

900
MCQs
ON
RADIOLOGICAL
PROCEDURES

Preface

Radiology today stands as one of the most dynamic and essential pillars of modern medicine. With the rapid advancement in diagnostic imaging techniques, it is imperative for students and practitioners to stay updated with both conventional procedures and cutting-edge modalities.

This eBook, titled “**Radiological Procedures MCQs – A Comprehensive Collection of 900 Questions,**” has been meticulously curated to serve as a **complete practice and revision guide** for students of Radiography and Imaging Technology, as well as candidates preparing for competitive exams like RRB, DSSSB, ESIC, PGIMER, AIIMS, and others.

Divided into **28 well-organized chapters**, the book covers:

- Contrast media usage and safety
- Genitourinary, gastrointestinal, and hepatobiliary procedures
- Vascular and interventional techniques
- Advanced diagnostic modalities including **CT, MRI, PET, Doppler, and Mammography**
- New chapters such as **MRI contrast** and **Advances in Interventions** to reflect current trends

Each chapter contains **30 to 50 MCQs** with carefully selected options and answers, emphasizing both theoretical knowledge and clinical application. The questions have been designed to test core concepts, image-based reasoning, and the procedural protocols followed in real-world radiology departments.

This book is not only a **tool for exam preparation** but also a **clinical companion** that reinforces learning through active recall and self-assessment. Whether you are a beginner, an intern, or a professional seeking certification, this book will provide you with a robust foundation in radiological procedures.

Send your suggestions or any corrections redtechofficial2020@gmail.com

We hope this compilation strengthens your confidence, enhances your diagnostic approach, and empowers you in your academic and professional journey in the field of radiology.

MCQs on Radiological Procedures

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Chapter 1: Contrast Media

1. Which property is MOST desirable in an ideal contrast media?

- A. High viscosity
- B. High osmolality
- C. High water solubility
- D. Low iodine content

✓ **Answer:** C. High water solubility

□ *Explanation:* Ideal contrast agents must be water soluble for easy excretion and minimal side effects.

2. Which of the following is a non-ionic monomer?

- A. Diatrizoic acid
- B. Iohexol
- C. Ioxaglic acid
- D. Iothalamic acid

✓ **Answer:** B. Iohexol

□ *Explanation:* Iohexol is a non-ionic monomer, reducing adverse reactions.

3. Which contrast media has the highest osmolality?

- A. Omnipaque
- B. Urografin
- C. Hexabrix
- D. Iopromide

✓ **Answer:** B. Urografin

□ *Explanation:* Urografin (diatrizoate) is a high-osmolality ionic compound.

4. The iodine-to-particle ratio in non-ionic dimers is:

- A. 3:2
- B. 3:1
- C. 6:2
- D. 6:1

✓ **Answer:** D. 6:1

□ *Explanation:* Non-ionic dimers like Iotrol have an iodine:particle ratio of 6:1, making them low-osmolar.

5. Which agent is contraindicated in bronchial asthma due to bronchospasm risk?

- A. Iohexol
- B. Diatrizoate meglumine

C. Iopamidol

D. Iodixanol

✓ **Answer:** B. Diatrizoate meglumine

□ *Explanation:* Meglumine salts can trigger bronchospasm, hence avoided in asthma.

6. Which contrast agent is preferred in suspected GI perforation?

A. Barium sulfate

B. Gastrografin

C. Iopamidol

D. Urografin

✓ **Answer:** B. Gastrografin

□ *Explanation:* Gastrografin is water-soluble and safe in suspected GI leaks.

7. Which one is most nephrotoxic?

A. Omnipaque

B. Iohexol

C. Diatrizoic acid

D. Iopromide

✓ **Answer:** C. Diatrizoic acid

□ *Explanation:* High-osmolar ionic agents like diatrizoate have higher nephrotoxicity.

8. Which route of excretion is predominant for iodinated contrast agents?

A. Hepatic

B. Biliary

C. Renal (glomerular filtration)

D. Lymphatic

✓ **Answer:** C. Renal (glomerular filtration)

□ *Explanation:* Over 95% of iodine-based agents are cleared by kidneys.

9. Which of the following additives prevents precipitation and improves shelf life?

A. Na citrate

B. EDTA

C. Na phosphate

D. Meglumine

✓ **Answer:** B. EDTA

□ *Explanation:* EDTA acts as a stabilizer in contrast media.

10. Which contrast media property causes vasodilatation and sensation of warmth?

A. Low osmolality

- B. High iodine content
- C. High osmolality
- D. Low viscosity

✓ **Answer:** C. High osmolality

□ *Explanation:* Hyperosmolar agents draw water, causing vasodilation and warmth.

11. Contrast media cause direct endothelial damage due to:

- A. Alkalinity
- B. High molecular weight
- C. Hyperosmolarity
- D. Lipid solubility

✓ **Answer:** C. Hyperosmolarity

□ *Explanation:* It disrupts endothelial integrity, increasing capillary permeability.

12. The mechanism of nephrotoxicity in contrast media includes all EXCEPT:

- A. Renal vasoconstriction
- B. Decreased perfusion
- C. Immune complex deposition
- D. Tubular cell swelling

✓ **Answer:** C. Immune complex deposition

□ *Explanation:* It's not immune-mediated but due to hypoperfusion, toxicity, and obstruction.

13. What is the role of Tamm-Horsfall protein in CIN?

- A. Vasodilator
- B. Promotes glomerular filtration
- C. Forms tubular plugs
- D. Reduces nephrotoxicity

✓ **Answer:** C. Forms tubular plugs

□ *Explanation:* Contrast media precipitates with these proteins, blocking tubules.

14. Which is TRUE about Omnipaque (Iohexol)?

- A. High viscosity and ionic
- B. Non-ionic and low-osmolar
- C. Contraindicated in pediatric use
- D. Used only for GI studies

✓ **Answer:** B. Non-ionic and low-osmolar

□ *Explanation:* Omnipaque is preferred for its safety profile.

15. The major reason for decreased adverse reactions in non-ionic contrast agents is:

- A. High osmolality
- B. Large molecular size
- C. Absence of ionization
- D. Faster renal excretion

✓ **Answer:** C. Absence of ionization

□ *Explanation:* Non-ionizing agents reduce histamine release and allergic reactions.

16. The viscosity of a contrast agent mainly affects:

- A. Renal excretion
- B. Injection force required
- C. Allergic reaction
- D. Opacity of image

✓ **Answer:** B. Injection force required

□ *Explanation:* Higher viscosity requires more force for injection and may affect catheter performance.

17. Which of the following is the SAFEST for intrathecal use (myelography)?

- A. Diatrizoate
- B. Iothalamate
- C. Iohexol
- D. Urografin

✓ **Answer:** C. Iohexol

□ *Explanation:* Iohexol is non-ionic and specifically approved for intrathecal use due to low neurotoxicity.

18. Which of the following has the LOWEST viscosity at body temperature (37°C)?

- A. Urografin
- B. Omnipaque 240
- C. Hexabrix
- D. Conray

✓ **Answer:** B. Omnipaque 240

□ *Explanation:* Among the options, Omnipaque 240 has the least viscosity, enhancing flow and injectability.

19. The incidence of allergic-like reactions with non-ionic contrast media is approximately:

- A. 20–30%
- B. 10–15%
- C. 0.6–3.1%
- D. <0.1%

✓ **Answer:** C. 0.6–3.1%

□ *Explanation:* Non-ionic contrast agents show a much lower rate of adverse reactions.

20. Which of the following is TRUE about LD₅₀ values for contrast agents?

- A. Lower LD₅₀ indicates safer agent
- B. Higher LD₅₀ indicates safer agent
- C. LD₅₀ is not related to safety
- D. All contrast media have the same LD₅₀

✓ **Answer:** B. Higher LD₅₀ indicates safer agent

□ *Explanation:* LD₅₀ (lethal dose in 50% of animals) – higher value = lower toxicity.

21. Which of the following is NOT a common reaction to contrast media?

- A. Nausea
- B. Sneezing
- C. Anemia
- D. Warm sensation

✓ **Answer:** C. Anemia

□ *Explanation:* Anemia is not a documented direct reaction to iodinated contrast.

22. High osmolality contrast agents can cause all EXCEPT:

- A. Diuresis
- B. Capillary leak
- C. Vasodilation
- D. Bradycardia

✓ **Answer:** D. Bradycardia

□ *Explanation:* High osmolality causes vasodilation and reflex **tachycardia**, not bradycardia.

23. Which property of iodinated contrast determines its radiopacity?

- A. Viscosity
- B. Number of benzene rings
- C. Iodine concentration
- D. Osmolarity

✓ **Answer:** C. Iodine concentration

□ *Explanation:* More iodine atoms = more X-ray attenuation = better radiopacity.

24. The most common route of elimination for gadolinium-based MRI contrast is:

- A. Hepatic
- B. Renal
- C. Intestinal
- D. Biliary

✓ **Answer:** B. Renal

□ *Explanation:* Gadolinium chelates are eliminated via kidneys.

25. Which contrast media is associated with nephrogenic systemic fibrosis (NSF)?

- A. Iohexol
- B. Iopromide
- C. Gadolinium
- D. Barium

✓ **Answer:** C. Gadolinium

□ *Explanation:* Gadolinium in renal failure patients may trigger NSF – a rare but serious disorder.

26. The blood-brain barrier (BBB) prevents entry of:

- A. Lipid-soluble substances
- B. Non-ionic contrast
- C. Ionic contrast
- D. Hydrophilic contrast media

✓ **Answer:** D. Hydrophilic contrast media

□ *Explanation:* Intact BBB blocks large, water-soluble contrast agents like iodinated media.

27. Gadolinium is chelated in MRI contrast agents to:

- A. Increase osmolality
- B. Enhance relaxation
- C. Reduce toxicity
- D. Improve viscosity

✓ **Answer:** C. Reduce toxicity

□ *Explanation:* Free gadolinium is toxic. Chelation renders it safe and stable.

28. Which of the following is used to prevent allergic-like contrast reactions?

- A. Atropine
- B. Hydrocortisone
- C. Dopamine
- D. Ranitidine

✓ **Answer:** B. Hydrocortisone

□ *Explanation:* Steroids reduce the risk of moderate to severe contrast reactions when given as premedication.

29. The best management for minor contrast reactions (nausea, rash) includes:

- A. Adrenaline
- B. Oxygen and fluids

C. Reassurance and observation

D. Ephedrine

✓ **Answer:** C. Reassurance and observation

□ *Explanation:* Mild, self-limiting symptoms don't require drugs; just monitor the patient.

30. Which ultrasound contrast agent is based on microbubbles?

A. Levovist

B. Omnipaque

C. Iodixanol

D. Gd-BOPTA

✓ **Answer:** A. Levovist

□ *Explanation:* Levovist uses gas-filled microbubbles to enhance echogenicity in ultrasound imaging.

Chapter 2: Intravenous Urogram (IVU)

1. IVU is primarily indicated for evaluating:

A. Renal cortex and medulla

B. Renal collecting system and ureters

C. Adrenal tumors

D. Renal artery stenosis

✓ **Answer:** B. Renal collecting system and ureters

□ *Explanation:* IVU visualizes the pelvicalyceal system and ureters using iodinated contrast.

2. The nephrogram phase appears at approximately:

A. 10 minutes

B. 15 minutes

C. 1–2 minutes

D. 30 minutes

✓ **Answer:** C. 1–2 minutes

□ *Explanation:* Nephrogram (parenchymal enhancement) appears within the first 1–2 minutes.

3. In pediatric IVU, dehydration is:

A. Recommended for better contrast

B. Essential in neonates

C. Hazardous and avoided

D. Not necessary for children under 5

✓ **Answer:** C. Hazardous and avoided

□ **Explanation:** Dehydration risks contrast nephropathy and should never be used in children.

4. The standard adult dose of non-ionic contrast for IVU is:

A. 10–20 ml

B. 25–40 ml

C. 40–80 ml

D. 100–120 ml

✓ **Answer:** C. 40–80 ml

□ **Explanation:** Depending on iodine concentration, typical dose ranges from 40–80 ml.

5. Compression during IVU is applied at the level of:

A. Umbilicus

B. Iliac crest

C. Anterior superior iliac spine

D. Pubic symphysis

✓ **Answer:** C. Anterior superior iliac spine

□ **Explanation:** Ureteric compression enhances pelvicalyceal filling.

6. Compression in IVU is contraindicated in:

A. Bilateral hydronephrosis

B. Pregnancy

C. Renal trauma

D. All of the above

✓ **Answer:** D. All of the above

□ **Explanation:** Compression risks worsening obstruction or hemorrhage.

7. The purpose of delayed films in IVU is to:

A. Confirm residual urine

B. Evaluate urethra

C. Visualize collecting system in delayed excretors

D. Check for foreign bodies

✓ **Answer:** C. Visualize collecting system in delayed excretors

□ **Explanation:** Delayed images help in hydronephrosis or poor-function kidneys.

8. An IVU study in a patient with suspected pheochromocytoma may cause:

A. Hypoglycemia

B. Hypertensive crisis

C. Hematuria

D. Tachypnea

✓ **Answer:** B. Hypertensive crisis

□ *Explanation:* Contrast can stimulate catecholamine release in pheochromocytoma.

9. Which position improves ureteral filling in IVU?

A. Supine

B. Prone

C. Right lateral

D. Left lateral

✓ **Answer:** B. Prone

□ *Explanation:* Prone position improves contrast layering in ureters.

10. The initial film taken before injecting contrast is called:

A. Tomogram

B. Scout film

C. Spot film

D. Post-void film

✓ **Answer:** B. Scout film

□ *Explanation:* Scout film identifies calcifications, bowel gas, masses, and ensures positioning.

11. What is the imaging sequence for a normal adult IVU?

A. Scout → 5 min → 15 min → Post void

B. Scout → 1 min → 5 min → 15 min → Post void

C. 5 min → 15 min → 30 min

D. Only a single delayed film

✓ **Answer:** B. Scout → 1 min → 5 min → 15 min → Post void

□ *Explanation:* This sequence captures nephrographic, pyelographic, and drainage phases.

12. “Non-visualizing kidney” in IVU means:

A. Kidney is absent

B. No contrast seen in pelvicalyceal system

C. Contrast is in bladder only

D. CT scan is mandatory

✓ **Answer:** B. No contrast seen in pelvicalyceal system

□ *Explanation:* Could be due to poor function or obstruction; further evaluation needed.

13. Which of the following is NOT an absolute indication for IVU?

A. Hematuria

- B. Renal colic
- C. Suspected renal mass
- D. Pheochromocytoma

✓ **Answer:** D. Pheochromocytoma

□ *Explanation:* IVU is relatively contraindicated due to risk of hypertensive crisis.

14. Which film in IVU is used to detect residual urine?

- A. Scout
- B. 1-minute
- C. Post-void
- D. 5-minute

✓ **Answer:** C. Post-void

□ *Explanation:* Evaluates bladder emptying, wall abnormalities, and residual urine.

15. An oblique view in IVU is used to:

- A. Visualize anterior calyces
- B. Visualize bladder outlet
- C. Project ureter away from spine
- D. Confirm renal artery stenosis

✓ **Answer:** C. Project ureter away from spine

□ *Explanation:* Helps differentiate ureteric stones from vertebral shadows.

16. In IVU, the renal blush refers to:

- A. Renal artery opacification
- B. Early nephrogram
- C. Visualization of renal vein
- D. Delayed pelvicalyceal filling

✓ **Answer:** B. Early nephrogram

□ *Explanation:* Renal blush is the early parenchymal enhancement seen 30–60 seconds post-injection.

17. In IVU, which structure appears last?

- A. Renal pelvis
- B. Ureter
- C. Bladder
- D. Nephrogram

✓ **Answer:** C. Bladder

□ *Explanation:* Contrast collects in bladder after passing through ureters.

18. IVU is least useful in evaluating:

- A. Ureteric stricture

- B. Medullary sponge kidney
- C. Renal tuberculosis
- D. Renal artery stenosis

✓ **Answer:** D. Renal artery stenosis

□ *Explanation:* IVU is for collecting system; renal artery assessment needs CT/MR angiography.

19. The “cup and spill” appearance in IVU is seen in:

- A. PUJ obstruction
- B. Bladder diverticulum
- C. Renal tuberculosis
- D. Papillary necrosis

✓ **Answer:** D. Papillary necrosis

□ *Explanation:* Necrotic papillae slough into calyces creating this appearance.

20. “Golf hole ureter” in IVU is a sign of:

- A. Ureterocele
- B. TB ureteritis
- C. Vesicoureteric reflux
- D. Bladder mass

✓ **Answer:** B. TB ureteritis

□ *Explanation:* TB causes ureteric narrowing and irregularity with fixed orifice – “golf hole” sign.

21. The contrast media used in IVU is mostly excreted within:

- A. 10 minutes
- B. 30 minutes
- C. 1 hour
- D. 2 hours

✓ **Answer:** C. 1 hour

□ *Explanation:* In normal renal function, >90% contrast is cleared within 1 hour.

22. Best method to assess kidney position during IVU:

- A. Prone film
- B. AP erect view
- C. AP supine view
- D. Oblique view

✓ **Answer:** C. AP supine view

□ *Explanation:* Supine image shows vertical level of kidneys relative to spine.

23. In horseshoe kidney, the ureters:

- A. Enter hilum normally
 - B. Pass posterior to isthmus
 - C. Pass anterior to isthmus
 - D. Are always dilated
- ✓ **Answer:** C. Pass anterior to isthmus

□ *Explanation:* The isthmus lies in front of aorta; ureters cross anterior to it.

24. Ureteric jet phenomenon refers to:

- A. Air in ureter
 - B. Backflow into kidney
 - C. Intermittent ureteric filling
 - D. Pulsatile urine ejection into bladder
- ✓ **Answer:** D. Pulsatile urine ejection into bladder

□ *Explanation:* Seen on ultrasound or IVU as intermittent flow into bladder.

25. Which finding in IVU suggests a PUJ obstruction?

- A. Non-visualized ureter
 - B. Delayed nephrogram
 - C. Ballooned renal pelvis with narrow PUJ
 - D. Bladder wall thickening
- ✓ **Answer:** C. Ballooned renal pelvis with narrow PUJ

□ *Explanation:* Classical finding in PUJ obstruction.

26. “Spider-leg calyces” are seen in:

- A. Polycystic kidney
- B. Hydronephrosis
- C. Medullary nephrocalcinosis
- D. Renal TB

✓ **Answer:** A. Polycystic kidney

□ *Explanation:* Calyceal stretching by cysts creates spider-leg appearance.

27. Which anomaly shows duplication of collecting system in IVU?

- A. Horseshoe kidney
- B. Cross-fused ectopia
- C. Duplex kidney
- D. Calyceal diverticulum

✓ **Answer:** C. Duplex kidney

□ *Explanation:* Two ureters or duplicated calyceal systems are visualized.

28. What is the effect of hypovolemia on IVU contrast excretion?

- A. Faster excretion
- B. Delayed excretion
- C. Enhanced nephrogram
- D. No change

✓ **Answer:** B. Delayed excretion

□ *Explanation:* Hypovolemia reduces renal perfusion and delays excretion.

29. IVU findings in papillary necrosis may include all EXCEPT:

- A. Blunted calyces
- B. Cavitation
- C. Filling defects
- D. Increased vascular blush

✓ **Answer:** D. Increased vascular blush

□ *Explanation:* Vascularity is usually reduced; blush not a finding in necrosis.

30. Which of the following is NOT needed for IVU?

- A. Low-residue diet
- B. Laxative preparation
- C. Hydration
- D. General anesthesia

✓ **Answer:** D. General anesthesia

□ *Explanation:* IVU is non-invasive and painless; sedation not routinely needed.

Chapter 3: MCU

1. MCU is primarily used to evaluate:

- A. Ureteric stones
- B. Renal cysts
- C. Vesicoureteric reflux

D. Renal cell carcinoma

✓ **Answer:** C. Vesicoureteric reflux

□ *Explanation:* MCU is the gold standard for diagnosing VUR in children and adults.

2. The most common age group for MCU in pediatric patients is:

A. Neonates

B. 2–5 years

C. 5–10 years

D. Adolescents

✓ **Answer:** B. 2–5 years

□ *Explanation:* This is the peak age for evaluating UTIs and suspected reflux.

3. Best time to visualize VUR during MCU is:

A. Pre-voiding phase

B. Bladder filling

C. Voiding phase

D. Post-void phase

✓ **Answer:** C. Voiding phase

□ *Explanation:* Reflux often occurs during micturition due to raised bladder pressure.

4. Which type of catheter is used in infants for MCU?

A. Foley 10 Fr

B. Feeding tube 5–8 Fr

C. Nelaton 12 Fr

D. Suprapubic catheter

✓ **Answer:** B. Feeding tube 5–8 Fr

□ *Explanation:* Small-size soft catheters like feeding tubes are ideal for neonates.

5. The contrast media of choice for MCU is:

A. Barium sulfate

B. Non-ionic iodinated contrast

C. Gadolinium

D. Gastrografin

✓ **Answer:** B. Non-ionic iodinated contrast

□ *Explanation:* Non-ionic, low-osmolar contrast is safest for intravesical use.

6. The maximum contrast volume instilled in children for MCU is approximately:

A. 10–15 ml

B. 50–60 ml

- C. 100 ml
- D. 300 ml

✓ **Answer:** B. 50–60 ml

□ *Explanation:* Children's bladder volume is small; instilling too much may cause rupture.

7. Which view best shows posterior urethra in MCU?

- A. AP supine
- B. Lateral voiding
- C. Oblique erect
- D. Prone lateral

✓ **Answer:** B. Lateral voiding

□ *Explanation:* Lateral projection during micturition best demonstrates posterior urethra.

8. Which finding indicates posterior urethral valve (PUV) in MCU?

- A. Dilated anterior urethra
- B. Smooth tapering urethra
- C. Dilated posterior urethra with abrupt narrowing
- D. Bladder diverticula

✓ **Answer:** C. Dilated posterior urethra with abrupt narrowing

□ *Explanation:* Classic "keyhole sign" of PUV.

9. The 'keyhole' sign in MCU refers to:

- A. Normal urethral curve
- B. Urethral stricture
- C. Dilated posterior urethra with distended bladder neck
- D. Vesicoureteric junction obstruction

✓ **Answer:** C. Dilated posterior urethra with distended bladder neck

□ *Explanation:* Seen in posterior urethral valve patients.

10. Which of the following is contraindicated for MCU?

- A. Urinary tract infection
- B. Hematuria
- C. VUR
- D. Neurogenic bladder

✓ **Answer:** A. Urinary tract infection

□ *Explanation:* MCU should not be done during active UTI due to infection risk.

11. Which of the following is a complication of MCU?

- A. Urethral stricture

- B. Bladder rupture
- C. Pneumaturia
- D. Hydronephrosis

✓ **Answer:** B. Bladder rupture

□ *Explanation:* Overfilling can lead to bladder wall injury.

12. The grade of VUR in which ureter is dilated without pelvicalyceal involvement is:

- A. Grade I
- B. Grade II
- C. Grade III
- D. Grade IV

✓ **Answer:** C. Grade III

□ *Explanation:* Grade III shows ureteric and mild pelvicalyceal dilatation.

13. Which position is essential during voiding films in boys?

- A. Supine
- B. Prone
- C. Left lateral
- D. Oblique or lateral

✓ **Answer:** D. Oblique or lateral

□ *Explanation:* Visualizes the urethra and reflux more clearly.

14. Which structure is evaluated LAST during MCU?

- A. Posterior urethra
- B. Bladder
- C. Ureters
- D. Anterior urethra

✓ **Answer:** D. Anterior urethra

□ *Explanation:* Final voiding image captures anterior urethra.

15. MCU is useful in all EXCEPT:

- A. Female urethral stricture
- B. Posterior urethral valves
- C. Neurogenic bladder
- D. Prostatic cancer

✓ **Answer:** D. Prostatic cancer

□ *Explanation:* Prostate evaluation is better done with TRUS or MRI.

16. The most important precaution before MCU is:

- A. Fasting for 6 hours
- B. Pre-procedure ultrasound
- C. Excluding active urinary tract infection
- D. Hydration

✓ **Answer:** C. Excluding active urinary tract infection

□ *Explanation:* Performing MCU during UTI can worsen infection or cause sepsis.

17. Which grade of VUR is characterized by tortuous ureters and blunted fornices?

- A. Grade II
- B. Grade III
- C. Grade IV
- D. Grade V

✓ **Answer:** D. Grade V

□ *Explanation:* Grade V is the most severe, with gross ureteral tortuosity and calyceal changes.

18. MCU is usually performed under which condition?

- A. General anesthesia
- B. Local anesthesia
- C. Conscious sedation
- D. No anesthesia

✓ **Answer:** D. No anesthesia

□ *Explanation:* The procedure is fast and generally well tolerated without sedation.

19. Which radiographic sign is seen in anterior urethral diverticulum?

- A. Pear-shaped bladder
- B. Beak-like urethral tip
- C. Round contrast-filled sac in anterior urethra
- D. Smooth tapering of posterior urethra

✓ **Answer:** C. Round contrast-filled sac in anterior urethra

□ *Explanation:* Diverticula appear as round outpouchings filled with contrast.

20. Which finding on MCU suggests bladder outlet obstruction?

- A. Smooth bladder outline
- B. Post-void residual urine
- C. Prompt contrast emptying
- D. Early urethral filling

✓ **Answer:** B. Post-void residual urine

□ *Explanation:* Indicates incomplete bladder emptying, common in BOO.

21. The ideal contrast temperature for MCU instillation is:

- A. Room temperature
- B. Warmed to body temperature
- C. Iced
- D. Heated to 45°C

✓ **Answer:** B. Warmed to body temperature

□ *Explanation:* Prevents bladder spasms and enhances patient comfort.

22. Which of the following is not part of the normal voiding mechanism assessed in MCU?

- A. Detrusor contraction
- B. Urethral relaxation
- C. External sphincter coordination
- D. Renal perfusion

✓ **Answer:** D. Renal perfusion

□ *Explanation:* MCU assesses bladder and urethra, not kidney perfusion.

23. What is the typical order of image acquisition during MCU?

- A. Voiding → Scout → Filling
- B. Scout → Filling → Voiding → Post-void
- C. Voiding → Filling → Delayed
- D. Post-void → Scout → Filling

✓ **Answer:** B. Scout → Filling → Voiding → Post-void

□ *Explanation:* Follows standard fluoroscopic procedure.

24. Vesicoureteric reflux occurs due to:

- A. Bladder stone
- B. Urethral diverticulum
- C. Incompetent ureterovesical junction
- D. Posterior urethral valve

✓ **Answer:** C. Incompetent ureterovesical junction

□ *Explanation:* Allows retrograde flow of urine during bladder contraction.

25. Which grade of VUR involves calyceal blunting and tortuous ureter?

- A. Grade I
- B. Grade II
- C. Grade III
- D. Grade IV

✓ **Answer:** D. Grade IV

□ *Explanation:* More advanced reflux leads to anatomical distortion.

26. A 'Christmas tree' appearance of the bladder suggests:

- A. Cystitis
- B. Neurogenic bladder
- C. Bladder cancer
- D. Diverticulum

✓ **Answer:** B. Neurogenic bladder

□ *Explanation:* Trabeculated, irregular contour of bladder gives this appearance.

27. What is the typical contrast instillation technique in MCU?

- A. Manual injection with syringe
- B. Hanging bottle gravity method
- C. IV infusion
- D. Urethral spray

✓ **Answer:** B. Hanging bottle gravity method

□ *Explanation:* Allows gradual filling and prevents overdistension.

28. Which of the following is a normal finding in MCU?

- A. Contrast in ureters during voiding
- B. Urethral stricture
- C. Anterior urethral diverticulum
- D. Smooth, uninterrupted bladder contour

✓ **Answer:** D. Smooth, uninterrupted bladder contour

□ *Explanation:* Normal bladder shows smooth margins and complete contrast emptying.

29. An anterior urethral valve may show all EXCEPT:

- A. Bulbar urethral dilatation
- B. Proximal urethral obstruction
- C. Smooth tapering urethra
- D. Post-void residue

✓ **Answer:** C. Smooth tapering urethra

□ *Explanation:* Obstruction causes irregularity, not smooth tapering.

30. The best projection to identify urethral trauma in MCU is:

- A. Supine AP
- B. Prone
- C. Oblique

D. Lateral voiding

✓ **Answer:** D. Lateral voiding

□ *Explanation:* Especially in males, lateral view shows urethral disruption.

Chapter 4: Retrograde Pyeloureterography

1. Retrograde pyeloureterography is performed using:

A. Intravenous contrast injection

B. Urethral catheterization

C. Ureteric catheter via cystoscopy

D. Suprapubic puncture

✓ **Answer:** C. Ureteric catheter via cystoscopy

□ *Explanation:* Contrast is injected directly into ureters via cystoscope-guided catheterization.

2. The main indication for retrograde pyelography is:

A. Renal function evaluation

B. Intrarenal mass

C. Non-visualized kidney on IVU

D. Trauma bladder

✓ **Answer:** C. Non-visualized kidney on IVU

□ *Explanation:* When IVU fails, RGP helps visualize the collecting system directly.

3. Retrograde pyelography is superior to IVU in:

A. Identifying renal vein thrombosis

B. Evaluating renal parenchyma

C. Ureteric stricture localization

D. Detecting nephrocalcinosis

✓ **Answer:** C. Ureteric stricture localization

□ *Explanation:* Allows precise demonstration of stricture length and location.

4. RGP is contraindicated in:

A. Suspected ureteric obstruction

B. Active urinary tract infection

C. Unilateral hydronephrosis

D. Renal calculi

✓ **Answer:** B. Active urinary tract infection

□ *Explanation:* Risk of introducing bacteria further or causing sepsis.

5. The contrast used for RGP must be:

- A. Barium sulfate
- B. Ionic high-osmolar
- C. Non-ionic low-osmolar iodinated
- D. Fat-soluble

✓ **Answer:** C. Non-ionic low-osmolar iodinated

□ *Explanation:* Minimizes irritation and allergic reactions in the urinary tract.

6. The catheter typically used for RGP is:

- A. Foley catheter
- B. Double J stent
- C. Open-ended ureteric catheter
- D. Suprapubic catheter

✓ **Answer:** C. Open-ended ureteric catheter

□ *Explanation:* Allows direct injection of contrast into ureter and PCS.

7. RGP provides visualization of all EXCEPT:

- A. Minor calyces
- B. Ureter
- C. Renal parenchyma
- D. Pelvicalyceal system

✓ **Answer:** C. Renal parenchyma

□ *Explanation:* RGP outlines luminal anatomy, not parenchymal tissue.

8. “Corkscrew ureter” appearance in RGP is seen in:

- A. TB ureteritis
- B. Ureterocele
- C. Ureteral stricture
- D. Retroperitoneal fibrosis

✓ **Answer:** D. Retroperitoneal fibrosis

□ *Explanation:* Ureter gets medially deviated and twisted—classic “corkscrew” look.

9. Which is a key difference between RGP and IVU?

- A. IVU is invasive, RGP is not
- B. RGP visualizes parenchyma
- C. RGP bypasses renal function
- D. IVU needs cystoscopy

✓ **Answer:** C. RGP bypasses renal function

□ *Explanation:* Contrast is delivered directly, irrespective of renal excretion.

10. The patient position for RGP is:

- A. Prone
- B. Lithotomy
- C. Supine
- D. Trendelenburg

✓ **Answer:** B. Lithotomy

□ *Explanation:* Required for cystoscopic access to ureteric orifices.

11. Retrograde pyelography is often combined with:

- A. MRI
- B. Urethrogram
- C. Cystoscopy
- D. VCUG

✓ **Answer:** C. Cystoscopy

□ *Explanation:* Cystoscope guides ureteric catheter insertion.

12. Contrast instillation in RGP is done:

- A. Rapid bolus
- B. High pressure
- C. Slow, gentle injection
- D. Through IV pump

✓ **Answer:** C. Slow, gentle injection

□ *Explanation:* To prevent reflux, trauma, and pyelovenous backflow.

13. A normal finding in RGP is:

- A. Irregular calyces
- B. Filling defects
- C. Tapered ureteric end
- D. Moth-eaten calyces

✓ **Answer:** C. Tapered ureteric end

□ *Explanation:* The ureter tapers normally toward vesicoureteric junction.

14. The main complication of RGP is:

- A. Renal hemorrhage
- B. Urethral rupture
- C. Pyelovenous reflux and infection
- D. Bladder rupture

✓ **Answer:** C. Pyelovenous reflux and infection

□ *Explanation:* Improper injection pressure may force contrast into veins.

15. Pyelotubular backflow seen in RGP is due to:

- A. Vesicoureteric reflux
- B. High-pressure contrast
- C. Renal artery aneurysm
- D. Foley catheter trauma

✓ **Answer:** B. High-pressure contrast

□ *Explanation:* Forcing contrast backward into tubules through renal papilla.

16. The most sensitive investigation for detecting ureteric stricture is:

- A. IVU
- B. Ultrasonography
- C. CT KUB
- D. Retrograde pyelography

✓ **Answer:** D. Retrograde pyelography

□ *Explanation:* Direct opacification gives precise anatomical detail of stricture.

17. A 'beaded ureter' in RGP is characteristic of:

- A. Ureteric tumor
- B. Ureterocele
- C. Tuberculous ureteritis
- D. Hydronephrosis

✓ **Answer:** C. Tuberculous ureteritis

□ *Explanation:* TB causes multiple irregular constrictions—'beaded' appearance.

18. A filling defect seen in RGP may be due to:

- A. Papillary necrosis
- B. Clot
- C. Ureteric calculus
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* Any of these can cause contrast non-filling areas.

19. Which of the following is NOT evaluated on RGP?

- A. Ureteral strictures
- B. Bladder wall lesions
- C. Renal pelvis filling defects
- D. Calyceal diverticulum

✓ **Answer:** B. Bladder wall lesions

□ *Explanation:* Bladder is not evaluated in this procedure.

20. Which of the following is required for RGP setup?

- A. Lead apron
- B. Sterile catheterization tray
- C. Pulse oximeter
- D. Radiation shielding for patient only

✓ **Answer:** B. Sterile catheterization tray

□ *Explanation:* Asepsis is critical during catheter placement.

21. The advantage of RGP in patients with poor renal function is:

- A. Improved GFR
- B. No contrast needed
- C. Does not depend on renal excretion
- D. Measures urea and creatinine

✓ **Answer:** C. Does not depend on renal excretion

□ *Explanation:* Contrast is injected directly, bypassing filtration.

22. Which layer is first breached during ureteric catheterization?

- A. Submucosa
- B. Ureteric adventitia
- C. Urothelium
- D. Muscularis externa

✓ **Answer:** C. Urothelium

□ *Explanation:* Catheter enters through ureteric orifice lined by transitional epithelium.

23. In RGP, how is ureteral peristalsis visualized?

- A. Not seen at all
- B. Seen as continuous contrast flow
- C. Seen as wave-like narrowing
- D. Seen as ureteral rupture

✓ **Answer:** C. Seen as wave-like narrowing

□ *Explanation:* Intermittent peristaltic waves can be seen as tapering/movement.

24. Which of the following findings suggests early ureteric TB in RGP?

- A. Moth-eaten calyces
- B. Ureterocele
- C. Cobblestone bladder
- D. Dilated ureter

✓ **Answer:** A. Moth-eaten calyces

□ *Explanation:* Early renal TB shows irregular calyceal erosion.

25. Ureteral perforation during RGP may be suspected if:

- A. Contrast rapidly enters bladder
- B. Contrast extravasates into retroperitoneum
- C. No contrast visible in ureter
- D. Pain is absent

✓ **Answer:** B. Contrast extravasates into retroperitoneum

□ *Explanation:* Indicates wall breach and requires immediate attention.

26. Which of the following techniques is essential to prevent infection in RGP?

- A. High-pressure injection
- B. Routine antibiotics
- C. Strict aseptic technique
- D. Pre-procedure biopsy

✓ **Answer:** C. Strict aseptic technique

□ *Explanation:* Reduces risk of introducing pathogens.

27. What is the primary indication for performing bilateral RGP?

- A. Bilateral hydronephrosis
- B. Hematuria
- C. Recurrent pyelonephritis
- D. Non-visualization of both kidneys on IVU

✓ **Answer:** D. Non-visualization of both kidneys on IVU

□ *Explanation:* RGP is especially useful when both kidneys fail to excrete contrast.

28. The pressure used for contrast injection in RGP should be:

- A. High manual bolus
- B. Gravity-assisted low pressure
- C. IV pump-driven
- D. Pulsatile syringe

✓ **Answer:** B. Gravity-assisted low pressure

□ *Explanation:* Prevents complications such as reflux and trauma.

29. Which sign in RGP suggests a ureteral tumor?

- A. Smooth tapering
- B. Spiral filling
- C. Irregular filling defect
- D. Double ureter

✓ **Answer:** C. Irregular filling defect

□ *Explanation:* Suggests a space-occupying lesion like tumor or clot.

30. What is the best follow-up study after abnormal RGP?

- A. MRI abdomen
- B. Renal ultrasound
- C. CT urography
- D. Serum creatinine

✓ **Answer:** C. CT urography

□ *Explanation:* Provides cross-sectional detail and evaluates surrounding structures.

Chapter 5: Contrast Media in GIT

1. The most commonly used contrast for GI fluoroscopic studies is:

- A. Iodine
- B. Gadolinium
- C. Barium sulfate
- D. Air

✓ **Answer:** C. Barium sulfate

□ *Explanation:* Barium provides high mucosal coating and radiodensity.

2. A water-soluble iodinated contrast is preferred over barium in cases of:

- A. Constipation
- B. Normal GI tract
- C. Suspected perforation
- D. Gastric ulcers

✓ **Answer:** C. Suspected perforation

□ *Explanation:* Barium can leak into the peritoneum and cause peritonitis.

3. Barium sulfate is contraindicated in:

- A. Gastroesophageal reflux
- B. Perforated duodenal ulcer
- C. Dysphagia
- D. Achalasia

✓ **Answer:** B. Perforated duodenal ulcer

□ *Explanation:* Use non-ionic water-soluble contrast in suspected perforation.

4. Which of the following contrast agents is hyperosmolar?

- A. Barium
 - B. Gastrografin
-

C. Gadolinium

D. Saline

✓ **Answer:** B. Gastrografin

□ *Explanation:* It is hyperosmolar and can draw fluid into the bowel lumen.

5. The double contrast technique uses:

A. Barium + iodine

B. Air + gadolinium

C. Barium + air

D. Saline + contrast

✓ **Answer:** C. Barium + air

□ *Explanation:* Air enhances mucosal detail when used with barium.

6. GIT contrast studies should be avoided in:

A. Constipation

B. Diarrhea

C. Acute abdomen with suspected perforation

D. Suspected polyps

✓ **Answer:** C. Acute abdomen with suspected perforation

□ *Explanation:* Water-soluble agents are safer in these cases.

7. The most suitable contrast for evaluating a tracheoesophageal fistula is:

A. Barium

B. Gastrografin

C. MRI contrast

D. Lipiodol

✓ **Answer:** B. Gastrografin

□ *Explanation:* Safer due to water solubility and less risk if aspirated.

8. Barium sulfate is a suspension because:

A. It dissolves in water

B. It is water-soluble

C. It is insoluble in water

D. It forms a colloidal solution

✓ **Answer:** C. It is insoluble in water

□ *Explanation:* Needs suspension in water or methylcellulose.

9. The best contrast for detecting early mucosal lesions in the GI tract is:

A. Barium alone

- B. Iodine
- C. Double contrast (Barium + air)
- D. Gadolinium
- ✓ **Answer:** C. Double contrast (Barium + air)

☐ *Explanation:* Air separates and highlights mucosal detail.

10. The osmolality of Gastrografin is:

- A. Hypo-osmolar
- B. Iso-osmolar
- C. Hyperosmolar
- D. Equal to blood
- ✓ **Answer:** C. Hyperosmolar

☐ *Explanation:* High osmolality can cause fluid shift and diarrhea.

11. Barium sulfate's advantage over iodinated contrast includes:

- A. Water solubility
- B. Better mucosal coating
- C. Better for CT
- D. Less cost-effective
- ✓ **Answer:** B. Better mucosal coating

☐ *Explanation:* Barium coats mucosa evenly and provides high contrast.

12. Aspiration of Gastrografin into lungs can cause:

- A. Nothing
- B. Chemical pneumonitis
- C. Fibrosis
- D. Bronchiectasis
- ✓ **Answer:** B. Chemical pneumonitis

☐ *Explanation:* Due to its hyperosmolar nature and tissue reaction.

13. Which GIT contrast medium is absorbed from the peritoneum?

- A. Barium
- B. Gastrografin
- C. Gadolinium
- D. None
- ✓ **Answer:** B. Gastrografin

☐ *Explanation:* Iodinated contrast can be absorbed and excreted renally.

14. Methylcellulose is used as:

- A. Radiopaque agent
 - B. Negative contrast
 - C. Bowel cleanser
 - D. Suspension stabilizer and distending agent
- ✓ **Answer:** D. Suspension stabilizer and distending agent

☐ *Explanation:* Used with double contrast to maintain lumen distension.

15. The best study for detecting GI polyps is:

- A. Single contrast barium
- B. Water-soluble contrast
- C. Double contrast barium
- D. Plain radiograph

✓ **Answer:** C. Double contrast barium

☐ *Explanation:* Provides clear outline of mucosal projections like polyps.

16. Ionic iodinated contrast in GIT studies may cause:

- A. Constipation
- B. Seizures
- C. Diarrhea
- D. Bowel obstruction

✓ **Answer:** C. Diarrhea

☐ *Explanation:* Due to hyperosmolarity drawing water into the bowel lumen.

17. Which contrast should be avoided in suspected aspiration?

- A. Barium
- B. Gastrografin
- C. Water
- D. Methylcellulose

✓ **Answer:** B. Gastrografin

☐ *Explanation:* It is hyperosmolar and can cause life-threatening pneumonitis.

18. Which is the best contrast for suspected esophageal perforation?

- A. Barium sulfate
- B. Gastrografin
- C. Gadolinium
- D. None

✓ **Answer:** B. Gastrografin

☐ *Explanation:* Water-soluble and safe in case of leak.

19. In double contrast barium meal, the role of gas-producing agent is to:

- A. Fill stomach
- B. Remove air
- C. Distend the stomach and bowel
- D. Enhance barium absorption

✓ **Answer:** C. Distend the stomach and bowel

□ *Explanation:* Improves mucosal visualization by separating walls.

20. Why is barium preferred over iodine in most GI exams?

- A. It's safer
- B. Cheaper
- C. Better coating & radiodensity
- D. Easier to inject

✓ **Answer:** C. Better coating & radiodensity

□ *Explanation:* Provides high-resolution mucosal detail.

21. Which of the following can act as negative contrast?

- A. Barium
- B. Air
- C. Iodine
- D. Gastrografin

✓ **Answer:** B. Air

□ *Explanation:* Negative contrast appears dark (radiolucent).

22. Water-soluble contrasts can be administered via:

- A. Oral route
- B. Rectal route
- C. Nasogastric tube
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* Depending on the site being examined.

23. A foamy barium preparation is used for:

- A. Sigmoidoscopy
- B. Air contrast studies
- C. Small bowel enema
- D. HSG

✓ **Answer:** B. Air contrast studies

□ *Explanation:* Barium foam adheres better and works well with air for mucosal coating.

24. In children with suspected perforation, preferred contrast is:

- A. Barium
- B. Air
- C. Gastrografin diluted
- D. Methylcellulose

✓ **Answer:** C. Gastrografin diluted

□ *Explanation:* Minimizes aspiration risk and provides visualization.

25. Barium studies are avoided before:

- A. Colonoscopy
- B. MRI abdomen
- C. Upper GI endoscopy
- D. Bowel surgery

✓ **Answer:** D. Bowel surgery

□ *Explanation:* Barium leakage during surgery can cause peritonitis.

26. Anaphylactoid reactions are more common with:

- A. Barium
- B. Gadolinium
- C. Ionic iodinated contrast
- D. CO₂

✓ **Answer:** C. Ionic iodinated contrast

□ *Explanation:* Especially with older high-osmolar contrast agents.

27. In suspected aspiration risk patients, you should use:

- A. Barium sulfate
- B. Gastrografin
- C. Diluted non-ionic iodinated contrast
- D. Methylcellulose

✓ **Answer:** C. Diluted non-ionic iodinated contrast

□ *Explanation:* Safer than hyperosmolar Gastrografin and less irritating than barium.

28. Gastrografin is a trade name for:

- A. Barium
- B. Diatrizoate meglumine + sodium
- C. Iodixanol
- D. Gadolinium

✓ **Answer:** B. Diatrizoate meglumine + sodium

□ *Explanation:* It is a water-soluble contrast agent used in GIT.

29. GIT contrast that shows rapid transit and poor mucosal coating is:

- A. Barium
- B. Gastrografin
- C. Air
- D. Methylcellulose

✓ **Answer:** B. Gastrografin

□ *Explanation:* It is less viscous and does not coat mucosa as effectively.

30. In suspected fistulas involving GIT, the safest contrast is:

- A. Air
- B. Barium
- C. Gastrografin
- D. MRI contrast

✓ **Answer:** C. Gastrografin

□ *Explanation:* Prevents peritoneal irritation and chemical peritonitis.



Chapter 6: Barium Swallow

1. The barium swallow study is primarily used to assess:

- A. Stomach
- B. Colon
- C. Esophagus
- D. Duodenum

✓ **Answer:** C. Esophagus

□ *Explanation:* The study focuses on evaluating structure and function of the esophagus.

2. The best view to assess esophageal motility is:

- A. AP erect
- B. Lateral view
- C. RAO view
- D. Trendelenburg

✓ **Answer:** B. Lateral view

□ *Explanation:* It demonstrates bolus transit and peristalsis clearly.

3. The standard contrast agent used in routine barium swallow is:

- A. Water
- B. Gastrografin
- C. Barium sulfate
- D. Air

✓ **Answer:** C. Barium sulfate

□ *Explanation:* Provides optimal mucosal detail and coating.

4. The most important indication for a barium swallow is:

- A. Gastric ulcer
- B. Duodenal obstruction
- C. Dysphagia
- D. Constipation

✓ **Answer:** C. Dysphagia

□ *Explanation:* Barium swallow is the first-line imaging for swallowing difficulties.

5. In suspected perforation, barium should be replaced with:

- A. Gadolinium
- B. Air
- C. Water
- D. Water-soluble iodinated contrast

✓ **Answer:** D. Water-soluble iodinated contrast

□ *Explanation:* Safer in case of leakage into mediastinum or peritoneum.

6. Zenker's diverticulum is best seen on which view?

- A. PA erect
- B. AP prone
- C. Lateral view
- D. Supine oblique

✓ **Answer:** C. Lateral view

□ *Explanation:* Shows posterior midline outpouching at the pharyngoesophageal junction.

7. Corkscrew esophagus appearance is diagnostic of:

- A. Achalasia
- B. Carcinoma
- C. Diffuse esophageal spasm
- D. Reflux esophagitis

✓ **Answer:** C. Diffuse esophageal spasm

□ *Explanation:* Multiple simultaneous contractions give corkscrew look.

8. In achalasia, barium swallow reveals:

- A. Dilated upper esophagus
- B. Narrow gastroesophageal junction
- C. Bird beak appearance
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* Achalasia causes dilatation above and tapering at LES.

9. Best patient position for esophageal transit evaluation:

- A. Supine
- B. Left lateral
- C. Erect
- D. Prone

✓ **Answer:** C. Erect

□ *Explanation:* Gravity-assisted bolus passage simulates real-life swallowing.

10. The term “rat-tail” or “shouldering” in barium swallow is associated with:

- A. Esophageal web
- B. Achalasia
- C. Esophageal carcinoma
- D. Hiatus hernia

✓ **Answer:** C. Esophageal carcinoma

□ *Explanation:* Shouldering occurs due to irregular narrowing of lumen by tumor.

11. Best contrast for suspected aspiration in neurological patients:

- A. Thick barium
- B. Gastrografin
- C. Diluted barium
- D. Non-ionic iodinated contrast

✓ **Answer:** D. Non-ionic iodinated contrast

□ *Explanation:* Safer if aspiration occurs; causes less irritation.

12. Barium swallow can identify all except:

- A. Esophageal varices
- B. Strictures
- C. Gallstones
- D. Fistulas

✓ **Answer:** C. Gallstones

□ *Explanation:* Barium swallow doesn't assess gallbladder.

13. A “double lumen” sign on barium swallow indicates:

- A. Diverticulum
- B. Web
- C. Tracheoesophageal fistula
- D. Esophageal duplication

✓ **Answer:** C. Tracheoesophageal fistula

□ *Explanation:* Two contrast-filled tracts—one in esophagus, another in trachea.

14. The earliest radiological sign of GERD is:

- A. Ulcer
- B. Stricture
- C. Free reflux of barium into esophagus
- D. Tumor

✓ **Answer:** C. Free reflux of barium into esophagus

□ *Explanation:* Indicates incompetence of lower esophageal sphincter.

15. Barrett's esophagus on barium swallow may show:

- A. Irregular narrowing
- B. Ulceration
- C. Strictures
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* Chronic GERD leads to these complications.

16. Which position best demonstrates a hiatal hernia in barium swallow?

- A. Prone
- B. Left lateral decubitus
- C. Erect with Valsalva
- D. Right posterior oblique

✓ **Answer:** C. Erect with Valsalva

□ *Explanation:* Increases intra-abdominal pressure, revealing herniated stomach.

17. Schatski's ring is typically found at:

- A. Upper esophagus
- B. Middle esophagus
- C. Lower esophagus
- D. Pylorus

✓ **Answer:** C. Lower esophagus

□ *Explanation:* Located at the gastroesophageal junction, seen as thin mucosal ring.

18. Which of the following may cause a “steeple sign” on barium swallow?

- A. Epiglottitis
- B. Achalasia
- C. Subglottic stenosis
- D. Tracheomalacia

✓ **Answer:** C. Subglottic stenosis

□ *Explanation:* Narrowed upper trachea causes a pointed vertical narrowing (steeple).

19. The best test to assess oropharyngeal dysphagia is:

- A. CT neck
- B. Barium meal
- C. Barium swallow with video fluoroscopy
- D. Endoscopy

✓ **Answer:** C. Barium swallow with video fluoroscopy

□ *Explanation:* Dynamic study helps assess coordination of swallowing muscles.

20. “Bird beak” sign is pathognomonic of:

- A. Reflux esophagitis
- B. Achalasia cardia
- C. Cricopharyngeal bar
- D. Varices

✓ **Answer:** B. Achalasia cardia

□ *Explanation:* Seen as tapering of the distal esophagus.

21. An “apple core” or “shouldering” lesion in the esophagus suggests:

- A. Reflux
- B. Ulcer
- C. Cancer
- D. Web

✓ **Answer:** C. Cancer

□ *Explanation:* The irregular, constricted lumen resembles an apple core.

22. Cricopharyngeal bar is best seen in which view?

- A. AP erect
- B. Supine
- C. Lateral
- D. Prone oblique

✓ **Answer:** C. Lateral

□ *Explanation:* Demonstrates posterior indentation at C5–C6 level.

23. A pulsion diverticulum in upper esophagus is known as:

- A. Meckel's diverticulum
- B. Zenker's diverticulum
- C. Killian-Jamieson diverticulum
- D. Epiphrenic diverticulum

✓ **Answer:** B. Zenker's diverticulum

□ *Explanation:* Occurs through Killian's dehiscence in upper esophagus.

24. Which of the following is a complication of long-standing achalasia?

- A. Megaesophagus
- B. Esophageal carcinoma
- C. Regurgitation
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* All are associated with untreated achalasia.

25. The "corkscrew" appearance of esophagus is best seen in which phase?

- A. After 24 hours
- B. Immediate post-swallow
- C. Mid-esophageal phase
- D. Inspiration

✓ **Answer:** B. Immediate post-swallow

□ *Explanation:* Seen during spastic contraction phase in diffuse esophageal spasm.

26. Which of the following is not a contraindication for barium swallow?

- A. Aspiration risk
- B. Esophageal perforation
- C. Stricture
- D. Severe respiratory distress

✓ **Answer:** C. Stricture

□ *Explanation:* It's actually an indication for evaluation.

27. Feline esophagus seen on barium swallow is due to:

- A. Varices
- B. Reflux esophagitis
- C. Achalasia
- D. Candida infection

✓ **Answer:** B. Reflux esophagitis

□ *Explanation:* Shows multiple fine transverse folds like cat's esophagus.

28. Best method to confirm esophageal motility disorder is:

- A. Manometry
- B. Barium swallow
- C. CT chest
- D. MRI

✓ **Answer:** A. Manometry

□ *Explanation:* Barium suggests, but manometry confirms motility issues.

29. In systemic sclerosis, barium swallow shows:

- A. Dilated aperistaltic esophagus
- B. Corkscrew appearance
- C. Rat-tail stricture
- D. Normal study

✓ **Answer:** A. Dilated aperistaltic esophagus

□ *Explanation:* Smooth muscle involvement causes hypoperistalsis.

30. Which of the following is a false statement about barium swallow?

- A. Useful in evaluating dysphagia
- B. Cannot detect webs
- C. Helpful in detecting Zenker's diverticulum
- D. Contraindicated in perforation

✓ **Answer:** B. Cannot detect webs

□ *Explanation:* Webs appear as thin shelf-like filling defects and are visible.

Chapter 7: Barium Meal

1. A barium meal study is best used to evaluate:

- A. Pharynx
- B. Esophagus
- C. Stomach and proximal small intestine
- D. Colon

✓ **Answer:** C. Stomach and proximal small intestine

□ *Explanation:* It focuses on the stomach and duodenum.

2. The best patient position to visualize the gastric fundus during a barium meal is:

- A. Supine
- B. Prone
- C. Left lateral decubitus
- D. Erect

✓ **Answer:** D. Erect

□ *Explanation:* In erect position, gas rises to fundus and barium settles inferiorly.

3. “Cloverleaf deformity” in barium meal is suggestive of:

- A. Gastric cancer
 - B. Healed duodenal ulcer with scarring
 - C. Pyloric stenosis
 - D. Gastric polyp
- ✓ **Answer:** B. Healed duodenal ulcer with scarring

□ *Explanation:* Deformity occurs due to puckering and fibrosis of the duodenal bulb.

4. “String sign of Kantor” is seen in:

- A. Duodenal ulcer
- B. Hypertrophic pyloric stenosis
- C. Crohn’s disease
- D. Gastric carcinoma

✓ **Answer:** C. Crohn’s disease

□ *Explanation:* Narrow terminal ileum due to inflammation gives string-like appearance.

5. Best view to demonstrate the antrum of the stomach is:

- A. PA view
- B. Supine
- C. Right anterior oblique (RAO)
- D. Left lateral

✓ **Answer:** C. Right anterior oblique (RAO)

□ *Explanation:* RAO gives optimal visualization of the antrum and pylorus.

6. A persistent filling defect in the stomach during barium meal suggests:

- A. Air bubble
- B. Polyp or tumor
- C. Gastritis
- D. Ulcer

✓ **Answer:** B. Polyp or tumor

□ *Explanation:* Filling defects represent space-occupying lesions.

7. A benign gastric ulcer is differentiated from malignant ulcer on barium meal by:

- A. Irregular margins
- B. Mucosal folds extending to crater
- C. Lack of radiating folds

D. Shouldering effect

✓ **Answer:** B. Mucosal folds extending to crater

□ *Explanation:* Benign ulcers retain radiating folds and are sharply demarcated.

8. “Bull’s eye” or “target sign” on barium study suggests:

A. Hypertrophic pyloric stenosis

B. Gastric carcinoma

C. Gastric lymphoma

D. Submucosal gastric tumor

✓ **Answer:** D. Submucosal gastric tumor

□ *Explanation:* Shows central ulceration in submucosal mass.

9. The most common site for peptic ulcer disease is:

A. Esophagus

B. Gastric antrum

C. Duodenum

D. Fundus

✓ **Answer:** C. Duodenum

□ *Explanation:* 90% of ulcers occur in the first part of the duodenum.

10. The “string sign” in hypertrophic pyloric stenosis is seen at the:

A. Duodenal bulb

B. Gastric fundus

C. Pyloric canal

D. Ileum

✓ **Answer:** C. Pyloric canal

□ *Explanation:* Narrow, elongated pyloric channel due to muscle hypertrophy.

11. A “shouldering” effect on barium meal usually indicates:

A. Gastric varices

B. Peptic ulcer

C. Gastric carcinoma

D. Duodenitis

✓ **Answer:** C. Gastric carcinoma

□ *Explanation:* Shoulder-like projection at lesion margins indicates infiltrative tumor.

12. Which sign is typical of benign gastric ulcer?

A. Heaped-up margins

B. Carman’s meniscus sign

C. Smooth round ulcer with radiating folds

D. Linitis plastica

✓ **Answer:** C. Smooth round ulcer with radiating folds

□ *Explanation:* Radiating folds are typical of benign ulcer crater.

13. “Linitis plastica” on barium meal refers to:

A. Thickened, rigid stomach with narrowed lumen

B. Hiatal hernia

C. Pyloric narrowing

D. Fundal polyp

✓ **Answer:** A. Thickened, rigid stomach with narrowed lumen

□ *Explanation:* Seen in infiltrative gastric carcinoma.

14. A barium meal series is contraindicated in:

A. Gastritis

B. Perforation

C. Functional dyspepsia

D. Peptic ulcer

✓ **Answer:** B. Perforation

□ *Explanation:* Risk of barium leak into peritoneal cavity.

15. The ideal timing to take delayed films in barium meal is:

A. Immediately post-ingestion

B. After 30 minutes

C. After 1 hour

D. Based on gastric emptying

✓ **Answer:** D. Based on gastric emptying

□ *Explanation:* Timing varies per patient depending on gastric motility.

16. A barium meal is particularly helpful in diagnosing:

A. Acute pancreatitis

B. Gallstones

C. Peptic ulcer disease

D. Ureteric obstruction

✓ **Answer:** C. Peptic ulcer disease

□ *Explanation:* Barium meal directly visualizes mucosal ulcers in stomach and duodenum.

17. In gastric carcinoma, barium meal most often shows:

A. Smooth margins

- B. Regular ulcer crater
- C. Heaped-up irregular margins
- D. No filling defect

✓ **Answer:** C. Heaped-up irregular margins

□ *Explanation:* Malignancy leads to irregular ulceration and mass effect.

18. Carman's meniscus sign is associated with:

- A. Duodenitis
- B. Gastric cancer
- C. Crohn's disease
- D. Varices

✓ **Answer:** B. Gastric cancer

□ *Explanation:* Concave meniscus-shaped filling defect seen in infiltrative gastric carcinoma.

19. Best position to evaluate pyloric canal in barium meal is:

- A. Supine
- B. Prone
- C. RAO
- D. Left lateral

✓ **Answer:** C. RAO

□ *Explanation:* RAO helps visualize antrum and pylorus due to dependent position.

20. The "penumbra sign" in barium meal is seen in:

- A. Peptic ulcer
- B. Small bowel tumor
- C. Submucosal lesion
- D. Adhesion

✓ **Answer:** C. Submucosal lesion

□ *Explanation:* The radiolucent halo between the barium and lesion indicates mucosal overlying intact layer.

21. Which of the following may mimic malignancy on barium meal?

- A. Benign ulcer with edema
- B. Large diverticulum
- C. Hypertrophic gastritis
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* These can cause wall thickening or mass effect on barium images.

22. Which of the following is not an advantage of barium meal?

- A. Non-invasive
- B. Cost-effective
- C. Allows biopsy
- D. Demonstrates motility

✓ **Answer:** C. Allows biopsy

□ *Explanation:* Biopsy requires endoscopy; barium is purely radiological.

23. The “pseudodiverticula” appearance in duodenum suggests:

- A. Carcinoma
- B. Diverticulitis
- C. Crohn’s disease
- D. Tuberculosis

✓ **Answer:** D. Tuberculosis

□ *Explanation:* Chronic ulceration and scarring lead to diverticulum-like outpouchings.

24. Which sign in barium meal suggests an obstructive lesion?

- A. Rapid barium transit
- B. Delayed emptying
- C. Absence of folds
- D. Constricted esophagus

✓ **Answer:** B. Delayed emptying

□ *Explanation:* Suggests narrowing or non-functioning pylorus.

25. A smooth narrowing of the pyloric canal with "string sign" is diagnostic of:

- A. Duodenitis
- B. Hypertrophic pyloric stenosis
- C. Gastric ulcer
- D. Bezoar

✓ **Answer:** B. Hypertrophic pyloric stenosis

□ *Explanation:* Seen in infants as elongated narrow pyloric canal.

26. The term “hourglass stomach” in barium meal refers to:

- A. Fundal diverticulum
- B. Herniated antrum
- C. Gastric volvulus
- D. Hourglass-shaped indentation due to scarring or tumor

✓ **Answer:** D. Hourglass-shaped indentation due to scarring or tumor

□ *Explanation:* Localized narrowing gives appearance of two chambers.

27. The “snail shell” appearance is seen in:

- A. Volvulus
- B. Achalasia
- C. Gastroparesis
- D. Chronic gastric ulcer

✓ **Answer:** A. Volvulus

☐ *Explanation:* Spiral rotation of stomach produces snail shell-like image.

28. What is the recommended fasting duration before barium meal exam?

- A. 2 hours
- B. 4 hours
- C. 6–8 hours
- D. 12 hours

✓ **Answer:** C. 6–8 hours

☐ *Explanation:* Ensures empty stomach for optimal coating and visibility.

29. Which of the following findings is NOT detected on barium meal?

- A. Ulcer crater
- B. Polyp
- C. H. pylori infection
- D. Pyloric obstruction

✓ **Answer:** C. H. pylori infection

☐ *Explanation:* It is microbiological and cannot be diagnosed on imaging.

30. Which contrast agent provides better mucosal coating in barium meal?

- A. High-density barium
- B. Gastrografin
- C. Methylcellulose
- D. Water

✓ **Answer:** A. High-density barium

☐ *Explanation:* Offers better mucosal visualization in double-contrast studies.

Chapter 8: Barium Meal Follow Through

1. Barium meal follow through is primarily done to assess:

- A. Esophagus
- B. Stomach

- C. Small intestine
- D. Colon

✓ **Answer:** C. Small intestine

□ *Explanation:* It tracks barium through jejunum and ileum after gastric emptying.

2. The most common indication for barium meal follow through is:

- A. Dysphagia
- B. Constipation
- C. Suspected small bowel pathology (e.g., Crohn's disease)
- D. Pancreatitis

✓ **Answer:** C. Suspected small bowel pathology

□ *Explanation:* It helps evaluate mucosal patterns, strictures, and ulceration.

3. Ideal patient preparation for follow through includes fasting for:

- A. 2 hours
- B. 4 hours
- C. 6–8 hours
- D. Overnight

✓ **Answer:** C. 6–8 hours

□ *Explanation:* Ensures stomach is empty for clear evaluation of GI transit.

4. The first film in barium meal follow through is typically taken at:

- A. 1 minute
- B. 15 minutes
- C. 30 minutes
- D. 1 hour

✓ **Answer:** B. 15 minutes

□ *Explanation:* Standard protocol begins image capture at 15 min intervals.

5. “String sign” in terminal ileum indicates:

- A. Ulcer
- B. Crohn's disease
- C. Lymphoma
- D. TB

✓ **Answer:** B. Crohn's disease

□ *Explanation:* Narrowed, rigid segment due to chronic inflammation.

6. “Stack of coins” appearance on small bowel barium study is seen in:

- A. Lymphoma

- B. Crohn's disease
- C. Jejunal edema
- D. Celiac disease

✓ **Answer:** C. Jejunal edema

□ *Explanation:* Thickened folds due to edema give coin-like appearance.

7. "Cobblestone appearance" is seen in:

- A. TB
- B. Crohn's disease
- C. Lymphoma
- D. Malrotation

✓ **Answer:** B. Crohn's disease

□ *Explanation:* Ulceration between residual mucosa causes this classic sign.

8. "Lead pipe" appearance of bowel loops suggests:

- A. Crohn's disease
- B. Ulcerative colitis
- C. TB
- D. Volvulus

✓ **Answer:** B. Ulcerative colitis

□ *Explanation:* Loss of haustral markings results in smooth, featureless colon.

9. Dilated bowel with central placement of loops is seen in:

- A. Small bowel obstruction
- B. Colitis
- C. Malrotation
- D. Ascites

✓ **Answer:** A. Small bowel obstruction

□ *Explanation:* Fluid-filled, dilated loops are hallmarks of SBO.

10. Transit time of barium to reach cecum in a normal follow-through is:

- A. 30 minutes
- B. 1–2 hours
- C. 3–4 hours
- D. 6–8 hours

✓ **Answer:** C. 3–4 hours

□ *Explanation:* Variable, but cecal filling often occurs around this time.

11. In barium follow through, jejunal loops are identified by:

- A. Smooth walls
- B. Sparse folds
- C. Feathery mucosal pattern
- D. None

✓ **Answer:** C. Feathery mucosal pattern

□ *Explanation:* Jejunum has valvulae conniventes creating a feathery look.

12. The “hide bound” appearance is seen in:

- A. Celiac disease
- B. Scleroderma
- C. Crohn's disease
- D. Intussusception

✓ **Answer:** B. Scleroderma

□ *Explanation:* Normal folds packed into dilated bowel due to muscle atrophy.

13. Most sensitive region for detecting early Crohn’s disease:

- A. Duodenum
- B. Jejunum
- C. Terminal ileum
- D. Ascending colon

✓ **Answer:** C. Terminal ileum

□ *Explanation:* Classic site for early involvement.

14. String sign can be confused with:

- A. Dilated loop
- B. Beak sign
- C. Overlap of folds
- D. Normal jejunal fold

✓ **Answer:** C. Overlap of folds

□ *Explanation:* Careful analysis needed to avoid misdiagnosis.

15. "Stacked coin" or "thumb printing" suggests:

- A. Ischemia
- B. Neoplasm
- C. TB
- D. Crohn’s disease

✓ **Answer:** A. Ischemia

□ *Explanation:* Edema and hemorrhage in bowel wall cause indentations.

16. Which of the following causes delayed barium transit?

- A. Crohn's disease
- B. Stricture
- C. Ileus
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* All can reduce motility or cause mechanical blockage.

17. Which view helps differentiate jejunum from ileum in follow through?

- A. Prone
- B. Supine
- C. Decubitus
- D. Oblique

✓ **Answer:** A. Prone

□ *Explanation:* Jejunum lies more centrally and superiorly in prone.

18. Fistulae in Crohn's disease may be seen as:

- A. Ulcer crater
- B. Contrast leakage outside bowel
- C. Stricture
- D. Mass lesion

✓ **Answer:** B. Contrast leakage outside bowel

□ *Explanation:* Entero-enteric or entero-cutaneous fistulas are common.

19. The "Coiled spring sign" is typical of:

- A. Diverticulosis
- B. Intussusception
- C. Volvulus
- D. Adhesions

✓ **Answer:** B. Intussusception

□ *Explanation:* Shows concentric circular folds as one bowel segment invaginates into another.

20. Rapid barium transit may occur in:

- A. Hyperthyroidism
- B. IBS
- C. Dumping syndrome
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* All lead to increased motility or rapid gastric emptying.

21. Most common tumor of small intestine visible in barium follow through is:

- A. Adenocarcinoma
- B. Lymphoma
- C. Carcinoid
- D. Leiomyoma

✓ **Answer:** C. Carcinoid

□ *Explanation:* Often seen as small enhancing lesion in ileum.

22. Barium follow through is contraindicated in:

- A. Perforation
- B. Ileocecal TB
- C. Subacute obstruction
- D. Crohn's disease

✓ **Answer:** A. Perforation

□ *Explanation:* Risk of barium entering peritoneum and causing inflammation.

23. Which sign is NOT associated with Crohn's disease?

- A. Cobblestone appearance
- B. Rose thorn ulcers
- C. String sign
- D. Lead pipe colon

✓ **Answer:** D. Lead pipe colon

□ *Explanation:* It's seen in ulcerative colitis, not Crohn's.

24. Barium distribution in small bowel is best assessed in:

- A. Supine AP
- B. Erect lateral
- C. Prone PA
- D. Decubitus

✓ **Answer:** C. Prone PA

□ *Explanation:* Distributes bowel loops more evenly.

25. Proximal jejunal dilatation with abrupt transition suggests:

- A. Ileal stricture
- B. Adhesion band
- C. Jejunal atresia
- D. Volvulus

✓ **Answer:** C. Jejunal atresia

□ *Explanation:* Congenital absence leads to dilated blind-ending loop.

26. Normal barium pattern in ileum appears:

- A. Feathery
- B. Featureless
- C. Homogeneous
- D. Granular

✓ **Answer:** B. Featureless

□ *Explanation:* Fewer and less prominent mucosal folds.

27. “Step-ladder pattern” in follow through indicates:

- A. Ileus
- B. Mechanical small bowel obstruction
- C. Ascites
- D. TB

✓ **Answer:** B. Mechanical small bowel obstruction

□ *Explanation:* Multiple air-fluid levels at different heights.

28. Segmental narrowing with pulled-up cecum is a feature of:

- A. Crohn's
- B. Lymphoma
- C. TB
- D. Adhesions

✓ **Answer:** C. TB

□ *Explanation:* TB causes ileocecal and ascending colon involvement.

29. The “inverted umbrella” sign suggests:

- A. Malrotation
- B. Ileal duplication
- C. Hyperplasia
- D. TB ileocecal involvement

✓ **Answer:** D. TB ileocecal involvement

□ *Explanation:* Due to pulled-up contracted cecum and narrowed IC junction.

30. Which of the following is essential after the last film in barium follow through?

- A. Supine abdomen
- B. Enema
- C. Post-evacuation film
- D. Lateral decubitus

✓ **Answer:** C. Post-evacuation film

□ *Explanation:* Confirms evacuation and completeness of study.

Chapter 9: Enteroclysis (Small Bowel Enema)

1. Enteroclysis is primarily used to evaluate:

- A. Esophagus
- B. Stomach
- C. Small intestine
- D. Large intestine

✓ **Answer:** C. Small intestine

□ *Explanation:* It allows detailed evaluation of jejunal and ileal mucosa.

2. Enteroclysis differs from barium follow-through by:

- A. Not using contrast
- B. Direct catheterization of duodenum
- C. Evaluation of colon
- D. Use of ultrasound

✓ **Answer:** B. Direct catheterization of duodenum

□ *Explanation:* Contrast is injected directly into small bowel via nasoenteric tube.

3. Best contrast media combination for enteroclysis is:

- A. Barium only
- B. Air and water
- C. Barium + methylcellulose
- D. Gastrografin only

✓ **Answer:** C. Barium + methylcellulose

□ *Explanation:* Barium outlines mucosa; methylcellulose distends loops.

4. A double-contrast enteroclysis gives better visualization of:

- A. Liver
- B. Lungs
- C. Small bowel mucosa
- D. Kidneys

✓ **Answer:** C. Small bowel mucosa

□ *Explanation:* It enhances mucosal detail for subtle pathology detection.

5. A major advantage of enteroclysis over follow-through is:

- A. Less radiation
- B. More time-consuming
- C. Better bowel distension and faster evaluation

D. Requires no equipment

✓ **Answer:** C. Better bowel distension and faster evaluation

□ *Explanation:* Provides superior bowel loop distension and mucosal coating.

6. Enteroclysis is especially useful in evaluating:

A. Appendicitis

B. Colonic polyp

C. Intermittent small bowel obstruction

D. Hiatus hernia

✓ **Answer:** C. Intermittent small bowel obstruction

□ *Explanation:* Detects transient or low-grade obstruction not seen on routine films.

7. Major contraindication for enteroclysis is:

A. Diarrhea

B. Constipation

C. Suspected perforation

D. Weight loss

✓ **Answer:** C. Suspected perforation

□ *Explanation:* Contrast injection under pressure may worsen perforation.

8. Typical catheter used in enteroclysis is:

A. Foley

B. Ryle's tube

C. Miller–Abbott tube

D. Bilumen enteroclysis tube

✓ **Answer:** D. Bilumen enteroclysis tube

□ *Explanation:* Allows dual contrast delivery—barium and methylcellulose.

9. Enteroclysis helps differentiate between:

A. Large and small bowel

B. Functional and structural obstruction

C. Liver and kidney

D. Duodenum and stomach

✓ **Answer:** B. Functional and structural obstruction

□ *Explanation:* Gives dynamic view of real-time small bowel transit.

10. Cobblestone appearance in enteroclysis is due to:

A. Mucosal thickening

B. Deep linear ulcers and residual mucosa

C. Polyps

D. Fistula

✓ **Answer:** B. Deep linear ulcers and residual mucosa

□ *Explanation:* Classic for Crohn's disease.

11. Strictures seen on enteroclysis are best described by:

A. Rat-tail deformity

B. Apple core

C. String sign

D. Corkscrew pattern

✓ **Answer:** C. String sign

□ *Explanation:* Narrowed segment with minimal lumen.

12. A "stacked coin" appearance is due to:

A. Lymphoma

B. Bowel wall edema

C. Celiac disease

D. Polypoid lesion

✓ **Answer:** B. Bowel wall edema

□ *Explanation:* Thickened folds seen like coins stacked together.

13. "Feline jejunum" pattern indicates:

A. Crohn's

B. TB

C. Scleroderma

D. Celiac disease

✓ **Answer:** D. Celiac disease

□ *Explanation:* Flattened, scalloped mucosa typical in celiac disease.

14. Rose-thorn ulcers are found in:

A. Celiac disease

B. Crohn's disease

C. UC

D. TB

✓ **Answer:** B. Crohn's disease

□ *Explanation:* Deep, linear ulcers projecting into lumen.

15. "Fluoroscopic spot filming" during enteroclysis is done to:

A. Save contrast

- B. Save radiation
 - C. Freeze dynamic loops for detailed analysis
 - D. For biopsy
 - ✓ **Answer:** C. Freeze dynamic loops for detailed analysis
 - *Explanation:* High-quality images of suspected pathology.
-

16. Which is not an advantage of enteroclysis?

- A. Better diagnostic yield
 - B. Dynamic evaluation
 - C. Non-invasive
 - D. Can detect motility disorders
 - ✓ **Answer:** C. Non-invasive
 - *Explanation:* It is invasive as it requires tube placement.
-

17. Enteroclysis is better than CT enterography in detecting:

- A. Lymph nodes
 - B. Extraluminal pathology
 - C. Subtle mucosal changes
 - D. Hepatic lesions
 - ✓ **Answer:** C. Subtle mucosal changes
 - *Explanation:* It offers excellent mucosal detail.
-

18. "Pseudopolyps" seen in enteroclysis suggest:

- A. Crohn's
 - B. TB
 - C. Ulcerative colitis
 - D. Ischemic bowel
 - ✓ **Answer:** C. Ulcerative colitis
 - *Explanation:* Residual mucosal islands surrounded by ulcers.
-

19. Barium sulfate used in enteroclysis is usually:

- A. Diluted
 - B. Concentrated
 - C. Air-insufflated
 - D. Replaced with iodine
 - ✓ **Answer:** A. Diluted
 - *Explanation:* To avoid rapid coating and allow smooth passage.
-

20. Enteroclysis is considered positive when:

- A. All loops opacify
- B. Rapid transit occurs
- C. Mucosal, wall, or motility abnormalities are seen
- D. Stomach is visualized

✓ **Answer:** C. Mucosal, wall, or motility abnormalities are seen

□ *Explanation:* Any abnormality of contrast progression or loop morphology.

21. Which of the following is not routinely assessed in enteroclysis?

- A. Bowel wall thickness
- B. Bowel motility
- C. Mucosal outline
- D. Subserosal fat

✓ **Answer:** D. Subserosal fat

□ *Explanation:* Only lumen and wall lining are visualized, not perienteric fat.

22. Long segment strictures with “conical narrowing” on enteroclysis suggest:

- A. TB
- B. Lymphoma
- C. Crohn’s
- D. Adhesions

✓ **Answer:** A. TB

□ *Explanation:* Tuberculosis causes long strictures, especially in ileocecal region.

23. Jejunal loops in enteroclysis appear more:

- A. Central
- B. Peripheral
- C. Right-sided
- D. Upper left quadrant

✓ **Answer:** D. Upper left quadrant

□ *Explanation:* Jejunum is typically seen in upper left abdomen.

24. Complications of enteroclysis may include:

- A. Perforation
- B. Vomiting
- C. Discomfort
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* Rare but possible complications include all three.

25. Cystic mass causing mass effect on loops in enteroclysis may indicate:

- A. Lymphoma
- B. Duplication cyst
- C. Intussusception
- D. Bezoar

✓ **Answer:** B. Duplication cyst

□ *Explanation:* Congenital duplication can compress small bowel loops.

26. Which sign indicates malabsorption in enteroclysis?

- A. Increased peristalsis
- B. Dilated loops
- C. Fuzzy mucosa with dilution of contrast
- D. Filling defect

✓ **Answer:** C. Fuzzy mucosa with dilution of contrast

□ *Explanation:* Poor absorption of contrast indicates malabsorption.

27. “Grapes-on-a-stalk” appearance suggests:

- A. Lymphoma
- B. Multiple diverticula
- C. Crohn’s
- D. TB

✓ **Answer:** B. Multiple diverticula

□ *Explanation:* Outpouchings seen arising from single segment.

28. In enteroclysis, segmentation of bowel is best seen using:

- A. Low-density contrast
- B. Barium only
- C. Double contrast
- D. Iodine

✓ **Answer:** C. Double contrast

□ *Explanation:* Enhances mucosal relief for segmentation study.

29. A “Jejunization” of ileum may indicate:

- A. Normal variant
- B. Celiac disease
- C. Crohn’s
- D. TB

✓ **Answer:** B. Celiac disease

□ *Explanation:* Loss of normal pattern leads to jejunal-like appearance of ileum.

30. Best position to visualize entire small bowel in enteroclysis is:

- A. Supine
- B. Prone
- C. RAO
- D. LPO

✓ **Answer:** B. Prone

□ *Explanation:* Prone flattens loops and separates them for better assessment.

Chapter 10: Barium Enema

1. The main indication for barium enema is:

- A. Peptic ulcer
- B. Renal stones
- C. Evaluation of colon pathology
- D. Esophageal stricture

✓ **Answer:** C. Evaluation of colon pathology

□ *Explanation:* Used to detect strictures, polyps, diverticula, and mass lesions.

2. Best patient preparation for barium enema includes:

- A. Full bladder
- B. Overnight fasting with bowel cleansing
- C. Normal diet
- D. No prep required

✓ **Answer:** B. Overnight fasting with bowel cleansing

□ *Explanation:* Ensures a clean colon for better visualization.

3. The most common contrast used in barium enema is:

- A. Gastrografin
- B. Normal saline
- C. Barium sulfate
- D. Iodinated oil

✓ **Answer:** C. Barium sulfate

□ *Explanation:* Provides optimal mucosal coating and radiographic contrast.

4. A “lead pipe colon” is characteristic of:

- A. Crohn’s disease
- B. Ulcerative colitis
- C. Diverticulosis
- D. TB

✓ **Answer:** B. Ulcerative colitis

□ *Explanation:* Haustral folds are lost, creating a smooth, featureless colon.

5. The “apple core” lesion suggests:

- A. Diverticulosis
- B. Polyp
- C. Colorectal carcinoma
- D. Intussusception

✓ **Answer:** C. Colorectal carcinoma

□ *Explanation:* Constricting annular lesion with shouldered edges.

6. What is the preferred position for inserting the enema tip?

- A. Supine
- B. Prone
- C. Left lateral (Sim’s position)
- D. Lithotomy

✓ **Answer:** C. Left lateral (Sim’s position)

□ *Explanation:* Eases insertion and reduces risk of rectal injury.

7. Double contrast barium enema involves:

- A. Barium + water
- B. Barium + oil
- C. Barium + air
- D. Barium only

✓ **Answer:** C. Barium + air

□ *Explanation:* Air distends colon; barium coats mucosa for enhanced detail.

8. Contraindication for barium enema is:

- A. Diarrhea
- B. Constipation
- C. Suspected perforation
- D. Hemorrhoids

✓ **Answer:** C. Suspected perforation

□ *Explanation:* Use water-soluble contrast like Gastrografin instead.

9. A “saw-tooth” appearance in barium enema suggests:

- A. Colon cancer
- B. Diverticulosis
- C. Hirschsprung’s disease

D. Megacolon

✓ **Answer:** B. Diverticulosis

□ *Explanation:* Irregular outpouchings give serrated appearance.

10. The main site of diverticulosis is:

A. Rectum

B. Ascending colon

C. Sigmoid colon

D. Transverse colon

✓ **Answer:** C. Sigmoid colon

□ *Explanation:* Most common due to increased intraluminal pressure.

11. A “bird of prey” sign is associated with:

A. Volvulus

B. Ulcer

C. Polyp

D. Rectal carcinoma

✓ **Answer:** A. Volvulus

□ *Explanation:* Seen in sigmoid volvulus due to twisted loop appearance.

12. “Filling defect” in barium enema may indicate:

A. Polyp

B. Ulcer

C. Stricture

D. Fistula

✓ **Answer:** A. Polyp

□ *Explanation:* Appears as smooth round defect within contrast-filled lumen.

13. Best view to demonstrate rectosigmoid junction is:

A. AP supine

B. LPO

C. RAO

D. Lateral decubitus

✓ **Answer:** C. RAO

□ *Explanation:* Oblique view opens up overlapping loops at rectosigmoid junction.

14. String sign in the colon can be caused by:

A. Crohn’s disease

B. UC

C. TB

D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* Chronic inflammation leads to narrowed, strictured segments.

15. Rectal carcinoma in barium enema appears as:

A. Dilated bowel

B. Conical narrowing

C. Apple core lesion

D. Rose-thorn ulcers

✓ **Answer:** C. Apple core lesion

□ *Explanation:* Classic for annular constricting growth in colon.

16. A common complication of improper barium enema is:

A. Vomiting

B. Colon perforation

C. Skin rash

D. Pneumothorax

✓ **Answer:** B. Colon perforation

□ *Explanation:* Rare but serious, especially in elderly or diseased bowel.

17. Haustral markings are best seen in:

A. Prone view

B. Double-contrast studies

C. Single-contrast enema

D. Scout film

✓ **Answer:** B. Double-contrast studies

□ *Explanation:* Air distends colon and enhances mucosal patterns.

18. Which is not an indication for barium enema?

A. Colonic tumor

B. Inflammatory bowel disease

C. Suspected perforation

D. Intussusception

✓ **Answer:** C. Suspected perforation

□ *Explanation:* Water-soluble contrast preferred instead.

19. Barium enema in Hirschsprung's disease shows:

A. Dilated distal colon

- B. Conical stricture
 - C. Narrow distal segment with proximal dilatation
 - D. Loss of haustra
 - ✓ **Answer:** C. Narrow distal segment with proximal dilatation
 - *Explanation:* Due to aganglionic distal bowel segment.
-

20. “Thumbprinting” in colon suggests:

- A. Diverticulitis
 - B. Ischemic colitis
 - C. Lymphoma
 - D. Rectal prolapse
 - ✓ **Answer:** B. Ischemic colitis
 - *Explanation:* Mucosal edema or hemorrhage causes rounded indentations.
-

21. The “inverted umbrella” sign in colon suggests:

- A. Volvulus
 - B. Ileocecal TB
 - C. UC
 - D. Polyp
 - ✓ **Answer:** B. Ileocecal TB
 - *Explanation:* Contracted, pulled-up cecum with narrow IC junction.
-

22. Barium enema can reduce which condition?

- A. Polyp
 - B. Rectal prolapse
 - C. Intussusception
 - D. UC
 - ✓ **Answer:** C. Intussusception
 - *Explanation:* Retrograde hydrostatic pressure may relieve telescoped segment.
-

23. In a normal colon, barium enema shows:

- A. Featureless colon
 - B. Haustral folds
 - C. Irregular ulceration
 - D. “Saw tooth” appearance
 - ✓ **Answer:** B. Haustral folds
 - *Explanation:* Characteristic mucosal pattern of healthy colon.
-

24. “Napkin ring” lesion in colon is typical of:

- A. Lymphoma
- B. TB
- C. Carcinoma
- D. Volvulus

✓ **Answer:** C. Carcinoma

□ *Explanation:* Encircling lesion with central narrowing and abrupt edges.

25. Which of the following is false regarding barium enema?

- A. Detects colon cancer
- B. Detects diverticula
- C. Used in suspected perforation
- D. Can show strictures

✓ **Answer:** C. Used in suspected perforation

□ *Explanation:* It is contraindicated in perforation; use Gastrografin instead.

26. During barium enema, the enema bag should be placed at:

- A. Floor level
- B. Level of patient
- C. 2 feet above table
- D. 6 feet above patient

✓ **Answer:** C. 2 feet above table

□ *Explanation:* Provides optimal gravity pressure for flow.

27. Which condition is best seen in prone lateral rectal view?

- A. Sigmoid volvulus
- B. Intussusception
- C. Rectal carcinoma
- D. Anorectal fistula

✓ **Answer:** C. Rectal carcinoma

□ *Explanation:* Lateral view delineates rectal wall and lumen narrowing.

28. Contraindication to air insufflation in barium enema:

- A. Constipation
- B. Elderly age
- C. Suspected perforation
- D. All of the above

✓ **Answer:** C. Suspected perforation

□ *Explanation:* Risk of peritonitis if air escapes through perforation.

29. In diverticulitis, the barium enema may show:

- A. Multiple tiny filling defects
- B. Deep ulcers
- C. Fistulous tract
- D. Mucosal edema

✓ **Answer:** A. Multiple tiny filling defects

□ *Explanation:* Represent diverticula filled with contrast.

30. The “omega loop” or “coffee bean sign” is associated with:

- A. Crohn’s
- B. Sigmoid volvulus
- C. Celiac disease
- D. Rectal prolapse

✓ **Answer:** B. Sigmoid volvulus

□ *Explanation:* Twisted sigmoid colon with central overlap forms classic shape.

Chapter 11: Hysterosalpingography (HSG)

1. Hysterosalpingography (HSG) is primarily used to evaluate:

- A. Uterine prolapse
- B. Ovarian cysts
- C. Uterine cavity and fallopian tube patency
- D. Vaginal infections

✓ **Answer:** C. Uterine cavity and fallopian tube patency

□ *Explanation:* HSG is mainly used in infertility workup to assess tubal blockage and uterine anomalies.

2. Ideal timing for performing HSG is:

- A. During menstruation
- B. Mid-cycle (day 14–16)
- C. Day 7–10 of menstrual cycle
- D. Day 20–22

✓ **Answer:** C. Day 7–10 of menstrual cycle

□ *Explanation:* This ensures the endometrium is thin and avoids interfering with a potential early pregnancy.

3. The contrast medium used in HSG is:

- A. Barium sulfate
- B. Air
- C. Water-soluble iodinated contrast

D. Lipid-based oil

✓ **Answer:** C. Water-soluble iodinated contrast

□ *Explanation:* Non-ionic iodinated contrast is preferred for safety and clarity.

4. Contraindication for HSG includes:

A. Infertility

B. Tubal blockage

C. Active pelvic infection

D. Uterine fibroids

✓ **Answer:** C. Active pelvic infection

□ *Explanation:* Procedure may worsen infection or spread it through the tubes.

5. The radiographic view commonly used during HSG is:

A. Lateral view

B. PA erect view

C. Supine AP view

D. Oblique lateral

✓ **Answer:** C. Supine AP view

□ *Explanation:* This view allows visualization of the uterine cavity and tubes in continuity.

6. Cornual spasm during HSG may mimic:

A. Hydrosalpinx

B. Fibroid

C. Tubal blockage

D. Endometriosis

✓ **Answer:** C. Tubal blockage

□ *Explanation:* Spasm at uterine cornua can prevent contrast from entering the tubes temporarily.

7. A “beaded” appearance of fallopian tubes suggests:

A. Endometriosis

B. Salpingitis isthmica nodosa

C. Normal finding

D. PID

✓ **Answer:** B. Salpingitis isthmica nodosa

□ *Explanation:* Seen as outpouchings along the tube due to chronic inflammation.

8. In HSG, the presence of free peritoneal spill indicates:

A. Tubal blockage

- B. Uterine fibroid
- C. Normal tube patency
- D. Adenomyosis

✓ **Answer:** C. Normal tube patency

□ *Explanation:* Free spill means the tube is open and functional.

9. A filling defect within the uterine cavity may suggest:

- A. Polyps
- B. Blockage
- C. Hydrosalpinx
- D. Ectopic pregnancy

✓ **Answer:** A. Polyps

□ *Explanation:* Appears as smooth intraluminal defects.

10. Common complication after HSG is:

- A. Uterine perforation
- B. Pneumothorax
- C. Mild cramping and spotting
- D. Embolism

✓ **Answer:** C. Mild cramping and spotting

□ *Explanation:* Usually self-limiting; managed with rest and analgesics.

11. In bicornuate uterus, HSG will show:

- A. Normal uterine cavity
- B. Single cavity with one tube
- C. Two endometrial cavities with horns
- D. Intrauterine mass

✓ **Answer:** C. Two endometrial cavities with horns

□ *Explanation:* Seen as two symmetric endometrial channels diverging from the cervix.

12. The uterus appears “T-shaped” in HSG in cases of:

- A. Adenomyosis
- B. Fibroids
- C. DES exposure
- D. Endometriosis

✓ **Answer:** C. DES exposure

□ *Explanation:* Congenital anomaly due to in-utero diethylstilbestrol exposure.

13. The catheter tip for HSG is usually placed at:

- A. Vaginal vault
- B. External os
- C. Cervical canal
- D. Internal os

✓ **Answer:** D. Internal os

□ *Explanation:* Ensures efficient filling of the uterine cavity.

14. Which position is ideal during HSG?

- A. Supine
- B. Left lateral decubitus
- C. Lithotomy
- D. Prone

✓ **Answer:** C. Lithotomy

□ *Explanation:* Standard position for gynecological procedures.

15. "Ampullary block" in fallopian tubes on HSG indicates:

- A. Uterine septum
- B. Ectopic pregnancy
- C. Blockage at the distal third of tube
- D. Normal anatomy

✓ **Answer:** C. Blockage at the distal third of tube

□ *Explanation:* Ampulla is the most common site for tubal blockage.

16. HSG can help in diagnosing:

- A. Tubal occlusion
- B. Endometrial polyps
- C. Uterine anomalies
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* It visualizes the uterine cavity and tubes.

17. Hydrosalpinx on HSG appears as:

- A. Corkscrew pattern
- B. Club-shaped dilated tube with no spill
- C. Filling defect
- D. Free peritoneal spill

✓ **Answer:** B. Club-shaped dilated tube with no spill

□ *Explanation:* Indicates fluid-filled, blocked fallopian tubes.

18. Indication for oil-based contrast in HSG:

- A. Suspected perforation
- B. PID
- C. Repeated unexplained infertility
- D. Pregnancy

✓ **Answer:** C. Repeated unexplained infertility

□ *Explanation:* Some studies suggest higher pregnancy rates post oil-based HSG.

19. HSG should be avoided if:

- A. Tubal ligation
- B. On oral contraceptives
- C. Suspected pregnancy
- D. Prior myomectomy

✓ **Answer:** C. Suspected pregnancy

□ *Explanation:* Radiation and contrast risk to fetus.

20. The procedure is discontinued if patient develops:

- A. Mild pain
- B. Cramps
- C. Allergic reaction or vasovagal syncope
- D. Vaginal discharge

✓ **Answer:** C. Allergic reaction or vasovagal syncope

□ *Explanation:* Medical emergency requires immediate management.

21. Which uterine anomaly cannot be differentiated from septate uterus by HSG alone?

- A. Arcuate uterus
- B. Bicornuate uterus
- C. T-shaped uterus
- D. Normal uterus

✓ **Answer:** B. Bicornuate uterus

□ *Explanation:* Further evaluation by MRI or 3D USG needed.

22. Fluoroscopy in HSG is useful to observe:

- A. Real-time spill
- B. Polyps
- C. Ovarian size
- D. Fibroid mass

✓ **Answer:** A. Real-time spill

□ *Explanation:* Allows dynamic assessment of contrast movement.

23. Which anomaly shows complete non-filling of one horn on HSG?

- A. Bicornuate uterus
 - B. Unicornuate uterus
 - C. Septate uterus
 - D. Didelphys
- ✓ **Answer:** B. Unicornuate uterus

☐ *Explanation:* Only one developed horn is visualized.

24. Which of the following conditions gives “saccular outpouching” on HSG?

- A. Hydrosalpinx
- B. Salpingitis isthmica nodosa
- C. TB
- D. Endometriosis

✓ **Answer:** B. Salpingitis isthmica nodosa

☐ *Explanation:* Nodular outpouchings seen along isthmus.

25. Which of the following conditions gives a “corkscrew tube” appearance?

- A. Hydrosalpinx
- B. Ectopic pregnancy
- C. Peritubal adhesions
- D. TB

✓ **Answer:** C. Peritubal adhesions

☐ *Explanation:* Adhesions cause tortuous, twisted appearance.

26. A floccular contrast appearance in the pelvis post HSG suggests:

- A. Blocked tubes
- B. Peritoneal spill
- C. Uterine rupture
- D. Contrast allergy

✓ **Answer:** B. Peritoneal spill

☐ *Explanation:* Seen when contrast freely spills through open tubes.

27. A high-pressure injection during HSG may cause:

- A. Tubal rupture
- B. Better images
- C. More spill
- D. None

✓ **Answer:** A. Tubal rupture

☐ *Explanation:* Should be avoided—can damage fragile tubes.

28. Which pathology cannot be detected by HSG?

- A. Tubal occlusion
- B. Endometrial carcinoma
- C. Septate uterus
- D. Salpingitis

✓ **Answer:** B. Endometrial carcinoma

□ *Explanation:* Requires biopsy or hysteroscopy.

29. Optimal volume of contrast used in HSG is:

- A. 2–3 ml
- B. 5–10 ml
- C. 15–20 ml
- D. 30–40 ml

✓ **Answer:** B. 5–10 ml

□ *Explanation:* Enough to fill cavity and visualize tubes.

30. The best follow-up imaging post-HSG for further evaluation is:

- A. Ultrasound
- B. CT
- C. MRI
- D. Mammography

✓ **Answer:** C. MRI

□ *Explanation:* Helps confirm uterine anomalies and differentiate septate vs. bicornuate uterus.

Chapter 13: Sialography

1. Sialography is primarily used to assess:

- A. Sinus infection
- B. Salivary gland ducts and parenchyma
- C. Lymph nodes
- D. Thyroid gland

✓ **Answer:** B. Salivary gland ducts and parenchyma

□ *Explanation:* It is a radiographic study of salivary glands using contrast media.

2. The most commonly studied gland in sialography is:

- A. Parotid gland
- B. Sublingual gland
- C. Lacrimal gland
- D. Pineal gland

✓ **Answer:** A. Parotid gland

□ *Explanation:* Easily cannulated and commonly involved in obstructive disorders.

3. Contrast used in sialography is typically:

- A. Barium sulfate
- B. Air
- C. Water-soluble iodinated contrast
- D. Lipid-based contrast

✓ **Answer:** C. Water-soluble iodinated contrast

□ *Explanation:* Readily absorbed and gives excellent ductal visualization.

4. The main indication for sialography is:

- A. Otitis media
- B. Salivary gland obstruction or sialadenitis
- C. Cavernous sinus thrombosis
- D. Adenoid hypertrophy

✓ **Answer:** B. Salivary gland obstruction or sialadenitis

□ *Explanation:* Identifies ductal blockage, stones, inflammation, and strictures.

5. Sialography is contraindicated in:

- A. Acute sialadenitis
- B. Chronic infection
- C. Recurrent swelling
- D. Xerostomia

✓ **Answer:** A. Acute sialadenitis

□ *Explanation:* Procedure may exacerbate infection and cause pain.

6. Which duct is cannulated for parotid gland sialography?

- A. Wharton's duct
- B. Bartholin's duct
- C. Stensen's duct
- D. Paranasal duct

✓ **Answer:** C. Stensen's duct

□ *Explanation:* It opens near the upper second molar in the buccal mucosa.

7. Best view for sialography imaging is:

- A. PA view of skull
- B. Lateral oblique view of the face
- C. Lateral cervical spine
- D. AP supine abdomen

✓ **Answer:** B. Lateral oblique view of the face

□ *Explanation:* Demonstrates parotid and submandibular glands with minimal superimposition.

8. Pre-procedural stimulation of saliva is done using:

- A. Bitter solution
- B. Sour juice or lemon
- C. Saline water
- D. Air puff

✓ **Answer:** B. Sour juice or lemon

□ *Explanation:* Stimulates salivary flow to aid duct visualization.

9. After injecting contrast in sialography, post-evacuation films are taken to:

- A. Confirm catheter position
- B. Identify lymph nodes
- C. Assess gland clearance
- D. Check bone lesions

✓ **Answer:** C. Assess gland clearance

□ *Explanation:* Indicates gland function and drainage efficiency.

10. A “pruned tree” appearance suggests:

- A. Sialolithiasis
- B. Sjögren’s syndrome
- C. Mumps
- D. Parotid tumor

✓ **Answer:** B. Sjögren’s syndrome

□ *Explanation:* Loss of terminal ductal branches due to chronic inflammation.

11. Sialography shows a round, smooth filling defect – likely cause:

- A. Tumor
- B. Stone
- C. Ductal spasm
- D. Artifact

✓ **Answer:** B. Stone

□ *Explanation:* Stones appear as radiolucent or filling defects in contrast-filled ducts.

12. A “sausage string” appearance indicates:

- A. Tumor
- B. Calculus
- C. Chronic sialadenitis
- D. Acute infection

✓ **Answer:** C. Chronic sialadenitis

□ *Explanation:* Alternating ductal narrowing and dilation.

13. Wharton’s duct drains which gland?

- A. Parotid
- B. Sublingual
- C. Submandibular
- D. Lacrimal

✓ **Answer:** C. Submandibular

□ *Explanation:* Opens beside the frenulum of the tongue.

14. In normal sialography, contrast fills up to:

- A. Only main duct
- B. Only secondary ducts
- C. Terminal acini
- D. None of the above

✓ **Answer:** C. Terminal acini

□ *Explanation:* Normal pattern includes ductal arborization till the smallest branches.

15. Most common cause of ductal obstruction:

- A. Tumor
- B. Congenital narrowing
- C. Sialolithiasis
- D. Parotitis

✓ **Answer:** C. Sialolithiasis

□ *Explanation:* Stone formation is common in submandibular glands.

16. During sialography, catheter is lubricated to:

- A. Prevent breakage
- B. Prevent bleeding
- C. Ease entry and avoid duct injury

D. Trap air

✓ **Answer:** C. Ease entry and avoid duct injury

□ *Explanation:* Avoids trauma and false tracts.

17. Best time to take post-evacuation sialography film:

A. Immediately after injection

B. After 1 hour

C. After patient chews lemon

D. Next day

✓ **Answer:** C. After patient chews lemon

□ *Explanation:* Stimulates salivary flow to flush out contrast.

18. Sialography is NOT helpful in diagnosing:

A. Ductal stricture

B. Calculi

C. Malignancy

D. Lymph node calcification

✓ **Answer:** D. Lymph node calcification

□ *Explanation:* Lies outside the ductal system.

19. Which pathology appears as “snowstorm” appearance in sialography?

A. TB

B. Mumps

C. Sialodochitis

D. Autoimmune sialadenitis

✓ **Answer:** D. Autoimmune sialadenitis (e.g., Sjögren’s)

□ *Explanation:* Due to irregular punctate contrast collections.

20. Normal volume of contrast required for parotid gland is:

A. 0.2–0.5 ml

B. 0.5–1.5 ml

C. 2–5 ml

D. 10 ml

✓ **Answer:** B. 0.5–1.5 ml

□ *Explanation:* Larger volumes risk rupture or false tract.

21. For submandibular gland, ideal contrast volume is:

A. 0.5 ml

B. 0.5–1.0 ml

- C. 2–4 ml
- D. 5–10 ml

✓ **Answer:** B. 0.5–1.0 ml

□ *Explanation:* Submandibular duct is narrower.

22. Complication of sialography includes all EXCEPT:

- A. Contrast reaction
- B. Ductal rupture
- C. Parotid abscess
- D. Bone erosion

✓ **Answer:** D. Bone erosion

□ *Explanation:* Not associated with this soft tissue imaging.

23. Most common tumor in parotid gland (seen indirectly on sialography):

- A. Pleomorphic adenoma
- B. Warthin's tumor
- C. Adenocarcinoma
- D. Mucoepidermoid

✓ **Answer:** A. Pleomorphic adenoma

□ *Explanation:* Appears as persistent mass with ductal displacement.

24. "Ball in hand" appearance in sialography refers to:

- A. Chronic infection
- B. Mucous retention cyst
- C. Sialodochitis
- D. Tumor with ductal displacement

✓ **Answer:** D. Tumor with ductal displacement

□ *Explanation:* Ducts are stretched around the lesion.

25. Technique to prevent air entry during contrast injection:

- A. Tilt the head back
- B. Apply external compression
- C. Keep syringe tip completely filled with contrast
- D. Elevate chin

✓ **Answer:** C. Keep syringe tip completely filled with contrast

□ *Explanation:* Prevents air artifacts.

26. Sialography is best avoided in:

- A. Chronic recurrent swelling

- B. Children with sialadenitis
 - C. Suspected calculi
 - D. Ductal stenosis
 - ✓ **Answer:** B. Children with sialadenitis
 - ☐ *Explanation:* Risk of pain, infection spread.
-

27. Sialography can be complemented with:

- A. CT sialography
 - B. MRI
 - C. Ultrasound
 - D. All of the above
 - ✓ **Answer:** D. All of the above
 - ☐ *Explanation:* Each has unique advantages; USG for stones, CT/MRI for tumors.
-

28. Which appearance suggests air bubbles in contrast column?

- A. Smooth filling defect
 - B. Jagged edge
 - C. Ring or halo defect
 - D. Branching tree
 - ✓ **Answer:** C. Ring or halo defect
 - ☐ *Explanation:* Trapped air bubbles mimic pathology.
-

29. Preferred contrast for CT sialography is:

- A. Barium
 - B. Gastrografin
 - C. Iohexol
 - D. Urografin
 - ✓ **Answer:** C. Iohexol
 - ☐ *Explanation:* Non-ionic contrast ideal for CT applications.
-

30. Salivary gland tumors are better assessed by:

- A. Sialography
 - B. CT/MRI
 - C. PET
 - D. Ultrasound only
 - ✓ **Answer:** B. CT/MRI
 - ☐ *Explanation:* Soft tissue contrast and cross-sectional detail superior.
-

Chapter 14: T-Tube Cholangiography

1. T-tube cholangiography is performed post:

- A. Appendectomy
- B. ERCP
- C. Cholecystectomy with common bile duct exploration
- D. Hepatectomy

✓ **Answer:** C. Cholecystectomy with common bile duct exploration

□ *Explanation:* It checks for residual stones and biliary patency after surgery.

2. The 'T' in T-tube cholangiography refers to:

- A. The shape of the bile duct
- B. Transverse liver ducts
- C. Shape of the drainage tube inserted
- D. Tumor marker

✓ **Answer:** C. Shape of the drainage tube inserted

□ *Explanation:* The T-shaped tube is placed in the common bile duct.

3. Ideal time for performing T-tube cholangiography postoperatively is:

- A. 1–2 days
- B. 3–4 days
- C. 7–10 days
- D. After 1 month

✓ **Answer:** C. 7–10 days

□ *Explanation:* This allows maturation of the fistula tract to avoid bile leak.

4. Which contrast is used in T-tube cholangiography?

- A. Barium sulfate
- B. Air
- C. Water-soluble iodinated contrast
- D. Lipid-soluble contrast

✓ **Answer:** C. Water-soluble iodinated contrast

□ *Explanation:* Easily visualizes ducts and is safe in biliary system.

5. T-tube cholangiography is done to rule out:

- A. Gallstones
- B. Residual or missed CBD stones
- C. Pancreatitis

D. Hepatic abscess

✓ **Answer:** B. Residual or missed CBD stones

□ *Explanation:* Helps confirm stone clearance post CBD exploration.

6. Which finding confirms patency of biliary system in T-tube cholangiography?

A. No contrast movement

B. Contrast reaching jejunum

C. Intrahepatic ductal dilatation

D. Stone shadow

✓ **Answer:** B. Contrast reaching jejunum

□ *Explanation:* Free flow of contrast into the duodenum indicates patency.

7. A filling defect in the common bile duct during T-tube cholangiography suggests:

A. Tumor

B. Air bubble

C. Residual stone

D. Mucosal fold

✓ **Answer:** C. Residual stone

□ *Explanation:* Appears as well-defined non-opacified area within contrast column.

8. If air bubbles mimic stones, how can they be differentiated?

A. Air bubbles are dense

B. Air bubbles move on position change

C. Stones disappear on re-injection

D. Stones are radio-opaque

✓ **Answer:** B. Air bubbles move on position change

□ *Explanation:* Positioning helps separate artifacts from pathology.

9. Common complication of T-tube cholangiography is:

A. Stone formation

B. Bile leak

C. Contrast allergy

D. Air embolism

✓ **Answer:** B. Bile leak

□ *Explanation:* Especially if performed before tract maturation.

10. "Beading" of intrahepatic ducts suggests:

A. Cholangiocarcinoma

B. Stone disease

- C. Primary sclerosing cholangitis
- D. Cirrhosis

✓ **Answer:** C. Primary sclerosing cholangitis

□ *Explanation:* Characteristic irregular ductal narrowing and dilatation.

11. Proper patient preparation for T-tube cholangiography includes:

- A. Full meal
- B. Fasting for 6–8 hours
- C. General anesthesia
- D. IV sedation

✓ **Answer:** B. Fasting for 6–8 hours

□ *Explanation:* Reduces risk of aspiration and improves visibility.

12. Which structure is not visualized in T-tube cholangiography?

- A. Common hepatic duct
- B. Cystic duct
- C. Gallbladder
- D. Common bile duct

✓ **Answer:** C. Gallbladder

□ *Explanation:* Removed during cholecystectomy.

13. “Meniscus sign” in T-tube cholangiography may indicate:

- A. Sludge
- B. Tumor
- C. Stone with contrast around it
- D. Artifact

✓ **Answer:** C. Stone with contrast around it

□ *Explanation:* Crescent-shaped contrast around a filling defect.

14. If contrast fails to pass into duodenum, it indicates:

- A. Normal finding
- B. Blocked ampulla of Vater
- C. Patent sphincter
- D. Duodenitis

✓ **Answer:** B. Blocked ampulla of Vater

□ *Explanation:* Could be due to retained stone or edema.

15. The imaging modality that complements T-tube cholangiography is:

- A. Plain X-ray

- B. USG
- C. MRCP
- D. ECG

✓ **Answer:** C. MRCP

☐ *Explanation:* MRCP is non-invasive and useful for pre/post-op biliary assessment.

16. How is the contrast introduced during T-tube cholangiography?

- A. IV
- B. Oral
- C. Through T-tube catheter
- D. Subcutaneously

✓ **Answer:** C. Through T-tube catheter

☐ *Explanation:* Directly fills biliary tree from drainage tube.

17. Which finding does NOT require stone removal?

- A. Filling defect with no symptoms
- B. Multiple CBD stones
- C. Obstructive jaundice
- D. Dilated bile ducts with stone

✓ **Answer:** A. Filling defect with no symptoms

☐ *Explanation:* Small stones may pass spontaneously if asymptomatic.

18. Before removing T-tube, what must be ensured?

- A. Patient is febrile
- B. Biliary tree is blocked
- C. Normal liver function tests and free contrast flow
- D. Enlarged liver

✓ **Answer:** C. Normal liver function tests and free contrast flow

☐ *Explanation:* Ensures ductal patency and no residual pathology.

19. In T-tube cholangiography, retrograde flow of contrast suggests:

- A. Block
- B. Duodenal reflux
- C. Normal peristalsis
- D. Surgical error

✓ **Answer:** A. Block

☐ *Explanation:* Lack of forward contrast movement suggests obstruction.

20. Which of the following appears as a linear radiolucency within the contrast column?

- A. Air bubble
- B. Stone
- C. Catheter artifact
- D. Sphincter

✓ **Answer:** A. Air bubble

□ *Explanation:* Trapped air in duct mimics filling defect.

21. How to reduce risk of bile peritonitis during T-tube cholangiography?

- A. Inject contrast quickly
- B. Wait 10–14 days after surgery
- C. Avoid contrast altogether
- D. Use large bore tube

✓ **Answer:** B. Wait 10–14 days after surgery

□ *Explanation:* Ensures tract has sealed off.

22. Indication for urgent repeat exploration post T-tube cholangiogram:

- A. Mild pain
- B. Normal flow
- C. Persistent stone with jaundice
- D. Post-evacuation air

✓ **Answer:** C. Persistent stone with jaundice

□ *Explanation:* May need surgical or endoscopic intervention.

23. Normal T-tube cholangiogram shows:

- A. No ductal opacification
- B. Abrupt cut-off
- C. Free flow into duodenum
- D. Filling defects

✓ **Answer:** C. Free flow into duodenum

□ *Explanation:* Confirms bile duct continuity and patency.

24. High-pressure contrast injection can cause:

- A. Better image
- B. Biliary rupture
- C. Better flow
- D. Cyst formation

✓ **Answer:** B. Biliary rupture

□ *Explanation:* Avoided by slow and careful injection.

25. Which of these can be confused with stone in cholangiogram?

- A. Catheter
- B. Air bubble
- C. Residual bile
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* Proper technique helps differentiate artifacts.

26. T-tube cholangiography helps prevent:

- A. Malignancy
- B. Retained stones and bile duct strictures
- C. Hepatitis
- D. Pancreatic necrosis

✓ **Answer:** B. Retained stones and bile duct strictures

□ *Explanation:* Detects and guides treatment early.

27. The main duct seen branching on both sides is the:

- A. Portal vein
- B. Right and left hepatic ducts
- C. Pancreatic duct
- D. Cystic duct

✓ **Answer:** B. Right and left hepatic ducts

□ *Explanation:* Join to form common hepatic duct.

28. Which imaging view is best for visualizing the CBD?

- A. AP abdomen
- B. Lateral decubitus
- C. Oblique or right anterior oblique (RAO)
- D. Erect chest

✓ **Answer:** C. Oblique or RAO

□ *Explanation:* Reduces overlap and improves biliary visualization.

29. The radio-opaque “T” shape seen in fluoroscopy is due to:

- A. Catheter material
- B. Air
- C. Barium
- D. Calcified bile

✓ **Answer:** A. Catheter material

□ *Explanation:* The T-tube shows up on X-ray/fluoro due to radiopaque material.

30. T-tube cholangiography helps in deciding:

- A. Need for gallbladder removal
- B. Removal of appendix
- C. When to remove T-tube
- D. Management of ascites

✓ **Answer:** C. When to remove T-tube

□ *Explanation:* Confirms resolution and guides timing of removal.

Chapter 15: Percutaneous Transhepatic Cholangiography (PTC)

1. Percutaneous transhepatic cholangiography (PTC) is primarily indicated in:

- A. Renal stone disease
- B. Intestinal obstruction
- C. Obstructive jaundice
- D. Esophageal varices

✓ **Answer:** C. Obstructive jaundice

□ *Explanation:* PTC is used to visualize biliary tract obstruction when ERCP is not feasible.

2. The contrast is introduced into the biliary system via:

- A. Oral route
- B. Rectal enema
- C. Transhepatic needle puncture
- D. Nasogastric tube

✓ **Answer:** C. Transhepatic needle puncture

□ *Explanation:* Contrast is injected directly through liver parenchyma into biliary ducts.

3. PTC is commonly performed when which test fails or is contraindicated?

- A. USG
- B. ERCP
- C. CT
- D. MRI

✓ **Answer:** B. ERCP

□ *Explanation:* ERCP is usually first line; PTC is used when it's not possible.

4. Preferred site of puncture for PTC is:

- A. Right iliac fossa
- B. Left epigastric region
- C. Right midaxillary line
- D. Right subcostal approach

✓ **Answer:** D. Right subcostal approach

□ *Explanation:* Provides direct access to right intrahepatic ducts.

5. Which needle is used in PTC?

- A. Veress needle
- B. Chiba needle
- C. Biopsy needle
- D. Jamshidi needle

✓ **Answer:** B. Chiba needle

□ *Explanation:* Fine-bore needle ideal for biliary duct puncture.

6. Best imaging modality for needle guidance in PTC is:

- A. Plain X-ray
- B. CT
- C. Fluoroscopy and ultrasound
- D. DSA

✓ **Answer:** C. Fluoroscopy and ultrasound

□ *Explanation:* Combines real-time soft tissue guidance and duct visualization.

7. What is the patient preparation before PTC?

- A. Full meal
- B. Fasting and coagulation profile
- C. Sedation only
- D. Colonoscopy

✓ **Answer:** B. Fasting and coagulation profile

□ *Explanation:* Prevents complications such as aspiration and bleeding.

8. Major complication of PTC is:

- A. Vomiting
- B. Bleeding and bile peritonitis
- C. Constipation
- D. Renal failure

✓ **Answer:** B. Bleeding and bile peritonitis

□ *Explanation:* Due to liver puncture and possible ductal leak.

9. Advantage of PTC over ERCP:

- A. Easier
- B. More comfortable
- C. Better access to proximal biliary system

D. Requires no preparation

✓ **Answer:** C. Better access to proximal biliary system

□ *Explanation:* Especially in high biliary block or post-surgical anatomy.

10. PTC is usually followed by:

A. Liver biopsy

B. Laparotomy

C. Biliary drainage or stenting

D. Ultrasound

✓ **Answer:** C. Biliary drainage or stenting

□ *Explanation:* If obstruction is confirmed, intervention is planned.

11. The major risk in coagulopathic patients undergoing PTC is:

A. Hypotension

B. Infection

C. Hemobilia

D. Stone formation

✓ **Answer:** C. Hemobilia

□ *Explanation:* Bleeding into biliary system due to liver puncture.

12. Which structure must be avoided during needle insertion?

A. Diaphragm

B. Hepatic artery and portal vein

C. Pancreas

D. Duodenum

✓ **Answer:** B. Hepatic artery and portal vein

□ *Explanation:* Accidental puncture leads to hemorrhage or AV fistula.

13. PTC contrast fills:

A. Pancreatic duct

B. Only gallbladder

C. Intra- and extrahepatic biliary ducts

D. Portal venous system

✓ **Answer:** C. Intra- and extrahepatic biliary ducts

□ *Explanation:* Provides complete mapping of the biliary tree.

14. What is “biliary decompression”?

A. Aspiration of liver abscess

B. Evacuation of gallstones

C. Drainage of bile from obstructed ducts

D. Removing peritoneal fluid

✓ **Answer:** C. Drainage of bile from obstructed ducts

□ *Explanation:* Prevents complications from prolonged biliary obstruction.

15. A contraindication for PTC is:

A. Obstructive jaundice

B. Coagulopathy

C. Suspected cholangiocarcinoma

D. Non-visualized gallbladder

✓ **Answer:** B. Coagulopathy

□ *Explanation:* Increases risk of hemorrhage.

16. Which drug is given before PTC to reduce risk of infection?

A. Diuretics

B. Corticosteroids

C. Prophylactic antibiotics

D. Heparin

✓ **Answer:** C. Prophylactic antibiotics

□ *Explanation:* Reduces risk of cholangitis.

17. A “meniscus sign” on PTC suggests:

A. Gas

B. Tumor

C. Stone

D. Stent

✓ **Answer:** C. Stone

□ *Explanation:* Contrast outlines a rounded stone.

18. What is the typical symptom after successful biliary decompression?

A. Dark urine

B. Pain

C. Decreased jaundice

D. Fever

✓ **Answer:** C. Decreased jaundice

□ *Explanation:* Bilirubin levels drop as bile flow is restored.

19. PTC is useful in all EXCEPT:

A. Defining bile duct anatomy

- B. Detecting CBD stones
- C. Screening for pancreatic cancer
- D. Stent placement

✓ **Answer:** C. Screening for pancreatic cancer

□ *Explanation:* PTC evaluates biliary tree, not pancreas directly.

20. The purpose of water-soluble contrast in PTC is to:

- A. Prevent gallstones
- B. Dissolve tumors
- C. Outline bile ducts without peritoneal irritation
- D. Increase peristalsis

✓ **Answer:** C. Outline bile ducts without peritoneal irritation

□ *Explanation:* Safer if leakage occurs.

21. Best patient position during PTC is:

- A. Prone
- B. Supine
- C. Right lateral decubitus
- D. Left lateral

✓ **Answer:** B. Supine

□ *Explanation:* Allows optimal access and imaging.

22. Fluoroscopic signs of biliary leak post-PTC include:

- A. Stone migration
- B. Delayed drainage
- C. Contrast extravasation
- D. Ductal narrowing

✓ **Answer:** C. Contrast extravasation

□ *Explanation:* Indicates bile or contrast leaking outside ducts.

23. “Beaded appearance” in intrahepatic ducts during PTC suggests:

- A. Choledochal cyst
- B. Sclerosing cholangitis
- C. Carcinoma
- D. Fistula

✓ **Answer:** B. Sclerosing cholangitis

□ *Explanation:* Alternating narrowing and dilation.

24. A stricture seen during PTC may indicate:

- A. Stone
 - B. Sclerosing cholangitis or tumor
 - C. Normal variation
 - D. Foreign body
- ✓ **Answer:** B. Sclerosing cholangitis or tumor

☐ *Explanation:* Persistent focal or long segment narrowing.

25. For left duct puncture in PTC, which approach is used?

- A. Anterior
 - B. Posterior oblique
 - C. Midline epigastric
 - D. Left subcostal
- ✓ **Answer:** D. Left subcostal

☐ *Explanation:* Gives access to left hepatic ducts.

26. A stent placed post-PTC is used to:

- A. Drain pus
 - B. Dilate esophagus
 - C. Maintain ductal patency
 - D. Visualize kidney
- ✓ **Answer:** C. Maintain ductal patency

☐ *Explanation:* Keeps bile flow open across the obstruction.

27. Biloma is a complication due to:

- A. Pancreatic necrosis
 - B. Gallstone ileus
 - C. Bile leak forming localized collection
 - D. Ascites
- ✓ **Answer:** C. Bile leak forming localized collection

☐ *Explanation:* Seen post PTC or trauma.

28. What confirms successful PTC drainage?

- A. Pain relief
 - B. Clear fluid
 - C. Drop in bilirubin and free contrast flow
 - D. Stone extraction
- ✓ **Answer:** C. Drop in bilirubin and free contrast flow

☐ *Explanation:* Indicates functional biliary decompression.

29. PTC can be therapeutic in all EXCEPT:

- A. Biliary strictures
- B. Stone retrieval
- C. Pancreatitis
- D. Biliary stenting

✓ **Answer:** C. Pancreatitis

□ *Explanation:* Not a direct treatment for pancreas.

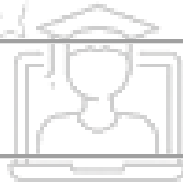
30. Common cause of failed PTC puncture:

- A. Anemia
- B. Deep breathing
- C. Non-dilated ducts
- D. Cystic duct stone

✓ **Answer:** C. Non-dilated ducts

□ *Explanation:* Difficult to visualize and access small ducts.:

Chapter 16: Catheters



1. The primary purpose of a catheter in radiological procedures is:

- A. Pain relief
- B. Fluid intake
- C. Contrast delivery or drainage
- D. Temperature control

✓ **Answer:** C. Contrast delivery or drainage

□ *Explanation:* Catheters help inject contrast into vascular or hollow systems or drain fluids.

2. The French (Fr) size of a catheter refers to:

- A. Internal diameter in cm
- B. Outer diameter in mm
- C. Outer diameter in mm x 3
- D. Volume capacity

✓ **Answer:** C. Outer diameter in mm x 3

□ *Explanation:* 1 Fr = 1/3 mm in outer diameter.

3. Pigtail catheter is typically used for:

- A. Feeding
- B. Vascular access
- C. Percutaneous drainage
- D. Cardiac catheterization

✓ **Answer:** C. Percutaneous drainage

□ *Explanation:* Its curled end prevents dislodgment and tissue trauma.

4. Which catheter is most commonly used in angiography?

- A. Foley
- B. Judkins
- C. Ryles
- D. Malecot

✓ **Answer:** B. Judkins

□ *Explanation:* Shaped for coronary artery catheterization.

5. A catheter with a balloon at the tip used for urinary drainage is:

- A. Foley
- B. Central line
- C. Pigtail
- D. Swan-Ganz

✓ **Answer:** A. Foley

□ *Explanation:* Retention balloon keeps it in place in the bladder.

6. For selective arterial cannulation, the ideal catheter tip is:

- A. Straight
- B. Angled
- C. Balloon-tipped
- D. Curl-tipped

✓ **Answer:** B. Angled

□ *Explanation:* Helps navigate vessel branches.

7. The term “sheath” in interventional radiology refers to:

- A. Outer covering of catheter
- B. Introducer placed into a vessel
- C. Drainage system
- D. Syringe housing

✓ **Answer:** B. Introducer placed into a vessel

□ *Explanation:* Facilitates entry and exchange of catheters/wires.

8. Which material is commonly used in catheter manufacturing?

- A. Polyvinyl chloride
- B. Rubber
- C. Metal

D. Lead

✓ **Answer:** A. Polyvinyl chloride

□ *Explanation:* Flexible, biocompatible, and cost-effective.

9. Catheter kinking during insertion can be prevented by:

A. Cooling it

B. Using stylet or guidewire

C. Heating it

D. Avoiding contrast

✓ **Answer:** B. Using stylet or guidewire

□ *Explanation:* Provides internal support during advancement.

10. Swan-Ganz catheter is used for:

A. Arterial stenting

B. Urological drainage

C. Pulmonary artery pressure monitoring

D. Hepatic embolization

✓ **Answer:** C. Pulmonary artery pressure monitoring

□ *Explanation:* Measures hemodynamic parameters in cardiac patients.

11. Multipurpose catheters have:

A. Only one application

B. Variable rigidity

C. Side holes for multiple uses

D. No radiopaque markers

✓ **Answer:** C. Side holes for multiple uses

□ *Explanation:* Suited for injection, aspiration, and access.

12. A nephrostomy catheter is placed into:

A. Urinary bladder

B. Gallbladder

C. Kidney pelvis

D. Common bile duct

✓ **Answer:** C. Kidney pelvis

□ *Explanation:* Provides urinary diversion via skin.

13. The radiopaque line along a catheter is used for:

A. Flow enhancement

B. Visibility on fluoroscopy

- C. Heating
 - D. Pressure monitoring
 - ✓ **Answer:** B. Visibility on fluoroscopy
 - *Explanation:* Enables real-time imaging guidance.
-

14. Guidewires assist catheter insertion by:

- A. Heating the vessel
 - B. Navigating tortuous anatomy
 - C. Blocking flow
 - D. Acting as contrast
 - ✓ **Answer:** B. Navigating tortuous anatomy
 - *Explanation:* Wires provide directional stability.
-

15. Central venous catheters are placed into:

- A. Radial artery
 - B. Pulmonary vein
 - C. Subclavian/internal jugular vein
 - D. Aorta
 - ✓ **Answer:** C. Subclavian/internal jugular vein
 - *Explanation:* For central venous access and monitoring.
-

16. Angiographic catheters must be flushed with:

- A. Normal saline
 - B. Air
 - C. Heparinized saline
 - D. Glucose
 - ✓ **Answer:** C. Heparinized saline
 - *Explanation:* Prevents clot formation inside lumen.
-

17. A catheter with multiple lumens is used to:

- A. Give contrast only
 - B. Drain bile
 - C. Simultaneously infuse drugs, measure pressure, and monitor flow
 - D. Navigate airways
 - ✓ **Answer:** C. Simultaneously infuse drugs, measure pressure, and monitor flow
 - *Explanation:* Common in critical care and intervention.
-

18. Malecot catheter is used for:

- A. Long-term feeding

- B. Urine diversion
- C. Biliary or nephrostomy drainage
- D. Rectal contrast

✓ **Answer:** C. Biliary or nephrostomy drainage

□ *Explanation:* Winged tip helps anchorage in cavities.

19. A balloon catheter is inflated using:

- A. Air
- B. Water
- C. Diluted contrast
- D. Any fluid

✓ **Answer:** C. Diluted contrast

□ *Explanation:* Ensures visibility and controlled inflation.

20. Sump catheters are used for:

- A. Injection only
- B. Suction and simultaneous air escape
- C. Temporary tracheostomy
- D. Foley replacement

✓ **Answer:** B. Suction and simultaneous air escape

□ *Explanation:* Dual lumen system prevents collapse.

21. In biliary stenting, which catheter type is used?

- A. Foley
- B. Ureteric
- C. Pigtail or straight biliary drainage catheter
- D. Feeding tube

✓ **Answer:** C. Pigtail or straight biliary drainage catheter

□ *Explanation:* Maintains bile flow externally or internally.

22. Catheter tip occlusion during procedure is managed by:

- A. Injecting air
- B. Withdrawing and re-advancing
- C. Flushing with saline or heparin
- D. Cutting the catheter

✓ **Answer:** C. Flushing with saline or heparin

□ *Explanation:* Restores patency and prevents clot.

23. A central line catheter is inserted under:

- A. CT
- B. MRI
- C. Ultrasound and fluoroscopy
- D. Plain film

✓ **Answer:** C. Ultrasound and fluoroscopy

□ *Explanation:* Reduces risk and confirms position.

24. The “J-tipped” guidewire is named due to:

- A. Manufacturer
- B. Shape of the tip
- C. Length
- D. Color

✓ **Answer:** B. Shape of the tip

□ *Explanation:* Curved tip minimizes vascular injury.

25. Risk of infection is highest with:

- A. Peripheral IV line
- B. Intermittent catheter
- C. Long-term indwelling central catheter
- D. Arterial blood gas catheter

✓ **Answer:** C. Long-term indwelling central catheter

□ *Explanation:* Regular monitoring and aseptic technique essential.

26. A “coaxial catheter system” is used in:

- A. Feeding
- B. Multi-access procedures
- C. Routine blood draw
- D. Brain surgery

✓ **Answer:** B. Multi-access procedures

□ *Explanation:* One catheter inside another; allows exchange without losing access.

27. Ureteric catheter is typically inserted retrograde via:

- A. Bladder
- B. Rectum
- C. Kidney
- D. Duodenum

✓ **Answer:** A. Bladder

□ *Explanation:* Through cystoscope to reach ureter.

28. Balloon-tipped occlusion catheters are used for:

- A. Hemostasis during embolization
- B. Colon study
- C. Bronchoscopy
- D. Drainage of abscess

✓ **Answer:** A. Hemostasis during embolization

□ *Explanation:* Temporarily occludes blood flow.

29. Size of pediatric catheter is usually:

- A. 10–12 Fr
- B. 16–18 Fr
- C. 4–8 Fr
- D. 20–24 Fr

✓ **Answer:** C. 4–8 Fr

□ *Explanation:* Smaller lumens to match smaller vessels and anatomy.

30. One key feature of radiological catheters is:

- A. No coating
- B. Transparent color
- C. Radiopaque marker for fluoroscopic visibility
- D. Wireless technology

✓ **Answer:** C. Radiopaque marker for fluoroscopic visibility

□ *Explanation:* Enables tracking under imaging.

Chapter 17: Angiography

1. Angiography is the radiographic study of:

- A. Brain tissue
- B. Airways
- C. Blood vessels
- D. GI tract

✓ **Answer:** C. Blood vessels

□ *Explanation:* “Angio” means vessel; used to image arteries/veins.

2. Which contrast is used in angiography?

- A. Barium sulfate
- B. Iodinated water-soluble contrast
- C. Gastrografin
- D. Fat-soluble dye

✓ **Answer:** B. Iodinated water-soluble contrast

□ *Explanation:* Provides rapid opacification and is vascular-safe.

3. Common access site for angiography is:

- A. Brachial artery
- B. Subclavian vein
- C. Femoral artery
- D. Popliteal vein

✓ **Answer:** C. Femoral artery

□ *Explanation:* Large, easily compressible, commonly used site.

4. Seldinger technique is used to:

- A. Diagnose tumors
- B. Introduce a catheter into a vessel
- C. Remove gallstones
- D. Biopsy the liver

✓ **Answer:** B. Introduce a catheter into a vessel

□ *Explanation:* Involves guidewire, dilator, and catheter sequence.

5. For coronary angiography, catheter is inserted into:

- A. Aorta
- B. Left ventricle
- C. Coronary arteries via aorta
- D. Pulmonary artery

✓ **Answer:** C. Coronary arteries via aorta

□ *Explanation:* Accessed through femoral or radial artery.

6. Cerebral angiography typically uses which artery?

- A. Femoral
- B. Radial
- C. Carotid or vertebral
- D. Ulnar

✓ **Answer:** C. Carotid or vertebral

□ *Explanation:* Supplies brain circulation.

7. Which imaging modality is used for digital subtraction angiography (DSA)?

- A. CT
- B. MRI
- C. Fluoroscopy
- D. PET

✓ **Answer:** C. Fluoroscopy

□ *Explanation:* Live X-ray imaging with subtraction of bone/tissue.

8. Main risk in angiography is:

- A. Appendicitis
 - B. Vascular perforation
 - C. Bronchitis
 - D. GI bleeding
- ✓ **Answer:** B. Vascular perforation

☐ *Explanation:* Can occur if catheter punctures vessel wall.

9. Indication for renal angiography is:

- A. Gastritis
 - B. Hypertension evaluation
 - C. Osteomyelitis
 - D. Myasthenia gravis
- ✓ **Answer:** B. Hypertension evaluation

☐ *Explanation:* To detect renal artery stenosis.

10. To prevent thrombosis during angiography, what is used?

- A. Saline
 - B. Glucose
 - C. Heparin
 - D. Air
- ✓ **Answer:** C. Heparin

☐ *Explanation:* Anticoagulant administered systemically or via flush.

11. When injecting contrast, what precaution should be taken?

- A. Use cold contrast
 - B. Inject fast without checking
 - C. Confirm catheter tip location
 - D. Keep patient standing
- ✓ **Answer:** C. Confirm catheter tip location

☐ *Explanation:* Prevents extravasation or vessel damage.

12. Major complication of cerebral angiography is:

- A. Seizure
 - B. Stroke
 - C. Infection
 - D. Hair loss
- ✓ **Answer:** B. Stroke

☐ *Explanation:* Due to embolism or vessel injury.

13. Which vessel shows “string of beads” appearance in fibromuscular dysplasia?

- A. Femoral artery
- B. Renal artery
- C. Pulmonary vein
- D. Mesenteric artery

✓ **Answer:** B. Renal artery

□ *Explanation:* Alternating stenosis and aneurysms.

14. Angioplasty involves:

- A. Tumor biopsy
- B. Balloon dilation of a stenosed artery
- C. Contrast instillation into bladder
- D. Venous sampling

✓ **Answer:** B. Balloon dilation of a stenosed artery

□ *Explanation:* Reopens narrowed vessels.

15. Aneurysm appears as:

- A. Abrupt cut-off
- B. Corkscrew
- C. Focal outpouching
- D. Beaded narrowing

✓ **Answer:** C. Focal outpouching

□ *Explanation:* Bulging of vessel wall.

16. Embolization is done to:

- A. Increase blood flow
- B. Block abnormal vessels
- C. Dilate veins
- D. Inject antibiotics

✓ **Answer:** B. Block abnormal vessels

□ *Explanation:* For bleeding, AVM, tumors.

17. What is the main component of DSA machine?

- A. Gamma camera
- B. Flat panel detector
- C. Ultrasonic probe
- D. CT gantry

✓ **Answer:** B. Flat panel detector

□ *Explanation:* Records rapid sequential X-rays.

18. Coronary angiography is contraindicated in:

- A. MI
- B. Heart failure
- C. Contrast allergy
- D. Hypertension

✓ **Answer:** C. Contrast allergy

□ *Explanation:* Must be treated or alternative contrast used.

19. For mesenteric ischemia, the artery evaluated is:

- A. Renal artery
- B. Inferior mesenteric artery
- C. SMA
- D. Aorta

✓ **Answer:** C. SMA

□ *Explanation:* Supplies most of the small bowel.

20. A “vascular blush” on angiogram indicates:

- A. Tumor vascularity
- B. Venous leak
- C. Hypoperfusion
- D. Air embolism

✓ **Answer:** A. Tumor vascularity

□ *Explanation:* Increased contrast pooling.

21. Interventional angiography can treat:

- A. Varicose veins
- B. Tuberculosis
- C. AVMs and bleeding
- D. Pneumothorax

✓ **Answer:** C. AVMs and bleeding

□ *Explanation:* Through embolization or coiling.

22. In aortic dissection, angiography shows:

- A. Focal aneurysm
- B. Discontinuity
- C. Double lumen
- D. Stone

✓ **Answer:** C. Double lumen

□ *Explanation:* True and false lumen due to wall tear.

23. Blood pressure during angiography should be:

- A. Unchecked
- B. Very high
- C. Monitored continuously
- D. Only checked after

✓ **Answer:** C. Monitored continuously

□ *Explanation:* To manage hemodynamic stability.

24. Peripheral angiography includes vessels of:

- A. Brain
- B. Abdomen
- C. Limbs
- D. Pelvis only

✓ **Answer:** C. Limbs

□ *Explanation:* Done for PVD (Peripheral Vascular Disease).

25. What is roadmapping in angiography?

- A. GPS tracking
- B. 3D printing
- C. Overlay of static image to guide live intervention
- D. Digital cleaning

✓ **Answer:** C. Overlay of static image to guide live intervention

□ *Explanation:* Helps catheter navigation.

26. “Run-off” phase in angiography assesses:

- A. Heart function
- B. Arterial perfusion to distal vessels
- C. Brain ischemia
- D. Tumor margins

✓ **Answer:** B. Arterial perfusion to distal vessels

□ *Explanation:* Especially in limb ischemia cases.

27. Advantage of DSA is:

- A. Radiation free
- B. Better soft tissue contrast
- C. Subtracts background
- D. MRI based

✓ **Answer:** C. Subtracts background

□ *Explanation:* Enhances vascular visualization.

28. Coil embolization uses:

- A. Plastic beads
- B. Platinum or stainless steel coils
- C. Ice
- D. Glue

✓ **Answer:** B. Platinum or stainless steel coils

□ *Explanation:* Induces clot formation at target site.

29. Catheter used in aortic arch angiography is:

- A. Cobra
- B. Pigtail
- C. Malecot
- D. Foley

✓ **Answer:** B. Pigtail

□ *Explanation:* Spiral tip disperses contrast evenly.

30. Flush aortogram evaluates:

- A. Renal tumor
- B. Whole aorta and major branches
- C. Lungs
- D. Pancreas

✓ **Answer:** B. Whole aorta and major branches

□ *Explanation:* Single large-volume injection of contrast.

Chapter 18: Phlebography

1. Phlebography is a radiological examination of:

- A. Arteries
- B. Bile ducts
- C. Veins
- D. Lymphatics

✓ **Answer:** C. Veins

□ *Explanation:* “Phlebo” refers to veins; this test outlines venous anatomy and pathology.

2. The most common indication for phlebography is:

- A. Aneurysm
- B. Deep vein thrombosis (DVT)
- C. Pulmonary embolism
- D. Varicocele

✓ **Answer:** B. Deep vein thrombosis (DVT)

□ *Explanation:* Used when ultrasound is inconclusive.

3. Which contrast is preferred in phlebography?

- A. Barium
- B. Gastrografin
- C. Water-soluble iodinated contrast
- D. Oil-based contrast

✓ **Answer:** C. Water-soluble iodinated contrast

□ *Explanation:* Provides safe, clear imaging of venous structures.

4. The injection site for lower limb phlebography is typically:

- A. Radial vein
- B. Cephalic vein
- C. Dorsal vein of foot
- D. Popliteal artery

✓ **Answer:** C. Dorsal vein of foot

□ *Explanation:* Allows contrast to travel upward through deep veins.

5. Phlebography is commonly performed under:

- A. CT
- B. Fluoroscopy
- C. Ultrasound
- D. MRI

✓ **Answer:** B. Fluoroscopy

□ *Explanation:* Real-time visualization of contrast flow.

6. Which position is ideal for lower limb phlebography?

- A. Supine
- B. Standing
- C. Semi-erect or Trendelenburg
- D. Prone

✓ **Answer:** C. Semi-erect or Trendelenburg

□ *Explanation:* Enhances venous filling.

7. Phlebography can diagnose:

- A. Varicose veins
- B. Valvular incompetence
- C. Venous obstruction
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* Shows structure and flow dynamics in veins.

8. Which of the following is a contraindication for phlebography?

- A. Suspected DVT
- B. Contrast allergy
- C. Chronic venous insufficiency
- D. Varicose veins

✓ **Answer:** B. Contrast allergy

□ *Explanation:* Iodinated contrast may trigger allergic reactions.

9. Phlebography should be avoided in pregnancy because:

- A. Radiation risk
- B. Thrombosis risk
- C. Contrast taste
- D. Ineffective imaging

✓ **Answer:** A. Radiation risk

□ *Explanation:* Ionizing radiation exposure is unsafe in pregnancy.

10. Filling defect in a deep vein during phlebography suggests:

- A. Infection
- B. Thrombosis
- C. Aneurysm
- D. Arteriovenous fistula

✓ **Answer:** B. Thrombosis

□ *Explanation:* Contrast is blocked by thrombus, creating a defect.

11. A “tram-track” appearance on phlebography suggests:

- A. Normal vein
- B. Venous malformation
- C. Recanalized thrombus
- D. Valvular incompetence

✓ **Answer:** C. Recanalized thrombus

□ *Explanation:* Channels form around an old clot.

12. In venous insufficiency, phlebography may show:

- A. Dilated superficial veins
- B. Reflux of contrast
- C. Delayed emptying
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* All are signs of incompetent venous valves.

13. A sclerosed vein appears as:

- A. Thin, smooth channel
- B. Tortuous flow
- C. Narrowed or absent filling
- D. Bulging defect

✓ **Answer:** C. Narrowed or absent filling

□ *Explanation:* Reflects fibrotic or obliterated venous lumen.

14. Upper limb phlebography is indicated in:

- A. Shoulder injury
- B. Thoracic outlet syndrome
- C. Cardiac tamponade
- D. Pericarditis

✓ **Answer:** B. Thoracic outlet syndrome

□ *Explanation:* Assesses subclavian vein compression.

15. In phlebography, reflux of contrast is caused by:

- A. Arterial pressure
- B. Valve incompetence
- C. Contrast dilution
- D. Peristalsis

✓ **Answer:** B. Valve incompetence

□ *Explanation:* Contrast flows backward when valves fail.

16. The “empty vein” sign suggests:

- A. Pneumothorax
- B. Arterial disease
- C. Acute thrombus
- D. Portal hypertension

✓ **Answer:** C. Acute thrombus

□ *Explanation:* No contrast enters vein due to blockage.

17. Contrast injection for phlebography should be:

- A. Rapid
- B. Gravity-assisted
- C. Warmed and slow
- D. Cold and fast

✓ **Answer:** C. Warmed and slow

□ *Explanation:* Prevents spasms and ensures good flow.

18. Phlebography is therapeutic in which of the following?

- A. Diagnosing trauma
- B. Placing IVC filters
- C. Detecting hernias
- D. GI bleeding

✓ **Answer:** B. Placing IVC filters

□ *Explanation:* Assesses location and placement path.

19. Catheter-based phlebography differs from direct contrast injection by:

- A. Using air
- B. Entering through artery
- C. Being more precise and selective
- D. Less cost

✓ **Answer:** C. Being more precise and selective

□ *Explanation:* Allows targeted venous imaging.

20. Phlebography of pelvic veins is useful in diagnosing:

- A. Appendicitis
- B. Pelvic congestion syndrome
- C. Gallstones
- D. Bladder mass

✓ **Answer:** B. Pelvic congestion syndrome

□ *Explanation:* Venous dilation and stasis in pelvic veins.

21. Main disadvantage of phlebography is:

- A. Poor detail
- B. Radiation and contrast use
- C. No dynamic data
- D. Inability to image deep veins

✓ **Answer:** B. Radiation and contrast use

□ *Explanation:* Makes it secondary to Doppler.

22. Gold standard for DVT diagnosis remains:

- A. MRI
- B. Phlebography
- C. Doppler ultrasound
- D. CT

✓ **Answer:** B. Phlebography

□ *Explanation:* Still the most definitive test when Doppler is inconclusive.

23. Dilated collateral veins seen in phlebography may indicate:

- A. Normal flow
- B. Obstruction
- C. Infection
- D. Muscle strain

✓ **Answer:** B. Obstruction

□ *Explanation:* Collaterals bypass blocked segments.

24. Which is a complication of phlebography?

- A. Anaphylaxis
- B. Venous rupture
- C. Contrast extravasation
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* Rare, but known risks.

25. Tourniquet application in phlebography is used to:

- A. Stop arterial flow
- B. Block venous flow
- C. Divert contrast into deep veins
- D. Prevent swelling

✓ **Answer:** C. Divert contrast into deep veins

□ *Explanation:* Ensures contrast fills deep rather than superficial system.

26. Venography is another name for:

- A. Angiography
- B. Phlebography
- C. Lymphangiography
- D. ERCP

✓ **Answer:** B. Phlebography

□ *Explanation:* Both terms are synonymous.

27. In upper limb phlebography, contrast is injected into:

- A. Popliteal vein
- B. Subclavian artery
- C. Dorsal hand vein
- D. External iliac vein

✓ **Answer:** C. Dorsal hand vein

□ *Explanation:* Ensures antegrade filling of upper limb veins.

28. A long-standing thrombus appears as:

- A. Soft filling defect
- B. Partial occlusion
- C. Collateral formation and narrowing
- D. Normal filling

✓ **Answer:** C. Collateral formation and narrowing

□ *Explanation:* Chronic obstruction leads to adaptive changes.

29. What helps distinguish acute from chronic DVT on phlebography?

- A. Location
- B. Side affected
- C. Collaterals and vein wall irregularities
- D. Color of contrast

✓ **Answer:** C. Collaterals and vein wall irregularities

□ *Explanation:* Chronic cases have scarring, collaterals, and uneven outlines.

30. Which method has largely replaced diagnostic phlebography today?

- A. CT
- B. Ultrasound Doppler
- C. MRI
- D. PET

✓ **Answer:** B. Ultrasound Doppler

□ *Explanation:* Non-invasive, no contrast, and excellent sensitivity.

Chapter 19: Dacryocystography

1. Dacryocystography is a radiological investigation of the:

- A. Bile ducts**
- B. Lacrimal drainage system**
- C. Bronchial tree**
- D. Eustachian tube**

✓ **Answer:** B. Lacrimal drainage system

□ *Explanation:* It evaluates lacrimal sac and nasolacrimal duct for obstruction.

2. The commonest indication for dacryocystography is:

- A. Nasal polyp
- B. Epiphora (chronic tearing)

C. Head trauma

D. Sinusitis

✓ **Answer:** B. Epiphora

□ *Explanation:* Suggests lacrimal pathway obstruction.

3. Which contrast medium is ideal for dacryocystography?

A. Barium sulfate

B. Oil-based contrast

C. Water-soluble iodinated contrast

D. Gadolinium

✓ **Answer:** C. Water-soluble iodinated contrast

□ *Explanation:* Easy to inject, safe, and provides good mucosal detail.

4. The injection site for dacryocystography is through the:

A. Nasal cavity

B. Lacrimal sac

C. Punctum (upper or lower eyelid)

D. Eye globe

✓ **Answer:** C. Punctum (upper or lower eyelid)

□ *Explanation:* Cannulation of lacrimal canaliculi allows retrograde filling.

5. Dacryocystography is performed under:

A. CT

B. MRI

C. Fluoroscopy or plain radiograph

D. Ultrasound

✓ **Answer:** C. Fluoroscopy or plain radiograph

□ *Explanation:* Dynamic or static X-ray imaging is used to visualize contrast flow.

6. The canaliculi drain into the:

A. Frontal sinus

B. Lacrimal sac

C. Maxillary sinus

D. Orbit

✓ **Answer:** B. Lacrimal sac

□ *Explanation:* Upper and lower canaliculi merge into the sac.

7. Which of the following is a contraindication for dacryocystography?

A. Blocked nasolacrimal duct

- B. Acute dacryocystitis
- C. Epiphora
- D. History of eye surgery

✓ **Answer:** B. Acute dacryocystitis

□ *Explanation:* Risk of contrast leakage and infection spread.

8. Which radiographic projection is preferred in dacryocystography?

- A. Lateral skull
- B. Waters view
- C. Caldwell view
- D. Modified lateral oblique (oculo-naso projection)

✓ **Answer:** D. Modified lateral oblique (oculo-naso projection)

□ *Explanation:* Shows the entire nasolacrimal system without superimposition.

9. Dacryocystography evaluates obstruction in:

- A. Anterior chamber
- B. Lacrimal drainage system
- C. Extraocular muscles
- D. Vitreous cavity

✓ **Answer:** B. Lacrimal drainage system

□ *Explanation:* Helps localize and define level of block.

10. Obstruction in the sac shows contrast accumulation in:

- A. Puncta only
- B. Canaliculi
- C. Lacrimal sac without passage to duct
- D. Entire nasolacrimal duct

✓ **Answer:** C. Lacrimal sac without passage to duct

□ *Explanation:* Contrast fills until the site of obstruction.

11. What does a normal dacryocystogram show?

- A. Irregular duct
- B. Non-opacified sac
- C. Free contrast flow into inferior nasal meatus
- D. Filling defect

✓ **Answer:** C. Free contrast flow into inferior nasal meatus

□ *Explanation:* Indicates patency of the drainage pathway.

12. Reflux of contrast into the opposite canaliculus suggests:

- A. Ductal stenosis
- B. Complete obstruction
- C. Common canaliculus block
- D. Overinjection

✓ **Answer:** C. Common canaliculus block

□ *Explanation:* Causes backflow and poor drainage.

13. The nasolacrimal duct drains into:

- A. Middle nasal meatus
- B. Inferior nasal meatus
- C. Superior nasal meatus
- D. Maxillary sinus

✓ **Answer:** B. Inferior nasal meatus

□ *Explanation:* Final drainage site for tears.

14. Chronic dacryocystitis may show:

- A. Duct narrowing
- B. Sac distention
- C. Mucocele formation
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* Inflammation leads to fibrosis and dilation.

15. The test is usually done using a:

- A. 5F catheter
- B. Intravenous cannula
- C. Lacrimal cannula or dacryocystography syringe
- D. Foley catheter

✓ **Answer:** C. Lacrimal cannula or dacryocystography syringe

□ *Explanation:* Specialized fine metal tip for punctum entry.

16. What may cause contrast not to pass beyond the sac?

- A. Facial palsy
- B. Congenital atresia
- C. Retinal detachment
- D. Cataract

✓ **Answer:** B. Congenital atresia

□ *Explanation:* Common cause in children; duct fails to canalize.

17. Which of these is a complication of dacryocystography?

- A. Infection
- B. Hemorrhage
- C. Contrast allergy
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* Though rare, all may occur in sensitive individuals.

18. Double contrast dacryocystography uses:

- A. Barium + oil
- B. Contrast + air
- C. Saline + oil
- D. Gadolinium + CO₂

✓ **Answer:** B. Contrast + air

□ *Explanation:* Enhances mucosal visualization and luminal irregularities.

19. In lacrimal sac tumors, the typical finding is:

- A. Rapid flow
- B. Filling defect or mass
- C. Overdistension
- D. Nasal blockage

✓ **Answer:** B. Filling defect or mass

□ *Explanation:* Tumor disrupts uniform opacification.

20. Which of the following is a congenital cause of nasolacrimal duct obstruction?

- A. Trauma
- B. Idiopathic fibrosis
- C. Persistent membrane at valve of Hasner
- D. Tumor

✓ **Answer:** C. Persistent membrane at valve of Hasner

□ *Explanation:* Most common cause in infants.

21. Dacryocystography helps plan for which surgery?

- A. Cataract removal
- B. Trabeculectomy
- C. Dacryocystorhinostomy (DCR)
- D. Corneal transplant

✓ **Answer:** C. Dacryocystorhinostomy (DCR)

□ *Explanation:* Identifies block site for bypass surgery.

22. The lacrimal apparatus includes all EXCEPT:

- A. Puncta
- B. Canaliculi
- C. Lacrimal sac
- D. Optic nerve

✓ **Answer:** D. Optic nerve

□ *Explanation:* Not part of the tear drainage system.

23. The earliest sign of partial obstruction in dacryocystography is:

- A. Non-opacification
- B. Slow contrast drainage
- C. Contrast in frontal sinus
- D. Reflux to globe

✓ **Answer:** B. Slow contrast drainage

□ *Explanation:* Suggests narrowing without complete block.

24. What is the role of forceful irrigation before dacryocystography?

- A. Therapeutic
- B. Diagnostic
- C. Both
- D. None

✓ **Answer:** C. Both

□ *Explanation:* May relieve mucous plugs and identify block sites.

25. Dacryocystocele appears on imaging as:

- A. Normal sac
- B. Small sac
- C. Large, rounded, opacified sac
- D. Empty canaliculi

✓ **Answer:** C. Large, rounded, opacified sac

□ *Explanation:* Seen in infants with blocked proximal and distal ends.

26. In trauma, dacryocystography may detect:

- A. Bone fracture
- B. Canalicular laceration
- C. Globe rupture
- D. Lens dislocation

✓ **Answer:** B. Canalicular laceration

□ *Explanation:* Disruption of continuity may appear as contrast leak.

27. What test precedes dacryocystography in practice?

- A. MRI
- B. Syringing and probing
- C. CT orbit
- D. Fluorescein test

✓ **Answer:** B. Syringing and probing

□ *Explanation:* Simple bedside test to check patency.

28. The term “sac distension” refers to:

- A. Miosis
- B. Dilation of the lacrimal sac
- C. Glaucoma
- D. Retinal detachment

✓ **Answer:** B. Dilation of the lacrimal sac

□ *Explanation:* Seen in chronic obstruction or mucocele.

29. Dacryoscintigraphy differs from dacryocystography in that it:

- A. Uses radioactive tracer
- B. Is less sensitive
- C. Is invasive
- D. Does not require contrast

✓ **Answer:** A. Uses radioactive tracer

□ *Explanation:* Provides physiological assessment of tear drainage.

30. Imaging sign of complete obstruction in dacryocystography is:

- A. Normal drainage
- B. Narrow sac
- C. No contrast beyond sac
- D. Hyperdense orbit

✓ **Answer:** C. No contrast beyond sac

□ *Explanation:* Indicates high-grade or complete block.

Chapter 20: Interventional Radiology

1. Interventional Radiology primarily involves:

- A. Open surgery
- B. Diagnostic X-rays only
- C. Image-guided minimally invasive procedures
- D. Nuclear medicine

- ✓ **Answer:** C. Image-guided minimally invasive procedures
☐ *Explanation:* Performed using fluoroscopy, ultrasound, CT, or MRI.
-

2. Which of the following is NOT an interventional radiology tool?

- A. Catheter
- B. Scalpel
- C. Guidewire
- D. Stent

- ✓ **Answer:** B. Scalpel
☐ *Explanation:* IR is minimally invasive and rarely uses open surgical tools.
-

3. The Seldinger technique is used for:

- A. Open surgery
- B. Biopsy of brain
- C. Percutaneous vascular access
- D. Endoscopy

- ✓ **Answer:** C. Percutaneous vascular access
☐ *Explanation:* Uses needle → guidewire → catheter method.
-

4. A key advantage of interventional radiology is:

- A. More radiation
- B. Large incisions
- C. Faster recovery
- D. High cost

- ✓ **Answer:** C. Faster recovery
☐ *Explanation:* Smaller access, fewer complications.
-

5. Percutaneous nephrostomy is done to:

- A. Drain abscess
- B. Remove gallbladder
- C. Bypass urinary obstruction
- D. Visualize spinal canal

- ✓ **Answer:** C. Bypass urinary obstruction
☐ *Explanation:* Tube placed into renal pelvis via skin to drain urine.
-

6. Which imaging is used to guide liver abscess drainage?

- A. X-ray
- B. CT or ultrasound
- C. MRI

D. PET

✓ **Answer:** B. CT or ultrasound

□ *Explanation:* Both guide accurate needle/catheter placement.

7. The most common embolic agent used in IR is:

- A. Gadolinium
- B. Platinum coil
- C. Silicone gel
- D. Fluorosilicate

✓ **Answer:** B. Platinum coil

□ *Explanation:* Used for vascular occlusion procedures.

8. Radiofrequency ablation is most often used for:

- A. Joint pain
- B. Tumor destruction
- C. Hernia repair
- D. Bowel obstruction

✓ **Answer:** B. Tumor destruction

□ *Explanation:* Thermal energy used to destroy cancer cells.

9. TIPSS is a procedure done for:

- A. Renal cyst
- B. Ascites drainage
- C. Portal hypertension
- D. Gallstones

✓ **Answer:** C. Portal hypertension

□ *Explanation:* Shunts blood between portal and hepatic veins.

10. In IR, stents are placed to:

- A. Remove tumors
- B. Dilate stenosed vessels or ducts
- C. Drain fluid
- D. Biopsy lymph nodes

✓ **Answer:** B. Dilate stenosed vessels or ducts

□ *Explanation:* Stents restore and maintain luminal patency.

11. Which organ is most biopsied under CT guidance?

- A. Brain
- B. Liver

- C. Spleen
- D. Stomach

✓ **Answer:** B. Liver

□ *Explanation:* Safe and accessible under imaging guidance.

12. A potential complication of angioplasty is:

- A. Vision loss
- B. Arterial rupture
- C. Pneumothorax
- D. Liver cirrhosis

✓ **Answer:** B. Arterial rupture

□ *Explanation:* Due to balloon-induced vessel trauma.

13. Vertebroplasty is done for:

- A. Spinal disc herniation
- B. Vertebral body fracture
- C. Meningitis
- D. Scoliosis

✓ **Answer:** B. Vertebral body fracture

□ *Explanation:* Cement injected to stabilize compression fractures.

14. IVC filters prevent:

- A. DVT
- B. PE (Pulmonary Embolism)
- C. Ascites
- D. Hypertension

✓ **Answer:** B. PE (Pulmonary Embolism)

□ *Explanation:* Filters trap clots from legs before reaching lungs.

15. Which is a non-vascular intervention?

- A. Angioplasty
- B. Tumor ablation
- C. Embolization
- D. Carotid stenting

✓ **Answer:** B. Tumor ablation

□ *Explanation:* Can be done percutaneously under image guidance.

16. Percutaneous cholecystostomy is used for:

- A. Removing stones

- B. Opening CBD
 - C. Drainage of infected gallbladder
 - D. Dilating pylorus
 - ✓ **Answer:** C. Drainage of infected gallbladder
 - ☐ *Explanation:* Especially in high-risk surgical patients.
-

17. Which of the following procedures uses glue as embolic agent?

- A. Sclerotherapy
 - B. AVM embolization
 - C. Thrombolysis
 - D. CT myelogram
 - ✓ **Answer:** B. AVM embolization
 - ☐ *Explanation:* Cyanoacrylate glue is used for rapid occlusion.
-

18. What is the preferred imaging for biopsy of deep lesions?

- A. X-ray
 - B. Ultrasound
 - C. CT
 - D. DEXA
 - ✓ **Answer:** C. CT
 - ☐ *Explanation:* Offers precise needle placement in deep body regions.
-

19. Drainage catheters in IR are usually left in place for:

- A. 2 hours
 - B. 24 hours
 - C. Until output ceases and infection resolves
 - D. Permanently
 - ✓ **Answer:** C. Until output ceases and infection resolves
 - ☐ *Explanation:* Typically days to weeks based on clinical response.
-

20. A bone biopsy is best done under:

- A. PET
 - B. MRI
 - C. CT or fluoroscopy
 - D. Doppler
 - ✓ **Answer:** C. CT or fluoroscopy
 - ☐ *Explanation:* Ensures safety and precise targeting.
-

21. Which procedure is used to manage varicoceles in IR?

- A. Nephrostomy
- B. Embolization of gonadal vein
- C. TIPSS
- D. Cholecystostomy

✓ **Answer:** B. Embolization of gonadal vein

□ *Explanation:* Minimally invasive alternative to surgery.

22. The major risk of percutaneous biopsy is:

- A. Vomiting
- B. Infection
- C. Hemorrhage
- D. Allergy

✓ **Answer:** C. Hemorrhage

□ *Explanation:* Especially in vascular organs like liver, kidney.

23. Most IR procedures require which form of anesthesia?

- A. General
- B. Spinal
- C. Local ± sedation
- D. Epidural

✓ **Answer:** C. Local ± sedation

□ *Explanation:* Minimally invasive, usually outpatient.

24. The radiologist uses what to guide catheters through vessels?

- A. Endoscopy
- B. Ultrasound
- C. Fluoroscopy with roadmapping
- D. CT only

✓ **Answer:** C. Fluoroscopy with roadmapping

□ *Explanation:* Allows real-time image guidance.

25. The guidewire is used in IR to:

- A. Dilate vessels
- B. Anchor catheter
- C. Navigate vessels safely
- D. Deliver chemotherapy

✓ **Answer:** C. Navigate vessels safely

□ *Explanation:* Minimizes trauma and helps catheter access.

26. Ureteral stenting in IR is done for:

- A. Bowel perforation
- B. Urinary tract obstruction
- C. Rectal fistula
- D. Vaginal stenosis

✓ **Answer:** B. Urinary tract obstruction

□ *Explanation:* Ensures urine drainage from kidney to bladder.

27. Embolization of bleeding vessels is commonly done in:

- A. Brain hemorrhage
- B. GI bleeds
- C. Trauma
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* Effective life-saving procedure in acute bleeds.

28. Interventional oncology includes all EXCEPT:

- A. Tumor embolization
- B. Tumor ablation
- C. Chemotherapy infusion
- D. Total resection

✓ **Answer:** D. Total resection

□ *Explanation:* Surgery, not radiology-guided procedure.

29. A "microcatheter" is used when:

- A. Target vessel is large
- B. Deep brain biopsy
- C. Small, tortuous vessels must be accessed
- D. Barium studies are done

✓ **Answer:** C. Small, tortuous vessels must be accessed

□ *Explanation:* Used for super-selective embolization.

30. Which of the following is the most radiation-intensive IR procedure?

- A. Biopsy
- B. IVC filter
- C. Cerebral embolization
- D. CT-guided FNAC

✓ **Answer:** C. Cerebral embolization

□ *Explanation:* Prolonged fluoroscopy and roadmap use.

Chapter 21: New Trends in Radiography

1. What is a key advancement in digital radiography over screen-film systems?

- A. Slower image processing
- B. Lower resolution
- C. Improved post-processing and dose efficiency
- D. Less portability

✓ **Answer:** C. Improved post-processing and dose efficiency

□ *Explanation:* Digital systems allow image manipulation and reduce repeat exposures.

2. CR (Computed Radiography) systems use:

- A. Cassette-less detectors
- B. PSP plates and readers
- C. Flat-panel detectors
- D. Selenium drums

✓ **Answer:** B. PSP plates and readers

□ *Explanation:* CR utilizes photostimulable phosphor plates in cassettes.

3. DR (Digital Radiography) systems offer advantages over CR because they:

- A. Require darkrooms
- B. Are slower
- C. Provide real-time imaging and no plate reading
- D. Use film

✓ **Answer:** C. Provide real-time imaging and no plate reading

□ *Explanation:* Direct digital capture improves workflow.

4. PACS stands for:

- A. Patient Access and Care System
- B. Picture Archiving and Communication System
- C. Post Analysis and Clinical Software
- D. Positioning And Calibration System

✓ **Answer:** B. Picture Archiving and Communication System

□ *Explanation:* PACS is used to store, retrieve, and distribute medical images.

5. The key role of DICOM is to:

- A. Secure patient data
- B. Encrypt images
- C. Standardize image format and communication
- D. Repair radiology equipment

- ✓ **Answer:** C. Standardize image format and communication
☐ *Explanation:* DICOM ensures compatibility between imaging systems.
-

6. Flat-panel detectors are made of:

- A. Barium sulfate
- B. Selenium or cesium iodide
- C. Silver nitrate
- D. Lead

- ✓ **Answer:** B. Selenium or cesium iodide
☐ *Explanation:* Used in direct or indirect conversion DR systems.
-

7. In DR, image latency refers to:

- A. Patient motion
- B. System calibration delay
- C. Time lag between exposure and image display
- D. Tube warm-up

- ✓ **Answer:** C. Time lag between exposure and image display
☐ *Explanation:* A key factor in detector performance.
-

8. One major benefit of DR is:

- A. Increased patient dose
- B. Slow processing
- C. Better spatial resolution
- D. Quick image acquisition

- ✓ **Answer:** D. Quick image acquisition
☐ *Explanation:* DR eliminates cassette handling.
-

9. AI integration in radiography is used for:

- A. Tube cooling
- B. Contrast injection
- C. Image interpretation and triage
- D. PACS backup

- ✓ **Answer:** C. Image interpretation and triage
☐ *Explanation:* AI helps flag abnormal findings for faster reporting.
-

10. Artificial intelligence in chest X-rays can detect:

- A. Tuberculosis
- B. Lung nodules
- C. Pneumothorax

D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* AI enhances diagnostic accuracy and speeds reporting.

11. Teleradiology enables:

A. Long-distance X-ray generation

B. Sharing of reports/images remotely

C. 3D printing

D. Film-based imaging

✓ **Answer:** B. Sharing of reports/images remotely

□ *Explanation:* Essential for remote diagnostics and consultation.

12. Which radiographic advancement reduces radiation dose significantly?

A. CR

B. Digital subtraction

C. AEC (Automatic Exposure Control)

D. PACS

✓ **Answer:** C. AEC (Automatic Exposure Control)

□ *Explanation:* AEC adjusts exposure based on body part density.

13. Which of the following is used in mobile DR systems?

A. Large CRTs

B. Wireless flat-panel detectors

C. Selenium films

D. Cine loops

✓ **Answer:** B. Wireless flat-panel detectors

□ *Explanation:* Increase portability and flexibility.

14. Dual-energy imaging helps differentiate:

A. Soft tissue and bone

B. Left and right side

C. Air and fat

D. Vessels and ligaments

✓ **Answer:** A. Soft tissue and bone

□ *Explanation:* Two different X-ray energies provide tissue contrast.

15. Smart image post-processing includes:

A. Brightness only

B. Noise increase

- C. Edge enhancement and noise reduction
 - D. Manual cropping
 - ✓ **Answer:** C. Edge enhancement and noise reduction
 - *Explanation:* Improves diagnostic image quality.
-

16. Tomosynthesis in radiography is used mainly in:

- A. Bone scan
 - B. Mammography
 - C. Barium studies
 - D. Spine X-rays
 - ✓ **Answer:** B. Mammography
 - *Explanation:* Provides pseudo-3D sectional images of the breast.
-

17. Dose monitoring software tracks:

- A. MRI duration
 - B. Patient diet
 - C. Radiation exposure per exam
 - D. Blood pressure
 - ✓ **Answer:** C. Radiation exposure per exam
 - *Explanation:* Ensures patient safety and dose audit.
-

18. Cloud PACS allows:

- A. Manual image printing
 - B. Online, off-site image access
 - C. Local-only storage
 - D. Faster X-ray tube heating
 - ✓ **Answer:** B. Online, off-site image access
 - *Explanation:* Secure, scalable image storage in the cloud.
-

19. One advantage of cloud-based PACS is:

- A. Loss of images
 - B. Slow upload
 - C. Universal accessibility
 - D. High server costs
 - ✓ **Answer:** C. Universal accessibility
 - *Explanation:* Access from anywhere with login.
-

20. Which of the following can AI NOT currently do reliably in radiography?

- A. Triage abnormal cases

- B. Interpret complex multisystem disorders
- C. Detect fractures
- D. Identify pneumothorax

✓ **Answer:** B. Interpret complex multisystem disorders

□ *Explanation:* AI supports but doesn't replace radiologist expertise.

21. The future of radiography may involve:

- A. Manual film processing
- B. AI-assisted diagnosis and automated positioning
- C. Only CT and MRI
- D. Complete technician removal

✓ **Answer:** B. AI-assisted diagnosis and automated positioning

□ *Explanation:* Enhances workflow and accuracy.

22. Noise reduction algorithms help to:

- A. Increase image blur
- B. Sharpen images while reducing dose
- C. Remove digital detector
- D. Decrease scan speed

✓ **Answer:** B. Sharpen images while reducing dose

□ *Explanation:* Key to dose optimization.

23. In DR, a histogram analysis is used to:

- A. Draw graphs
- B. Estimate radiation output
- C. Optimize image contrast
- D. Clean detectors

✓ **Answer:** C. Optimize image contrast

□ *Explanation:* Helps map pixel intensity to display range.

24. The “exposure index” in digital imaging reflects:

- A. Patient weight
- B. Image brightness
- C. Radiation dose received by the detector
- D. Pixel density

✓ **Answer:** C. Radiation dose received by the detector

□ *Explanation:* Helps maintain optimal exposure levels.

25. One limitation of AI in radiology is:

- A. Too fast diagnosis
- B. Bias from training data
- C. Perfect accuracy
- D. Unlimited access

✓ **Answer:** B. Bias from training data

□ *Explanation:* Errors may occur if training data lacks diversity.

26. Post-processing includes all EXCEPT:

- A. Edge enhancement
- B. Exposure correction
- C. Patient positioning
- D. Window leveling

✓ **Answer:** C. Patient positioning

□ *Explanation:* Done before image capture.

27. Radiographic imaging software can automatically detect:

- A. Fractures
- B. Rotation errors
- C. Lung nodules
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* AI tools are integrated into imaging software.

28. Smart stitching is useful for:

- A. Dental radiography
- B. Long bone or spine studies
- C. Neonatal skull
- D. Abdomen

✓ **Answer:** B. Long bone or spine studies

□ *Explanation:* Joins multiple images into one continuous view.

29. Grid suppression algorithms are useful in:

- A. Film-based radiography
- B. Reducing scatter in digital systems
- C. Enhancing mAs
- D. Positioning

✓ **Answer:** B. Reducing scatter in digital systems

□ *Explanation:* Makes image cleaner without physical grid.

30. The role of deep learning in radiography includes:

- A. Image compression only
- B. Predictive diagnostics and pattern recognition
- C. Tube cooling
- D. Detector replacement

✓ **Answer:** B. Predictive diagnostics and pattern recognition

□ *Explanation:* Deep learning aids automated detection.

Chapter 22: Mammography and Sono-Elastography

✓ All 30 MCQs with Answers and Explanations

1. Mammography is the imaging modality of choice for:

- A. Lung metastasis
- B. Ovarian cancer
- C. Breast pathology
- D. Lymph nodes

✓ **Answer:** C. Breast pathology

□ *Explanation:* It is a dedicated technique for early detection of breast abnormalities.

2. The typical X-ray tube target material in mammography is:

- A. Tungsten
- B. Molybdenum
- C. Lead
- D. Copper

✓ **Answer:** B. Molybdenum

□ *Explanation:* It provides low-energy X-rays optimal for soft tissue contrast.

3. Standard views in screening mammography include:

- A. PA and lateral
- B. CC and MLO
- C. Axial and coronal
- D. AP and oblique

✓ **Answer:** B. CC and MLO

□ *Explanation:* Craniocaudal (CC) and Mediolateral Oblique (MLO) are standard projections.

4. The main purpose of breast compression in mammography is to:

- A. Cause discomfort
- B. Reduce scatter and motion
- C. Increase dose
- D. Improve blood flow

✓ **Answer:** B. Reduce scatter and motion

□ *Explanation:* Compression enhances image quality and lowers radiation dose.

5. A spiculated mass on mammography is highly suggestive of:

- A. Lipoma
- B. Fibroadenoma
- C. Breast cancer
- D. Fat necrosis

✓ **Answer:** C. Breast cancer

□ *Explanation:* Spiculated margins indicate invasive malignancy.

6. The average dose in a single mammographic view is approximately:

- A. 0.01 mSv
- B. 0.1–0.2 mSv
- C. 1–2 mSv
- D. 5 mSv

✓ **Answer:** B. 0.1–0.2 mSv

□ *Explanation:* Modern mammography uses very low radiation doses.

7. Microcalcifications are best evaluated on:

- A. Ultrasound
- B. MRI
- C. Mammography
- D. CT

✓ **Answer:** C. Mammography

□ *Explanation:* High spatial resolution makes it ideal for detecting small calcifications.

8. BIRADS category 5 indicates:

- A. Normal
- B. Benign
- C. Probably benign
- D. Highly suspicious for malignancy

✓ **Answer:** D. Highly suspicious for malignancy

□ *Explanation:* Category 5 requires biopsy.

9. Mammographic density is highest in which group?

- A. Postmenopausal women
- B. Obese women
- C. Young women
- D. Diabetics

✓ **Answer:** C. Young women

□ *Explanation:* Dense fibroglandular tissue is more common in younger women.

10. Spot compression view is taken to:

- A. Increase radiation
- B. Enhance visibility of a lesion
- C. Evaluate the spine
- D. Detect metastasis

✓ **Answer:** B. Enhance visibility of a lesion

□ *Explanation:* Provides localized compression to clarify overlapping structures.

11. The primary advantage of digital mammography is:

- A. High radiation dose
- B. Low spatial resolution
- C. Image manipulation and storage
- D. Poor lesion detection

✓ **Answer:** C. Image manipulation and storage

□ *Explanation:* Offers post-processing and easier sharing.

12. Tomosynthesis in breast imaging allows:

- A. Single 2D view
- B. 3D imaging of the breast
- C. MRI contrast scan
- D. Thermal imaging

✓ **Answer:** B. 3D imaging of the breast

□ *Explanation:* Improves lesion localization in dense breasts.

13. Which of the following is NOT an indication for mammography?

- A. Screening above age 40
- B. Breast lump evaluation
- C. Follow-up post breast surgery
- D. Evaluation of rib fracture

✓ **Answer:** D. Evaluation of rib fracture

□ *Explanation:* Rib fracture is assessed by chest X-ray.

14. In males, mammography is used for suspected:

- A. Lung cancer
- B. Gynecomastia or male breast carcinoma
- C. Testicular mass
- D. Peptic ulcer

✓ **Answer:** B. Gynecomastia or male breast carcinoma

□ *Explanation:* Rare but essential for evaluating male breast pathology.

15. Which of these is a contraindication for mammography?

- A. Breast implants
- B. Pregnancy
- C. Postmenopausal status
- D. Hormone therapy

✓ **Answer:** B. Pregnancy

□ *Explanation:* Radiation is avoided unless absolutely necessary.

16. Sonoelastography is used to assess:

- A. Vascular flow
- B. Tissue stiffness
- C. Bone density
- D. Radiation exposure

✓ **Answer:** B. Tissue stiffness

□ *Explanation:* Helps distinguish between benign and malignant lesions.

17. The principle of sonoelastography is based on:

- A. MRI signal
- B. X-ray attenuation
- C. Deformation response of tissues
- D. Thermal imaging

✓ **Answer:** C. Deformation response of tissues

□ *Explanation:* Harder tissues deform less under compression.

18. In breast sonoelastography, malignant lesions appear:

- A. Soft and uniform
- B. Hard and less deformable
- C. Anechoic
- D. Calcified

✓ **Answer:** B. Hard and less deformable

□ *Explanation:* Due to increased cellularity and fibrosis.

19. Strain elastography displays:

- A. Velocity
 - B. Tissue strain patterns in color
 - C. Thermal gradients
 - D. Ductal flow
- ✓ **Answer:** B. Tissue strain patterns in color

□ *Explanation:* Visualizes tissue compression under probe pressure.

20. Shear wave elastography differs from strain elastography by:

- A. Using manual compression
 - B. Measuring wave propagation speed
 - C. Using thermal imaging
 - D. Using MRI
- ✓ **Answer:** B. Measuring wave propagation speed

□ *Explanation:* It gives quantitative stiffness measurement.

21. A typical benign lesion in elastography will show:

- A. Hard blue zone
 - B. Uniform soft green/red
 - C. Isoechoic pattern
 - D. High stiffness
- ✓ **Answer:** B. Uniform soft green/red

□ *Explanation:* Suggests elasticity typical of non-cancerous tissue.

22. Which imaging technique provides highest sensitivity for breast cancer?

- A. Ultrasound
 - B. Mammography
 - C. MRI
 - D. CT
- ✓ **Answer:** C. MRI

□ *Explanation:* Especially useful in dense breasts and high-risk screening.

23. Breast MRI requires contrast because:

- A. It increases radiation
 - B. It suppresses fat
 - C. It detects vascularity of lesions
 - D. It reduces field strength
- ✓ **Answer:** C. It detects vascularity of lesions

□ *Explanation:* Contrast-enhanced MRI shows lesion enhancement patterns.

24. Sonoelastography can be combined with:

- A. CT
- B. PET
- C. Gray-scale ultrasound
- D. Bone scan

✓ **Answer:** C. Gray-scale ultrasound

□ *Explanation:* Offers structural and mechanical data simultaneously.

25. One limitation of sonoelastography is:

- A. No image generation
- B. Operator dependency and motion artifact
- C. High cost
- D. Inability to image soft tissues

✓ **Answer:** B. Operator dependency and motion artifact

□ *Explanation:* Accuracy depends on consistent pressure and settings.

26. The goal of breast cancer screening is to:

- A. Find all types of cancers
- B. Identify late-stage disease
- C. Detect disease early for better prognosis
- D. Reduce imaging usage

✓ **Answer:** C. Detect disease early for better prognosis

□ *Explanation:* Early detection improves survival.

27. Elastography is NOT suitable for:

- A. Thyroid lesions
- B. Breast lesions
- C. Lung tumors
- D. Liver fibrosis

✓ **Answer:** C. Lung tumors

□ *Explanation:* Lungs are air-filled and not conducive for sonographic evaluation.

28. The most cost-effective screening tool for breast cancer is:

- A. MRI
- B. CT
- C. Mammography
- D. Thermography

✓ **Answer:** C. Mammography

□ *Explanation:* Widely available and effective in early detection.

29. Which of the following can mimic cancer on mammography?

- A. Fat necrosis
- B. Radial scar
- C. Sclerosing adenosis
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* All can present with suspicious features.

30. A BIRADS category 0 report implies:

- A. No lesion
- B. Incomplete; needs additional imaging
- C. Malignant lesion
- D. Benign lesion

✓ **Answer:** B. Incomplete; needs additional imaging

□ *Explanation:* Indicates inconclusive findings.

Here is the full next chapter as requested:

Chapter 23: Doppler in Obstetrics and Peripheral Vessels

1. Doppler ultrasound evaluates:

- A. Bony architecture
- B. Gas movement
- C. Blood flow velocity and direction
- D. Radiation dose

✓ **Answer:** C. Blood flow velocity and direction

□ *Explanation:* Doppler effect measures red blood cell movement.

2. In obstetrics, Doppler is most useful for assessing:

- A. Uterine fibroids
- B. Fetal growth and placental circulation
- C. Pelvic bones
- D. Endometrial thickness

✓ **Answer:** B. Fetal growth and placental circulation

□ *Explanation:* Doppler evaluates umbilical, uterine, and fetal vessels.

3. The most commonly assessed vessel in fetal Doppler is:

- A. Renal artery

- B. Umbilical artery
- C. Pulmonary vein
- D. Femoral artery

✓ **Answer:** B. Umbilical artery

□ *Explanation:* Its resistance index reflects placental circulation.

4. Increased resistance in the umbilical artery suggests:

- A. Normal growth
- B. Twin gestation
- C. Intrauterine growth restriction (IUGR)
- D. Fetal macrosomia

✓ **Answer:** C. Intrauterine growth restriction (IUGR)

□ *Explanation:* Elevated resistance indicates poor placental perfusion.

5. Absent or reversed end-diastolic flow in umbilical artery indicates:

- A. Normal variation
- B. Improved placental flow
- C. Severe fetal compromise
- D. Post-term pregnancy

✓ **Answer:** C. Severe fetal compromise

□ *Explanation:* Warrants close monitoring or delivery.

6. Normal waveform in uterine artery Doppler is:

- A. Triphasic
- B. Low-resistance, continuous forward flow
- C. High-resistance with notch
- D. Reversed flow

✓ **Answer:** B. Low-resistance, continuous forward flow

□ *Explanation:* Reflects good placental implantation.

7. The “notch” in uterine artery waveform is considered abnormal after:

- A. 6 weeks
- B. 20 weeks
- C. 28 weeks
- D. Term

✓ **Answer:** B. 20 weeks

□ *Explanation:* Persistence may suggest preeclampsia risk.

8. Which vessel is used to assess fetal anemia and hypoxia?

- A. Renal artery
- B. Middle cerebral artery (MCA)
- C. Aorta
- D. Femoral artery

✓ **Answer:** B. Middle cerebral artery (MCA)

□ *Explanation:* Decreased resistance in MCA suggests fetal hypoxia.

9. A low resistance index in MCA signifies:

- A. Increased intracranial pressure
- B. IUGR
- C. Fetal hypoxia
- D. Normal growth

✓ **Answer:** C. Fetal hypoxia

□ *Explanation:* Brain-sparing effect due to redistribution of blood.

10. Doppler indices include all EXCEPT:

- A. Resistive Index (RI)
- B. Pulsatility Index (PI)
- C. Systolic/Diastolic ratio (S/D)
- D. Diffusion coefficient

✓ **Answer:** D. Diffusion coefficient

□ *Explanation:* It's used in MRI, not Doppler.

11. PI (Pulsatility Index) is calculated by:

- A. Systolic / Diastolic
- B. (Systolic – Diastolic) / Mean
- C. Mean / Peak
- D. Diastolic – Systolic

✓ **Answer:** B. (Systolic – Diastolic) / Mean

□ *Explanation:* Reflects resistance and pulsatility.

12. Increased PI in umbilical artery indicates:

- A. Normal fetus
- B. Hypervolemia
- C. High vascular resistance
- D. Polyhydramnios

✓ **Answer:** C. High vascular resistance

□ *Explanation:* Suggests abnormal placental function.

13. Which vessel Doppler is used for predicting preeclampsia?

- A. Aorta
- B. Uterine artery
- C. Carotid artery
- D. Inferior vena cava

✓ **Answer:** B. Uterine artery

□ *Explanation:* Increased resistance and notching are risk markers.

14. In peripheral arterial Doppler, a normal flow pattern is:

- A. Biphasic
- B. Monophasic
- C. Triphasic
- D. Flat

✓ **Answer:** C. Triphasic

□ *Explanation:* Indicates healthy vessel compliance.

15. Monophasic flow in peripheral artery suggests:

- A. Normal vessel
- B. Stenosis or obstruction
- C. High velocity
- D. Bone calcification

✓ **Answer:** B. Stenosis or obstruction

□ *Explanation:* Reduced compliance and poor flow variation.

16. Deep vein thrombosis (DVT) is diagnosed using:

- A. Spectral Doppler
- B. Color Doppler
- C. Compression ultrasound
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* Compression is key; Doppler confirms flow.

17. A common finding in venous insufficiency is:

- A. Reversed arterial flow
- B. Venous reflux
- C. No waveform
- D. Hyperechoic clots

✓ **Answer:** B. Venous reflux

□ *Explanation:* Valve incompetence allows backward blood flow.

18. Spectral Doppler represents flow:

- A. In 3D
 - B. Qualitatively
 - C. As a waveform over time
 - D. In pixel colors
- ✓ **Answer:** C. As a waveform over time
- ☐ *Explanation:* Shows velocity vs. time.
-

19. Doppler shift increases when:

- A. Flow is slower
 - B. Angle is 90°
 - C. Velocity increases
 - D. Gain is reduced
- ✓ **Answer:** C. Velocity increases
- ☐ *Explanation:* Greater movement causes higher frequency shift.
-

20. Ideal Doppler angle for peripheral vessel is:

- A. 0°
 - B. $45-60^\circ$
 - C. $75-90^\circ$
 - D. 180°
- ✓ **Answer:** B. $45-60^\circ$
- ☐ *Explanation:* Provides accurate velocity without cosine error.
-

21. Color Doppler shows flow direction by:

- A. Speed
 - B. Color maps (Red and Blue)
 - C. Resolution
 - D. Vessel thickness
- ✓ **Answer:** B. Color maps (Red and Blue)
- ☐ *Explanation:* Red toward, blue away from transducer (conventionally).
-

22. Spectral broadening on Doppler waveform suggests:

- A. Laminar flow
 - B. High velocity flow
 - C. Turbulence or stenosis
 - D. Normal venous return
- ✓ **Answer:** C. Turbulence or stenosis
- ☐ *Explanation:* Spread of frequency implies disturbed flow.
-

23. Aliasing on Doppler occurs due to:

- A. High velocity exceeding Nyquist limit
- B. Low frequency transducer
- C. Tissue motion
- D. Long wavelengths

✓ **Answer:** A. High velocity exceeding Nyquist limit

□ *Explanation:* Produces artifact in color or spectral Doppler.

24. Power Doppler detects:

- A. Direction
- B. Speed
- C. Flow presence regardless of direction
- D. Waveform shape

✓ **Answer:** C. Flow presence regardless of direction

□ *Explanation:* Sensitive to low flow but lacks directional info.

25. Doppler gate refers to:

- A. Flow control valve
- B. Time interval
- C. Sampling volume in vessel
- D. Transducer delay

✓ **Answer:** C. Sampling volume in vessel

□ *Explanation:* Defines where in vessel the velocity is sampled.

26. Normal umbilical artery S/D ratio in third trimester is:

- A. <2
- B. <3
- C. >4
- D. >5

✓ **Answer:** B. <3

□ *Explanation:* Ratios above 3 suggest placental insufficiency.

27. Which of the following is NOT used in fetal Doppler?

- A. MCA
- B. Umbilical artery
- C. Ductus venosus
- D. Femoral vein

✓ **Answer:** D. Femoral vein

□ *Explanation:* Peripheral veins are not standard in fetal Doppler.

28. Pulsatile flow in the portal vein suggests:

- A. Normal variant
- B. Liver cirrhosis
- C. Cardiac failure
- D. Portal hypertension

✓ **Answer:** C. Cardiac failure

□ *Explanation:* Pulsatility transmitted from right heart.

29. Doppler of the ductus venosus is useful in:

- A. Lung maturity
- B. Down syndrome screening
- C. Renal agenesis
- D. Placental grading

✓ **Answer:** B. Down syndrome screening

□ *Explanation:* Abnormal flow is a soft marker for aneuploidy.

30. Doppler evaluation of fetal heart includes:

- A. Aortic arch
- B. Ductus arteriosus
- C. Tricuspid and mitral valves
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* Helps assess rhythm, flow, and structural anomalies.

Chapter 24: Advances in Interventions

1. A major recent advancement in interventional radiology is:

- A. Open surgery
- B. Use of anesthesia alone
- C. Image-guided minimally invasive procedures
- D. Non-digital X-ray systems

✓ **Answer:** C. Image-guided minimally invasive procedures

□ *Explanation:* Modern interventional radiology uses USG, CT, or fluoroscopy for guidance.

2. Which of the following is a commonly used imaging modality in interventional procedures?

- A. SPECT
- B. MRI
- C. CT and Fluoroscopy
- D. Scintigraphy

✓ **Answer:** C. CT and Fluoroscopy

□ *Explanation:* Both are real-time or cross-sectional modalities ideal for guiding needles and

catheters.

3. The term “angioplasty” refers to:

- A. Vessel removal
- B. Catheter placement
- C. Vessel dilatation
- D. Lymph node excision

✓ **Answer:** C. Vessel dilatation

□ *Explanation:* Balloon angioplasty opens narrowed arteries.

4. Stents are used in vascular intervention to:

- A. Biopsy vessel wall
- B. Prevent bleeding
- C. Maintain vessel patency
- D. Occlude veins

✓ **Answer:** C. Maintain vessel patency

□ *Explanation:* Stents support the lumen and prevent restenosis.

5. An IVC filter is placed to prevent:

- A. Renal failure
- B. Pulmonary embolism
- C. Stroke
- D. Bleeding

✓ **Answer:** B. Pulmonary embolism

□ *Explanation:* Filters trap emboli from reaching lungs.

6. Recent embolization agents include:

- A. Plastic beads and coils
- B. Ethanol
- C. Glue
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* Many agents are available based on indication.

7. Radiofrequency ablation is used to:

- A. Freeze tissue
- B. Electrically burn tumors
- C. Provide chemotherapy
- D. Measure blood pressure

✓ **Answer:** B. Electrically burn tumors

□ *Explanation:* Heat-based tumor ablation under image guidance.

8. Microwave ablation differs from RFA by:

- A. Using cold energy
 - B. Delivering higher and faster heating
 - C. Only for liver
 - D. Using radioactive isotopes
- ✓ **Answer:** B. Delivering higher and faster heating
- *Explanation:* More efficient and less heat sink effect.
-

9. Which of the following is an indication for uterine artery embolization (UAE)?

- A. Ovarian torsion
 - B. Uterine fibroids
 - C. Fallopian tube blockage
 - D. Vaginal prolapse
- ✓ **Answer:** B. Uterine fibroids
- *Explanation:* Reduces fibroid vascularity and symptoms.
-

10. TIPS (Transjugular Intrahepatic Portosystemic Shunt) is placed in cases of:

- A. Gallstones
 - B. Cirrhosis with portal hypertension
 - C. Liver trauma
 - D. Renal artery stenosis
- ✓ **Answer:** B. Cirrhosis with portal hypertension
- *Explanation:* Creates communication between portal and hepatic vein to decompress portal system.
-

11. Cryoablation is based on:

- A. High-frequency current
 - B. Thermal coagulation
 - C. Freezing tissues to -40°C
 - D. Laser therapy
- ✓ **Answer:** C. Freezing tissues to -40°C
- *Explanation:* Ice ball formation causes cell death.
-

12. A main recent development in interventional oncology is:

- A. Laparotomy
- B. Trans-arterial chemoembolization (TACE)
- C. Hepatectomy
- D. Hormone therapy

✓ **Answer:** B. Trans-arterial chemoembolization (TACE)

□ *Explanation:* Local delivery of chemo drugs with embolization for liver tumors.

13. Image fusion technology allows:

- A. Only CT usage
- B. Blending different imaging modalities
- C. Film printing
- D. Removal of artifacts

✓ **Answer:** B. Blending different imaging modalities

□ *Explanation:* Combines real-time USG with MRI or CT data.

14. Cone-beam CT (CBCT) in angiography provides:

- A. 2D images
- B. Only venography
- C. Real-time 3D imaging
- D. Scintigraphic data

✓ **Answer:** C. Real-time 3D imaging

□ *Explanation:* Enhances localization of lesions and vessels.

15. A major benefit of image-guided biopsy is:

- A. Increased invasiveness
- B. Better localization and safety
- C. General anesthesia requirement
- D. Open surgery

✓ **Answer:** B. Better localization and safety

□ *Explanation:* Minimizes complications and sampling error.

16. Newer guide wires are designed for:

- A. Increased rigidity and steerability
- B. Breaking easily
- C. Intra-articular imaging
- D. Dye delivery

✓ **Answer:** A. Increased rigidity and steerability

□ *Explanation:* Allows navigation through tortuous vessels.

17. Which intervention is used in post-trauma internal bleeding control?

- A. Endoscopic ligation
- B. Embolization
- C. Pleural tapping

D. Cystoscopy

✓ **Answer:** B. Embolization

□ *Explanation:* Catheter-directed occlusion of bleeding vessels.

18. Drainage of liver abscess is now preferably done via:

A. Surgery

B. Percutaneous pigtail catheter under imaging

C. Blunt aspiration

D. Antibiotics alone

✓ **Answer:** B. Percutaneous pigtail catheter under imaging

□ *Explanation:* Minimally invasive and effective.

19. Biliary interventions include:

A. Cholecystectomy

B. ERCP

C. Percutaneous biliary drainage (PTBD)

D. All of the above

✓ **Answer:** C. Percutaneous biliary drainage (PTBD)

□ *Explanation:* Drains obstructed biliary tree via catheter.

20. Intracranial neuro-interventions include:

A. Coiling of aneurysms

B. Brain biopsy

C. Skull drilling

D. EEG mapping

✓ **Answer:** A. Coiling of aneurysms

□ *Explanation:* Minimally invasive treatment for aneurysms via catheter.

21. Robotic catheter systems aim to improve:

A. Image brightness

B. Hand fatigue

C. Precision and reduced radiation exposure

D. Surgical exposure

✓ **Answer:** C. Precision and reduced radiation exposure

□ *Explanation:* Operator-controlled systems increase accuracy.

22. Drug-eluting beads are used in:

A. Biopsy

B. Vascular occlusion

C. Chemoembolization

D. Stenting only

✓ **Answer:** C. Chemoembolization

□ *Explanation:* Slowly release chemotherapy drugs at tumor site.

23. Nanoparticle delivery systems in IR are evolving for:

A. Radiation exposure

B. Enhanced drug targeting

C. Lower contrast dose

D. Bone treatment

✓ **Answer:** B. Enhanced drug targeting

□ *Explanation:* Improves therapeutic effect and reduces systemic side effects.

24. Patient preparation for most interventions includes:

A. Full stomach

B. No consent

C. Pre-procedural imaging and lab tests

D. Radiotherapy

✓ **Answer:** C. Pre-procedural imaging and lab tests

□ *Explanation:* Essential for planning and safety.

25. "Road mapping" in angiography helps:

A. Record heart rate

B. Mark bony landmarks

C. Overlay real-time navigation on static vessel image

D. Compare image sizes

✓ **Answer:** C. Overlay real-time navigation on static vessel image

□ *Explanation:* Aids catheter guidance.

26. Which of the following is NOT an interventional radiology procedure?

A. Ureteric stenting

B. CT-guided lung biopsy

C. Endoscopy

D. TIPS

✓ **Answer:** C. Endoscopy

□ *Explanation:* Performed by gastroenterologists, not IR.

27. "Hydrophilic" wires are useful because:

A. They break easily

- B. They cause clots
 - C. They reduce friction and improve access
 - D. They are rigid
 - ✓ **Answer:** C. They reduce friction and improve access
 - ☐ *Explanation:* Smooth movement in vessels or ducts.
-

28. Real-time navigation during IR procedures is enhanced by:

- A. Delayed fluoroscopy
 - B. Cone-beam CT and 3D roadmap
 - C. PET imaging
 - D. Manual needle tracking
 - ✓ **Answer:** B. Cone-beam CT and 3D roadmap
 - ☐ *Explanation:* Facilitates accurate targeting.
-

29. Interventional radiology procedures are increasingly preferred due to:

- A. Long recovery time
 - B. Non-selective therapy
 - C. Minimally invasive approach and short recovery
 - D. Need for general anesthesia
 - ✓ **Answer:** C. Minimally invasive approach and short recovery
 - ☐ *Explanation:* Reduces hospital stay and complications.
-

30. “Plug and coil” technique is used in:

- A. Tumor biopsy
 - B. Arteriovenous malformation embolization
 - C. Biliary drainage
 - D. Drain placement
 - ✓ **Answer:** B. Arteriovenous malformation embolization
 - ☐ *Explanation:* Used to occlude abnormal vascular communications.
-

Chapter 25: CT Procedures

1. The Hounsfield unit of water in CT is:

- A. 0
- B. 100
- C. -100
- D. 1000
- ✓ **Answer:** A. 0
- ☐ *Explanation:* Water is the reference baseline for attenuation.

2. CT number for air is approximately:

- A. -100
- B. -500
- C. -800
- D. -1000

✓ **Answer:** D. -1000

☐ *Explanation:* Air has the lowest attenuation.

3. The most accurate imaging modality for detecting acute subarachnoid hemorrhage is:

- A. MRI
- B. CT without contrast
- C. PET
- D. CT with contrast

✓ **Answer:** B. CT without contrast

☐ *Explanation:* Hyperdense blood is best seen on non-contrast CT.

4. In CT chest, the window setting for mediastinum is typically:

- A. 400 WW / 40 WL
- B. 1600 WW / -600 WL
- C. 4000 WW / 400 WL
- D. 800 WW / 80 WL

✓ **Answer:** A. 400 WW / 40 WL

☐ *Explanation:* Soft tissue window setting for mediastinal structures.

5. Best CT phase for evaluating renal masses:

- A. Arterial
- B. Nephrographic
- C. Delayed
- D. Plain

✓ **Answer:** B. Nephrographic

☐ *Explanation:* Offers best parenchymal enhancement and mass delineation.

6. The pitch in spiral CT is defined as:

- A. Table feed / slice thickness
- B. kVp / mAs
- C. Field of view / time
- D. Exposure / rotation

✓ **Answer:** A. Table feed / slice thickness

☐ *Explanation:* Pitch determines scan speed and coverage.

7. The gantry tilt in CT head is generally adjusted to avoid radiation to:

- A. Spine
- B. Orbit
- C. Skull base
- D. Brainstem

✓ **Answer:** B. Orbit

□ *Explanation:* To minimize radiation dose to the eye lens.

8. CT pulmonary angiography is best performed in:

- A. Arterial phase
- B. Delayed phase
- C. Portal phase
- D. Venous phase

✓ **Answer:** A. Arterial phase

□ *Explanation:* Enhances pulmonary arteries to detect embolism.

9. In CT abdomen, the portal venous phase is optimal for:

- A. Adrenal lesions
- B. Pancreatic cyst
- C. Liver metastasis
- D. Ureteric stone

✓ **Answer:** C. Liver metastasis

□ *Explanation:* Enhances liver parenchyma for lesion detection.

10. A renal stone appears as:

- A. Hypodense
- B. Isoattenuating
- C. Hyperdense
- D. Enhancing lesion

✓ **Answer:** C. Hyperdense

□ *Explanation:* Stones are bright due to calcium.

11. Contrast-induced nephropathy is defined by:

- A. Proteinuria
- B. Increased bilirubin
- C. Rise in serum creatinine $\geq 25\%$
- D. Hematuria

✓ **Answer:** C. Rise in serum creatinine $\geq 25\%$

□ *Explanation:* Occurs after contrast exposure.

12. CT colonography is also called:

- A. Virtual bronchoscopy
- B. CT urogram
- C. Virtual colonoscopy
- D. Sigmoidoscopy

✓ **Answer:** C. Virtual colonoscopy

□ *Explanation:* 3D reconstructions of colon using CT.

13. Oral contrast in CT abdomen helps to:

- A. Visualize blood vessels
- B. Differentiate bowel from other organs
- C. Evaluate bones
- D. Reduce radiation

✓ **Answer:** B. Differentiate bowel from other organs

□ *Explanation:* Opacifies GIT for anatomic clarity.

14. Ring enhancement on contrast CT is seen in:

- A. Brain infarct
- B. Meningioma
- C. Abscess
- D. Glioma

✓ **Answer:** C. Abscess

□ *Explanation:* Due to capsule formation with central necrosis.

15. The advantage of helical CT includes:

- A. More radiation
- B. Slow imaging
- C. Volumetric data acquisition
- D. No multiplanar reconstructions

✓ **Answer:** C. Volumetric data acquisition

□ *Explanation:* Allows fast scanning with 3D reformation.

16. CT angiography requires synchronization with:

- A. ECG
- B. Respiratory rate
- C. Contrast bolus timing
- D. EEG

✓ **Answer:** C. Contrast bolus timing

□ *Explanation:* Ensures peak enhancement of vessels.

17. Multidetector CT scanners allow:

- A. Single slice only
- B. Faster scans with thinner slices
- C. Less resolution
- D. No 3D recon

✓ **Answer:** B. Faster scans with thinner slices

□ *Explanation:* Multiple rows of detectors improve quality and speed.

18. Effective radiation dose from a CT abdomen is roughly:

- A. 0.1 mSv
- B. 0.5 mSv
- C. 5–10 mSv
- D. 50 mSv

✓ **Answer:** C. 5–10 mSv

□ *Explanation:* Varies by protocol, patient size, and scanner.

19. Contrast-enhanced CT (CECT) is contraindicated in:

- A. Diabetes
- B. Pregnancy
- C. Renal failure
- D. Thyroid disease

✓ **Answer:** C. Renal failure

□ *Explanation:* Risk of contrast nephropathy.

20. Low-dose CT chest is used in screening for:

- A. Tuberculosis
- B. Sarcoidosis
- C. Lung cancer
- D. COPD

✓ **Answer:** C. Lung cancer

□ *Explanation:* Detects early-stage nodules in high-risk individuals.

21. Slice thickness in high-resolution CT (HRCT) chest is:

- A. 10 mm
- B. 5 mm
- C. 3 mm
- D. 1–1.5 mm

✓ **Answer:** D. 1–1.5 mm

□ *Explanation:* Thin slices capture fine lung detail.

22. The artifact due to high-density structures like bone is called:

- A. Streak artifact
- B. Motion artifact
- C. Beam hardening
- D. Ghosting

✓ **Answer:** C. Beam hardening

□ *Explanation:* Caused by X-ray attenuation shift in dense tissues.

23. Contrast media used in CT is typically:

- A. Non-ionic iodinated
- B. Ionic barium
- C. Gadolinium
- D. Isotope-labeled

✓ **Answer:** A. Non-ionic iodinated

□ *Explanation:* Safer and better tolerated.

24. Bolus tracking in CT involves:

- A. ECG monitoring
- B. Injection pump calibration
- C. Real-time enhancement measurement
- D. Respiratory gating

✓ **Answer:** C. Real-time enhancement measurement

□ *Explanation:* Begins scanning when contrast reaches target vessel.

25. The term “lung window” in CT indicates:

- A. -400 WW / +40 WL
- B. 1600 WW / -600 WL
- C. 400 WW / 40 WL
- D. 80 WW / -80 WL

✓ **Answer:** B. 1600 WW / -600 WL

□ *Explanation:* Optimizes visibility of pulmonary structures.

26. In CT myelography, contrast is injected into:

- A. Vein
- B. Artery
- C. Subarachnoid space
- D. Epidural space

✓ **Answer:** C. Subarachnoid space

□ *Explanation:* Via lumbar puncture for spinal cord imaging.

27. For CT urogram, delayed scans are taken at:

- A. 10 seconds
- B. 30 seconds
- C. 3–5 minutes
- D. 10–15 minutes

✓ **Answer:** D. 10–15 minutes

□ *Explanation:* Allows contrast excretion into collecting system.

28. Targeted organ in CT enterography:

- A. Colon
- B. Small intestine
- C. Gallbladder
- D. Pancreas

✓ **Answer:** B. Small intestine

□ *Explanation:* Non-invasive assessment using oral contrast and IV contrast.

29. Dual-energy CT can differentiate:

- A. Air vs fluid
- B. Iodine vs calcium
- C. Muscle vs fat
- D. Liver vs spleen

✓ **Answer:** B. Iodine vs calcium

□ *Explanation:* Based on different attenuation at varying energy levels.

30. Cardiac CT calcium scoring is done:

- A. With contrast
- B. Using T1-weighted images
- C. Without contrast
- D. After stress test

✓ **Answer:** C. Without contrast

□ *Explanation:* Non-contrast CT quantifies coronary artery calcium.

31. CT perfusion assesses:

- A. Bone strength
- B. Blood flow in tissue
- C. Organ size
- D. Lung volume

✓ **Answer:** B. Blood flow in tissue

□ *Explanation:* Used in stroke imaging and oncology.

32. Gantry angle in CT head is set along:

- A. Reid's base line
- B. Midcoronal plane
- C. Transverse plane
- D. Interorbital line

✓ **Answer:** A. Reid's base line

□ *Explanation:* From infraorbital margin to external auditory meatus.

33. CT scan of pancreas is best in which phase?

- A. Arterial
- B. Portal
- C. Pancreatic parenchymal phase
- D. Delayed

✓ **Answer:** C. Pancreatic parenchymal phase

□ *Explanation:* Ideal timing for tumor detection.

34. CT artifact from motion is minimized by:

- A. Using sedation
- B. High kVp
- C. Fast scanning
- D. Prone positioning

✓ **Answer:** C. Fast scanning

□ *Explanation:* Reduces voluntary and involuntary motion blur.

35. Maximum intensity projection (MIP) is best for:

- A. Soft tissues
- B. Bone
- C. Vessels
- D. Lungs

✓ **Answer:** C. Vessels

□ *Explanation:* Emphasizes high-density structures like contrast-filled vessels.

36. The 3D volume rendering technique (VRT) allows:

- A. Only 2D sections
- B. Multiangle 3D images
- C. No tissue distinction
- D. Axial-only view

✓ **Answer:** B. Multiangle 3D images

□ *Explanation:* Provides realistic anatomical visualization.

37. CT detection of adrenal incidentaloma evaluates:

- A. Density on plain scan
- B. Enhancement pattern
- C. Washout percentage
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* Helps distinguish benign vs malignant lesions.

38. CT dose modulation helps:

- A. Increase radiation
- B. Constant dose
- C. Reduce radiation based on patient size
- D. Prolong scanning

✓ **Answer:** C. Reduce radiation based on patient size

□ *Explanation:* Smart scanning based on tissue attenuation.

39. CT urography protocol includes:

- A. Plain + Nephrographic + Delayed phases
- B. Only delayed phase
- C. Just a KUB
- D. MRI abdomen

✓ **Answer:** A. Plain + Nephrographic + Delayed phases

□ *Explanation:* Comprehensive assessment of kidneys and urinary tract.

40. CT abdomen for trauma includes:

- A. Arterial and venous phases
- B. Oral contrast only
- C. MRI
- D. Delayed only

✓ **Answer:** A. Arterial and venous phases

□ *Explanation:* Identifies bleeding and organ injuries.

41. CT enteroclysis involves contrast via:

- A. IV injection
- B. Oral route
- C. Nasoduodenal tube
- D. Rectal catheter

✓ **Answer:** C. Nasoduodenal tube

□ *Explanation:* Direct contrast infusion for small bowel distension.

42. CT in pancreatitis reveals:

- A. Hyperdense fluid
- B. Calcification
- C. Pseudocysts
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* CT identifies complications like necrosis, fluid, or calcification.

43. In contrast reactions, the first-line management is:

- A. Steroids
- B. Hydration
- C. IV epinephrine
- D. Sedation

✓ **Answer:** C. IV epinephrine

□ *Explanation:* Immediate drug for anaphylaxis.

44. In CT perfusion, CBV refers to:

- A. Cerebral body volume
- B. Contrast bolus volume
- C. Cerebral blood volume
- D. Contrast beam velocity

✓ **Answer:** C. Cerebral blood volume

□ *Explanation:* Assesses ischemic penumbra and infarct core.

45. CT protocol for GI bleeding includes:

- A. Arterial and delayed phases
- B. Non-contrast only
- C. Pelvic X-ray
- D. Oral barium

✓ **Answer:** A. Arterial and delayed phases

□ *Explanation:* Helps identify active extravasation.

46. The minimum time between contrast injections for repeat CT should be:

- A. 1 hour
- B. 4 hours
- C. 24 hours
- D. 48 hours

✓ **Answer:** C. 24 hours

□ *Explanation:* Reduces contrast nephropathy risk.

47. CT densitometry is used for:

- A. Measuring liver volume
- B. Bone mineral density
- C. Pancreatic mass
- D. Bowel obstruction

✓ **Answer:** B. Bone mineral density

□ *Explanation:* Evaluates osteoporosis.

48. The high attenuation artifact from metal implants is reduced by:

- A. Decreasing mAs
- B. Increasing slice thickness
- C. Dual-energy or metal artifact reduction software
- D. Slower gantry rotation

✓ **Answer:** C. Dual-energy or metal artifact reduction software

□ *Explanation:* Helps correct blooming artifacts.

49. CT cystography is best for evaluating:

- A. Ureter
- B. Renal artery
- C. Bladder injury
- D. Adrenal gland

✓ **Answer:** C. Bladder injury

□ *Explanation:* Contrast instilled via Foley to detect leak.

50. The “target sign” in CT abdomen is seen in:

- A. Appendicitis
- B. Intussusception
- C. Pancreatitis
- D. Hepatoma

✓ **Answer:** B. Intussusception

□ *Explanation:* Concentric rings due to telescoped bowel.

Chapter 26: MR Procedures (MRI)

1. MRI primarily utilizes:

- A. X-rays
- B. Gamma rays
- C. Magnetic field and radiofrequency waves
- D. Infrared radiation

- ✓ **Answer:** C. Magnetic field and radiofrequency waves
☐ *Explanation:* MRI is a non-ionizing imaging technique.
-

2. The basic nuclei used in clinical MRI is:

- A. Carbon
- B. Hydrogen
- C. Oxygen
- D. Calcium

- ✓ **Answer:** B. Hydrogen
☐ *Explanation:* Hydrogen is abundant in water and fat in tissues.
-

3. T1-weighted images show fat as:

- A. Black
- B. Bright
- C. Isointense
- D. Mixed

- ✓ **Answer:** B. Bright
☐ *Explanation:* T1W images make fat appear hyperintense.
-

4. T2-weighted images show water as:

- A. Hypointense
- B. Bright
- C. Dark
- D. Gray

- ✓ **Answer:** B. Bright
☐ *Explanation:* Fluids like CSF appear hyperintense on T2W images.
-

5. Gadolinium is used in MRI as a:

- A. X-ray contrast
- B. Radioisotope
- C. Paramagnetic contrast agent
- D. Ionizing tracer

- ✓ **Answer:** C. Paramagnetic contrast agent
☐ *Explanation:* Shortens T1 and enhances signals.
-

6. Contraindication to MRI includes:

- A. Cochlear implant
- B. Titanium prosthesis
- C. Surgical suture

D. Dental fillings

✓ **Answer:** A. Cochlear implant

□ *Explanation:* Ferromagnetic implants can pose danger or malfunction.

7. The signal intensity in MRI depends on:

A. Bone density

B. CT number

C. Proton density and relaxation times

D. Attenuation coefficient

✓ **Answer:** C. Proton density and relaxation times

□ *Explanation:* Determines how tissues appear in T1/T2 weighting.

8. MRI is superior to CT for evaluation of:

A. Lungs

B. Bone fractures

C. Soft tissues and CNS

D. Air-filled cavities

✓ **Answer:** C. Soft tissues and CNS

□ *Explanation:* MRI provides better soft tissue contrast.

9. The unit of magnetic field strength is:

A. Gray

B. Sievert

C. Tesla

D. Henry

✓ **Answer:** C. Tesla

□ *Explanation:* Most clinical MRI scanners are 1.5T or 3T.

10. Common field strength used in clinical MRI is:

A. 0.2T

B. 1.5T

C. 5T

D. 7T

✓ **Answer:** B. 1.5T

□ *Explanation:* Offers good image quality and safety.

11. The MRI sequence useful in detecting acute stroke is:

A. T1

B. T2

- C. DWI
- D. GRE

✓ **Answer:** C. DWI

□ *Explanation:* Diffusion-weighted imaging detects early ischemia.

12. A void signal in MRI usually represents:

- A. Fat
- B. Water
- C. Flowing blood or air
- D. Muscle

✓ **Answer:** C. Flowing blood or air

□ *Explanation:* They appear black due to lack of signal.

13. Gradient echo (GRE) sequences are sensitive to:

- A. Fluid
- B. Blood products and calcification
- C. Tumors
- D. Air

✓ **Answer:** B. Blood products and calcification

□ *Explanation:* GRE helps detect microbleeds or hemosiderin.

14. MRCP is used to evaluate:

- A. Kidney
- B. Brain
- C. Biliary and pancreatic ducts
- D. Lungs

✓ **Answer:** C. Biliary and pancreatic ducts

□ *Explanation:* Heavily T2-weighted images depict fluid-filled ducts.

15. MR angiography (MRA) can be performed without contrast by using:

- A. CT technique
- B. TOF (Time of Flight)
- C. PET
- D. SPECT

✓ **Answer:** B. TOF (Time of Flight)

□ *Explanation:* Exploits flow-related enhancement.

16. MRI is the investigation of choice in:

- A. Renal stone

- B. Pulmonary embolism
- C. Multiple sclerosis
- D. Lung cancer
- ✓ **Answer:** C. Multiple sclerosis

☐ *Explanation:* Detects demyelinating lesions.

17. In MRI, TR stands for:

- A. Time reversal
- B. Time to recover
- C. Repetition time
- D. Radiographic timing
- ✓ **Answer:** C. Repetition time

☐ *Explanation:* Time between successive RF pulses.

18. In MRI, TE stands for:

- A. Time to echo
- B. Thermal equilibrium
- C. Total energy
- D. Tissue excitation
- ✓ **Answer:** A. Time to echo

☐ *Explanation:* Time from RF pulse to signal collection.

19. Short TR and TE produce:

- A. T1-weighted image
- B. T2-weighted image
- C. Proton density image
- D. Flair image
- ✓ **Answer:** A. T1-weighted image

☐ *Explanation:* Useful for anatomical imaging.

20. Long TR and TE produce:

- A. T1-weighted
- B. T2-weighted
- C. STIR
- D. DWI
- ✓ **Answer:** B. T2-weighted

☐ *Explanation:* Highlights pathology due to fluid.

21. STIR sequence is used to suppress:

- A. Water
- B. Bone
- C. Fat
- D. CSF

✓ **Answer:** C. Fat

□ *Explanation:* Short Tau Inversion Recovery nulls fat signal.

22. FLAIR sequence suppresses:

- A. Gray matter
- B. White matter
- C. CSF
- D. Fat

✓ **Answer:** C. CSF

□ *Explanation:* Fluid Attenuated Inversion Recovery nulls CSF.

23. MRI is especially useful for imaging:

- A. Cortical bone
- B. Moving air
- C. Ligaments and brain
- D. Lungs

✓ **Answer:** C. Ligaments and brain

□ *Explanation:* MRI shows soft tissues in detail.

24. Gadolinium-based contrast agents are excreted via:

- A. Liver
- B. Kidneys
- C. Bile
- D. Skin

✓ **Answer:** B. Kidneys

□ *Explanation:* Impaired renal function delays excretion.

25. NSF (Nephrogenic Systemic Fibrosis) is associated with:

- A. CT
- B. Gadolinium in renal failure
- C. Barium contrast
- D. MRI noise

✓ **Answer:** B. Gadolinium in renal failure

□ *Explanation:* Serious fibrosing condition linked to gadolinium.

26. Claustrophobia in MRI can be managed with:

- A. No action
- B. Sedation or open MRI
- C. High contrast
- D. Turning off magnet

✓ **Answer:** B. Sedation or open MRI

□ *Explanation:* Patient comfort is critical for image quality.

27. MR spectroscopy evaluates:

- A. Anatomy
- B. Perfusion
- C. Tissue chemistry/metabolites
- D. Temperature

✓ **Answer:** C. Tissue chemistry/metabolites

□ *Explanation:* Used in tumors and brain disorders.

28. MRI-compatible devices include:

- A. Pacemaker
- B. Cochlear implant
- C. Titanium prosthesis
- D. All metal implants

✓ **Answer:** C. Titanium prosthesis

□ *Explanation:* Non-ferromagnetic, safe for MRI.

29. The RF shielding of MRI room is provided by:

- A. Wood
- B. Copper/Aluminum
- C. Plastic
- D. Concrete

✓ **Answer:** B. Copper/Aluminum

□ *Explanation:* Prevents interference from external signals.

30. The quenching of MRI magnet refers to:

- A. Overheating
- B. Magnetic shielding
- C. Sudden helium loss and loss of superconductivity
- D. Signal distortion

✓ **Answer:** C. Sudden helium loss and loss of superconductivity

□ *Explanation:* Emergency shutdown of magnet field.

31. Flow void in MRI is seen in:

- A. Arteries
- B. Tumors
- C. Bone
- D. Muscles

✓ **Answer:** A. Arteries

□ *Explanation:* Due to rapid flow of blood.

32. Which MRI sequence is most sensitive to hemorrhage?

- A. DWI
- B. GRE
- C. STIR
- D. FLAIR

✓ **Answer:** B. GRE

□ *Explanation:* Detects blooming effect of blood degradation products.

33. Safety zone around MRI magnet is:

- A. Zone I
- B. Zone II
- C. Zone IV
- D. Zone III

✓ **Answer:** C. Zone IV

□ *Explanation:* The magnet room where access is strictly restricted.

34. The following may cause MRI artifacts EXCEPT:

- A. Patient motion
- B. Dental fillings
- C. Eye movements
- D. Liver cyst

✓ **Answer:** D. Liver cyst

□ *Explanation:* Non-metallic, static lesions do not cause artifact.

35. Common side effect of gadolinium is:

- A. Severe vomiting
- B. Hypotension
- C. Mild nausea and headache
- D. Radiation toxicity

✓ **Answer:** C. Mild nausea and headache

□ *Explanation:* Rarely causes allergic reactions.

36. Imaging plane unique to MRI but difficult on CT is:

- A. Axial
 - B. Sagittal
 - C. Oblique coronal
 - D. Axial oblique
- ✓ **Answer:** C. Oblique coronal

☐ *Explanation:* MRI can acquire any plane without moving patient.

37. MR neurography is useful in imaging:

- A. Bones
 - B. Blood
 - C. Nerves
 - D. Lungs
- ✓ **Answer:** C. Nerves

☐ *Explanation:* Highlights peripheral nerves with special sequences.

38. Time-of-flight MRA is best for imaging:

- A. Abdomen
 - B. Lungs
 - C. Intracranial arteries
 - D. Colon
- ✓ **Answer:** C. Intracranial arteries

☐ *Explanation:* Non-contrast visualization of cerebral vessels.

39. MR perfusion studies in brain assess:

- A. Tumor metabolism
 - B. Blood-brain barrier
 - C. Capillary blood volume and transit time
 - D. Skull bone
- ✓ **Answer:** C. Capillary blood volume and transit time

☐ *Explanation:* Important in stroke and tumor grading.

40. The Larmor frequency is related to:

- A. Speed of sound
 - B. Magnetic susceptibility
 - C. Precession of proton
 - D. X-ray intensity
- ✓ **Answer:** C. Precession of proton

☐ *Explanation:* Basis of MR signal generation.

41. Signal-to-noise ratio (SNR) improves with:

- A. Smaller coils
- B. Lower field strength
- C. Larger voxel size
- D. Faster scans

✓ **Answer:** C. Larger voxel size

□ *Explanation:* Increases signal intensity per voxel.

42. MR elastography is used to measure:

- A. Flow
- B. Tumor size
- C. Tissue stiffness
- D. Metabolism

✓ **Answer:** C. Tissue stiffness

□ *Explanation:* Detects fibrosis in liver or tumors.

43. The inversion recovery sequence starts with:

- A. 90° RF pulse
- B. 180° RF pulse
- C. Gradient reversal
- D. Echo measurement

✓ **Answer:** B. 180° RF pulse

□ *Explanation:* Used in STIR and FLAIR for tissue suppression.

44. Parallel imaging technique reduces:

- A. Signal
- B. Time of acquisition
- C. Resolution
- D. Noise

✓ **Answer:** B. Time of acquisition

□ *Explanation:* Achieved via multiple coil elements.

45. Artifact near metal implants is reduced using:

- A. GRE
- B. STIR
- C. MAVRIC or SEMAC
- D. FLAIR

✓ **Answer:** C. MAVRIC or SEMAC

□ *Explanation:* Specialized sequences for metal artifact reduction.

46. Which of the following has lowest signal in T1W MRI?

- A. Fat
- B. Blood
- C. Air
- D. Brain

✓ **Answer:** C. Air

□ *Explanation:* Air has no hydrogen, hence no signal.

47. Fat saturation is helpful in imaging:

- A. Lung
- B. Brain tumors
- C. Musculoskeletal lesions
- D. Bone cortex

✓ **Answer:** C. Musculoskeletal lesions

□ *Explanation:* Enhances contrast by suppressing fat signal.

48. Magnetic susceptibility artifact is caused by:

- A. Flow
- B. Fat
- C. Metal or blood
- D. CSF

✓ **Answer:** C. Metal or blood

□ *Explanation:* Causes signal void and distortion.

49. MRI is not ideal for:

- A. Bone marrow
- B. Calcification
- C. Brainstem
- D. Ligaments

✓ **Answer:** B. Calcification

□ *Explanation:* CT better demonstrates calcified structures.

50. Zero echo time (ZTE) sequence helps to image:

- A. Moving fluids
- B. Air
- C. Cortical bone
- D. Nerve roots

✓ **Answer:** C. Cortical bone

□ *Explanation:* ZTE is an emerging technique for bone MRI.

Chapter 27: Positron Emission Tomography (PET)

1. PET imaging is primarily based on:

- A. X-ray absorption
- B. Gamma ray emission
- C. Positron emission and annihilation photons
- D. Sound wave reflection

✓ **Answer:** C. Positron emission and annihilation photons

□ *Explanation:* PET detects two 511 keV gamma rays produced by positron-electron annihilation.

2. The commonly used radiotracer in PET is:

- A. Iodine-131
- B. Technetium-99m
- C. Fluorodeoxyglucose (FDG)
- D. Gadolinium

✓ **Answer:** C. Fluorodeoxyglucose (FDG)

□ *Explanation:* FDG is a glucose analog labeled with fluorine-18.

3. Fluorine-18 has a half-life of approximately:

- A. 1 hour
- B. 110 minutes
- C. 6 hours
- D. 24 hours

✓ **Answer:** B. 110 minutes

□ *Explanation:* Suitable for imaging due to intermediate half-life.

4. FDG accumulates in tissues with:

- A. Low glucose metabolism
- B. High oxygenation
- C. High glucose metabolism
- D. High calcium content

✓ **Answer:** C. High glucose metabolism

□ *Explanation:* Like tumors, brain, and inflammatory areas.

5. PET-CT combines:

- A. CT with MRI
- B. PET with ultrasonography
- C. PET with CT imaging
- D. PET with SPECT

✓ **Answer:** C. PET with CT imaging

□ *Explanation:* Provides both metabolic and anatomical detail.

6. PET scan is most commonly used in:

- A. Bone trauma
- B. Neurological disorders
- C. Cancer detection and staging
- D. Obstetrics

✓ **Answer:** C. Cancer detection and staging

□ *Explanation:* Highly sensitive for detecting metabolically active malignancies.

7. The annihilation photons in PET travel:

- A. Randomly
- B. In the same direction
- C. 180° apart
- D. Perpendicular

✓ **Answer:** C. 180° apart

□ *Explanation:* Detected in coincidence for image reconstruction.

8. FDG uptake is increased in:

- A. Myocardial infarction
- B. Alzheimer's disease
- C. Inflammatory lesions
- D. Osteoporosis

✓ **Answer:** C. Inflammatory lesions

□ *Explanation:* Activated leukocytes have high glucose uptake.

9. False positives in PET can be caused by:

- A. Motion
- B. Low-dose CT
- C. Infections and inflammation
- D. Metal implants

✓ **Answer:** C. Infections and inflammation

□ *Explanation:* Mimic tumor uptake due to increased metabolism.

10. PET is superior to CT in:

- A. Anatomy of chest
- B. Bony details
- C. Functional or metabolic activity

D. Soft tissue calcifications

✓ **Answer:** C. Functional or metabolic activity

□ *Explanation:* PET images biochemical changes before anatomical changes appear.

11. The role of CT in PET-CT includes:

A. Showing flow

B. Measuring FDG uptake

C. Attenuation correction and localization

D. No role

✓ **Answer:** C. Attenuation correction and localization

□ *Explanation:* CT provides precise anatomical mapping.

12. SUV stands for:

A. Standard Uptake Value

B. Signal Uniformity Variation

C. Scanning Unit Value

D. Static Uptake Velocity

✓ **Answer:** A. Standard Uptake Value

□ *Explanation:* Quantifies FDG uptake relative to body weight and dose.

13. High SUV in PET scan indicates:

A. Decreased perfusion

B. Hypometabolism

C. Increased metabolic activity

D. Poor tracer distribution

✓ **Answer:** C. Increased metabolic activity

□ *Explanation:* Often correlates with malignancy or infection.

14. PET is useful in staging of all EXCEPT:

A. Lymphoma

B. Melanoma

C. Prostate cancer

D. Lung cancer

✓ **Answer:** C. Prostate cancer

□ *Explanation:* Prostate cancers often show low FDG uptake.

15. Which is not a limitation of PET-CT?

A. Radiation exposure

B. High cost

- C. Lack of functional imaging
- D. False positives from inflammation

✓ **Answer:** C. Lack of functional imaging

□ *Explanation:* PET provides excellent functional imaging.

16. Brain PET is useful in diagnosis of:

- A. Meningitis
- B. Parkinson's and Alzheimer's disease
- C. Hydrocephalus
- D. Subdural hematoma

✓ **Answer:** B. Parkinson's and Alzheimer's disease

□ *Explanation:* Detects regional metabolic abnormalities.

17. PET imaging is not useful in:

- A. Breast cancer
- B. Colorectal cancer
- C. Cardiac viability
- D. Acute bone fracture

✓ **Answer:** D. Acute bone fracture

□ *Explanation:* CT and MRI are preferred for fractures.

18. The positron range refers to:

- A. How far the photon travels
- B. The distance positron travels before annihilation
- C. CT resolution
- D. Scanner sensitivity

✓ **Answer:** B. The distance positron travels before annihilation

□ *Explanation:* Affects spatial resolution.

19. FDG is excreted through:

- A. Liver
- B. Bile
- C. Kidneys
- D. Intestine

✓ **Answer:** C. Kidneys

□ *Explanation:* Leads to physiologic uptake in urinary tract.

20. Normal FDG uptake is seen in:

- A. Brain

- B. Heart
- C. Kidneys
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* Physiologic uptake varies by organ metabolism.

21. FDG uptake in myocardium is variable based on:

- A. Renal clearance
- B. Glucose levels and fasting state
- C. Blood pressure
- D. Biliary function

✓ **Answer:** B. Glucose levels and fasting state

□ *Explanation:* Myocardial glucose metabolism is suppressed in fasting state.

22. In PET-CT, the CT component is performed with:

- A. High-dose contrast
- B. Standard radiography
- C. Low-dose CT
- D. MRI

✓ **Answer:** C. Low-dose CT

□ *Explanation:* Used primarily for attenuation correction and anatomical reference.

23. Most PET radiopharmaceuticals are produced in:

- A. Nuclear reactors
- B. Cyclotrons
- C. CT suites
- D. X-ray tubes

✓ **Answer:** B. Cyclotrons

□ *Explanation:* Required for short-lived positron-emitting isotopes.

24. The main concern in PET room shielding is:

- A. Beta radiation
- B. Gamma radiation
- C. Heat
- D. Sound

✓ **Answer:** B. Gamma radiation

□ *Explanation:* Emitted during annihilation events.

25. PET scan sensitivity is highest for detecting:

- A. Soft tissue swelling
- B. Bony metastases
- C. Metabolic active tumors
- D. Lung abscess

✓ **Answer:** C. Metabolic active tumors

□ *Explanation:* FDG PET is based on tumor glycolysis.

26. PET is commonly combined with which modality for best diagnostic value?

- A. SPECT
- B. CT
- C. MRI
- D. Fluoroscopy

✓ **Answer:** B. CT

□ *Explanation:* PET-CT provides metabolic + anatomical correlation.

27. Dual-time point imaging in PET refers to:

- A. Two contrast injections
- B. Repeating scans at different times
- C. Subtraction imaging
- D. Split-dose PET

✓ **Answer:** B. Repeating scans at different times

□ *Explanation:* Helps differentiate benign vs malignant uptake.

28. Which tracer is used for prostate PET scans?

- A. FDG
- B. Choline
- C. Iodine-123
- D. Gallium-67

✓ **Answer:** B. Choline

□ *Explanation:* Better suited for prostate tissue.

29. PET-MRI advantage over PET-CT includes:

- A. Cost
- B. Speed
- C. Radiation dose reduction
- D. Less complexity

✓ **Answer:** C. Radiation dose reduction

□ *Explanation:* MRI uses no ionizing radiation.

30. PET scan is most helpful in detecting:

- A. Bone erosion
- B. Soft tissue edema
- C. Viable tumor tissue
- D. Liver cyst

✓ **Answer:** C. Viable tumor tissue

□ *Explanation:* Helps monitor response to therapy.

31. The typical energy of annihilation photons in PET is:

- A. 140 keV
- B. 511 keV
- C. 1000 keV
- D. 25 keV

✓ **Answer:** B. 511 keV

□ *Explanation:* Standard for PET detectors.

32. Attenuation correction in PET improves:

- A. Patient comfort
- B. Signal-to-noise
- C. Image clarity and quantification
- D. Scan time

✓ **Answer:** C. Image clarity and quantification

□ *Explanation:* Reduces distortion from tissue density differences.

33. Which of the following has minimal FDG uptake?

- A. Brain
- B. Myocardium
- C. Urinary bladder
- D. Normal lung parenchyma

✓ **Answer:** D. Normal lung parenchyma

□ *Explanation:* Lungs are relatively avascular and show low uptake.

34. PET scan resolution is typically in the range of:

- A. 0.5 mm
- B. 2–5 mm
- C. 1 cm
- D. 10 cm

✓ **Answer:** B. 2–5 mm

□ *Explanation:* Dependent on scanner design and processing.

35. PET scanning is not recommended in:

- A. Diabetics without control
- B. Tumor recurrence
- C. Suspected inflammation
- D. CNS imaging

✓ **Answer:** A. Diabetics without control

□ *Explanation:* Hyperglycemia interferes with FDG uptake.

36. Patient preparation before FDG PET includes:

- A. High carbohydrate diet
- B. Fasting for 4–6 hours
- C. Sedation
- D. Fluid restriction

✓ **Answer:** B. Fasting for 4–6 hours

□ *Explanation:* Reduces insulin-mediated FDG uptake in muscle.

37. Highest physiologic uptake of FDG is seen in:

- A. Liver
- B. Kidneys
- C. Brain
- D. Spleen

✓ **Answer:** C. Brain

□ *Explanation:* Due to high baseline glucose metabolism.

38. Myocardial viability in PET is assessed using:

- A. Oxygen-15
- B. Thallium
- C. Nitrogen-13 ammonia
- D. FDG

✓ **Answer:** D. FDG

□ *Explanation:* Metabolically active but non-perfused tissue takes up FDG.

39. PET is preferred over SPECT for:

- A. Perfusion
- B. Bone scan
- C. Higher spatial resolution and quantification
- D. Lung V/Q scan

✓ **Answer:** C. Higher spatial resolution and quantification

□ *Explanation:* PET has better resolution and quantification than SPECT.

40. FDG is an analog of:

- A. Water
- B. Protein
- C. Glucose
- D. Lipid

✓ **Answer:** C. Glucose

□ *Explanation:* Used to trace glucose metabolism.

41. Delayed PET imaging helps differentiate:

- A. Inflammation vs infection
- B. Benign vs malignant lesions
- C. Blood vs bile
- D. Perfusion defects

✓ **Answer:** B. Benign vs malignant lesions

□ *Explanation:* Malignant lesions retain FDG longer.

42. Which is true about FDG uptake in tumors?

- A. Always low
- B. Independent of size
- C. Related to glycolytic activity
- D. Always proportional to grade

✓ **Answer:** C. Related to glycolytic activity

□ *Explanation:* High metabolic activity means more uptake.

43. PET detects recurrence better than:

- A. Histopathology
- B. MRI alone
- C. Blood tests
- D. X-ray

✓ **Answer:** D. X-ray

□ *Explanation:* PET is highly sensitive for early recurrence.

44. The half-life of carbon-11 is:

- A. 20 minutes
- B. 110 minutes
- C. 6 hours
- D. 12 hours

✓ **Answer:** A. 20 minutes

□ *Explanation:* Used for neuroreceptor studies.

45. The major limitation of PET is:

- A. Lack of specificity
- B. Too fast
- C. Low resolution
- D. High radiation

✓ **Answer:** A. Lack of specificity

□ *Explanation:* FDG uptake may be seen in benign conditions.

46. PET imaging is poor for evaluating:

- A. Brain tumors
- B. Myocardial perfusion
- C. Prostate cancer
- D. Lymphoma

✓ **Answer:** C. Prostate cancer

□ *Explanation:* Most prostate tumors have low FDG uptake.

47. Tumor SUV > 2.5 is suggestive of:

- A. Hypometabolic lesion
- B. Malignancy
- C. Benignity
- D. Nonfunctioning lesion

✓ **Answer:** B. Malignancy

□ *Explanation:* High uptake indicates aggressive nature.

48. Ideal tracer for PET brain perfusion:

- A. Iodine-123
- B. Gallium-68
- C. Oxygen-15
- D. FDG

✓ **Answer:** C. Oxygen-15

□ *Explanation:* Short half-life but ideal for perfusion studies.

49. PET scan should be avoided during:

- A. Hypothyroidism
- B. Pregnancy
- C. Lactation
- D. Menstruation

✓ **Answer:** B. Pregnancy

□ *Explanation:* Radiation exposure is hazardous to fetus.

50. PET-CT whole body scan typically takes:

- A. 5 minutes
- B. 10 minutes
- C. 30–45 minutes
- D. 90 minutes

✓ **Answer:** C. 30–45 minutes

□ *Explanation:* Includes uptake phase and scanning.

MRI Contrast Agents

1. The most commonly used contrast agent in MRI is based on:

- A. Iodine
- B. Gadolinium
- C. Barium
- D. Technetium

✓ **Answer:** B. Gadolinium

□ *Explanation:* Gadolinium is a paramagnetic metal used in most MRI contrasts.

2. Gadolinium enhances signal on:

- A. T1-weighted images
- B. T2-weighted images
- C. FLAIR
- D. Diffusion-weighted imaging

✓ **Answer:** A. T1-weighted images

□ *Explanation:* Gadolinium shortens T1 relaxation, appearing bright on T1W.

3. Which of the following is a macrocyclic gadolinium agent?

- A. Gadopentetate dimeglumine
- B. Gadobutrol
- C. Gadofosveset
- D. Manganese chloride

✓ **Answer:** B. Gadobutrol

□ *Explanation:* Macrocyclic agents have a more stable structure, reducing Gd release.

4. Gadolinium is considered unsafe in patients with:

- A. Liver disease
- B. Renal failure
- C. Asthma
- D. Pregnancy (1st trimester)

✓ **Answer:** B. Renal failure

□ *Explanation:* Linked to Nephrogenic Systemic Fibrosis (NSF).

5. Nephrogenic Systemic Fibrosis (NSF) is a rare but serious complication of:

- A. Iodinated contrast
- B. Barium
- C. Gadolinium
- D. CT angiography

✓ **Answer:** C. Gadolinium

□ *Explanation:* Occurs mainly in patients with severe renal dysfunction.

6. Which MRI contrast agent binds to albumin and provides prolonged vascular enhancement?

- A. Gadoterate meglumine
- B. Gadobutrol
- C. Gadofosveset trisodium
- D. Ferumoxytol

✓ **Answer:** C. Gadofosveset trisodium

□ *Explanation:* It is a blood-pool agent used for MR angiography.

7. A key property of gadolinium that helps in imaging is its:

- A. Ferromagnetism
- B. Paramagnetism
- C. Diamagnetism
- D. Superconductivity

✓ **Answer:** B. Paramagnetism

□ *Explanation:* Enhances T1 relaxation by local magnetic field fluctuations.

8. Which of the following is NOT a function of MRI contrast?

- A. Tumor characterization
- B. Angiography
- C. Bone mineral density
- D. Inflammation detection

✓ **Answer:** C. Bone mineral density

□ *Explanation:* MRI contrast does not assess mineral density.

9. Gadolinium toxicity is minimized by:

- A. Chelation with DTPA or macrocyclic ligands
- B. Heating
- C. Oral administration
- D. Dilution

✓ **Answer:** A. Chelation with DTPA or macrocyclic ligands

□ *Explanation:* Prevents free gadolinium ion release.

10. Which is a contraindication to gadolinium administration?

- A. High blood pressure
- B. Pregnancy (relative)
- C. Severe renal insufficiency (eGFR < 30 ml/min/1.73 m²)
- D. Hypothyroidism

✓ **Answer:** C. Severe renal insufficiency

□ *Explanation:* NSF risk increases significantly.

11. The use of gadolinium contrast in MRI is most helpful in evaluating:

- A. Calcified lesions
- B. Renal stones
- C. Brain tumors
- D. Pneumothorax

✓ **Answer:** C. Brain tumors

□ *Explanation:* Enhances tumor margins and breakdown of blood-brain barrier.

12. Which of the following is an iron oxide-based contrast agent?

- A. Gadodiamide
- B. Ferumoxytol
- C. Gadoteridol
- D. Gadopentetate

✓ **Answer:** B. Ferumoxytol

□ *Explanation:* Used in MR lymphangiography and vascular imaging.

13. The risk of NSF is least with:

- A. Linear gadolinium agents
- B. High-osmolar iodine contrast
- C. Macrocyclic gadolinium agents
- D. Iodixanol

✓ **Answer:** C. Macrocyclic gadolinium agents

□ *Explanation:* More stable, less likely to release free Gd ions.

14. Which parameter increases most with gadolinium contrast on MRI?

- A. T2 time
- B. Proton density
- C. T1 signal intensity

D. Echo time

✓ **Answer:** C. T1 signal intensity

□ *Explanation:* Brightens tissues on T1-weighted sequences.

15. Gadobutrol is marketed as:

A. Dotarem

B. Gadovist

C. Omniscan

D. Magnevist

✓ **Answer:** B. Gadovist

□ *Explanation:* A macrocyclic non-ionic contrast agent.

16. Gadolinium contrast excretion occurs mainly via:

A. Liver

B. Kidney

C. Skin

D. Lungs

✓ **Answer:** B. Kidney

□ *Explanation:* Hence the concern in renal impairment.

17. Gadolinium is administered:

A. Orally

B. Inhaled

C. Intravenously

D. Subcutaneously

✓ **Answer:** C. Intravenously

□ *Explanation:* Rapid distribution via blood.

18. Which structure normally shows no enhancement post-Gd injection in MRI?

A. Pituitary gland

B. Brainstem

C. Choroid plexus

D. Normal cortex (due to intact BBB)

✓ **Answer:** D. Normal cortex

□ *Explanation:* Intact blood-brain barrier restricts gadolinium entry.

19. An alternative contrast for patients allergic to gadolinium is:

A. Barium sulfate

B. Iodinated contrast

- C. Ferumoxytol
- D. None available

✓ **Answer:** C. Ferumoxytol

□ *Explanation:* Iron-based contrast, approved off-label for MRI.

20. Gadolinium contrast agents are classified into:

- A. Ionic vs non-ionic
- B. Linear vs macrocyclic
- C. High vs low T2 relaxivity
- D. Alpha vs beta emitters

✓ **Answer:** B. Linear vs macrocyclic

□ *Explanation:* Macrocyclic agents are safer in renal disease.

21. The main mechanism of Gd contrast enhancement is due to:

- A. Proton spin inversion
- B. Increase in T2 decay
- C. Reduction of T1 relaxation time
- D. Magnetic flux increase

✓ **Answer:** C. Reduction of T1 relaxation time

□ *Explanation:* Increases signal intensity on T1-weighted images.

22. Use of contrast in MRI angiography (MRA) is to:

- A. Reduce noise
- B. Highlight vascular flow
- C. Eliminate venous signals
- D. Lower TR and TE

✓ **Answer:** B. Highlight vascular flow

□ *Explanation:* Blood-pool agents improve visualization of vessels.

23. Immediate adverse reactions to gadolinium contrast include:

- A. Nephrotoxicity
- B. Nausea, vomiting, rash
- C. Bone marrow suppression
- D. Radiation dermatitis

✓ **Answer:** B. Nausea, vomiting, rash

□ *Explanation:* Rare and usually mild.

24. Gadoteric acid is marketed under the name:

- A. Dotarem

- B. Gadovist
- C. Omniscan
- D. Multihance

✓ **Answer:** A. Dotarem

□ *Explanation:* Macrocyclic ionic gadolinium agent.

25. Gadolinium-based contrast agents are not used in:

- A. Functional MRI
- B. Perfusion MRI
- C. T2* GRE imaging
- D. Bone mineral scans

✓ **Answer:** D. Bone mineral scans

□ *Explanation:* This is a nuclear medicine or DEXA-based study.

26. In hepatic imaging, which agent has liver-specific uptake?

- A. Gadobenate dimeglumine (Multihance)
- B. Gadoterate
- C. Gadobutrol
- D. Gadopentetate

✓ **Answer:** A. Gadobenate dimeglumine

□ *Explanation:* Shows delayed hepatobiliary phase enhancement.

27. After Gd contrast administration, images should be obtained within:

- A. 1–2 minutes
- B. 10–15 minutes
- C. 30–60 minutes
- D. 5–8 hours

✓ **Answer:** B. 10–15 minutes

□ *Explanation:* Most contrast enhancement is seen early.

28. Which population requires caution for Gd contrast use?

- A. Pediatric
- B. Elderly
- C. Pregnant women
- D. All of the above

✓ **Answer:** D. All of the above

□ *Explanation:* Especially for renal, fetal, and immune risks.

29. Gadolinium leakage through a compromised BBB causes:

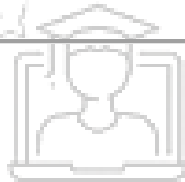
- A. Signal void
 - B. Bright enhancement on T1W
 - C. Artifact
 - D. T2 hypointensity
- ✓ **Answer:** B. Bright enhancement on T1W

□ *Explanation:* Indicates pathological disruption of the BBB.

30. Which organ is primarily involved in excreting gadolinium-based contrast agents?

- A. Spleen
 - B. Pancreas
 - C. Kidney
 - D. Gallbladder
- ✓ **Answer:** C. Kidney

□ *Explanation:* Hence GFR is checked prior to administration.



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