

# NECK MASSES

## History

1. Duration and growth rate of mass: malignant masses grow faster!

Rule of 7's: A mass that has been around 7 days is inflammatory, 7 months is malignant, and 7 years is congenital.

2. Age Group: Pediatric patients (up to 15) generally have inflammatory related neck masses and developmental more than neoplastic masses. Consider neoplasia first in older patients!

3. Location: Esp. important when considering congenital and developmental masses because they occur in consistent locations. Spread of head and neck carcinoma is similar to an inflammatory disease and follows orderly lymphatic spread.

4. Inflammatory Hx: Ask about recent fever, pain and tenderness. Any recent illness, URI, TB, sarcoidosis, fungal infection, dental problem, sinusitis or otitis?? Thyroiditis can occur post URI.

5. Malignant Hx: Ask about any previous Head & Neck malignancy. Also,

- Night Sweats
- Sun Exposure
- Smoking
- Alcohol (a consideration for Squamous Cell Carcinoma)
- Exposure to Radiation (Thyroid and Parathyroid Cancers) for medical/military
- Otalgia in elderly with normal ear exam suggestive of carcinoma
- Other Sx:
  - Nasal Obstruction,
  - Bleeding,
  - Otalgia,
  - Odynophagia, Dysphagia,
  - Hoarseness,
  - Sore Throat of > 3 Weeks,
  - Non Healing Ulcers,
  - Hemoptysis,
  - Wt Loss,
  - Cervical Adenopathy,
  - Hard Fixed Mass.
  - Hearing loss with blocked ear in adult and elderly – look for nasopharyngeal ca-

6. Trauma: Any recent history of trauma to the head or neck? In neonate ask about Forceps delivery ( may cause hematoma mass in anterior neck or within the SCM muscle).

7. Referred Pain: Esp. to the ear because of referred pain via CN V, IX or XI can indicate an inflammatory or neoplastic process in any area in the upper airodigestive tract mainly the oropharynx and hypopharynx.

8. Speech Difficulties: Voice Changes? Vocal cord paralysis suggests a thyroid carcinoma (b/c of involvement of recurrent laryngeal nerve) or primary laryngeal lesion

9. Family Hx: Any history of head or neck malignancies? Medullary Thyroid Cancer runs in families. Consider MEN (rare).

10. past Medical History: Diabetes, HIV, Malignancies? Cervical lymph node hyperplasia very common in HIV. Smoker? ETOH?

11. Past Surgical History

12. Nutritional Status: Any history of iodine deficiency? Suggested by residence in a geographic area of endemic goiter.

13. Hypo/Hyper-Thyroidism Sx

Hypothyroid Sx: Complaints of fatigue, cold intolerance, weakness, lethargy, wt gain, constipation, dry & coarse skin, thin hair etc.

Hyperthyroid Sx: Complaints of unexplained nervousness and sweating, heat intolerance, weight loss, palpitations, an enlarging neck mass, and ocular prominence (exophthalmos).

14. Hyperparathyroidism Sx:

"Bones, Stones, Abdominal Groans, Psychic Moans and Fatigue Overtones."

Bones: aches and arthralgias result from fractures and structural changes.

Stones: renal calculi because of hypercalcemia.

Abdominal Groans: also b/c of hypercalcemia. Dehydration and constipation. Pancreatitis. PUD may worsen.

Psychic Moans: hypercalcemia can cause anorexia, N/V, thirst and polydipsia, mood swings, psychosis.

Fatigue: lassitude and muscular fatigability.

## **Physical Exam**

1. Survey: Inspect the neck, noting its symmetry and any masses or scars. Look for enlargement of the parotid or submandibular glands, and note any visible lymph nodes

2. Lymph nodes: Palpate the lymph nodes;

- Describe the location by levels( I, II , III , IV, V, VI) or by triangle
- Enlargement of a supraclavicular node, esp. on the left, suggests possible mets from a thoracic or an abdominal malignancy.
- Tender nodes may (only may) suggest inflammation; hard or fixed nodes suggest malignancy.

3. Trachea and thyroid gland: Inspect the trachea for any deviation from its midline position, and then feel for deviation. Masses in the neck may push the trachea to one side. Inspect the neck for the thyroid gland, then palpate. Notes: size and shape of thyroid gland tells very little about thyroid function.

4. Full and details examination of the head and neck and the upper aerodigestive tract

## I-oral cavity and oropharynx

- Make note of any trismus
- notice any ulcer, leukoplakia- whit none removable discoloration-
- asymmetry of the tonsils
- fallen or loose teeth
- don't forget to eXamine the floor of mouth and the gingivobuccal sulcus
- bimanual palpation is a must

## ii- Nasal cavity

- notice any bleeding, ulcers or masses
- look for nasal blockage
- any nasal deformity
- don't forget the eye

## iii- Ear

- look for any masses or lesions in the pinna or the canal
- look for any middle ear effusion- may suggest nasopharyngeal ca-

## iv- Scalp

- don't forget to eXamine the scalp for any lesions – look for BCC, or SCCA and chronic infection

## v- Cranial nerves

- look for any facial paraesthesia or numbness and any facial weakness
- look for all the other cranial nerves

## Labs and Diagnostic Tests

1. Labs to be Considered as dictated by the DDX

2. Radiographs:

1. US: Pulsatile neck masses require US prior to FNA. Helps differentiate solid masses from cystic masses (especially useful for congenital and developmental cysts). Would help you distinguish a congenital branchial or thyroglossal cyst from solid lymph nodes, neurogenic tumors or ectopic thyroid tissue. U/S pretty accurate (90-95% differentiation success). Also helps assess size of a nodule and helps identify impalpable nodules. It is very helpful diagnostic tool in evaluating a thyroid and parathyroid tumors

5. CT: *Single most informative radiologic test.* Helps differentiate cysts from solid lesions, localizes masses inside or outside a gland or nodal chain and differentiates a vascular mass. Cost limits its use. Clinical judgment plus needle biopsy generally makes use of CT in diagnosing neck masses infrequent. Consider for deep suspicious masses.

6. MRI: Gives similar info as CT.

7. Abx Trial: If diagnosis after examination in younger pt remains uncertain but inflammatory adenopathy is suspected then give a trial of abx. therapy and observation for 2 weeks. If mass still persists or has gotten larger, do a FNA biopsy with pathologic examination.

### 8. Fine Needle Biopsy:

- ***Most important*** as the initial diagnostic procedure.
- **This is the current standard of care for initial biopsy. Small gauge aspiration needle is used (25 gauge) for multiple aspirations.**
- **FNA biopsy is performed before surgical endoscopy but after a thorough head and neck exam and most of the time before any other studies done – unless the mass is vascular.**
- ***Single most important*** study for diagnosing neck masses and thyroid cancer.
- **For thyroid**
  - 5% false negative rate for FNA and thyroid nodules.
  - Good for papillary, medullary and anaplastic thyroid carcinomas
  - But FNA cannot accurately distinguish b/t benign and malignant follicular thyroid tumors or Hürthle cell tumors.

### Special Considerations:

- FNA biopsy readily differentiates a cystic lesion from inflammatory lesion
- FNA helpful in differentiating lymphoma from carcinoma. Helps avoid endoscopic exam, guided biopsies and general anesthesia for a diagnosis of lymphoma. Would just need to do a simple nodal excision under local for histologic confirmation of lymphoma (after the FNA).
- High risk pt with pos hx of chronic tobacco and/or ETOH who have a solid neck mass that is not obviously a mucosal tumor may have inconclusive or negative FNA. Endoscopy and open biopsy are still required in this group b/c you should have high index of suspicion.

9. Endoscopy and Guided Biopsy: Helps identify primary tumor as source of a metastatic node.

10. Open Excisional Biopsy: Done after work-up is complete and if diagnosis is still not evident. Provide immediate specimen for histologic frozen section. Simultaneous radical neck dissection may be necessary if diagnosis supports squamous cell carcinoma, melanoma, or adenocarcinoma (unless mass is supraclavicular).

11. Culture with Sensitivity Tests: for inflammatory lesions after biopsy.

**So what to do** when patient presents with a neck mass? There are many algorithms and what follows is very simplified!

1. History

2. Initial Physical Exam

3. Any Pertinent Non-Invasive Lab and Radiographic Studies? And how useful they are in getting me the diagnosis

- For example, CBC-P, TFT's, US, Thyroid Radionuclide Scan, Esophagrams, Abx Trial Therapy in younger patients, etc.

#### 4. Update History and Repeat Physical Exam

#### 5. More Invasive Tests as Warranted

- For example, FNA biopsy of cervical lymph node or mass then endoscopy (direct laryngoscopy, esophagogastrosocopy or bronchoscopy) with guided biopsy if FNA reveals SCCa (to look for primary site).

6. Consider CT at this point if FNA biopsy is non confirmatory or for a suspicious lesion in a high-risk patient whose FNA is negative.

7. Open Biopsy of Mass if primary site still unknown. *Follow immediately w frozen section and removal of mass or radical neck dissection if the frozen show scca*

**Note: open biopsy is not the initial diagnostic test, if done for pt with SCCA the pt survival get compromise due to alteration of the lymphatic drainage**

## Congenital Differential Diagnosis of Neck Mass

### Thyroglossal duct cyst

Occurs when parts of the thyroglossal duct persist and form a cyst. Most commonly located in the midline near the hyoid bone

Moves with tongue protrusion

Tx: with Sistrunk procedure – excision of the cyst with its tract and the body of the hyoid bone to prevent recurrence-

## Differential Diagnosis of Neck Mass

### Inflammatory Causes

Lymphadenitis

Inflammation of a lymph node (nodes) due to a variety of infectious causes

Deep neck infection

Thyroiditis

See below; acute and subacute thyroiditis

### 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.

### Iodine Deficiency

Rarely a cause of goiter in the USA. If seen, it is usually treated medically and only rarely surgically for compressive symptoms.

### 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.

### Acute Thyroiditis

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

### Subacute Thyroiditis

2ndary 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 w NSAIDS usually or prednisone if sx are bad.

### 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.

### 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.

### **Thyroid Neoplasms**

#### Benign Thyroid Nodule

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

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.

### General Info about Thyroid Cancers

Risk Factors suggesting Carcinoma: Hx of radiation therapy to neck, History of rapid development of nodule, vocal cord paralysis, and cervical adenopathy, hard fixed mass, elevated serum calcitonin.

Risk Factors suggesting Malignancy: Hx of neck irradiation, young>old, cold nodule, solitary>multiple nodules.

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 awhile to be on safe side): can be decreased 2ndary to parathyroid damage. Must

### 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)or
  - 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.
- 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.
- 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 pt have stage IV (distant mets) at presentation.

### Non-Thyroid Neoplasms

Primary cervical neoplasms are rare!! Metastatic lesions represent up to 80% of all non-thyroid neoplastic neck masses. The initial management objective in these cases is always disclosure of site of origin of primary tumor (aerodigestive endoscopy!!). The other 20% represent lymphomas or salivary gland tumors. Of the metastatic lesions, up to 90% arise from clinically obvious primary neoplasms located above the clavicle.

#### Metastatic Lesions

Be aware that the immediate removal of enlarged lymph node for diagnostic purposes is NOT GOOD for pt w metastatic cervical carcinoma. Disruption of lymphatic drainage and manipulation of the mets decrease chance for clean excision and cure.

Enlarged nodes high in neck or in posterior triangle suggest nasopharyngeal lesion. Enlarged jugulodigastric nodes suggest tonsils, base of tongue or supraglottic larynx. If nodes are in supraclavicular area or lower 1/3 of neck then consider the whole digestive tract, lungs, breast, GU tract, and thyroid gland. Mets spread from chest or abdomen via thoracic duct (left side mets more common than right).

**Epidermoid (Squamous Cell) Carcinoma** is tumor of middle and late adulthood. Associated with smokers and ETOH. Primary tumor usually on a mucosal surface of upper aerodigestive tract. Neck mass represents mets. You must find primary site to treat successfully. Neck mass (es) can be unilateral, bilateral or multiple in number. HARD to palpation and may be fixed due to invasion of adjoining structures. Treatment: may include radical neck dissection Also, treat the primary site as warranted. Radiotherapy may be used.

#### Lymphomas

Commonest in early and middle adulthood. Masses are usually multiple but can be bilateral and/or unilateral. Range in size from one to ten centimeters. SOFT and MOBILE. Can be in anterior or posterior neck. Patient may be asymptomatic or possibly has low-grade fever, malaise, weight loss, night sweats. Diagnosis is made via cervical node excisional biopsy and histopath exam. Reed-Sternberg cells are associated with Hodgkin's. Treatment for lymphoma is medical

#### Salivary Gland Tumors



Benign tumors are a mobile and non-tender while malignant tumors are painful and fixed. Malignant tumors may involve lymph nodes (evidence of local metastasis) and/or facial paresis/paralysis. Diagnose w FNA. Treatment is generally via adequate surgical resection with neck dissection for node-positive necks and radiation

1. Parotid :
  - a. 90% of all salivary glands tumors
  - b. 90% is benign
  - c. 90% is pleomorphic adenoma (mixed tumor)
  - d. most common malignant tumor is mucoepidermoid carcinoma
2. Submandibular glands :
  - a. Involved in 10% of salivary gland tumors.
  - b. 60%are benign, 40% are malignant
  - c. most common benign is pleomorphic adenoma
  - d. Most common malignancy in submandibular, sublingual and minor salivary glands is the Adenoid Cystic Carcinoma (Mucoepidermoid Carcinoma is 2nd).
3. sublingual gland
  - a. rarely involved
  - b. 60-70 %is malignant
  - c. most common benign is pleomorphic adenoma
4. minor salivary gland
  - a. 90% is malignant
  - b. commonly involve the palatal region

### Malignant Lesions of Larynx

More common in men. Most common site is glottis. Risk factors: tobacco and alcohol. 90% are Squamous Cell Carcinoma. Sx: hoarseness, throat pain, dysphagia, odynophagia, neck mass, referred ear pain. Treatment: Total or supraglottic laryngectomy with neck dissection if there is nodal involvement. Radiation therapy or surgery for early lesions. Combination therapy for advanced disease.

### Parathyroid Masses

#### General Points about Parathyroid Glands

After parathyroidectomy, watch out for recurrent nerve injury, neck hematoma and hypocalcemia. "Hungry Bone Syndrome" is severe hypocalcemia after surgery correction of hyperparathyroidism as bone aggressively absorbs Ca. Sx of this syndrome: perioral tingling, paresthesias, positive Chvostek's sign, carpal pedal syndrome.

#### Primary Hyperparathyroidism: Adenoma

Primary hyperparathyroidism is usually due to an adenoma (85%) which is NOT usually palpable.

- Labs show elevated PTH and hypercalcemia. Check urine to R/O Familial Hypocalciuric Hypercalcemia.

#### Primary Hyperparathyroidism: Hyperplasia

All 4 glands affected. Seen in MEN type I and IIa (must R/O MEN if pt has hyperplasia). Do a neck exploration and remove all of the parathyroid glands (leave 30 mg of parathyroid tissue behind placed in nondominant forearm).

Please read about nasopharyngeal carcinoma from any text book( very very evry important)