test. This test may be used instead of myocardial perfusion imaging but not in addition unless the myocardial perfusion study was inconclusive (equivocal, technically uninterpretable or discordant with the beneficiary's other clinical data)

I. Non-diagnostic nuclear or echo stress testing

A. Cardiac catheterization is not planned AND
B. Any of the following results were present on the nuclear or echo stress testing
   1. Normal treadmill electrocardiogram with reversible perfusion abnormality or wall motion abnormality including transient ischemic dilatation
   2. Equivocal
   3. Positive treadmill electrocardiogram with normal imaging
   4. Technically uninterpretable

II. Evaluation prior to non-cardiac surgery [One of the following]

A. With current cardiac symptoms
   1. Prior documentation of coronary artery disease (See section III)
   2. No prior documentation of coronary artery disease (See section VI)
B. Without current cardiac symptoms
   1. Intermediate or high risk non-cardiac surgery
      a. Inability to reach four mets on treadmill exercise stress testing
      b. If able to reach four mets on treadmill exercise stress testing, one of the following must be documented
         i. Creatinine 2.0 or greater
         ii. Diabetes
         iii. Congestive heart failure
         iv. Known coronary artery disease

III. Evaluation of known coronary artery disease[1-6] [One of the following]

A. Recent hospitalization for acute myocardial infarction, acute coronary syndrome, or unstable angina
   1. No cardiac catheterization, imaging stress test or cardiac CT angiogram during or since the hospitalization
   2. Recurrent chest pain or shortness of breath since discharge
   3. Percutaneous coronary intervention or coronary artery bypass surgery during the hospitalization

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a. No nuclear or echo stress test was performed since the revascularization
b. A nuclear or echo stress test was performed, but new chest pain or shortness of breath has developed since that study

B. No recent hospitalization for acute myocardial infarction, acute coronary syndrome, or unstable angina
1. New chest pain or shortness of breath
2. No new chest pain or shortness of breath [One of the following]
a. Coronary artery bypass surgery or percutaneous coronary intervention was performed in the last two years and no imaging stress test has been performed after the revascularization
b. No coronary artery bypass surgery or percutaneous coronary intervention was performed in the last two years and documentation of a prior abnormal imaging stress test, cardiac catheterization, cardiac CT angiogram, percutaneous coronary intervention or bypass surgery, carotid stenosis or stroke, peripheral artery disease, aortic aneurysm, diabetes, or coronary calcification on CT scan [One of the following]
i. No cardiac catheterization, cardiac CT angiogram, or imaging stress test was performed in the past
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IV. To assess myocardial viability in patients with severe left ventricular dysfunction as a technique to determine candidacy for a revascularization procedure

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VII. Evaluation of newly diagnosed cardiomyopathy
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VIII. Evaluation of suspected coronary artery disease symptoms [One of the following]
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B. Evaluation of chest pain equivalent [One of the following]
1. Pre-test probability assessment – high risk

2. Pre-test probability assessment – low or intermediate risk
   a. Pharmacologic stress test
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   c. Currently taking digoxin/Lanoxin®
   d. Routine exercise stress test documents
      i. One mm or more ST-J depression with horizontal or downsloping ST segments for 80 msec after the J point
      ii. Ventricular tachycardia, multifocal premature ventricular contractions or triplets
      iii. Heart block
      iv. Drop in systolic blood pressure of 10 mmHg or more
      v. Inability to attain 85 percent of the maximum predicted heart rate
      vi. Chest pain

C. Evaluation of syncope [One of the following]
   1. Diabetes
   2. ATP* risk calculation 10 percent or more and no imaging stress test has been performed in the last two years

IX. Congenital anomalies of the coronary arteries

X. Viability

A. Follow up myocardial perfusion scan within 48 hours of an abnormal myocardial perfusion scan to determine if a perfusion defect noted on the initial study is scar or viable myocardium is included in 78452 by CPT code definition and a second MPI code is not appropriate
B. Recent documented myocardial infarction to determine extent of disease or scar

XI. Post transplant cardiac disease

A. Assessment of coronary arteriopathy

Rule 1: Determination of pretest probability for coronary disease based on chest pain

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	Women	Intermediate	Intermediate	Low	Very low
≥60	Men	High	Intermediate	Intermediate	Low

	Women	High	Intermediate	Intermediate	Low
High: Greater than 90% pre-test probability		Intermediate: Between 10% and 90% pre-test probability	Low: Between 5% and 10% pre-test probability	Very Low: Less than 5% pre-test probability	
Typical angina (definite): 1) Substernal chest pain or discomfort that is 2) provoked by exertion or emotional stress and 3) relieved by rest and/or nitroglycerin.					
Atypical angina (probable): Chest pain or discomfort that lacks one of the characteristics of definite or typical angina.					
Non-anginal chest pain: Chest pain or discomfort that meets one or none of the typical angina characteristics.					

References:

1. Hendel KA, Berman DS, Di Carli MF, et al. ACCF/ASNC/ACF/AHA/ASE/SCCT/SCMR/SNM.
2. 2009 appropriate use criteria for cardiac radionuclide imaging, J Am Coll Cardiol, 2009; 59: 2201-29.
3. Brindis RG, Douglas PS, Hendel RC, et al. ACCF/ASNC appropriateness criteria for single-photon emission computed tomography myocardial perfusion imaging (SPECT MPI): a report of the American College of Cardiology Foundation Quality Strategic Directions Committee Appropriateness Criteria Working Group and the American Society of Nuclear Cardiology, J Am Coll Cardiol, 2005; 46: 1587-605.
4. Klocke FJ, Baird MG, Bateman TM, et al. ACC/AHA/ASNC guidelines for the clinical use of cardiac radionuclide imaging: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (ACC/AHA/ASNC Committee to Revise the 1995 Guidelines for the Clinical Use of Radionuclide Imaging), 2003.
5. Gibbons RJ, Balady GJ, Bricker JT, et al. ACC/AHA 2002 guideline update for exercise testing: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Exercise Testing). 2002.
6. Fleisher LA, Beckman JA, Brown KA, et al. ACC/AHA 2007 guidelines on perioperative cardiovascular evaluation and care for noncardiac surgery: executive summary: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines on Perioperative Cardiovascular Evaluation for Noncardiac Surgery). Circulation. 2007;116:

Medicare LCD References:

7. National Coverage Determination (NCD) for FDG PET for Myocardial Viability (220.6.8). http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=National&NCSelection=NCD&KeyWord=FDG+PET+for+Myocardial+Viability&KeyWordLookUp=Title&KeyWordSearchType=Exact&kq=true&bc=IAAAAAAAAAAA&..
8. National Coverage Determination (NCD) for PET for Perfusion of the Heart (220.6.1). http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=National&NCSelection=NCD&KeyWord=PET+for+Perfusion+of+the+Heart&KeyWordLookUp=Title&KeyWordSearchType=Exact&kq=true&bc=IAAAAAAAAAAA&.
9. Local Coverage Determination (LCD) for Myocardial Imaging, Positron Emission Tomography (PET) Scan (L29231), First Coast Service Options, Inc., Florida. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=12&CntrctrType=1|9&CptHcpcsCode=78459&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&
10. Local Coverage Determination (LCD) for Radiopharmaceutical Agents (L31361), Wisconsin Physicians Service Insurance Corporation, Indiana. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=20&CntrctrType=1%7c9&KeyWord=78459&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=78459&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
11. Local Coverage Determination (LCD) for Radiopharmaceutical Agents (L31361), Wisconsin Physicians Service Insurance Corporation, Iowa. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=17&CntrctrType=1%7c9&KeyWord=78459&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=78459&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.

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12. Local Coverage Determination (LCD) for Radiopharmaceutical Agents (L31361), Wisconsin Physicians Service Insurance Corporation, Kansas. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=21&CntrctrType=1%7c9&KeyWord=78459&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=78459&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
13. Local Coverage Determination (LCD) for Radiopharmaceutical Agents (L31361), Wisconsin Physicians Service Insurance Corporation, Michigan. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=27&CntrctrType=1%7c9&KeyWord=78459&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=78459&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
14. Local Coverage Determination (LCD) for Radiopharmaceutical Agents (L31361), Wisconsin Physicians Service Insurance Corporation, Missouri. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=29&CntrctrType=1%7c9&KeyWord=78459&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=78459&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
15. Local Coverage Determination (LCD) for Radiopharmaceutical Agents (L31361), Wisconsin Physicians Service Insurance Corporation, Nebraska. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=36&CntrctrType=1%7c9&KeyWord=78459&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=78459&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
16. Local Coverage Determination (LCD) for Cardiac Radionuclide Imaging (L31700), Palmetto GBA, North Carolina. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=34&CntrctrType=1%7c9&KeyWord=78491&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=78491&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
17. Local Coverage Determination (LCD) for Cardiac Radionuclide Imaging (L31700), Palmetto GBA, South Carolina. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=48&CntrctrType=1%7c9&KeyWord=78491&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=78491&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
18. Local Coverage Determination (LCD) for Cardiac Radionuclide Imaging (L31700), Palmetto GBA, Virginia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=53&CntrctrType=1%7c9&KeyWord=78491&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=78491&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.
19. Local Coverage Determination (LCD) for Cardiac Radionuclide Imaging (L31700), Palmetto GBA, West Virginia. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&PolicyType=Final&s=58&CntrctrType=1%7c9&KeyWord=78491&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=78491&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.

78459, 78491, 78492 PET Myocardial: MEDICARE

Clinical criteria reviewed/revised: 7/13/14, 8/21/13, 7/15/12, 9/14/11, 4/11/11
Medical Advisory Committee reviewed and approved: 9/17/14, 9/18/213, 9/19/12, 9/21/11

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78608 PET Brain Metabolic

MEDICARE

Beta amyloid imaging for dementia with any FDA approved agent is currently not medically necessary or reasonable unless the member is participating in an approved clinical trial. Scans performed with a Beta Amyloid agent are not metabolic or perfusion scans. The correct code for this is either 78811 or 78814.

I. Dementia in order to differentiate Alzheimer's disease from frontotemporal dementia[1,2] with cognitive decline of at least 6 months [All of the following]

A. Progressive cognitive decline (suspected Alzheimer's) with Mini Mental State score of 24 or less on two exams at least 6 months apart
B. No observed medical conditions to explain dementia
C. Thyroid-function tests normal
D. Vitamin B 12 level normal
E. No prior brain SPECT or FDG PET for the same indication for one year. If these studies are not diagnostic or uninterpretable they may be repeated after a year
F. If there has been a change in the condition of the individual and A, B, C and D are met then FDG PET can be certified

II. Brain tumor[3]

A. Initial staging

III. Seizure[4] [All of the following]

A. Seizures not responsive to adequate dosage of medications
B. Surgery is planned
C. MRI does not define a "seizure focus"

References:

1. National Coverage Determination (NCD) for PET (FDG) for Dementia and Neurodegenerative Diseases (220.6.13). http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=National&NCSelection=NCD&KeyWord=FDG+PET+for+Dementia+and+Neurodegenerative+Diseases&KeyWordLookUp=Title&KeyWordSearchType=Exact&kq=true&bc=IAAAAAAAAAAA&.
2. Norman L. Foster, et al. FDG-PET improves accuracy in distinguishing frontotemporal dementia and Alzheimer's disease, Brain 2007; 130(10):2616-2635.
3. National Coverage Determination (NCD) for Positron Emission Tomography (FDG) for Oncologic Conditions (220.6.17). http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=National&NCSelection=NCD&KeyWord=Positron+Emission+Tomography+(FDG)+for+Oncologic+Conditions&KeyWordLookUp=Title&KeyWordSearchType=Exact&kq=true&bc=IAAAAAAAAAAA&.
4. Luttrull MD, Cornelius RS, Angtuaco EJ, et al. Expert Panel on Neurologic Imaging. American College of Radiology Appropriateness Criteria – Seizures and Epilepsy. http://www.acr.org/~/media/ACR/Documents/AppCriteria/Diagnostic/SeizuresAndEpilepsy.pdf.

78608 PET Brain Metabolic: MEDICARE

Clinical criteria reviewed/revised: 6/11/14, 11/15/13, 8/22/13, 2/27/13, 5/11/12, 9/12/11, 11/17/10, 12/09, 1/21/09
Medical Advisory Committee reviewed and approved: 9/17/14, 6/12/13, 9/19/12, 9/21/11

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78609 PET Brain Perfusion

MEDICARE

This is a non covered service by Medicare[1]

Reference:

1. NCD coding for Positron Emission Tomography (PET) Scans used for non-oncologic conditions (A47551). http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Local&ArticleType=Ed|Key|SAD|FAQ&PolicyType=Final&s=---&CntrctrType=1|9&KeyWord=NCD+Coding+Article+for+Positron+Emission+Tomography+%28PET%29+Scans+Used+for+Non-Oncologic+Conditions&KeyWordLookUp=Doc&KeyWordSearchType=Exact&kq=true&bc=IAAAAAAAAAAA&.

78609 PET Brain Perfusion: MEDICARE

Clinical criteria reviewed/revised: 6/11/14, 8/22/13, 8/17/11, 11/17/10, 12/8/09, 1/21/09
Medical Advisory Committee reviewed and approved: 9/5/14, 9/19/12, 9/21/11

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78811 PET Limited Area
78812 PET Skull Base to Mid-thigh
78813 PET Whole Body
78814 PET/CT Limited Area
78815 PET/CT Skull Base to Mid-thigh
78816 PET/CT Whole Body

MEDICARE[1-6]

Coverage is limited to those indications listed in the table below, which has been taken from the CMS Decision Memo for Positron Emission Tomography effective June 11, 2013.

NOPR remains open for NaF-18 PET scans. Any requests for this scan do not require prior authorization, but the provider and rendering site must go through NOPR (http://www.cancerpetregistry.org).

Beta Amyloid imaging for possible Alzheimer's disease is permitted once in the life of a Medicare beneficiary if that person is participating in a clinical trial approved by CMS. Currently there is one clinical trial approved for this indication which is ClinicalTrials.gov Identifier NCT02000583.

The proper code for this indication would be either 78811 or 78814 because this is not a metabolic or perfusion scan of the brain. No other CPT code should be approved for this indication.

General Statements

1. PET or PET/CT cannot be certified for initial staging of prostate cancer or leukemia. However, for prostate cancer, PET may be certified for subsequent treatment strategy.
2. PET or PET/CT cannot be certified for the initial diagnosis of male or female breast cancer.
3. PET or PET/CT cannot be certified for evaluation of axillary nodes in beneficiaries with a diagnosis of breast cancer.
4. PET or PET/CT cannot be certified for the evaluation of regional lymph nodes in beneficiaries with a diagnosis of melanoma.
5. PET or PET/CT may be certified for beneficiaries with a very strong suspicion of a solid tumor based on other diagnostic testing.
6. PET or PET/CT may not be certified for a beneficiary with an established diagnosis of a solid tumor but who is asymptomatic and not currently in treatment. However, if the beneficiary is asymptomatic but still actively managed for a solid tumor PET or PET/CT can be approved.
7. PET and PET/CT may be approved in a beneficiary with known diagnosis of malignancy to determine the optimal anatomic site for an invasive procedure.
8. The Decision Memo states: "This decision does not change coverage for any use of PET imaging using radiopharmaceuticals NaF-18 (fluorine-18 labeled sodium fluoride), ammonia N-13, or rubidium-82 (Rb-82)."
9. NOPR will accept members for NaF-18 bone scans.

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I. Breast carcinoma with a tissue diagnosis of breast cancer

A. PET is covered for initial treatment strategy for staging distant metastases
B. See table below for subsequent treatment strategy
C. PET is not to be used to:
   1. Establish the diagnosis of breast cancer or to detect the primary lesion
   2. Clarify a finding on mammography, physical examination, MRI or ultrasound
   3. Evaluate axillary nodes
   4. Not indicated for surveillance when not in active treatment

II. Cervical carcinoma

A. Initial staging for women with biopsy proven cervical cancer if conventional imaging is negative for extrapelvic metastases
B. See table below for subsequent treatment strategy

III. Melanoma with tissue diagnosis

A. NOT PERMITTED FOR EVALUATION OF REGIONAL NODES
B. Initial staging
C. See table below for subsequent treatment strategy

The chart below is taken directly from the Decision Memo for Positron Emission Tomography (FDG) for Solid Tumors (CAG-00181R4) and is effective June 11, 2013. Please note that the categories have changed and are now Initial Treatment Strategy and Subsequent Treatment Strategy. The NOPR is closed and participation is not required except for NaF bone scans. Notice that there are some exceptions for coverage as indicated by.

Medicare does not cover PET or PET/CT for surveillance of asymptomatic beneficiaries who have completed treatment and have no evidence clinically or on other imaging of disease.

FDG PET for Solid Tumors and Myeloma Tumor Type	Initial Treatment Strategy (formerly "diagnosis" & "staging")	Subsequent Treatment Strategy (formerly "restaging" and "monitoring response to treatment")
Colorectal	Cover	Cover
Esophagus	Cover	Cover
Head and neck (not thyroid or CNS)	Cover	Cover
Lymphoma	Cover	Cover
Non-small cell lung	Cover	Cover
Ovary	Cover	Cover
Brain	Cover	Cover
Cervix	Cover with exceptions *	Cover
Small cell lung	Cover	Cover
Soft tissue sarcoma	Cover	Cover
Pancreas	Cover	Cover
Testes	Cover	Cover
Prostate	Non-cover	Cover

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Thyroid	Cover	Cover
Breast (male and female)	Cover with exceptions *	Cover
Melanoma	Cover with exceptions *	Cover
All other solid tumors	Cover	Cover
Myeloma	Cover	Cover
All other cancers not listed	Cover	Cover

*Cervix: Nationally non-covered for the initial diagnosis of cervical cancer related to initial anti-tumor treatment strategy. All other indications for initial anti-tumor treatment strategy for cervical cancer are nationally covered.

*Breast: Nationally non-covered for initial diagnosis and/or staging of axillary lymph nodes. Nationally covered for initial staging of metastatic disease. All other indications for initial anti-tumor treatment strategy for breast cancer are nationally covered.

*Melanoma: Nationally non-covered for initial staging of regional lymph nodes. All other indications for initial anti-tumor treatment strategy for melanoma are nationally covered.

1. If the clinical problem involves an organ system that is well imaged by other techniques they should be used instead of PET for example most bone metastases can be adequately imaged by a nuclear medicine bone scan or MRI
2. PET scans should not be performed for at least three weeks following last chemotherapy
3. PET scans should not be performed for at least 8-12 weeks following completion of radiotherapy

IV. Beta Amyloid PET scan for dementia in order to differentiate Alzheimer's disease from frontotemporal dementia [1, 7] [All of the following] The correct code for this type of imaging is either 78811 or 78814. No other PET scan code will be approved for beta amyloid PET scan. It is only approved once in the life time of a beneficiary. The beneficiary must be enrolled in a clinical trial approved by CMS in order to be approved for this study

References:

1. Decision Memo for Positron Emission Tomography (FDG) for Solid Tumors (CAG-0018R4), Centers for Medicare and Medicaid Services. http://www.cms.gov/medicare-coverage-database/details/nca-decision-memo.aspx?NCAId=263&NcaName=Positron+Emission+Tomography+(FDG)+for+Solid+Tumors&DocID=CAG-00181R4&SearchType=Advanced&bc=IAAAAAgACAAAAA%3d%3d&.
2. National Coverage Determination (NCD) for Positron Emission Tomography (FDG) for Oncologic Conditions (220.6.17), Centers for Medicare and Medicaid Services. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=National&NCSelection=NCD&KeyWord=POSITRON+EMISSION+TOMOGRAPHY+(FDG)+for+ONCOLOGIC+CONDITIONS&KeyWordLookUp=Title&KeyWordSearchType=Exact&kq=true&bc=IAAAAAAAAAAA&.
3. National Coverage Determination (NCD) for FDG PET for Melanoma (220.6.6), Centers for Medicare and Medicaid Services. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=National&NCSelection=NCD&KeyWord=FDG+PET+for+MELANOMA&KeyWordLookUp=Title&KeyWordSearchType=Exact&kq=true&bc=IAAAAAAAAAAA&.
4. National Coverage Determination (NCD) for FDG PET for Lymphoma (220.6.5), Centers for Medicare and Medicaid Services. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=National&NCSelection=NCD&KeyWord=FDG+PET+for+LYMPHOMA&KeyWordLookUp=Title&KeyWordSearchType=Exact&kq=true&bc=IAAAAAAAAAAA&.
5. National Coverage Determination (NCD) for FDG PET for Lung Cancer (220.6.2), Centers for Medicare and Medicaid Services. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=National&NCSelection=NCD&KeyWord=FDG+PET+for+LUNG+CANCER&KeyWordLookUp=Title&KeyWordSearchType=Exact&kq=true&bc=IAAAAAAAAAAA&.
6. National Coverage Determination (NCD) for FDG PET for Brain, Cervical, Ovarian, Pancreatic, Small Cell Lung and Testicular Cancers (220.6.14), Centers for Medicare and Medicaid Services. http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=National&NCSelection=NCD&KeyWord=FDG+PET+for+BRAIN%2c+CERVICAL%2c+OVARIAN%2c+PANCREATIC%2c+SMALL+CELL+LUNG%2c+and+TESTICULAR+CANCERs&KeyWordLookUp=Title&KeyWordSearchType=Exact&kq=true&bc=IAAAAAAAAAAA&.
7. Amyloid Positron Emission Tomography (Amyloid PET) http://www.cms.gov/medicare-coverage-database/search/search-results.aspx?SearchType=Advanced&CoverageSelection=Both&NCSelection=NCA%7cCAL%7cNCD%7cMEDCAC%7cTA%7cMCD&PolicyType=Final&s=---&CntrctrType=12%7c1&KeyWord=Amyloid+PET&KeyWordLookUp=Doc&KeyWordSearchType=Exact&CptHcpcsCode=78811&kq=true&bc=IAAAAAAAAAAAAA%3d%3d&.

78811, 78812, 78813, 78814, 78815, 78816 PET Scan: MEDICARE

Clinical criteria reviewed/revised: 6/16/14, 9/5/13, 8/23/13, 7/9/13, 6/13/13, 2/4/13, 2/1/13, 12/6/12, 8/23/12, 8/8/11, 11/17/10, 1/18/09
Medical Advisory Committee reviewed and approved: 9/17/14, 9/18/13, 6/12/13, 12/12/12, 9/19/12, 9/21/11

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G0219 PET Imaging Whole Body; Melanoma for Non-covered Indications

MEDICARE

This procedure is not a covered benefit for Medicare beneficiaries.

Clinical criteria reviewed/revised: 8/7/14, 8/27/12, 9/15/11
Medical Advisory Committee reviewed and approved: 9/5/14, 9/19/12, 9/21/11

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G0235 PET Imaging Any Site Not Otherwise Specified

This code should be redirected to CPT codes 78811 through 78816.

G0235 PET Imaging Any Site Not Otherwise Specified

Clinical criteria reviewed/revised: 8/7/14, 8/27/12, 9/15/11
Medical Advisory Committee reviewed and approved: 9/5/14, 9/19/12, 9/21/11

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G0252 PET Imaging Full and Partial-Ring PET Scanners Only, for Initial Diagnosis of Breast Cancer and/or Surgical Planning for Breast Cancer (e.g., Initial Staging of Axillary Lymph Nodes)

MEDICARE

This procedure is not a covered benefit for Medicare beneficiaries.

Clinical criteria reviewed/revised: 8/7/14, 8/27/12, 9/15/11
Medical Advisory Committee reviewed and approved: 9/5/14, 9/19/12, 9/21/11

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S8032 Low Dose CT of the Chest for Lung Cancer Screening

This code should be redirected to CPT code 71250.

Clinical criteria reviewed/revised: 2/17/15, 7/16/14
Medical Advisory Committee reviewed and approved: 9/17/14

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S8042 MRI Low Field

This code should be redirected to an MRI CPT Code.

S8042 MRI Low Field

Clinical criteria reviewed/revised: 8/7/14, 8/27/12, 9/15/11
Medical Advisory Committee reviewed and approved: 9/5/14, 9/19/12, 9/21/11

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