Head & Neck I, II & III

Evaluation and Management of the Patients with a Neck Mass

Objectives:

- A) Neck masses introduction, anatomy, diagnosis, differential diagnosis, examples. B) Thyroid anatomy, thyroid nodule evaluation, thyroid cancer, surgery and complications.
- A) Salivary glands anatomy, physiology (in brief), infections, autoimmune, and tumors. B) Tumors of oral cavity, introduction, premalignant lesions, leukoplakia, etc... Malignant lesions, SCCA.
- A) Tumors of pharynx, nasopharynx, oropharynx, and hypopharynx. B) Tumors of larynx (laryngeal cancer and papillomatosis)

[Color index : Important | Notes | Extra]

Note: P.22-39 "other neoplasms" weren't mentioned in prof. Khalid lecture nor requested as an objective+read the salivary part at the end.

Resources: Slides + 434 team + 433 team + Notes + Toronto notes + lectures notes ENT + Oxford handbook of otolaryngology.

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Introduction:

- ❖ Neck mass is a common complain that requires systematic clinical approach in order to get a final diagnosis and set an appropriate management plan.
- ❖ The most effective and accurate screening tool is actually obtaining a good medical history and performing physical examination.

❖ Considerations:

- Age group: any neck mass in a patient above 40, you have to rule-out malignancy. (See the table)

Age (yr)	Possible Causes of Neck Lump		
<20	1. Congenital	2. Inflammatory/Infectious	3. Neoplastic
20-40	1. Inflammatory	2. Congenital	3. Neoplastic
>40	1. Neoplastic	2. Inflammatory	3. Congenital

- ❖ **Location**: Any condition in ENT with **unilateral** manifestation (nasal obstruction, hearing loss, ear pain, neck mass etc.) **you have to rule out malignancy**. It is extremely important in order to have a clear DDx and clinical approach as a certain area of the neck has its own deferential whether it is congenital or metastatic.
- ❖ **Duration**: **Week** or less think about **inflammatory**, **years** think of **benign** conditions, **months** to year think about **malignancy**.

Anatomy:

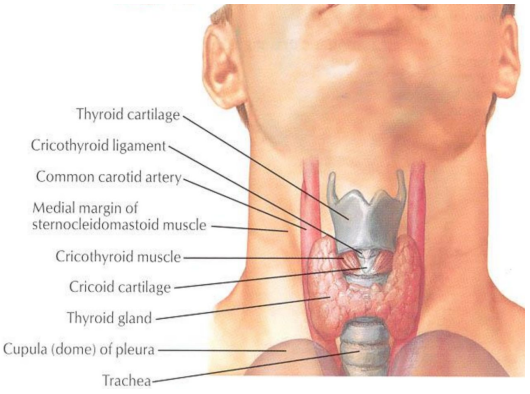
❖ Anatomical landmarks: the ONLY obvious landmarks in every single patient including obese.

- Angel of mandible.
- Clavicle.

➔ So, make sure you **locate them** before starting your examination.

➔ In the midline of the neck, there is a cricoid. Anything above the cricoid is called upper midline(your DDx will be B/W the carotids

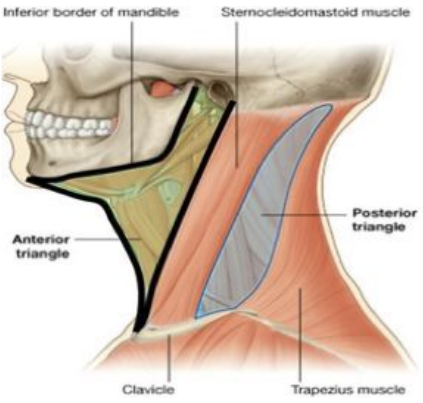
➔ Anything below the cricoid to the Suprasternal notch, we call it lower Midline (DDX related to thyroid lobes).



Description of the picture in doctor's slides:

- In the receding angle below the chin, the hyoid bone, situated opposite to the fourth cervical vertebra, can easily be made out. A finger's breadth below it is the laryngeal prominence of the thyroid cartilage; the space intervening between the hyoid bone and the thyroid cartilage is occupied by the hyothyroid membrane.
- The outlines of the thyroid cartilage are readily palpated; below its lower border is a depression corresponding to the middle cricothyroid ligament.
- The level of the vocal folds corresponds to the middle of the anterior margin of the thyroid cartilage. The anterior part of the cricoid cartilage forms an important landmark on the front of the neck; it lies opposite the sixth cervical vertebra, and indicates the junctions of pharynx with esophagus, and larynx with trachea.
- Below the cricoid cartilage the trachea can be felt, though it is only in thin subjects that the separate rings can be distinguished; as a rule, there are seven or eight rings above the jugular notch of the sternum, and of these the second, third, and fourth are covered by the isthmus of the thyroid gland.

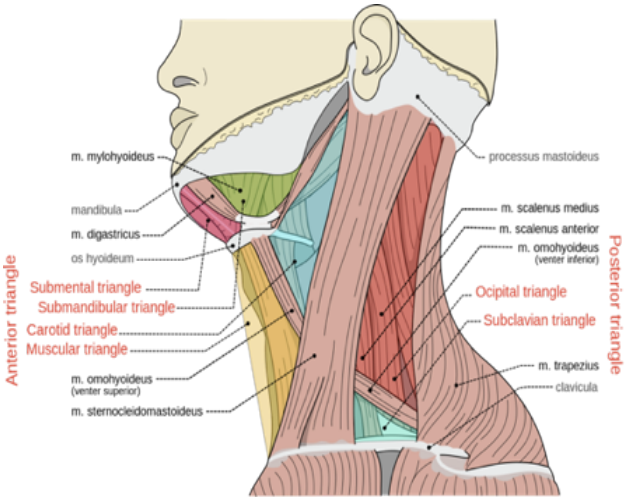
❖ Neck triangles:



1. **Anterior triangle:**
   - **Boundaries:**
     - SCM posterior (SCM separates A&P triangles).
     - Mandible superiorly.
     - Anteriorly the midline. It has 4 levels (L1-4, will be discussed down) of lymph nodes.

divided into:

- **submental triangle**: bounded by both anterior bellies of digastric and hyoid bone.
- **Submandibular triangle**: bounded by anterior and posterior bellies of digastric and inferior border of mandible.
- **carotid triangle**: bounded by sternocleidomastoid, anterior belly of omohyoid, and posterior belly of digastric.



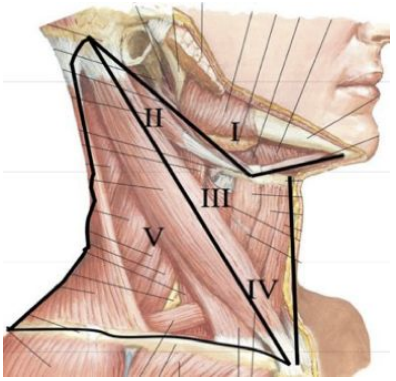
2. **Posterior triangle:**

   - bounded by sternocleidomastoid (anterior), trapezius, and middle third of clavicle.

   It contains lymphatic level 5.

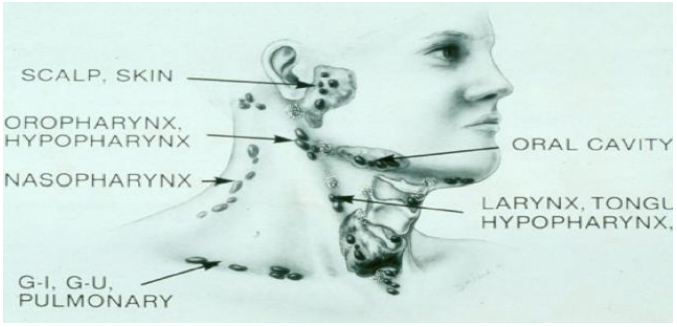
   Divided into: Occipital and subclavian triangle.

❖ **Lymphatic levels:** The lymph nodes in the neck are divided into 7 levels.

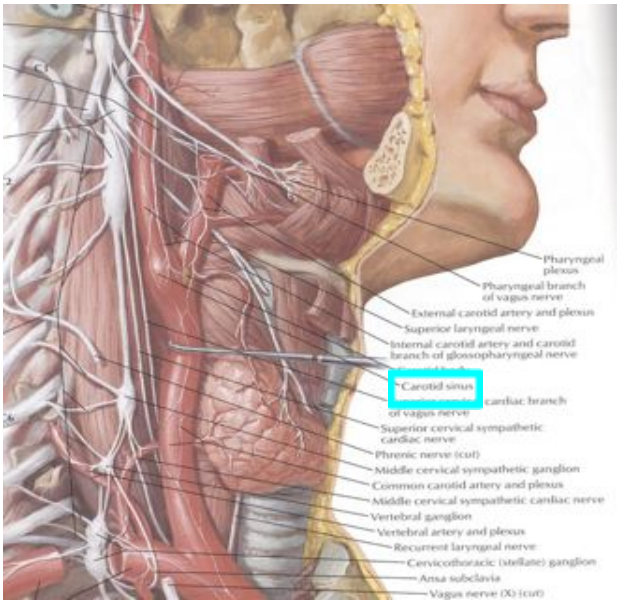


- Level 1: Between the 2 bellies of digastric muscle (in submental and submandibular triangle).
- Level 2: Deep cervical chain (from skull base to hyoid bone).
- Level 3: Deep cervical chain (between hyoid bone to the omohyoid muscle).
- Level 4: Deep cervical chain (below omohyoid muscle)
- Level 5: Posterior triangle (from SCM to the trapezius muscle).
- 1-4 are in anterior triangle, 5 is posterior.
- Level 6 & 7 are not palpable; you don't need to know them in this level"

➔ **Metastasis Location according to Various Primary Lesions:**



- **Submental lymph nodes (level I)**: examine the oral cavity, anterior nasal cavity, mouth floor, buccal area, and gums.
- **level II**: oral cavity, nasal cavity, naso/oro/hypopharynx, larynx, and parotid gland.
- **Level III**: Naso/oro/hypopharynx, larynx, and oral cavity.
- **Level IV**: Hypopharynx, larynx, and thyroid.
- **posterior triangle (Level V)**: think of Naso/oropharynx, cutaneous structures of the posterior scalp and neck.
- **Level VI**: think of thyroid.
- Sometimes the carotid is prominent and appears as a pulsating mass it is just a normal vibration nothing to worry (**carotid bulb**).



Diagnostic tests:

❖ History:

- Developmental time course.
- Course: progressive symptoms tend to be serious.
- Habits: smoking, alcohol all are carcinogens.
- Family history.
- Surgical / radiation in the area 8- Medication/ allergy.

➔ When taking history please pay attention to the points below:

- There are 8 questions you have to ask:

1. **Age**.
2. gender.
3. HPI: **site, duration**.
4. PMHx: surgeries.
5. Medications.
6. Allergies.
7. FHx: lymphoma, thyroid cancer.
8. Social Hx: Alcohol, smoking

- Common clinical findings:
  - **Dysphagia**: is something serious you should pay attention whether it is progressive and/or associated with Weight loss suspect malignancy. However sometimes it is totally different and unrelated – as simple as GERD- but it is always better being cautious than relaxed.
  - **Hoarseness**: it is of particular importance when it comes to distinguish between a primary vocal cord pathology i.e. laryngeal mass or an infiltrating neoplasm invading the recurrent laryngeal nerve causing paralysis e.g. malignant thyroid carcinoma.
  - **Aspiration.**
  - **B-symptoms**: (fever, weight loss, night sweat).

❖ Physical examination:

- ➢ Complete head and neck exam (visualize & palpate).
- ➢ Emphasis on location, mobility and consistency.

➔ It is important to examine 8 areas. Because some patient may have synchronous tumors (thyroid cancer coexisted with parotid cancer in the same time).

1. **Neck**: midline of the neck and 5 levels of lymph nodes
2. **Face**: included the parotid gland.
3. **Oral cavity**: look and palpate all hidden areas (floor of tongue must be looked at to not miss base of tongue tumors especially in those who chew on tobacco).
4. **Nose** (with flexible scope).
5. **Nasopharynx** (with flexible scope): the commonest head and neck tumor after the thyroid, don't miss it they usually present with neck mass.
6. **Oropharynx** (with flexible scope).
7. **Hypopharynx** (with flexible scope).
8. **Larynx**.
9. Extra: Perform a full examination of the mass, including detailed characteristics: size, shape, surface, pulse number, skin attachment, skin changes, discharge, consistency ...etc. Perform an Indentation, transillumination, and fluctuation (Paget's sign) Tests. Check reducibility and compressibility ...etc.

#Remember: Check the ear canal for possible skin lesions!

Differential diagnosis 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

If you have a clinical suspension of an inflammatory cause (redness, worm, tenderness, pus, tonsillitis, peritonsillar abscess), start an empirical trial of antibiotics for 2 weeks. Follow the patient up and see if there is symptomatic relief and reduction of the swelling size by at least 50% then it is mostly inflammatory and is responding. If there is no response or partial response the condition requires further investigation. Remember that some tumors partially responds to Abs.

Investigations:

- All investigations and imagings are dependant upon clinical suspicion following history and physical.

➔ Fine Needle Aspiration Biopsy (FNAB): Standard of diagnosis

- Indications:
  - Any neck mass that is not an obvious abscess.
  - Persistence after 2 weeks course of antibiotics.
- Small gage needle: reduces the bleeding, Seeding of tumor is not the concern when it comes to FNA.
- Requires proper collection and minimum of 4 separate passes and a skilled cytopathologist.
- **Contraindicated** in vascular tumors (pulsatile mass) wait for radiological images.

➔ CT Scan:

- It is a diagnostic radiological image that tells you the possibility of a diagnosis not a diagnosis.
- Distinguish cystic from solid.
- Extension of lesion.
- Vascularity (with contrast).
- Detection of unknown primary in case of metastatic masses.
- Pathological nodes require further investigations:
  - 1.5 cm and more.
  - Loss of shape, asymmetry.
  - Necrosis and calcification
  - Enhancement.

NB: Avoid contrast in thyroid lesions, always start ct first except in pediatric and thyroid mass !

➔ MRI:

- Similar information as CT.
- Better for upper neck and skull base.
- Vascular delineation with infusion.

➔ Ultrasound (US):

- Less important now with FNAB.
- Pulsatile neck masses require US prior to FNA.
- Helps differentiate solid masses from cystic masses (especially useful for congenital and developmental cysts).
- It is very helpful and best initial diagnostic tool in evaluating thyroid and parathyroid tumors.
- Noninvasive in case of pregnancy and children.

➔ Radionucleotide scanning:

- Salivary and thyroid masses.
- Location: glandular versus extra-glandular.
- Functional information.
- FNAB now preferred for thyroid nodules.
  - Solitary nodules.
  - Multinodular goiter with new increasing nodule.
  - Hashimoto’s with new nodule.

Inflammatory disorders:

❖ Lymphadenitis:

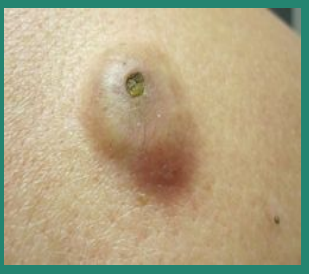
- Very common, especially within 1st decade.
- Tender node with signs of systemic infection.
- Directed antibiotic therapy with follow-up.
- FNAB indications (pediatric):
    - Actively infectious condition with no response.
    - Progressively enlarging.
    - Solitary and asymmetric nodal mass.
    - Supraclavicular mass (60% malignancy).
    - Persistent nodal mass without active infection.

➔ **Equivocal or suspicious FNAB in the pediatric nodal mass requires open excisional biopsy to rule out malignant or granulomatous diseases.**

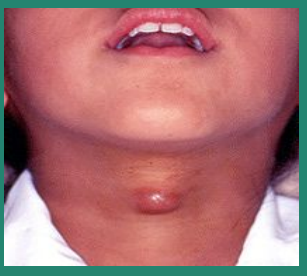
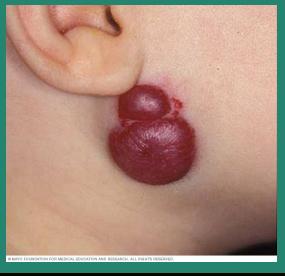
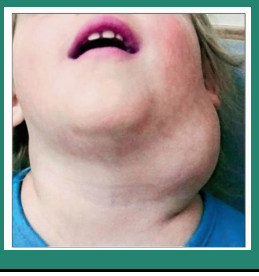
❖ Granulomatous lymphadenitis:

- Infection develops over weeks to months
- Minimal systemic complaints or findings
- Common etiologies:
    - TB, atypical TB, cat-scratch fever, actinomycosis, sarcoidosis
- Firm, relatively fixed node with injection of skin.
- **Typical *M. tuberculosis:***
    - more common in adults.
    - Posterior triangle nodes.
    - Usually responds to anti-TB medications.
    - May require excisional biopsy for further workup.
- **Atypical *M. tuberculosis:***
    - Pediatric age groups.
    - Anterior triangle nodes.
    - Brawny skin, induration and pain.
    - Usually responds to complete surgical excision or curettage.
- **Cat-scratch fever (Bartonella):**
    - Pediatric group.
    - Preauricular and submandibular nodes.
    - Spontaneous resolution with or without antibiotics.

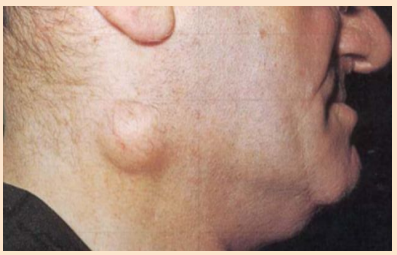
Congenital and developmental masses:

Epidermal & sebaceous cyst	• The most common, older age group. • **Painless** neck swelling. • elevation and movement of overlying skin, Skin dimple. • CT followed by FNA. excisional biopsy confirms. • Excision. • The most common congenital mass. 

Branchial cleft cyst	• Older children or young adult.
	• Lateral Neck swelling Following an URI.
	• Smooth, fluctuant mass underlying the SCM. Erythema may be present if infected.
	• Control the infection Surgical excision including tract.
	• 1st cleft may require a total parotidectomy.
	• Types:
	  ○ 1st cleft: less common close association with facial nerve.
	  ○ 2nd cleft: commonest between external and internal carotid medial to CN VII.
	 

Thyroglossal duct cyst	• 50% before 20. • Midline neck swelling. • Midline / near midline Just inferior to hyoid bone. • Elevates with swallowing and Tongue protrusion. • Surgical removal (sis trunk) after resolution of infection. • 75% midline 25%near midline. 
Vascular tumors	• Usually within first year of life. • CT , MRI may be helpful. ➔ **Lymphangioma**: Surgical excision for easily accessible lesions affecting vital functions, high recurrence. ➔ Hemangioma: Surgical excision for those who have rapid growth affecting vital structures and/or associated with thrombocytopenia with failed medical therapy. • Hemangioma often resolves spontaneously while lymphangiomas remain unchanged. • Left pic (Hemangioma), Right pic (Lymphangioma).  

Case 1: A 70-year-old, he is healthy and not smoker. He has this neck mass (picture) in the level 2. It has been there for 10 years. He has no complaint. He just visited his son in Riyadh and his son brought him to you.



Q1: What is level 2 in the neck?

- From skull base to the hyoid bone.

Q2: What will you do next in this patient?

- Examination of the 8 areas to exclude other masses.

Q3: Everything was normal in the examination, what is the next step?

- CT scan followed by FNA. FNA showed epidermoid cyst.

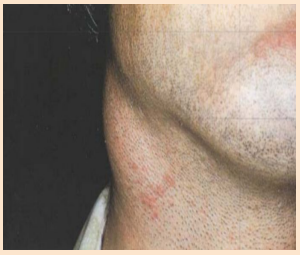
Case 2: A 24-year-old patient presents with level-2-neck mass. He had a history of tonsillitis. On examination: it looks red and tender. Face examination has shown changed in the appearance of the face (VII palsy).

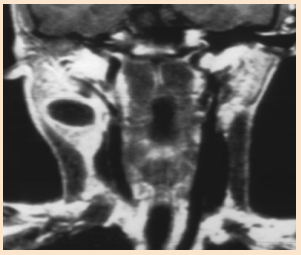
Q1: What will you do next in this patient?

- Examination and history are suggestive of inflammatory condition. So, empirical treatment.

Q2: Mention the most likely diagnosis.

- Branchial Cleft Cysts.





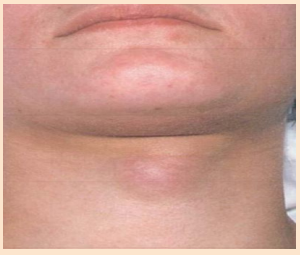
Case 3: A 13-year-old patient presents with midline-neck mass. On examination it moves with swallowing.

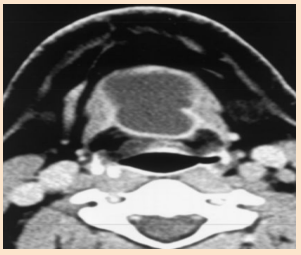
Q1: What is the most likely diagnosis?

- Thyroglossal Duct Cyst.

Q2: Mention other DDx seen in midneck?

- Bulging granula (children).
- Teratoma (children).





Primary tumors:

1. Thyroid mass:

- Leading cause of anterior neck masses.
- Children:
  - Most common neoplastic condition.
  - Male predominance.
  - Higher incidence of malignancy.
- Adults:
  - Female predominance.
  - Mostly benign.
- Lymph node metastasis:
  - Initial symptom in 15% of papillary carcinomas.
  - 40% with malignant nodules.
  - Histologically (microscopic) in >90%.
- FNAB has replaced US and radionucleotide scanning (Test of choice):
  - Decreases number of patients with surgery.
  - Increased number of malignant tumors found at surgery.
  - Doubled the number of cases followed up.
  - Unsatisfactory aspirate –> repeat in 1 month.

2. Diffuse Thyroid Enlargement:

- **Definition of Goiter**: A goiter is diffuse enlargement of the thyroid gland seen in Graves Disease, Plummer's Disease, Iodine Deficiency, Acute Thyroiditis, Subacute Thyroiditis, and Chronic Thyroiditis (Hashimoto's and Riedel's Diseases). Also, goiters are seen in Diffuse Multinodular Goiter. So patient with a goiter can be clinically euthyroid, hyperthyroid or hypothyroid. (Most important test is TSH).

A. Iodine Deficiency:

- Rarely a cause of goiter in the USA.
- It is usually treated medically and only rarely surgically for compressive symptoms.

B. Grave's Disease

- Diffuse goiter with hyperthyroidism, exophthalmos, and pretibial myxedema. Caused by circulating antibodies that stimulate TSH receptors on follicular cells of the thyroid and cause deregulated production of thyroid hormones.
- Diagnosed by Increased T3 and T4 and very low TSH and global uptake of radioiodine.
- Treated in 3 ways: medical blockade (methimazole, PTU, propranolol, iodide), radioiodide ablation, surgical resection.

C. Acute Thyroiditis

- Rare complication of septicemia. High fever, redness of overlying skin, tenderness.ü Needle aspiration to identify organism.
- Intensive Abx therapy. Occasionally, incision and drainage.

D. Subacute Thyroiditis

- Secondary to viral infection and usually there is complete resolution within months.
- Fever, goiter and anterior neck pain. Possible sx and signs of hyperthyroidism w exquisitely tender thyroid gland on palpation.
- "Cold" uptake on scan distinguishes it from Graves b/c later in the course of the disease, pt becomes euthyroid and then hypothyroid.
- Treat with NSAIDS usually or prednisone if sx are bad.

E. Chronic Thyroiditis

- Hashimoto's Thyroiditis: lymphocytic infiltration and destruction of gland resulting in hypothyroidism and a diffuse goiter.
- Hashimoto's common in women.
- Most common cause of goiter and hypothyroidism in USA.
- T3 and T4 either normal or low. TSH is elevated.
- Tx: thyroxine but then surgery if dominant mass is not suppressed by this therapy.

F. Diffuse Multinodular Goiter

- This is adenomatous hyperplasia of the thyroid gland that is asymptomatic (non- toxic/euthyroid).
- R/O malignancy w FNA.
- Multiple nodules suggest a metabolic rather than a neoplastic process, but irradiation during childhood, a positive family history, enlarged cervical nodes, or continuing enlargement of one of the nodules raises the suspicion of malignancy.

G. Thyroid Neoplasms

- Benign Thyroid Nodule
- Palpable nodules of thyroid occur in 5% of population. 15-30% of these
- prove to be malignant.

➢ Benign Thyroid Nodule:

- Usually benign nodules are solitary follicular adenomas, colloid nodules, benign cysts, or uni-nodular thyroiditis.
- Solitary toxic adenomas occur in older patients and are usually benign. These toxic adenomas reveal decreased TSH w increased T3 and T4.
- Thyroid scan show "hot nodule" and complete suppression of unaffected lobe.
- Usually managed w radioactive iodine or a unilateral lobectomy if the nodule is large.

➢ Thyroid Cancer:

- **Risk Factors:** Hx of radiation therapy to neck, young>old, cold nodule, History of rapid development of nodule, solitary>multiple nodules, vocal cord paralysis, and cervical adenopathy, hard fixed mass, elevated serum calcitonin
- **Signs and Sx:** Mass/nodule, lymphadenopathy, most are euthyroid and usually asymptomatic masses in low midline ant. Neck.
- **Workup:** FNA and U/S, thyroid function test if there are symptoms or signs of hypo-or-hyperthyroidism
- **After thyroidectomy, you MUST follow Ca levels post-op** (even give them supplemental Ca for a while to be on safe side): can be decreased 2ndary to parathyroid damage

➔ Papillary Carcinoma:

- Constitutes 80% of thyroid carcinomas.
- Spreads lymphatically and slowly.
- 10 yr. survival rate is 95%. Good 131 I uptake.
- Tx:
    - Hemithyroidectomy (usually not enough).
    - Total Thyroidectomy most appropriate.
    - Post-Op need to give thyroid hormone replacement.
    - Post-Op 131 I scan can diagnose and treat mets.

➔ Follicular Adenocarcinoma:

- 10% of thyroid cancers.
- Hematogenous spread (commonly to bone).
- More aggressive.
- Good 131 I uptake.
- 10 yr. survival is 90%.
- ***Dx cannot be made w FNA***. Tissue structure (capsule) needed for diagnosis. (Malignancy if there is capsular or blood vessel invasion.)
- Tx same as in papillary ca.

➔ Medullary Carcinoma:

- 5% of thyroid cancers. Poorly differentiated.
- Associated with MEN type II.
- Secretes calcitonin.
- Diagnosis made w FNA.
- Poor 131 I uptake.
- Lymph and hematogenous spread.
- 10 yr. survival is 50%.
- Treat w total thyroidectomy and lymph node dissection.ü Hürthle Cell Thyroid Cancer sub type of follicular ca.

➔ Anaplastic Carcinoma

- Undifferentiated carcinoma arising in 75% of previously differentiated thyroid cancers.
- 1-2% of all thyroid cancers.
- FNA helps diagnose.
- Major DDx includes lymphoma (much better prognosis).
- Treat small tumors: Total Thyroidectomy (possibly w external beam radiation). If there is airway obstruction, then do a debulking surgery and tracheostomy.

  Dismal prognosis. Most patients have stage IV (distant mets) at presentation.

  Recurren laryngeal injury (hoarsness if uni, stridor if bi)

Malignant of thyroid cancer		
Type		**Management**
Well-differentiated	**Papillary carcinoma**	**Total thyroidectomy + post-op Radioactive Iodine (I-131)**
	Follicular carcinoma	
	Hurthle cell carcinoma (sub-type of follicular)	
Poorly-differentiated	**Medullary carcinoma**	**★ Total thyroidectomy + Neck dissection**
	Anaplastic carcinoma	**Surgery, Adjuvant radiation & Chemotherapy**
Other malignant	**Lymphoma**	
	Metastasis	
★ Neck dissection: removal of level 2,3 &4 lymph nodes		

➔ **Complications of thyroidectomy**:

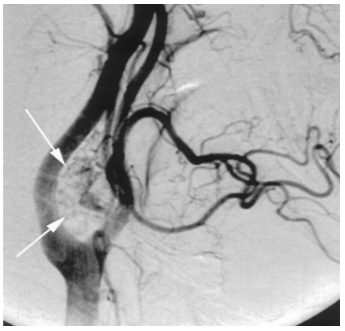
- Recurrent laryngeal nerve injury.
  - Unilateral: hoarseness.
  - Bilateral: airway obstruction (stridor).
- Hematoma: it may cause airway obstruction.
- Hypothyroidism or/and hypoparathyroidism.

❖ 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.
- FNAB – first line diagnostic test.
- If suggestive of lymphoma – open biopsy.
- Full workup – CT scans of chest, abdomen, head and neck; bone marrow biopsy.

❖ Salivary glands tumors: (Check page. 33 & 34)

- Enlarging mass anterior/ inferior to ear or at the mandible angle is suspect.
- Benign:
  - Asymptomatic except for mass.
- Malignant:
  - Rapid growth, skin fixation, cranial nerve palsies, pain.
- Diagnostic tests:
  - Open excisional biopsy (submandibulectomy or parotidectomy) preferred.
  - FNAB:
    - Shown to reduce surgery by 1/3 in some studies.
    - Delineates intraglandular 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
- Be prepared for total parotidectomy with possible facial nerve sacrifice.



- **Carotid body tumor:**
  - Rare in children.
  - Pulsatile, compressible mass.
  - Mobile medial lateral not superior inferior.
  - Clinical diagnosis confirmed by angiogram or CT.
  - Treatment:
    - Irradiation or close observation in the elderly.
    - Surgical resection for small tumors in young patients:
      - Hypotensive anesthesia (a type of anesthesia that reduces the mean arterial pressure (MAP) to 50 mmHg and thus reduces blood loss during the surgery).
      - Preoperative measurement of catecholamines.

- **Lipoma:**
  - Soft, ill-defined mass
  - Usually >35 years of age
  - Asymptomatic
  - Clinical diagnosis – confirmed by excision.

- Neurogenic tumor:

- Arise from neural crest derivatives.
- Include schwannoma, neurofibroma, and malignant peripheral nerve sheath tumor.
- Increased incidence in NF syndromes.
- Schwannoma most common in head & neck.

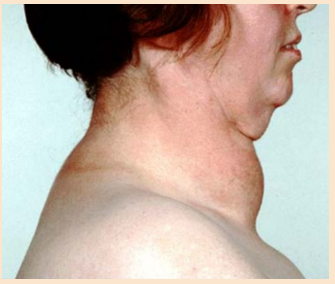
- Schwannoma:
  - Sporadic cases mostly.
  - 25 to 45% in neck when extracranial.
  - Most commonly between 20 and 50 years.
  - Usually mid-neck in poststyloid compartment.
  - Signs and symptoms (Depend on the site):
    - Medial tonsillar displacement.
    - Hoarseness (vagus nerve).
    - Horner's syndrome (sympathetic chain).

❖ Mucosal Tumors:

	DDx	Risk factors	Presentation	Treatment
Sinonasal	★ SCC	Dust exposure (occupation)	★ Unilateral nasal symptom(maybe ocular or oral pain)	★ Early: Surgery Late: Surgery and radiation
Oral	SCC salivary minor glands (adenoid cystic carcinoma)	Smoking, alcohol, multiple trauma, oral hygiene & HPV	Unilateral oral lesion	
Pharynx	SCC	★ Smoking, alcohol, HPV & GERD.	Unilateral neck mass (slowly growing).	Early: Surgery or radiation. Late: Surgery & Radiation **OR** Radiation & Chemotherapy.
Larynx	SCC	Smoking, HPV & Laryngopharyngeal Reflux (LPR)	Unilateral neck mass (slowly growing).	

- ★ SCC = squamous cell carcinoma (is the most common mucosal tumor).
- ★ Including nasal obstruction, rhinorrhea, epistaxis , loss of smell etc.
- ★ GERD is not RF for nasopharynx tumors. GENETIC AND EBV play an important role in nasopharynx.
- ★ Early and late depending on TNM system. If the N is 1 or more > late e.i. if there is a lymph node involvement = late.
- Investigations for mucosal carcinoma: CT scan (staging) then biopsy.
- Surgical VS Non-surgical :
  - For oral & sinonasal: Surgical approach is better.
  - For pharynx & larynx: non-surgical is better.
- Stage (TNM) 1&2 are early, while 3&4 are late.

Case 1: A female presented neck mass shown in the pic.



Q1: Describe the image?

- Diffused neck swelling more prominent in the lower midline.

Q2: What further investigation you would order?

- CT scan*

Q3: CT reported thyroid mass. What is the next step?

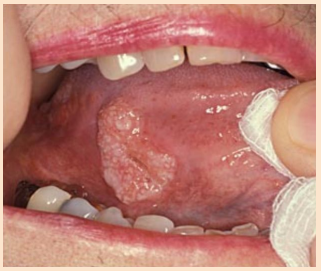
- Ultrasound and Fine-needle aspiration.

Q4: Histopathologic report revealed benign tumor. What the management?

- Surgery because the mass is big (>6 cm) although it is benign.

* We used CT in first place because we didn't know it was thyroid.

Case 2: A 60-year-old heavy smoker presented with pain in the tongue.



Q1: Describe the image?

- White-nodular lesion below the tongue.

Q2: What is the most common cancer seen in this area?

- Squamous cell carcinoma.

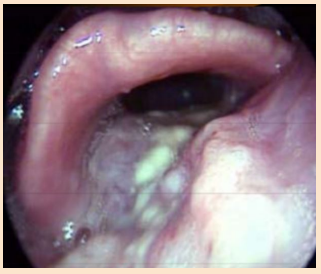
Q3: How would you confirm the diagnosis.

- First CT, then Biopsy.

Q4: Histopathologic report revealed SCC. What the management?

- Surgery

Case 3: A patient presented with dysphagia. Endoscopy showed this pic.



Q1: What is the most common cancer seen in this area?

- Squamous cell carcinoma .

Q2: What investigations you would order?

- First CT, then biopsy.

Q3: Histopathologic report revealed late stage SCC. What the management?

- Chemotherapy and radiation

- **The table above + these 3 cases are basically what prof. Khalid Al Qahtani mentioned in the 3rd lecture.**

Other neoplasms: (From old slides but included in the objectives)

- **Neoplasms of the Ear and Lateral Skull Base**

  - Lesions of the Pinna and EAC
  - Lesions of the Middle Ear and Mastoid
  - Lesions of the Petrous Apex and Clivus
  - Lesions of the IAC, CPA, and Skull Base

  - **Introduction:**
  - Generally classified by location, and occasionally by cell-type
  - Causes of these neoplasms are largely unknown.

Neoplasms of the pinna and external auditory canal:

- **Cutaneous carcinoma:**
  - Squamous cell carcinoma
  - Basal cell carcinoma
- **Malignant melanoma**
- **Glandular neoplasm:**
  - Ceruminous adenoma
  - Ceruminous adenocarcinoma
  - Pleomorphic adenoma
  - Adenoid cystic carcinoma
- **Osteoma and exostosis.**
- **Miscellaneous neoplasm:**
  - Merkel cell carcinoma
  - Squamous papilloma
  - Pilomatrixoma
  - Myxoma
  - Auricular endochondrial pseudocyst
  - Chondrodermatitis nodularis
  - chronica helicis (Winkler disease)

Lesions of the Petrous Apex and Clivus:

- **Adenomatous neoplasm**
  - Benign middle ear adenoma
  - Endolymphatic sac tumor
- **Chordoma**
- **Congenital neoplasm**
  - Dermoid
  - Teratoma
  - Choristoma
- **Cholesterol granuloma**
- **Langerhans cell histiocytosis:**
  - Eosinophilic granuloma
  - Hand-Schüller-Christian disease
  - Letterer-Siwe disease
  - Sarcoma
  - Rhabdomyosarcoma
  - Chondrosarcoma
  - Ewing sarcoma
  - Osteogenic sarcoma
  - Fibrosarcoma

Neoplasms of the internal auditory canal and cerebellopontine angle:

- Schwannoma:
  - Vestibular schwannoma
  - Facial nerve schwannoma
  - Trigeminal schwannoma
  - Jugular foramen schwannoma
- Meningioma
- Lipoma
- Metastases

Neoplasms of the Pinna and EAC:

- **Basal cell carcinoma (BCC):**
  - BCC (20% of ear / temporal bone neoplasms).
  - Most on pinna.
  - Sun exposure is initiator.
  - Locally infiltrative, rolled border central crusting ulcer.
  - May invade temporal bone if left untreated.

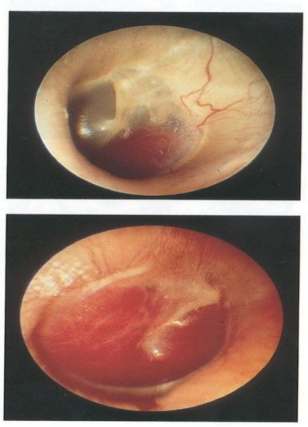
- **Squamous cell carcinoma (SCC):**
  - Pinna and EAC are common
  - Sun, cold, radiation are all factors
  - Scaly irregular indurated maculopapular lesion, often ulcerated with serosanguinous discharge.
  - Can be confused with OE.
  - Other symptoms VII, CHL, SNHL (with invasion of temporal bone).
  - Met. To LN more common than BCC.

- **Treatment:**
  - Mohs micrographic surgery for most scc and bcc pinna lesions
  - Temporal bone lesions require TB resection and RT
  - Address LN in SCC.

- **Osteomata and Exostoses:**
  - Benign bony growths in EAC.
  - Osteoma is solitary, pedunculated, smooth, round lesions arising from tympanomastoid and squamous suture.
  - Exostose is broad, more medial, multiple, often bilateral. Related to cold water exposure.

Lesions of the Middle Ear and Mastoid:

- **Paragangliomas:**
  - Most common neoplasm of middle ear but still rare.
  - **Glomus tympanicum:**
    - Originate on promontory of cochlea (jacobson or Arnold's nerve)
    - Fill ME space and ossicles involved
    - May extend to hypotympanum and expose jugular or petrous carotid
    - Present with HL and pulsatile tinnitus and ME mass
  - **Glomus jugulare:**
    - Arise in jugular fossa.
    - Become large before symptomatic (multiple CN).

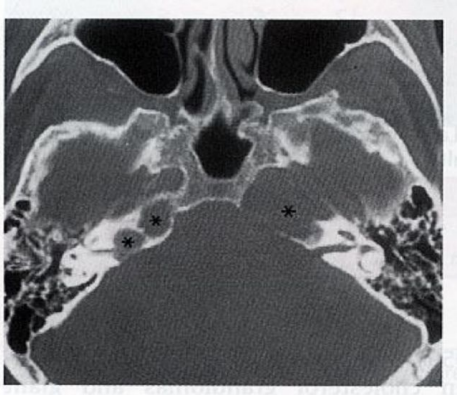


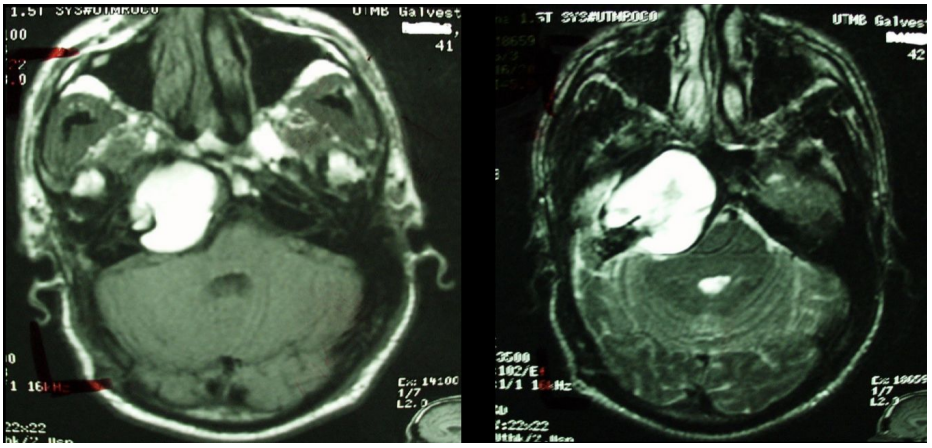
Brown sign: +ve pressure leads to blanching.
Aquino sign: ipsilateral CA compression decreases pulsation.
Vernet syndrome (or JF syndrome): paresis of CN IX, X, XI.
Villaret Syndrome = JF syndrome plus Horners.

  - **Treatment:**
    - Rx is complete surgical excision.
    - If secretory must address this (alpha or beta blockade).
    - Transcanal, trans mastoid-lab, transcervical, infratemporal, intracranial.
    - Pre-op embolization is a necessary.
    - If you think it invades the ICA, balloon occlusion studies must be done.
    - RT or stereotactic radiosurgery can halt disease in up to 90%.

Lesions of the Petrous Apex and Clivus:

- **Cholesterol granulomas:**
  - Most common lesion of the petrous apex
  - Negative pressure in lumen causes hemorrhage
  - Expansile lesion
  - Hearing loss, tinnitus, vertigo, facial twitching.
  - HRCT.
  - MRI diagnostic.
    - T1 and T2 hyperintense.

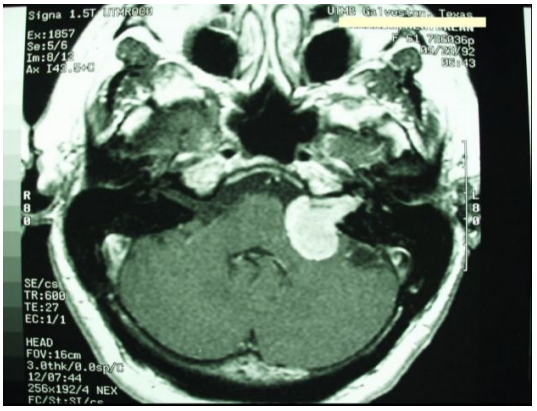




#Causes: poor drainage of ME, hemorrhage, obstruction of ventilation, FB reaction to cholesterol crystals from HB catabolism.
#Rx: surgical drainage.

Lesions of the IAC, CPA, and Skull Base:

- **Schwannomas** (no longer acoustic)
  - Arise from sheaths of cranial nerves.
  - Vestibular, facial, trigeminal, jugular
  - Varied presentation
  - HRCT:
    - Inhomogeneous enhancement.
    - Smooth mass effect.
  - MRI – definitive diagnosis:
    - T1- low intensity.
    - Marked enhancement with gadolinium on T1.



Neoplasms of the Nose and Paranasal Sinus:

- Very rare 3%.
- Delay in diagnosis due to similarity to benign conditions.
- Nasal cavity:
  - 1⁄2 benign.
  - 1⁄2 malignant.
- Paranasal Sinuses:
  - Malignant.

Multimodality treatment.
Orbital Preservation.
Minimally invasive surgical techniques.

- **Epidemiology:**
  - Predominately of older males.

- Exposure:
  - Wood, nickel-refining processes.
  - Industrial fumes, leather tanning.
- Cigarette and Alcohol consumption (No significant association has been shown).

- **Location:**
  - Maxillary sinus 70%
  - Ethmoid sinus 20%
  - Sphenoid 3%
  - Frontal 1%

- **Presentation:**
  - **Oral symptoms:** 25-35%
    - Pain, trismus, alveolar ridge fullness, erosion
  - **Nasal findings:** 50%
    - Obstruction, epistaxis, rhinorrhea
  - **Ocular findings:** 25%
    - Epiphora, diplopia, proptosis
  - **Facial signs:**
    - Paresthesias, asymmetry

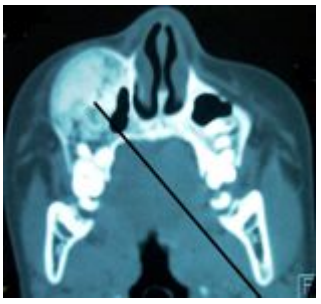
- **Benign Lesions of nose and paranasal sinuses:**
  - **Papilloma:**
    - Three types:
      - Fungiform: 50% nasal septum
      - Cylindrical: 3% lateral wall/sinuses
      - Inverted: 47% lateral wall.

    - Inverted Papilloma:
      - 4% of sinonasal tumors.
      - Site of Origin: lateral nasal wall.
      - Unilateral.
      - Malignant degeneration in 2-13% (avg. 10%).
      - Inverted Papilloma Resection:
        - Initially via transnasal resection:
          - 50-80% recurrence
        - Medial Maxillectomy via lateral rhinotomy: (Gold standard)
          - 10-20%
        - Endoscopic medial maxillectomy:
          - Key concepts:
            - Identify the origin of the papilloma.
            - Bony removal of this region.
        - Recurrent lesions:

        - Via medial maxillectomy vs. Endoscopic resection.
        - 22%.

- **Osteomas:**
    - Benign slow growing tumors of mature bone.
    - Location:
        - Frontal, ethmoid, maxillary sinuses.
    - When obstructing mucosal flow can lead to mucocele formation
    - Treatment is local excision

- **Fibrous dysplasia:**



    - Dysplastic transformation of normal bone with collagen, fibroblasts, and osteoid material.
      (Fibrous tissue develops in place of normal bone. This can weaken the affected bone and cause it to deform or fracture).
    - Monostotic vs Polyostotic (single bone vs multiple bones).
    - Surgical excision for obstructing lesions
    - Malignant transformation to rhabdomyosarcoma has been seen with radiation.

- **Malignant lesions of nose and paranasal sinuses:**

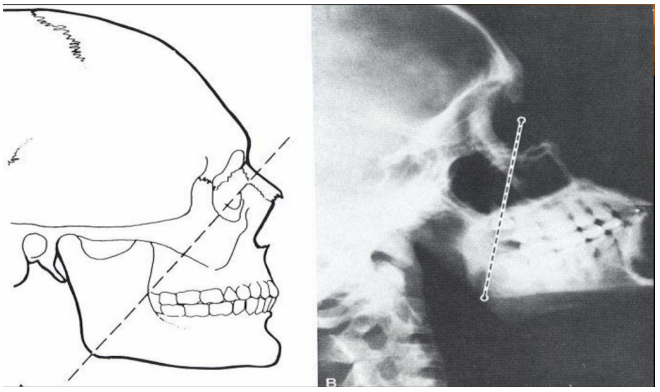
    - Squamous cell carcinoma.
    - Adenoid cystic carcinoma
    - Mucoepidermoid carcinoma
    - Adenocarcinoma
    - Hemangiopericytoma
    - Melanoma
    - Olfactory neuroblastoma.
    - Osteogenic sarcoma, fibrosarcoma, chondrosarcoma, rhabdomyosarcoma
    - Lymphoma
    - Metastatic tumors
    - Sinonasal undifferentiated carcinoma

- **Squamous cell carcinoma:**
    - Most common tumor (80%).
    - Location:
        - Maxillary sinus (70%).
        - Nasal cavity (20%).
    - 90% have local invasion by presentation.
    - Lymphatic drainage:
        - First echelon: retropharyngeal nodes.

- Second echelon: subdigastric nodes.

Staging of Maxillary Sinus Tumors:

- T1: limited to antral mucosa without bony erosion.
- T2: erosion or destruction of the infrastructure, including the hard palate and/or middle meatus.
- T3: Tumor invades: skin of cheek, posterior wall of sinus, inferior or medial wall of orbit, anterior ethmoid sinus.
- T4: tumor invades orbital contents and/or cribriform plate, posterior ethmoids or sphenoid, nasopharynx, soft palate, pterygopalatine or infratemporal fossa or base of skull.



Treatment:

- 88% present in advanced stages (T3/T4).
- Surgical resection with postoperative radiation.
    - Complex 3D anatomy makes margins difficult.

- **Olfactory Neuroblastoma (Esthesioneuroblastoma):**
    - Originate from stem cells of neural crest origin that differentiate into olfactory sensory cells.
    - Kadish Classification:
        - A: confined to nasal cavity
        - B: involving the paranasal cavity
        - C: extending beyond these limits
    - Aggressive behavior.
    - Local failure: 50-75%.
    - Metastatic disease develops in 20-30%.
    - Treatment:
        - En bloc surgical resection with postoperative XRT.

Oral Cavity Cancer:

- **Epidemiology:**
    - 95% are squamous cell carcinoma.

- Risk factors:
  - Smoking (depends on dosage and type).
  - Alcohol.
  - Snuff dipping / tobacco chewing.
  - HPV (subtype 16).
  - Reverse cigar smoking (India).
  - Betel-nut chewing (Asia).
  - Poor dentition / mechanical irritation (dentures).
- 75% of cases occur on 10% of mucosal surface area:
  - Area from anterior FOM along gingivobuccal sulcus and lateral border tongue to retromolar trigone and ant tonsil pillar.
  - Flow and pooling of carcinogen-contaminated saliva here.
- Incidence 4% cancers in males, 2% in females (increasing in females)

- **Evaluation and Diagnosis:**
  - Lesions generally easy to see
  - Simple biopsy under local anesthesia
  - Important goals:
    - Stage full extent of disease
    - Rule out synchronous primary
    - Evaluate for possible metastatic disease
  - CT or MRI for T2 or greater
  - Staging endoscopy

- **AJCC TNM Staging:**
  - Primary Tumor (T):
    - Tx: unassessable.
    - T1: tumor 2 cm or less in greatest diameter.
    - T2: tumor 2-4 cm.
    - T3: tumor > 4 cm.
    - T4: tumor invades adjacent structures (Cortical bone, deep tongue musculature, maxillary sinus, skin).

- **Differential Diagnosis:**
  - Minor salivary gland neoplasm
    - Adenoid cystic, mucoepidermoid, adeno-ca.
  - Sarcomas (rhabdo, lipo, MFH, leiomyo)
  - Hodgkin and NH lymphoma
  - Malignant melanoma
  - Hairy leukoplakia, Kaposi sarcoma
    - HIV, immunocompromised

- **Premalignant Lesions:**

- **Leukoplakia:**
  - Hyperkeratosis, dysplasia.
  - Malignant transformation greater in non-smokers.
  - Treatment:
    - Surgical or laser excision
    - Topical bleomycin, retinoids,

- **Erythroplasia**
  - Greater risk of malignancy

- **Prognostic Factors:**
  - Poor prognostic tumor factors include
    - Tumor thickness (3mm FOM, 5mm tongue).
    - Stage.
    - Perineural invasion.
    - Lymphatic invasion.
    - Vascular invasion.
    - Neck/distant mets.
    - DNA ploidy.
    - Pathology.

- **Treatment and post-treatment follow-up:**
  - **SURGERY**
    - Primary
      - Resection with adequate margins; frozen section as needed
      - Tracheostomy as needed
      - Feeding tube (optional)
      - Surgical orientation of specimen for pathologist
    - Neck
      - Modified/radical dissection for unilateral metastatic disease and bilateral dissections for metastases in both necks
      - Suction drainage
    - Perioperative care
      - Antibiotics
      - Hospitalization for 3–10 days
      - Tube feedings
      - Suction drainage for necks(s)—remove when output <25–30 mL/24-h period
      - Suture removal 5–10 days postoperatively

<u>Tumours of Pharynx:</u>

- **Nasopharyngeal Carcinoma:**

- Rare in the US, more common in Asia
- High index of suspicion required for early diagnosis
- Nasopharyngeal malignancies
  - SCCA (nasopharyngeal carcinoma).
  - Lymphoma.
  - Salivary gland tumors.
  - Sarcomas.

- **Classification:**
  - WHO classes
    - Based on light microscopy findings.
    - All SCCA by EM.
  - Type I (SCCA):
    - 25 % of NPC (in North American population).
    - 1-2 % NPC of endemic populations.
    - moderate to well differentiated cells similar to other SCCA (keratin, intercellular bridges).
  - Type II (non-keratinizing carcinoma):
    - 12 % of NPC
    - variable differentiation of cells (mature to anaplastic)
    - minimal if any keratin production
    - may resemble transitional cell carcinoma of the bladder
    - Lumped with Type III in 1991 WHO revision
  - Type III (undifferentiated" carcinoma):
    - 60 % of NPC in North Amer population, majority of NPC in young patients, and 95% of endemic cases.
    - Difficult to differentiate from lymphoma by light microscopy requiring special stains & markers.
    - Diverse group:
      - Lymphoepithelioma, spindle cell, clear cell and anaplastic variants

- **Epidemiology:**
  - Chinese native (esp. Guangdong province) > Chinese immigrant > North American caucasian.
    - Both genetic and environmental factors.
  - Genetic:
    - HLA histocompatibility loci possible markers.
  - HLA-A2, B17 and Bw46.
  - Environmental:
    - Viruses
      - EBV - well documented viral "fingerprints" in tumor cells and also anti-EBV serologies with WHO type II and III NPC.

        - HPV - possible factor in WHO type I lesions
    - Nitrosamines - salted fish.
    - Others - polycyclic hydrocarbons, chronic nasal infection, poor hygiene, poor ventilation.

- **Clinical Presentation:**
    - Often subtle initial symptoms:
        - unilateral HL (SOM).
        - painless, slowly enlarging neck mass (70%):
            - Lymphatic channels cross midline in NP, bilateral disease common.
    - Larger lesions:
        - nasal obstruction.
        - epistaxis.
        - cranial nerve involvement.

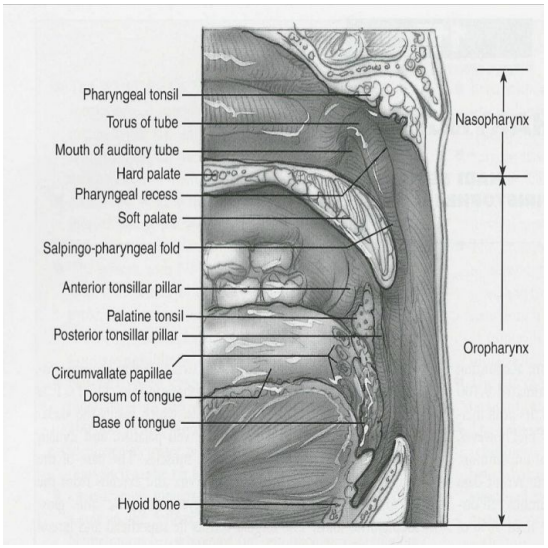
- **Staging EUCC:**
    - T1 – tumor confined to NP
    - T2 – tumor extends to soft tissue:
        - T2a: into OP or nasal cavity with no parapharyngeal extension.
        - T2b: with parapharyngeal extension (beyond the pharyngobasilar fascia).
    - T3 – Tumor invades bony structures and/or paranasal sinuses.
    - T4 – intracranial extension, involvement of cranial nerves, infratemporal fossa, hypopharynx, orbit or masticator space.

- **Treatment:**
    - External beam radiation:
        - Dose: 6500-7000 cGy.
        - Primary, upper cervical nodes.
        - Consider 5000 cGy prophylactic tx of clinically negative lower neck.
    - Adjuvant Chemotherapy:
        - Standard of care.
        - Cysplatinum (hematologic side effects therefore not overlapping toxicity).
        - – 5-FU

Oropharyngeal Cancer:

- Relatively uncommon.
- 6th and 7th decades mainly.
- Increasing in 4th and 5th decades.
- Male predominance.
- SCC = 90%.
- Tobacco and alcohol.
- Complex, multimodal treatment.
- Team approach.

- **Anatomy:**
  - Connects nasopharynx to hypopharynx.
  - Anterior:
    - Circumvallate papillae.
    - Anterior tonsillar pillars.
    - Junction of hard and soft palates.
  - Pharyngeal walls:
    - Mucosa, submucosa, pharyngobasilar fascia, constrictor muscles, buccopharyngeal fascia
  - Tonsils sit in tonsillar fossa
  - Soft Palate:
    - Palatine aponeurosis.
    - Tensor veli palatini.
    - Levator veli palatini.
    - Uvular muscle.
    - Palatoglossus.
    - palatopharyngeus.



- **Etiology:**
  - SCC arise from the accumulation of multiple genetic alterations to genes important to the regulation of cell growth and death.
  - Cells have selective growth advantage:
    - Genetic.
    - Environmental.
      - Tobacco and alcohol.
      - Dose related.
      - Synergistic.
    - HPV and EBV.
    - Dietary factors.
    - Immunosuppression.

- **Histopathology:**
  - Premalignant lesions:
    - Leukoplakia.
    - Erythroplakia.
    - Lichen planus.
  - SCC and variants > 90%.
  - Spindle cell – clinically and biologically similar to SCC.
  - Verrucous – fungating and slow growing, with well differentiated keratinizing epithelium and rare cellular atypia or mitosis.

- Both invade deeply with rare mets.

- Lymphoepithelioma:
  - Grow rapidly and readily mets.
  - Tonsillar region.
  - Younger patients without risk factors.
- Adenoid squamous, adenosquamous, and basaloid SCC are rare and highly aggressive (latter two have early mets).

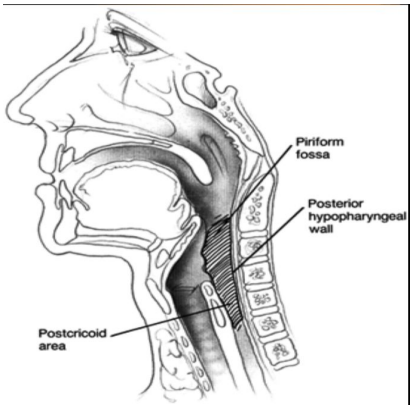
- **Treatment:**
  - Team approach:
    - Surgeons and Radiation Oncologists.
    - SLP.
    - Oral Surgeon.
  - T1 and T2 – surgery or radiation.
  - T3 and T4 – combined modality.
  - Neck:
    - N0 and N1 – surgery or XRT.
    - N2 and N3 - combined modality.
    - Both necks treated with central lesions.
    - Retropharyngeal nodes are always treated.

Hypopharyngeal Cancer:

- Incidence – 5-10% of all upper aerodigestive cancers (0.5% of all malignancies).
- M>F: males have 8X increased risk.
- Females with Plummer-Vinson.
  - Large increase in risk of developing SCC of the postcricoid region.
- Risk Factors:
  - Smoking.
  - EtOH.
  - Chronic reflux disease.

- **Treatment Challenge:**
  - Patients often present with advanced disease.
  - May be complicated by severe malnutrition.

- **Hypopharynx Anatomy:**
  - Abuts the oropharynx at the level of the hyoid, extends to the level of the inferior border of the cricoid.
  - 3 sub-sites: piriform fossa, post-cricoid region, posterior pharyngeal wall.



- Piriform apex – junction between post-cricoid area and the inferior aspect of the pyriform fossae.

- **Staging Endoscopy:**
  - Most important component of procedure (secondary to obtaining Bx samples for diagnosis) is determining the inferior limit of the tumour
  - Common site: pyriform fossae, post pharyngeal wall, post-cricoid region

- **Pathology:**
  - ~95% of cancers of the hypopharynx are SCC.
  - Lymphomas:
    - Angiocentric T-cell lymphoma.
    - MALT (mucosa associated lymphoid tissue).
    - Non-hodgkin's lymphoma.
  - Adenocarcinomas:
    - May originate in the minor salivary glands of the hypopharynx.
  - Benign lesions:
    - Lipoma: < 1%, usually resected due to risk of airway obstruction.

- **Surgical Tx Options**
  - Hypopharynx:
    - Based on Site of Involvement.
  - Piriform Fossa (64%).
  - Posterior Pharyngeal Wall (30%).
  - Post-cricoid (4%):
    - Treating the Neck.
  - Hypopharynx:
    - Neck mets in 75%
    - In N0 neck risk of occult nodes ~30-40% (all patients get neck dissections).
    - Risk of distant mets at presentation ~20%.

Procedure	T stage	Reconstruction
Partial Pharyngectomy	T1, T2	Primary closure
Partial Laryngopharyngectomy	T1, T2, T3	Regional or free flap
Supracricoid hemilaryngectomy	T1, T2, T3	Primary closure
Endoscopic CO2 laser resection	T1, T2 (possibly T3, T4)	Secondary intention
Total Laryngectomy with partial-total pharyngectomy	T3	Primary closure vs. regional or free flap
Total Laryngo-Pharyngo-esophagectomy	T4	Gastric pull-up

Laryngeal Tumours:

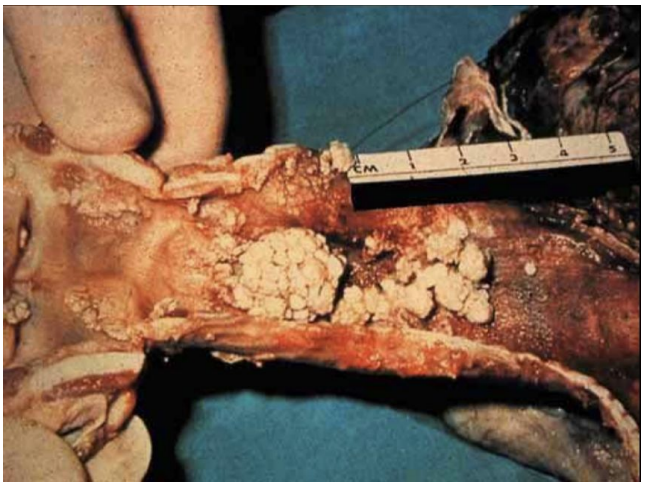
- **Epidemiology:**
  - • 11 600 new cases laryngeal cancer per year in USA
  - • ~1% of all cancers (excluding skin)
  - • 79% occur in ♂
  - • >90% are squamous cell carcinomas (SCC)

- **Etiology:**
  - EtOH – supraglottic
  - Tobacco – glottic
  - GERD – chronic laryngeal irritation
  - Viral infection
  - Asbestos
  - Nickel
  - Wood
  - Isopropyl alcohol
  - Radiation

- **Laryngeal Papillomatosis**
  - Most common benign laryngeal tumor, HPV etiology.
  - Vocal folds and subglottis most common laryngeal sites.
  - More prevalent in children, less common in individuals over 30 years of age
    - HPV is transmitted to child through birth canal from cervix.
    - Risk of transmission 1:400.

- Papillomas appear multinodular, and may be either sessile or exophytic
  - May resemble carcinoma-in-site or even invasive SCC.

Picture: Exophytic, warty, friable, tan-white to red growths.



- Most common viral subtypes are 6 or 11, but 16 or 18 have higher potential for malignant change.
- Hoarseness is common early symptom followed by airway obstruction and respiratory difficulty.
- Laryngeal papillomas presenting in adults seem to be less aggressive than juvenile form but remission rate unpredictable.
  - In adults, growth may be rapid during periods of hormone change such as during pregnancy
- Malignant degeneration of laryngeal papillomas rare and usually associated with history of radiotherapy, tobacco abuse or both.

- **Treatment:**
  - Surgery
    - Laser microlaryngoscopy (most commonly CO2 [10.6um] or Nd:YAG [1.06um]) at power setting of 2-8W pulse or continuous
    - Powered microdebrider
    - Always biopsy before remainder of case proceeds
  - Interferon
    - Bad chronic side-effects (myalgias, flu-like symptoms)
    - Lesions tend to return after interferon finished
  - Intralesional cidofovir (acyclic nucleoside analogue)
  - Indole-3-carbinol (found in cruciferous vegetables, works via inhibition of estrogen metabolism).
  - Acyclovir
  - Photodynamic therapy

Supraglottic vs Glottic Disease:

- North America glottic cancer > supraglottic (2:1).
- France supraglottic > glottic (2:1)

- **Anatomy of glottis:**
  - True vocal cords
  - Anterior and posterior commissures
  - Superior limit – apex of ventricle
  - Inferior limit – 1 cm inferior to line through apex

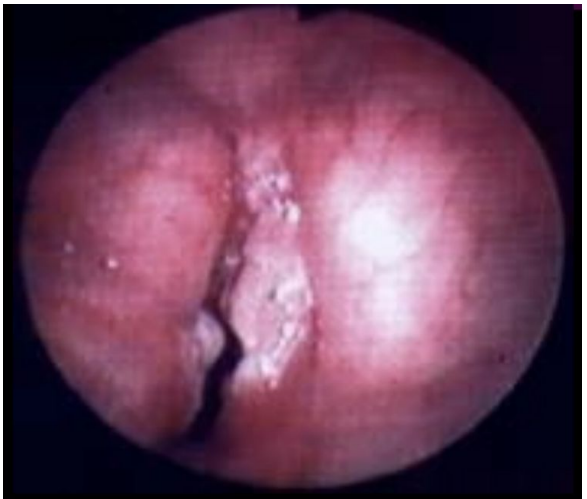
- **Staging (Early Glottic):**
  - Tis –> no invasion beyond basement membrane.
  - T1 –> confined to glottis with normal mobility.
    - T1a –> tumor limited to one vocal cord.
    - T1b –> tumor involves both cords, no limitation in mobility.
  - T2 –> extend into supra- or subglottis without complete vocal cord fixation.
    - T2a –> involve supra- or subglottis but do not impair movement.
    - T2b –> impair movement of vocal cords, but not complete fixation.

- **Staging (Advanced Glottic):**
  - T3 – complete vocal cord fixation, ± paraglottic space, ± minor thyroid cartilage erosion (inner cortex).
  - T4 – extends beyond larynx, into thyroid cartilage.

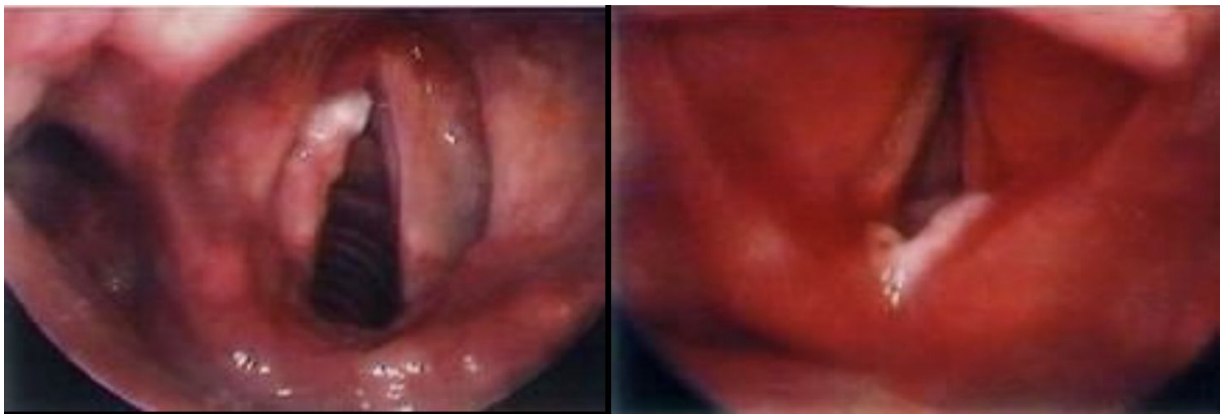
- **Symptoms.**
  - Hoarseness > 4 weeks –> investigate.
  - Occasionally may present without hoarseness.
  - Dysphagia.
  - Hemoptysis.

  - Early: irregular area of mucosal thickening.
  - Advanced: exophytic, fungating, endophytic, ulcerated mass.
  - More commonly keratinizing, well to moderately differentiated.
  - In situ component.
  - Invasive component predominantly infiltrative.
  - Up to 20% of T1 cancers have some degree of vocal cord ligament invasion.

- Most tumors originate on free surface of vocal cord.



- Anterior 2/3.



- **Treatment:**
    - Early Stage: Laser or Radiation.
    - Advance Stage: Chemo. + Radiation or Surgery + Radiation.

Salivary glands:

The parotid salivary glands, the largest of the three, Obey role of 80: - 80% of all salivary glands tumors. - 80 % benign. - 80% is pleomorphic adenoma.
Role of size: When the size of the tumor is big the probability of it being benign increase.
Most common malignant tumor is mucoepidermoid carcinoma.
Complications of parotid tumors: - Facial nerve palsy. - Frey syndrome (aka. gustatory sweating).
Cystic bilateral parotid mass -> rule out HIV.

The second pair, the submaxillary glands, also called submandibular glands, Involved in 10% of salivary gland tumors. 60% are benign, 40% are malignant.
most common benign is pleomorphic adenoma. Most common malignancy in submandibular, sublingual and minor salivary glands is the Adenoid Cystic Carcinoma (Mucoepidermoid Carcinoma is 2nd).
Nerves related to submandibular glands: - Hypoglossal. - Mandibular. - Lingual.

The third pair, the sublingual glands, Rarely involved. 60%-70% are malignant.

Acute inflammations of the salivary glands:

Mumps: The commonest, affect mainly the parotid, lead to painful swelling.
Acute Suppurative Parotitis: Uncommon, affect debeliated patients, treated with Abx or surgical drainage if abscess forms.
Acute Sialadenitis: Commonly in submandibular, rarely in parotid, because of duct calculus, pain and swelling, worse with eating, the patient usually unwell with pyrexia.

Sjögren's syndrome:

Sjögren's syndrome is an autoimmune systemic disorder affecting the salivary and lacrimal glands.There is enlargement of the glands and loss of secretion, leading to dryness of the eyes and mouth. biopsy of the lip mucosa will show minor salivary glands heavily infiltrated by lymphocytes.

Salivary gland tumors:

- **Benign tumors:**
  - **Pleomorphic adenoma:**
    The most common tumor especially of the parotid. Have the potential to transfer to malignant. Asymptomatic, firm, and mobile. Displace the ear lobe upward (if in superficial lobe). Facial nerve weakness indicate malignancy. If the deep lobe, the oropharynx will be displaced medially and tonsils will appear asymmetric.
  - **Warthins tumor (papillary cystadenoma lymphomatosum):**
    Affect elderly. Commonly in the parotid. 10% bilateral. Soft, cystic, and compressible. FNA reveals oncocytes (mitochondrial-rich cell)-> diagnosed using technetium-99 scanning.

#Hemangiomas and pleomorphic adenomas are the most common benign salivary gland neoplasms occurring in children.

- **Malignant tumors:**
  - **Mucoepidermoid carcinoma:**
    The most common malignant. composed of mucinous and epidermoid components. Associated with radiation exposure.
  - **Adenoid cystic carcinoma:**
    second most common. They are slow growing and have a strong tendency to spread along the nerves. Facial or other nerve weakness occurs early.

 # symptoms may suggest a malignant tumor:

- Pain.
- Facial or other nerve weakness.
- Skin involvement such as ulceration or fixation of the overlying skin- Blood-stained discharge into the mouth.
- Local lymph node enlargement suggests metastasis.

Other salivary gland malignancies:

- Acinic cell carcinoma
- Malignant mixed tumors
- Carcinoma ex-pleomorphic adenoma- Metastasizing mixed tumor
- Carcinosarcoma
- Salivary duct carcinoma
- Undifferentiated carcinoma
- Squamous cell carcinoma
- Lymphoma
- Adenocarcinoma
- Clear cell carcinoma
- Malignant oncocytoma.