NECK

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AGENDA

Clinical History

Examination

Impression & Differential Diagnoses

Workup & Management

Additional Notes

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HISTORY

Subtitle

HISTORY

- 46 year old / female
- C/O:
  - Neck swelling
  - Painless
  - Gradually getting bigger x few months, had fullness for years

FURTHER HISTORY

- Concerned about look on her neck.
- Had sorethroat a few weeks ago, otherwise no pain.
- No other lumps elsewhere.
- No PMHx.
- Migrant from Southeast Asia.
- Recalls grandmother has similar issue when she was younger.

WHAT ELSE WOULD YOU LIKE TO KNOW?

EXAMINATION

Normal general physical examination.

- Eyes normal.

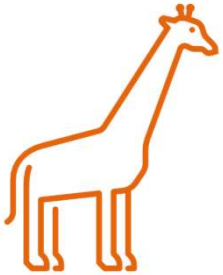
Vitals normal.

Normal mood and voice.

Neck examination:

- Large neck midline swelling extending towards to right side.
- Non tender, soft to firm in consistency, non-expanding.
- Moves with swallowing. Does not move with tongue protrusion.
- Carotid pulses felt.
- No other swellings felt.

OTHER EXAMINATIONS.



Lymph nodes.

Not enlargement LNs felt.

Systemic examinations:

CVS - normal.

Neurology including cranial nerves - normal.

Any other relevant examinations you'd like to perform and why?

WHAT DOES THE PATIENT HAVE?

Summarize the case.

IMPRESSION & Differential Diagnoses.

REMEMBER - WORRYING FEATURES.

- Dysphagia.
- Respiratory compromise.
- Hemoptysis.
- Rapid tumor enlargement.
- Changes in voice.
- Vocal cord paralysis.
- Tumor fixed to surrounding structures.
- Ultrasonographic evidence of macroscopic extrathyroidal extension.

LET'S GO THROUGH HX & EXAM IN DETAIL.

HOPI

Neck Swelling

- Where - Site.
- Onset.
- Duration.
- Sudden change in size or rate of growth +/- pain.

Pain

- Painful - duration.
- Painless.

Demographic Hx

- Age.
  - Rules of 80s.
- Sex.
- Occupation.
- Area of residence.
  - Why?
  - Iodine deficiency in certain geographical area - endemic goitre.

HOPI

Associated Sx

- Pressure or compressive effects.
  - Dysphagia, stridor (Listen!).
- Cosmetic.
- Hoarseness of voice.
  - Pressure vs involvement of RLN.

Thyroid status

- Euthyroid.
- Hyperthyroidism.
  - Primary thyrotoxicosis.
  - Secondary thyrotoxicosis.
  - Graves triad*.
- Hypothyroidism.
  - Metabolism changes.
  - Body habitus & features.
  - Neurology.

Other Hx

- Past history
  - Previous swellings: Burst, inflamed, size fluctuates, on & off discharge.
  - Med: Autoimmune.
  - Medications.
  - Childhood / Previous exposure to rad.
- Personal history
  - Diet - goitrogens (cabbage, kale), low iodine.
- Family history
  - Goitres, thyrotoxicosis, thyroid cancers.

Hypothyroidism

- Hair loss
- Inability to think clearly
- Goiter (enlarged thyroid)
- Reduced heart rate
- Strong fatigue
- Sensitivity to cold
- Dry skin
- Weight gain
- Puffiness
- Memory problems
- Constipation
- Irregular menstrual periods
- Severe PMS
- Depression, mood swings
- Joint, muscle pain
- High cholesterol

Hyperthyroidism

- Hair loss
- Bulging eyes
- Goiter (enlarged thyroid)
- Heart palpitations
- Tremors
- Heat intolerance
- Sleep disturbances
- Weight loss
- Shortness of breath
- Diarrhoea
- Increased appetite
- Irregular menstrual periods
- Muscle weakness
- Sweating
- Anxiety, nervousness
- Depression, mood swings

WHAT ARE YOU THINKING OF?

Formulate your Main Impression & Differential Diagnoses

Anything specific you would look for during examination?

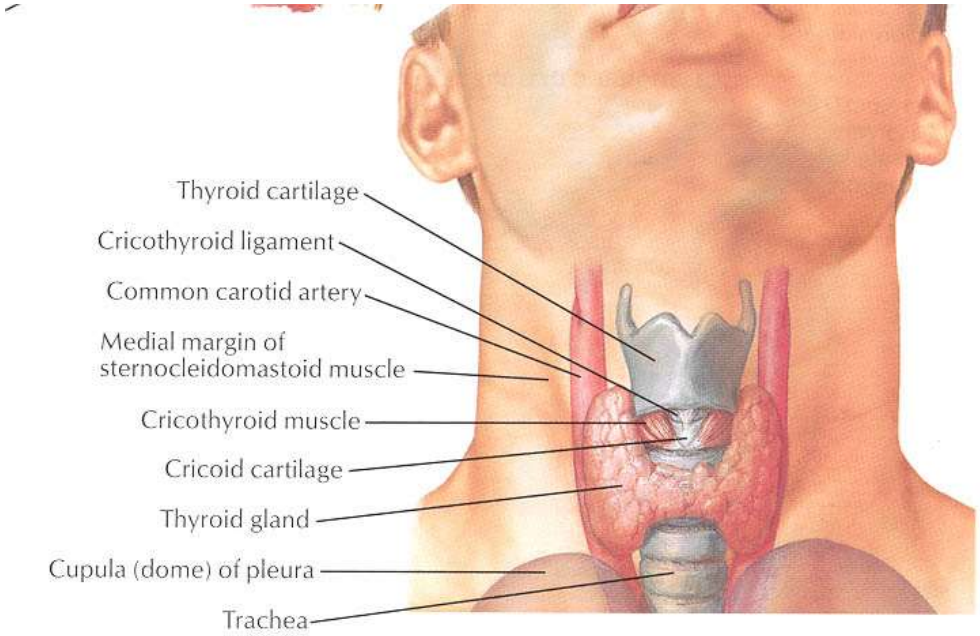
DIFFERENTIAL DIAGNOSES OF NECK MASSES

Table 1. Common Neck Masses

Neoplastic	Congential/Developmental	Inflammatory
Metastatic Unknown primary epidermoid carcinoma	Sebaceous cysts	Lymphadenopathy
Primary head and neck epidermoid carcinoma or melanoma	Branchial cleft cysts	Bacterial
Adenocarcinoma	Thyroglossal duct cysts	Viral
Thyroid	Lymphangioma/hemangioma	Granulomatous
Lymphoma	Dermoid cysts	Tuberculous
Salivary	Ectopic thyroid tissue	Catscratch
Lipoma	Laryngocele	Sarcoidosis
Angioma	Pharyngeal diverticulum	Fungal
Carotid body tumor	Thymic cysts	Sialadenitis
Rhabdomyosarcoma		Parotid
		Submaxillary
		Congenital cysts
		Throtrast granulomas

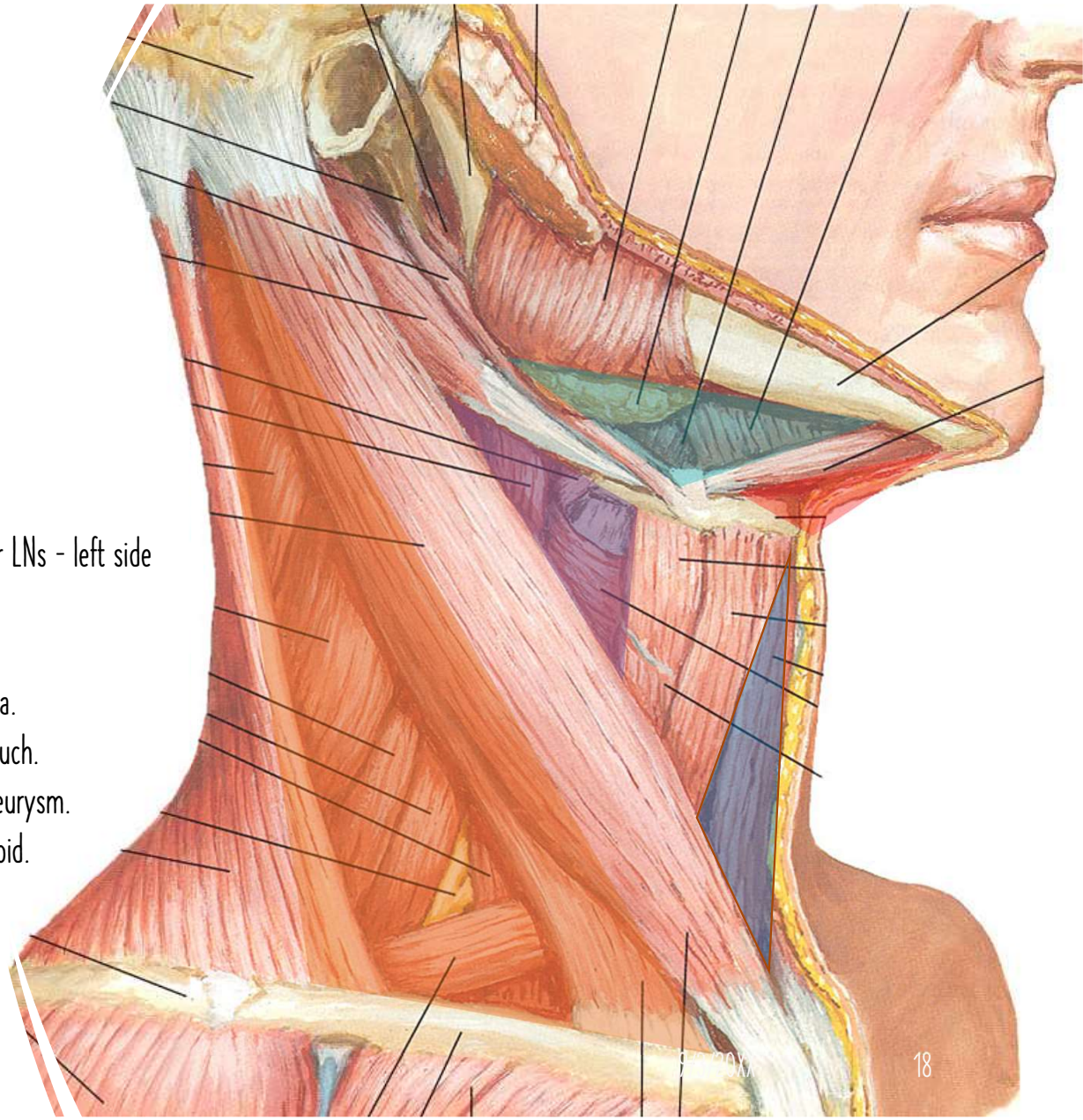
MIDLINE SWELLINGS - ANTERIOR TRIANGLE

- Ludwig Angina.
- Lymph node or salivary gland - submental.
- Dermoid cyst (anywhere in the midline).
- Lipoma (submental).
- Thyroglossal cyst.
- Subhyoid bursitis.
- Extrinsic Ca of larynx (late).
- Thyroid swelling.
- Thymic swelling.
- Cystic hygroma (suprasternal space).
- Infected cysts / abscesses.



LATERAL NECK SWELLINGS

- Submandibular Δ
  - LNs.
  - Submandibular salivary gland.
  - Deep / plunging ranula.
  - Bony tumour or growth from the jaw.
- Carotid Δ
  - Aneurysm of carotid arteries.
  - Carotid body tumours - clinical features?
  - Branchial cyst.
  - Goitre.
  - SCM tumour.
- Posterior Δ
  - Supraclavicular LNs - left side (be aware!)
  - Cervical rib.
  - Cystic hygroma.
  - Pharyngeal pouch.
  - Subclavian aneurysm.
  - Aberrant thyroid.
- Submental Δ
- Muscular Δ



ASK YOURSELF:
IS THIS A MIDLINE OR LATERAL NECK SWELLING(S)?

This helps you narrow down your differential diagnoses and determine what examination you'll have to perform to confirm your suspicion.

In correlation to the positive history you have obtained from the patient.

EXAMINATION - THYROID

General Physical Examination

- Nutrition & build.
- Facies.
  - Hyper-: Agitation, nervousness +/- exophthalmos.
  - Hypo-: Puffiness, mask-like.
- Mental state.
- Skin & temperature.
  - Moist, sweaty vs dry, inelastic.
- Vitals: BP & pulse rate.

Local / Neck Examination

- LOOK
  - Midline or lateral swelling(s).
  - Diffuse/uniform or obvious unilateral.
  - Movement on deglutition.
  - Movement of protrusion of tongue.
  - Skin changes, sinus opening, previous scar or radiation burn.
  - Horner's syndrome: DDx??

LOCAL EXAMINATION - CONTINUE

Palpation

- Where do you stand & patient's position.
  - Patient sitting, relaxed neck position.
  - Behind then front?
- Palpate each lobe.
  - Describe the characteristics.
- Palpate on swallowing.
  - Feel for movement.
  - Feel for lower border

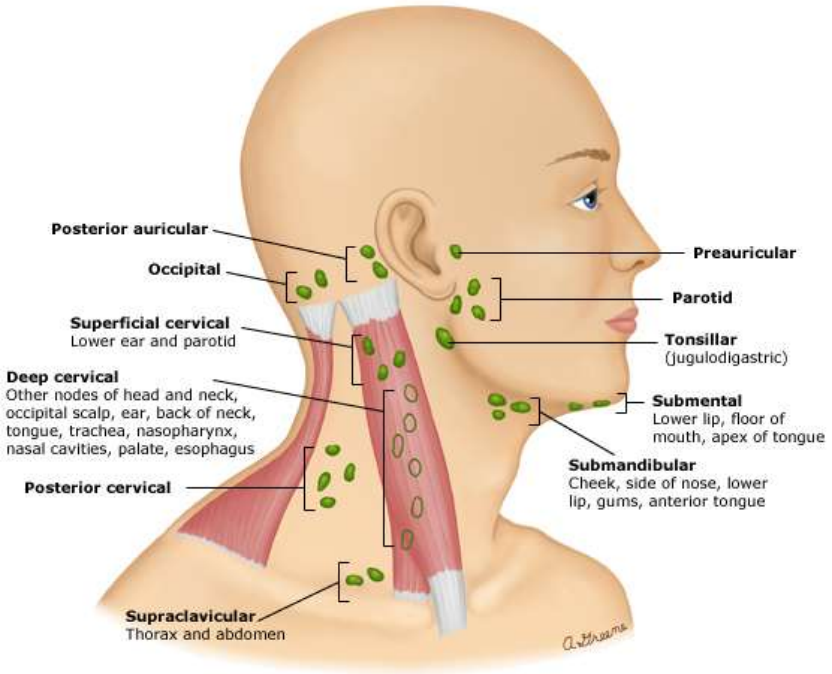
Palpation

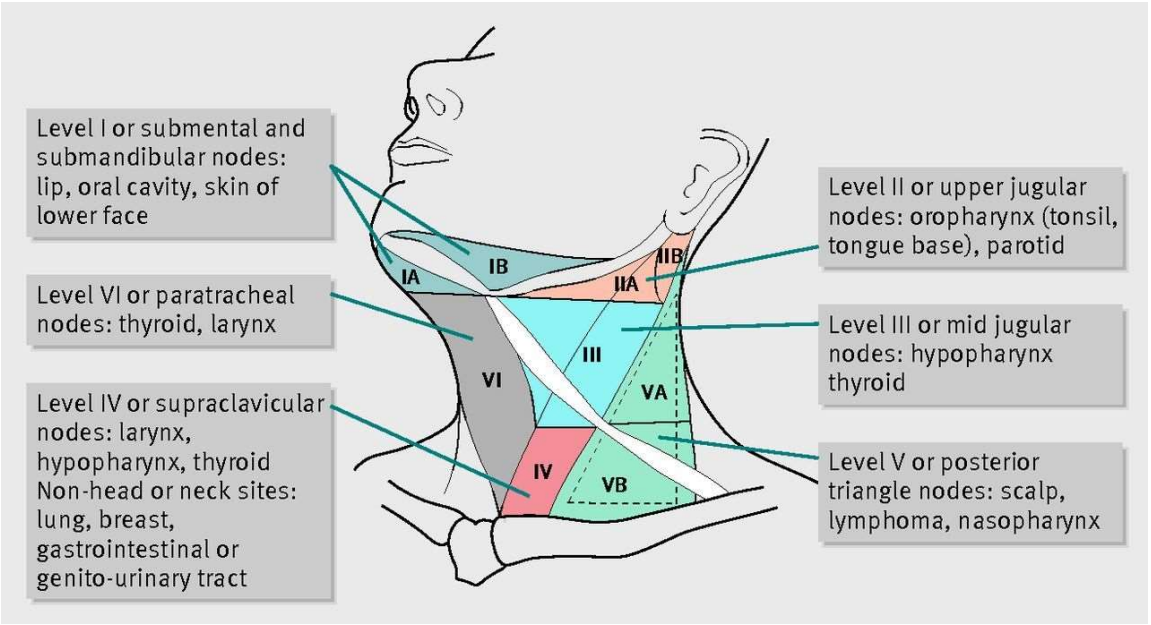
- Enlargement.
  - Whole or localized swelling.
  - Single or multiple.
  - Mobility.
  - Lower border - extension.
  - Pressure effect.
    - Dysphagia.
    - Stridor.
  - Displacement of trachea.

Palpation

- Carotid pulse ++.
  - Berry's sign.
- Cervical lymph nodes.
  - Do you have a systematic way of palpating?
- Other swellings.

LYMPHATIC LEVELS





LOCAL EXAMINATION - CONT..

Percussion

- Manubrium sterni.
    - Not always, but extremely large retrosternal goitre can extend behind sternum = dullness

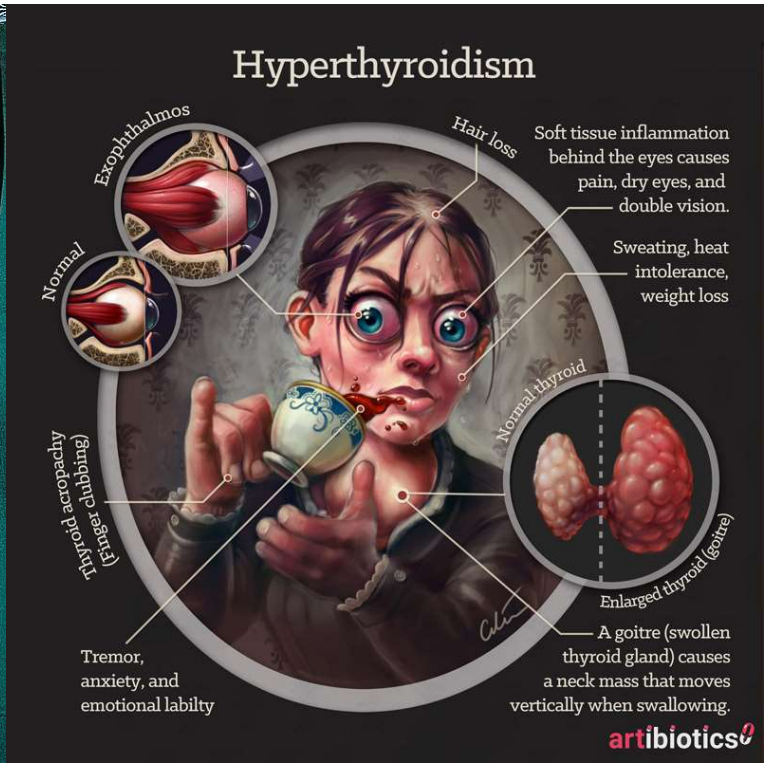
Listen

- Stridor.
    - Compression - airway obstruction.
- Cardiac murmurs or systolic bruits.
    - Hyperdynamic state: Ejection systolic murmur in thyrotoxicosis.
    - Bruit: Thyroid bruit (hyperTSH - high blood flow), aneurysm, carotid body tumour.

OTHER RELEVANT EXAMINATION

Hyperthyroid - Toxic signs.

- Thyrotoxic eye signs & complications.
- Pulse rate & volume + BP ↑.
- Tremor - fine.
- Hand acropathy / clubbing.
- Pretibial myxedema - Graves.
- Skin & temp.
- Thyroid bruits (+/-).
- CVS:
  - Thyrotoxic dilated cardiomyopathy (NIDCM).
  - Arrythmias.
  - Heart failure.



OTHER RELEVANT EXAMINATION

Fig. 2 **A patient before and after successful treatment of primary hypothyroidism.**

Hypothyroid.

- Facies & body habitus - obese.
- Sparse hair - eyebrow*, scalp.
- Dry skin.
- Pulse rate - Bradycardia, heart block.
- CNS.
  - Delayed reflexes.
  - Myxedema coma.

WORKUP

Investigate

- Bedside:
  - ECG - why?
- Blood.
  - Routine bloods.
  - TFT.
  - Autoimmune screen.
    - When would you perform this?
- Urine.
  - Pregnancy test.

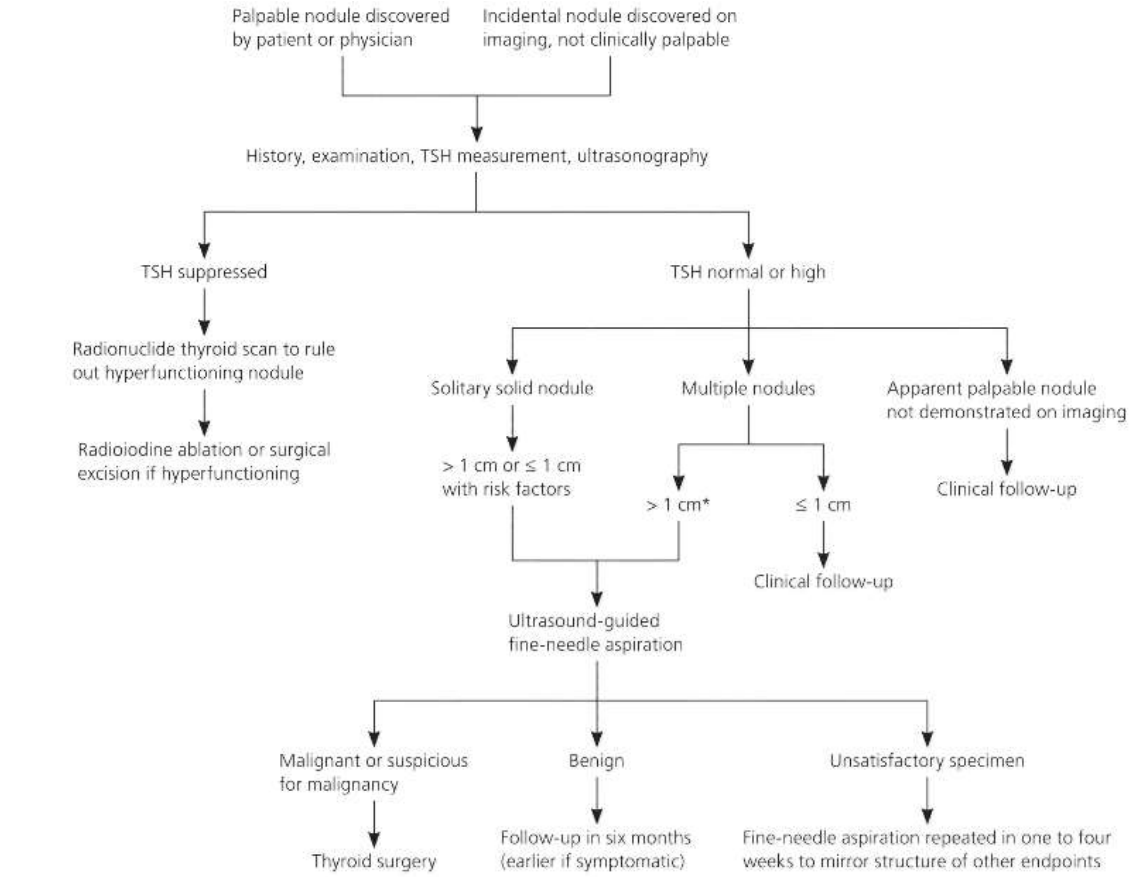
Imaging

- USS +/- FNA.
  - All patients with thyroid swelling.
  - Including incidentaloma on CT.
  - Solid vs cystic masses.
  - Congenital cysts from solid nodes / tumours.
  - Non-invasive.
  - FNA = Standard of diagnosis.
    - Any neck mass that is not an obvious abscess
    - Persistence after a 2 week course of antibiotics for initial diagnosis of inflammatory mass

Anything else?

- CT scan. Why?
  - Extent of lesion.
  - Detection of primary of unknown origin (metastatic).
  - Pathologic node: Lucent, >1.5cm, loss of shape.
- MRI - similar info as CT.
- PET scan. Why?
- Thyroid scintigraphy / radionuclide scan.
  - Non-invasive using radiopharmaceutical.
  - Salivary gland and thyroid masses.

THYROID NODULE ASSESSMENT



—Cutoff size for biopsy with multiple nodules not clearly established.

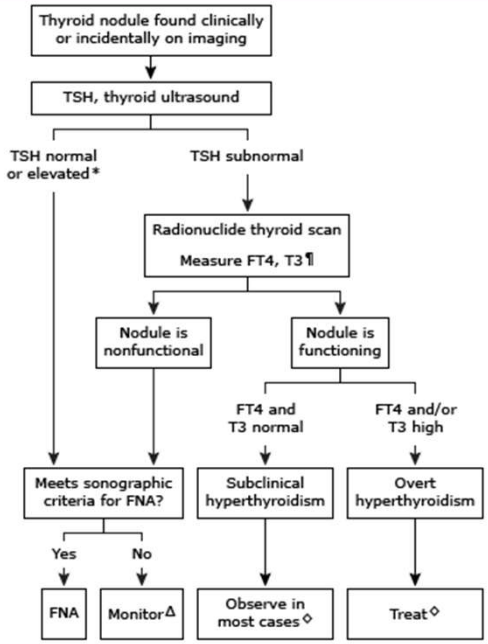
Modified from Am Fam Physician. 2013 Aug 1;88(3):193-196

Ultrasound features associated with thyroid cancer risk in adults

Ultrasonographic features that are associated with an increased risk of thyroid cancer
Hypoechoic
Microcalcifications
"Twinkling" on B-flow imaging
Central vascularity
Irregular margins
Incomplete halo
Nodule is taller than wide
Documented enlargement of a nodule
Ultrasonographic features that are associated with a low risk of thyroid cancer
Hyperechoic
Large, coarse calcifications (except medullary cancer)
Peripheral vascularity
Resembles puff or Napoleon pastry
Spongiform appearance
Comet-tail shadowing

UpToDate®

Initial evaluation of a patient with a thyroid nodule



This algorithm is intended to be used in conjunction with additional UpToDate content on thyroid nodules.

TSH: thyroid-stimulating hormone; FT4: free thyroxine; T3: triiodothyronine; FNA: fine-needle aspiration.
* Patients with TSH above the normal range require an evaluation for hypothyroidism. Refer to UpToDate content on hypothyroidism.
¶ Patients with TSH below the normal range require an evaluation for hyperthyroidism. Refer to UpToDate content on hyperthyroidism.
Δ Thyroid nodules that do not meet sonographic criteria for FNA should be monitored with periodic ultrasonography. The frequency of evaluation (ranging from 6 to 24 months) depends upon the sonographic features of the nodules.
◇ Selected cases of subclinical hyperthyroidism warrant treatment. Refer to UpToDate content on subclinical hyperthyroidism and toxic adenoma.

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NODAL WORKUP

ANY WORRYING FEATURES?

Malignancy is the major concern in an adult with a new lateral neck mass.

Asymptomatic cervical mass - 12% of cancer.

~ 80% of these are SCC.

MANAGEMENT - THYROID

Medical management (if relevant)

- Endocrine input.
  - Control hormonal status.
  - TFT monitoring & symptoms management.
  - Thyrotoxicosis.
    - Beta-blocker.
    - Thionamide - teratogenic.
    - If pregnant, Propylthiouracil (PTU) in T1 → then switch.
    - Iodine (prior to surgery, if indicated).

Operation

- Indications:
  - Compressive or obstructing symptoms.
  - Suspicious or indeterminate nodules.
  - Toxic adenoma or MNG.
- Thyroid surgery: hemi- or complete thyroidectomy.
  - Neck / Lymph node dissection - malignancy.
- Observe.
  - Pregnant.
  - Asymptomatic & serial scan monitoring.
  - Cannot operate is active thyrotoxicosis! Why??

MANAGEMENT

Post op - Immediate & benign.

- Postop follow up.
  - Immediate:
    - Calcium +/- PTH in complete thyroidectomy. Why?
    - Look for other complications. Eg?
  - Histology f/up & wound.
  - TFT monitoring and supplementation.

Post op cancer.

- Cancer follow up.
  - USS.
  - TSH.
  - Serum TG (thyroid hormone suppression).
  - Other imaging if relevant eg PET-FDG.

Treatment of Graves' hyperthyroidism

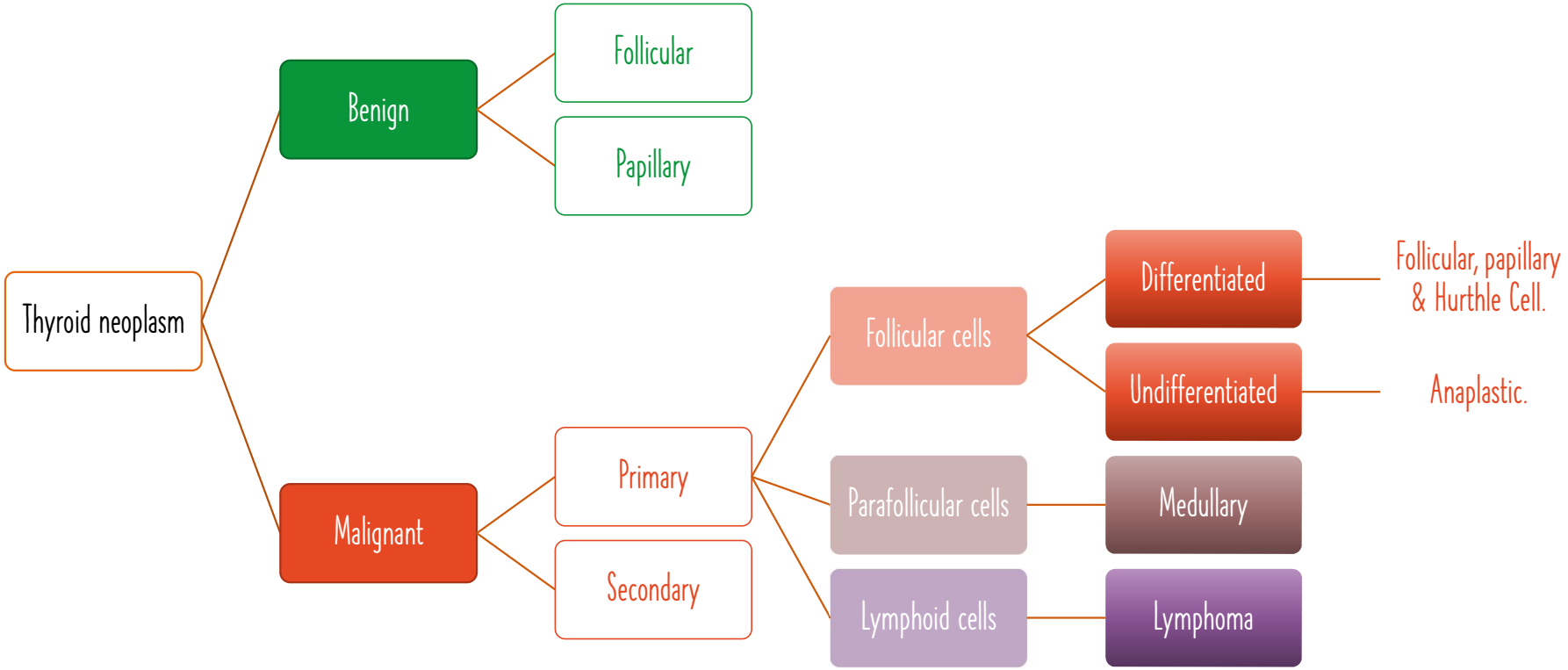
Therapy	Advantages	Disadvantages
Thionamides	Chance of permanent remission Some patients avoid permanent hypothyroidism Lower initial cost	Minor side effects – Rash, hives, arthralgias, transient granulocytopenia, gastrointestinal symptoms Major side effects – Agranulocytosis, vasculitis (lupus-like syndrome), hepatitis Risk of fetal goiter, hypothyroidism, and congenital anomalies if pregnant Requires more frequent monitoring
Radioiodine	Permanent resolution of hyperthyroidism	Permanent hypothyroidism Patient must take radiation precautions for several days after treatment, avoiding contact with young children and pregnant women Development or worsening of Graves' ophthalmopathy Rare radiation thyroiditis Patient concerns about long-term oncogenic effects of radiation
Surgery	Rapid, permanent cure of hyperthyroidism	Permanent hypothyroidism Risks for iatrogenic hypoparathyroidism and recurrent laryngeal nerve damage Risks associated with general anesthesia High cost

Summary of the advantages and disadvantages of the 3 major therapeutic modalities used in the treatment of Graves' hyperthyroidism.

UpToDate®

	Papillary Ca	Follicular Ca	Medullary Ca	Anaplastic Ca
Presentation	Earlier peak: 30-50 years.	Peak: 40-60 years.	Sporadic / Familial MEN 2A & B.	Older.
Mets	Lymph node (most common).	Hematogenous & vascular invasion. Distant mets (25%) - bone, lung etc.	Lymph node & early mets.	Locally advance & early lung involvement (most common) & brain (5%).
Tumour marker or specific lab Ix.	-	-	Calcitonin & CEA.	Ca2+ ↑↑↑ - parathyroid glands invasion.
Tissue diagnosis	FNA.	Frozen section. *FNA - follicular cells, can be benign or malignant!	FNA - pleomorphic cells, calcitonin-producing parafollicular C cells.	FNA +/- Core biopsy.
Remarks	Good prognosis. Monitor TG levels postop.	FNA is not diagnostic.	Genetic screen. MEN syndrome workup.	Painful aggressive swelling. BRAF gene. Poor prognosis.

THYROID NEOPLASM



ADDITIONAL NOTES

Other conditions & extra info

GENERAL CONSIDERATIONS

Patient age

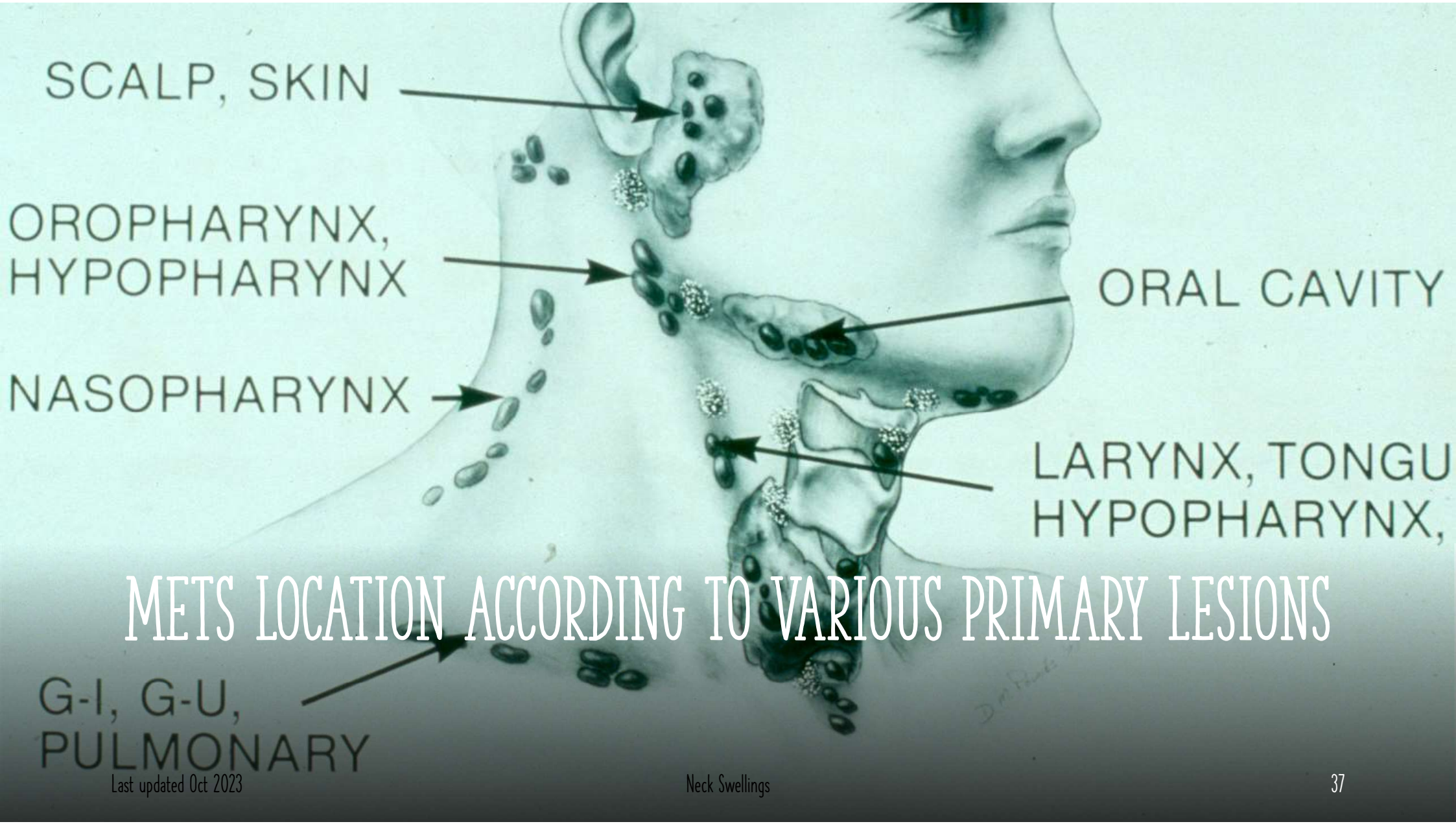
- Pediatric (0 - 15 years): 90% benign.
- Young adult (16 - 40 years): 90% benign.
- Late adult (>40 years): "rule of 80s".

***the rule of 80s"

- An adult with a suspicious lateral neck mass:
  - 80% of the neoplasms are malignant.
  - 80% of the malignancies represent metastases.
  - 80% of these metastases are from above the clavicle.

Location

- Congenital masses: consistent in location.
- Metastatic masses: key to primary lesion.



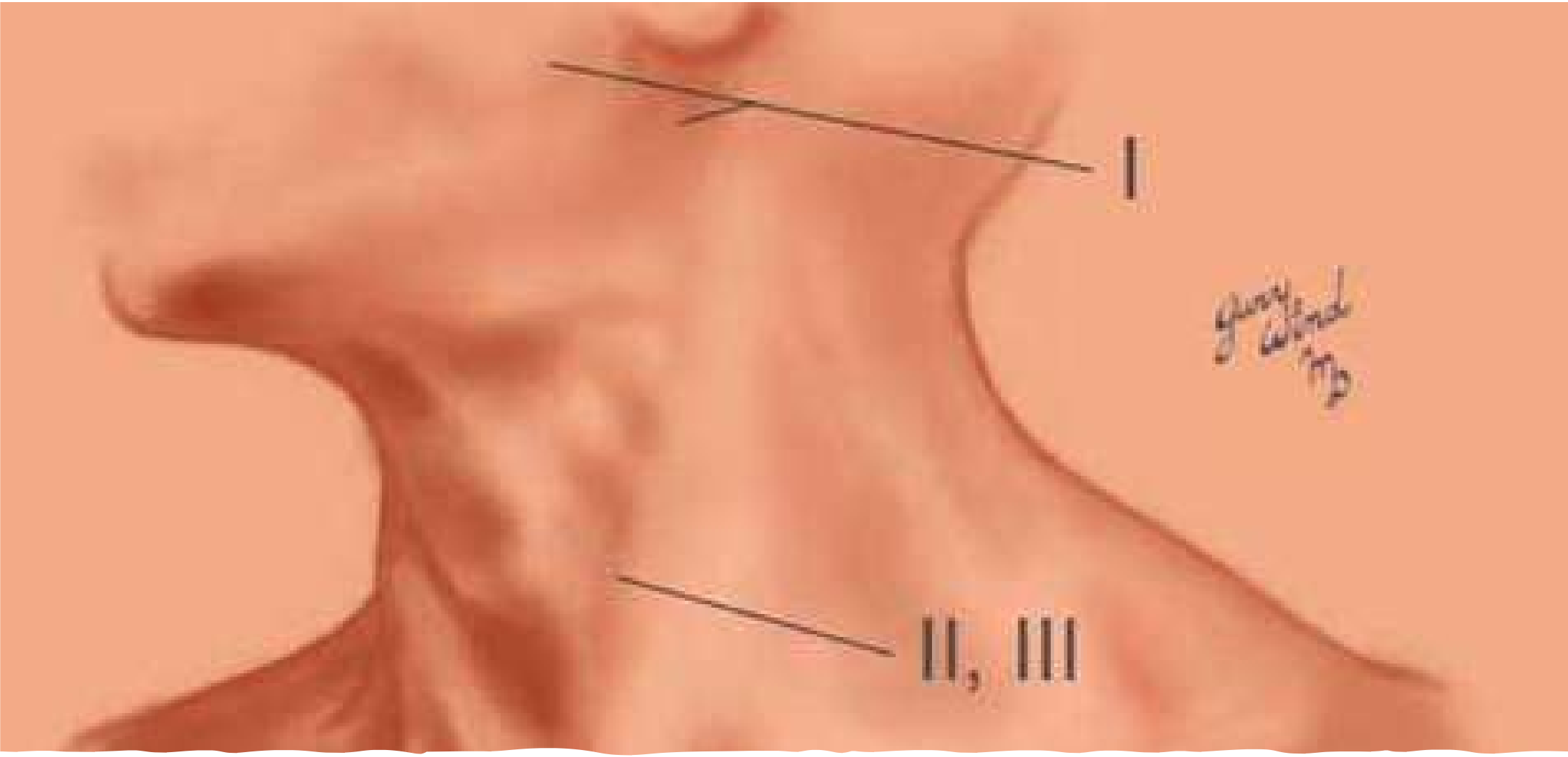
METS LOCATION ACCORDING TO VARIOUS PRIMARY LESIONS

CONGENITAL AND DEVELOPMENTAL MASS

- Epidermal and sebaceous cysts
- Branchial cleft cysts
- Thyroglossal duct cyst
- Vascular tumors

BRANCHIAL CLEFT CYSTS

- Branchial cleft anomalies.
- 2nd cleft most common (95%) - tract medial to cnXII between internal and external carotids.
- 1st cleft less common - close association with facial nerve possible.
- 3rd and 4th clefts rarely reported.
- Present in older children or young adults often following URTI.
- Most common as smooth, fluctuant mass underlying the SCM.
- Skin erythema and tenderness if infected.
- Treatment:
  - Initial control of infection.
  - Surgical excision, including tract.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THYROGLOSSAL DUCT CYST

- Most common congenital neck mass (70%).
- 50% present before age 20.
- Midline (75%) or near midline (25%).
- Usually just inferior to hyoid bone (65%).
- Elevates on swallowing/protrusion of tongue.
- Treatment is surgical removal (Sistrunk procedure) after resolution of any infection.

LYMPHOMA

- More common in children and young adults.
- Up to 80% of children with Hodgkin's have a neck mass.
- Signs and symptoms:
  - Lateral neck mass only (discrete, rubbery, nontender).
  - Fever.
  - Hepatosplenomegaly.
  - Diffuse adenopathy.

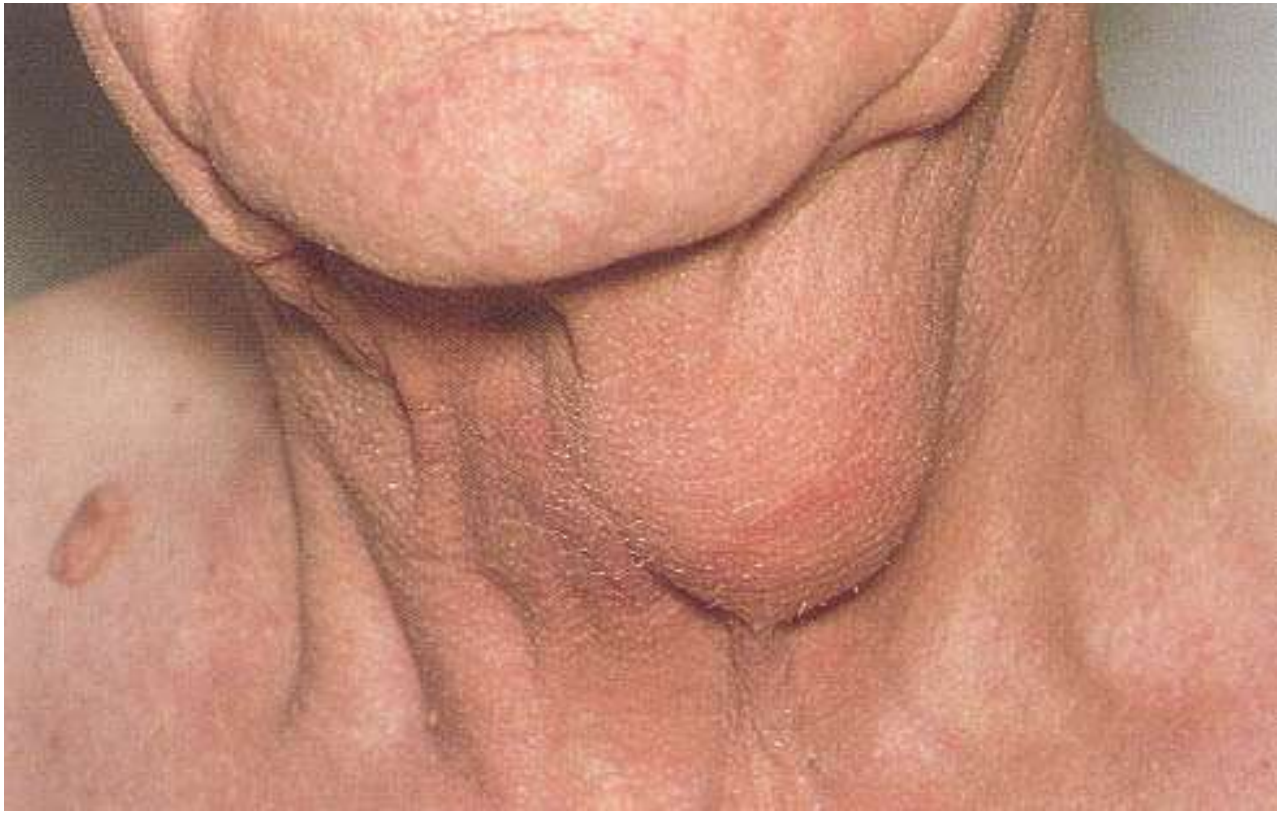
- FNA - first line diagnostic test.
- May require open excisional biopsy for subtyping of lymphoma.
- Full workup:
  - CT scans of chest, abdomen, head and neck.
  - Bone marrow biopsy.

SALIVARY GLAND TUMOURS

- Enlarging mass anterior/inferior to ear or at the mandible angle - highly suspicious.
- Benign
  - Asymptomatic except for mass.
- Malignant
  - Rapid growth, skin fixation, cranial nerve palsies.
    - Which nerves?
- Diagnostic tests
  - FNA:
    - Preferred test.
    - Shown to reduce surgery by 1/3.
    - Delineates intra-glandular lymph node, localized sialadenitis or benign lymphoepithelial cysts.
    - May facilitate surgical planning and patient counseling.
    - Accuracy >90% (sensitivity: ~90%; specificity: ~80%).
  - CT/MRI:
    - Deep lobe tumors, intra vs. extra-parotid.

LIPOMA

- Soft, ill-defined mass.
- Usually >35 years of age.
- Asymptomatic.
- Clinical diagnosis.



EPIDERMAL AND SEBACEOUS CYSTS

Most common congenital/developmental mass.

Older age groups.

Clinical diagnosis.

- Elevation and movement of overlying skin.
- Skin dimple or pore or punctum.

Excisional biopsy.

OTHERS

Vascular Tumours

- Lymphangiomas and hemangiomas.
- Usually within 1st year of life.
- Hemangiomas often resolve spontaneously, while lymphangiomas remain unchanged.
- CT/MRI may help define extent of disease.

Inflammatory Disorders

- Lymphadenitis.
  - Very common, 1st decade.
  - Tender + systemic infection signs.
  - Directed ABX with f/up.
- Granulomatous lymphadenitis.
  - Infection over weeks to months.
  - Common etiologies: TB, cat-scratch fever, actinomycosis, sarcoidosis.

SUMMARY

- Malignancy is the major concern in an adult with a new lateral neck mass.
- Accurate history and complete clinical examination are essential.
- Fine-needle aspiration biopsy is an effective tool to determine the etiology of a neck mass.

THANK YOU

Dr Yvonne Mak

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Attendance - Medical Student Education 2023