Objectives:
Not Given

Resources:
- Davidson's.
- 436 doctors slides.
- Surgical recall.
- 435’ team work

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Leaders: Heba Alnasser, Jawaher Abanumy, Mohammed Habib, Mohammad Al-Mutlaq
Revised by: Yara Aldigi
Basic review:

Anatomy of the neck:
- The investing layer of deep cervical fascia lies deep to the skin. The layer between them is the platysma (it assists the muscles of facial expression).
- The cervical branch of the facial nerve supplies the platysma.
- Other than Subcutaneous Lipoma and Sebaceous cysts, most neck swellings lie deep to platysma.
- The sternocleidomastoid muscle (which is supplied by the spinal accessory nerve) divides the front of the neck into anterior and posterior triangles.
- The anterior triangle is further subdivided into:
  1- Submental triangle: contains nodes draining central portion of the lips and tip of the tongue.
  2- Submandibular triangle: contains submandibular gland and lymph nodes. The floor of this triangle is formed by the hyoglossus muscle with the hypoglossal nerve lying on it.
  3- Carotid triangle: contains the common carotid artery, internal jugular vein, vagus nerve. Branchial cysts and carotid body tumors are common in the carotid triangle.
  4- The muscular triangle: contains infrahyoid muscles, thyroid gland, larynx, trachea oesophagus, recurrent laryngeal nerve, inferior laryngeal artery and external laryngeal nerve.

Most neck masses are painless, but may be painful due to infection and malignant diseases. Rapid enlargement makes malignant disease more likely. Salivary gland swelling, caused by duct obstruction, enlarges when patient eats.
Common neck swellings

**Thyroid Goiter**

- Thyroid cyst
- Multinodular goiter
- Inflammatory thyroiditis
- Benign tumour
- Malignant tumour
- Physiological goiter

Don't mix up goiter “swelling” with dysfunction!! they are different: we can have one without the other.

### CAUSES OF GOITER: Types of swellings:

1. **Thyroid cyst:**

<table>
<thead>
<tr>
<th>Features</th>
<th>Simple accumulation of fluids. Benign, <strong>painless</strong>. Normal function of the thyroid.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diagnosis</strong></td>
<td>Ultrasound and FNA “fine needle aspiration”.</td>
</tr>
<tr>
<td></td>
<td>- Thyroid gland is located behind a fascia “pretracheal fascia”, so it is difficult to differentiate solid mass or cyst by examination. <strong>Ultrasound and FNA</strong> are the best options to differentiate between them. FNA can be both diagnostic and therapeutic.</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
<td>Aspiration.</td>
</tr>
<tr>
<td></td>
<td>If it reoccurs up to two times → aspirate cyst again, but the 3rd time surgery is indicated. (lobectomy)</td>
</tr>
<tr>
<td><strong>Pics</strong></td>
<td><img src="https://via.placeholder.com/150" alt="Images" /></td>
</tr>
</tbody>
</table>

2. **Multinodular goiter**:

3. **Inflammatory thyroiditis**:

4. **Benign tumour**:

5. **Malignant tumour**:

6. **Physiological goiter**:
2. Multinodular goiter (Simple goiter):

| What is it? | Functional problem, it’s Hyperplasia of the cells. It is solid and locally causing dysphagia, dyspnea, stridor or hoarseness. It is the most common thyroid disease. 80-90% of cases. 80% euthyroidism (that’s why it’s called “simple”), 10% hypothyroidism, hyperthyroidism |
| Causes | The hyperplasia of cells is because of: 1. iodine deficiency 2. side effect of “lithium” 3. problem in the synthesis (idiopathic). |
| Clinical features | Starts as a simple goiter then becomes nodular (but the function stays normal). After years in about 5% of patients, some of the nodules will produce excessive amounts of thyroxine; we call it toxic multinodular goiter and will cause symptoms of hyperthyroidism. So simple multinodular goiter may eventually turn into toxic. - simple multinodular goiter is the most common cause of single nodule (هو الوحيد المحسوس بينهم). - indication for surgical intervention → if the multinodular goiter restrict the respiration or dysphagia. |
| Diagnosis | - Ultrasound and FNA then nuclear (warm) scan. - Warm scan is normal: like the lobe on the right side of the picture - abnormal either: Hot (overtaking iodine hyperactive). Or Cold (circled area): it means that area is not uptaking iodine hence it is no longer thyroid tissue, indicative of malignancies in 15% of patients. |
| Presentation | The goiter presents incidentally: either: 1-Toxic goiter: Associated with hyperthyroidism. E.g. Graves disease, toxic multinodular goiter (Plummer’s disease), and toxic adenoma. 2-Nontoxic goiter: Asymptomatic goiter but can cause compression symptoms, thyroid function is normal. It may be diffuse or multinodular. |

3. Inflammatory (thyroiditis):

1 Common in iodine deficiency area.
2 In nuclear scan: hot nodule: the nodule uptake the iodine and produce thyroxine more than surrounding tissue, and cold nodule: it doesn’t uptake iodine (hence it appears lighter in the image) and not functioning.
Note

Here we are NOT talking about infection (pyogenic) we are talking about autoimmune inflammation.

Types

1- **Acute Autoimmune thyroiditis**: is extremely rare especially pyogenic (bacterial) inflammation.

2- **Sub-acute Autoimmune thyroiditis**: is rare. noninfectious either de Quervain's disease (hyperthyroidism) that is associated with an influenza-like illness (virus) and painful diffuse swelling of the gland, or Riedel's thyroiditis (hypothyroidism) which is a very rare cause of painless thyroid.

3- **Chronic (Hashimoto’s thyroiditis)**: Most common inflammation. It is difficult to differentiate between inflammatory and simple goiter clinically, you need to do FNA. (Even by US they look alike) usually mixed with simple goiter (painless diffuse swelling), no signs of inflammation like redness. Starts slightly hyperthyroidism → then euthyroid → lastly hypothyroidism. Surgically removed if the patient is symptomatic (dysphagia , dyspnea) Or if we’re not 100% sure that there is no malignancy.

Diagnosis

By serological markers and biopsy which shows lymphocytes that confirms the diagnosis, monocytes, etc.

<table>
<thead>
<tr>
<th>4. Benign tumor</th>
<th>5. Malignant tumor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types: 1-Papillary Carcinoma</td>
<td>Types: 1-Papillary Carcinoma</td>
</tr>
<tr>
<td>2- Follicular Carcinoma</td>
<td>3- Medullary</td>
</tr>
<tr>
<td>4- Undifferentiated</td>
<td>5- Lymphoma</td>
</tr>
<tr>
<td>- Usually Follicular adenoma.</td>
<td>Less than 10% of tumors.</td>
</tr>
<tr>
<td>- 90% of tumors.</td>
<td>“Painless swelling”</td>
</tr>
<tr>
<td>- Difficult to differentiate between it and malignancy with histology. So as a RULE we have to remove any benign tumor of the thyroid.</td>
<td></td>
</tr>
<tr>
<td>- It can start secreting thyroxine and cause hyperthyroidism.</td>
<td></td>
</tr>
<tr>
<td>- A multinodular goiter may have one nodule that is a tumour. (the nodule is usually not diffused)</td>
<td></td>
</tr>
<tr>
<td>Presentation: Painless swelling (nodule).</td>
<td></td>
</tr>
</tbody>
</table>

6. **Physiological goiter** (simple diffuse swelling): Happens as a result of increase in the demand (like in puberty - due to growth - and in pregnancy...etc ), the body needs thyroxine and the gland will try to

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3 sudden onset of severe neck pain, fever, and chills. It usually follows an acute URTI; most often by strep/staph/pneumo cocci or coliforms. Maybe associated with pyriform sinus fistula. Barium swallow is therefore recommended in recurrences.

4 thyroid swelling, head and chest pain, fever, palpitations, and weight loss. Some have no pain (silent thyroiditis), in which case the condition must be distinguished from Graves disease.

5 Slightly, not high like graves disease.
compensate by swelling up. It’s usually not extremely enlarged.
Fast growth → increased need of thyroxine → thyroid hypertrophy.

Remember: Normal thyroid function in: Thyroid cyst - Simple multinodular - Malignant tumor -
physiological goiter - Inflammatory.

Case: Ahmed (28 year-old) came to the Outpatient clinic complaining of nervousness, palpitations, sweating, and
weight loss. Clinical examination revealed the presence of a goiter. Hyperthyroidism Thyrotoxicosis can be a
manifestation of a number of thyroid conditions, but the most common are:
1. Grave’s disease: autoimmune disease (inflammatory) causes thyrotoxicosis and it has a direct affect on the eyes. Eye
signs in grave’s disease are very obvious(lid retraction and exophthalmos). Usually affects the young.
2. Toxic multinodular goiter: It starts as a simple goiter, but sometimes with time these nodules may turn into toxic
nodules (which secrete thyroxine).
In nuclear scan, you will see hot nodules. And sometimes only one nodule becomes toxic on nuclear scan.

Causes of a solitary thyroid nodule:

1- Thyroid cyst.
2- Dominant nodule in a multinodular goiter (most common cause).
3- Degeneration or hemorrhage into a colloid cyst or nodule.
4- Benign tumor.
5- malignancy.

Malignant tumors of the thyroid:

ESSENTIALS OF DIAGNOSIS :
1- Painless enlarging nodule
لما يقول البيشنت عندي آلم أفرح
2- Lymphadenopathy ⇒ specially ipsilateral cervical, there’s a high chance of malignancy (specific for, but
not sensitive). More than 95% of the malignancy conditions don’t have lymphadenopathy. Lymphadenopathy
is very uncommon in malignancy BUT Lymphadenopathy + thyroid swelling is malignancy until proven
otherwise.

3- Hoarseness of voice → recurrent laryngeal nerve involvement: malignancy or iatrogenic. (also specific
99%, but not Sensitive) Swelling in the neck and hoarseness of voice is highly suggestive of malignancy why? Because the only reason for hoarseness of voice
is injury to the recurrent laryngeal nerve either by malignancy or by a surgeon.

4- Dysphagia (because of the size).
5- Function in malignancy is usually normal
لحد يقول لي بالاختبار ثايروتوکسيكوسس

6 Which means that if lymphadenopathy is present → very suggestive for malignancy, but you can’t exclude malignancy if
it’s not present.
6- Investigation: Whenever you see cold nodule (nuclear) or nodule stippled with microcalcifications (U/S) ⇒ Suspect malignancy

7- Family history of thyroid cancer.

- 99% of cases of thyroid cancer do not have lymphadenopathy or hoarseness because it’s usually caught early before involvement of lymph nodes or the recurrent laryngeal nerve.

**TYPES OF THYROID CANCER:**

Remember: Papillary + Follicular are the differentiated malignant tumors (the cells are well formed), while anaplastic tumors are called undifferentiated malignant tumors.

1. **Papillary carcinoma**

<table>
<thead>
<tr>
<th>Occurrence</th>
<th>Spread and metastases</th>
<th>Management</th>
<th>Prognosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Female:Male ratio ⇒ 3:1 (more common in females).</td>
<td>- Lymphatic spread. Imp</td>
<td>Total thyroidectomy (because it is multifocal) is the optimal surgical procedure. Chemotherapy is not used.</td>
<td>Usually good prognosis. Patients with this type of malignancy usually die with the disease not from it.</td>
</tr>
<tr>
<td>- occurs in young age ⇒ any &lt;20 y/o patient with a single thyroid nodule should be considered as a case of papillary carcinoma until proven otherwise. imp</td>
<td>Any malignancy in the body with lymph nodes involvement → worse prognosis, EXCEPT papillary, the prognosis doesn’t change we can still cure the patient. (the spread through the lymphatics doesn’t make the stage higher)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Most common endocrine cancer is thyroid cancer (and Papillary accounts about 85% of thyroid cancers).</td>
<td>- Metastasizes to lung &amp; bone.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Appears in early adult life (Painless).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Incidence increases with exposure to radiation &amp; in familial types. + due to better diagnostic measures. papillary thyroid carcinoma</td>
<td></td>
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</tbody>
</table>

2. **Follicular carcinoma:**

   A BRAF mutation is the most common mutation in papillary thyroid cancer and is associated with lymph node metastases and a higher recurrence rate.
### Occurrence
- In 30–50 year age group (later than papillary).
- Accounts for about 10% of thyroid cancers.

### Spread and metastases
- Blood spread. **Doesn’t spread to lymph.**
- Metastasizes to lung & bone (**functional metastasis**, bone and lung starts uptaking radionuclear iodine and producing thyroxine by themselves).
- Hürthle cell carcinoma is a clinical variant of follicular carcinoma. It is more likely to be multifocal and involve lymph nodes. Like follicular carcinoma, it makes thyroglobulin, however it does not usually take up radioiodine.

### Management
Treatment consists of total thyroidectomy with preservation of the parathyroids. But metastasis should be treated by radionuclear radiation containing iodine isotopes so once the bone metastases has uptaken it it’ll burn the cells.

### Prognosis
Not as good as papillary carcinoma.

### 3. Medullary carcinoma⁸:

#### Origin
It’s solid, containing amyloid, nodular tumor that does not take up radioiodine and **secretes calcitonin** since it **Arisest from C-Cells in pancreas and adrenals**. Hence, radioiodine is not as good in the investigation or treatment of this condition.
- Accounts for about 7% of thyroid cancers.
- 25% is familial (hereditary) type of medullary carcinoma (Associated with MEN 2a/2b syndrome).
- Most aggressive in MEN2B patients.

#### Management
- It’s better to do thyroidectomy and remove surrounding lymphs before it progresses.
- Preoperative CT CAP is advised as well as exclusion of pheochromocytoma (MEN2).

#### Prognosis
Prognosis is not good, especially if it's part of MEN ⇒ that's why we screen families.

### 4. Undifferentiated (Anaplastic):

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⁸ MEN IIa: medullary carcinoma, pheochromocytoma, hyperparathyroidism.
MEN IIb: Medullary carcinoma, pheochromocytoma, mucosal neuromas and marfanoid shape
**Occurrence**
- Usually in Elderly.
- Accounts for about 1% of thyroid cancers.

**Features**
- Rapidly growing.
- Usually evolves from papillary or follicular neoplasm.
- Locally invasive → causing compression (dyspnea) and hoarseness of voice, and may cause Horner's syndrome (miosis-ptosis-anhidrosis)

**Spread & metastases**
Cervical lymphadenopathy and pulmonary metastases are common

**Management**
Both resection and chemotherapy don’t show any value, external beam radiation may be of value. The idea is to relieve compression.

**Prognosis**
the worst; Rarely cured and recurrence is high.

### 5. Lymphoma

**Occurrence**
- More common in our part of the world.
- Higher risk in Hashimoto’s.
- Accounts for about < 5% of all thyroid cancers.

**Diagnosis**
Usually diagnosed post-op by pathology, but if diagnosed before → send to oncology for treatment.

**Management**
Chemo & radiotherapy.

### Investigations:
1. Ultrasound ➔ 1st diagnostic method.
2. Fine Needle Aspiration (FNA) ➔ Most important method.
3. Percutaneous needle biopsy ➔ The most cost-effective diagnostic test.

   along with ultrasound, Needle biopsy is not as helpful in patients with a history of irradiation to the neck. Because radiation-induced tumors are often multifocal and a negative biopsy may therefore be unreliable.

4. Thyroid uptake scan (basically nuclear medicine). We give the patients radioactive iodine and the cells that secrete thyroxine will take up the RAI and appear black. If the area did not uptake it we call it cold nodule and areas with high uptake are called hot nodules.

5. FNA/Bethesda System ➔ The main diagnostic method.

The Bethesda System for Reporting Thyroid Cytopathology (TBSRTC) established a standardized, category-based reporting system for thyroid fine-needle aspiration (FNA) specimens.

### Indications for Thyroidectomy

*Surgery is often the preferred treatment, because it’s more rapid and has more certain control of the disease than radioiodine.*

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9.livre, العين وفتحات العرق (miosis-ptosis-anhidrosis)

10. livre, العين وفتحات العرق (miosis-ptosis-anhidrosis)
1- in the presence of a very large goiter or a multinodular goiter with relatively low radioactive iodine uptake.
2- if there is a suspicious or malignant thyroid nodule.
3- for patients with ophthalmopathy.
4- for the treatment of pregnant patients or children.
5- for the treatment of women who wish to become pregnant within 1 year after treatment.
6- for patients with amiodarone-induced hyperthyroidism.
7- compressive symptoms e.g. Dysphagia, dyspnea and/or hoarseness.

**Branchial cyst and fistula: Extra**

- Swellings lying laterally in the upper neck may be branchial cysts. They are thought to be remnants of the second and third branchial arches yet often present in young adults. The cysts contain opaque fluid with cholesterol crystals. Lymphoid tissue is found in their walls. They may become infected and usually require excision.
- Branchial fistula may occur between the skin surface, low in the neck, and the tonsil or lower pharynx internally. Infection often occurs and excision is usually required.

**Other cystic swellings: Extra**

**Cystic hygroma** is a rare, benign lymphangioma of the neck, which usually presents in early life. Complete excision is difficult, leading to frequent recurrence.

**Dermoid cysts** May also occur in the upper neck, usually in the midline or submandibular area, in younger children. They contain skin appendages unlike sebaceous cysts.

**Laryngoceles** Occur as a result of herniation of laryngeal mucosa laterally into the neck. They distend with air during the Valsalva manoeuvre and may become infected. Excision is usually required.

**General considerations**

Thyrotoxicosis: is the clinical condition of presence of high levels of thyroid hormones in Blood by any cause.

**Hyperthyroidism** is over activity of the thyroid gland, thus it causes thyrotoxicosis.

<table>
<thead>
<tr>
<th>Hyperthyroidism</th>
<th>Hypothyroidism</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-GRAVE’S</td>
<td>1-Surgical removal of thyroid gland</td>
</tr>
<tr>
<td>2-Toxic multinodular goiter</td>
<td>2-Late Hashimoto’s</td>
</tr>
<tr>
<td>3-early Hashimoto’s</td>
<td></td>
</tr>
<tr>
<td>4-single toxic nodule (commonly Follicular Adenoma).</td>
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</tbody>
</table>

**Lymph node swelling**
- Majority of lymphadenopathy occur in the posterior triangle.

<table>
<thead>
<tr>
<th>Inflammatory</th>
<th>Neoplastic</th>
</tr>
</thead>
</table>
| **1- Acute:** Tonsillitis. Treat the cause | **1- Primary**
|                       | **Lymphoma,** Either hodgkin or non-hodgkin lymphoma. They are discrete (not mated) and rubbery. |
| 1- Chronic:           | 2- Secondary                      |
| **- Non specific**    | **- Metastasis:** Usually from the head and neck, Brain, Larynx, Pharynx, Sinuses |
| **- TB:** Tuberculosis must be ruled out. It usually presents as swelling of a group of lymph nodes. There can be signs of inflammation or cold abscess. You treat like TB anywhere else in the body. | **- Supraclavicular Lymph nodes:** usually the causes are infraclavicular, Gastro, Pulmo, Breast, and testicular tumors. |

**Parathyroid swelling**
**Primary Hyperparathyroidism (PHPT):**

*(Dr. didn’t explain it but asked us to read about it)*

<table>
<thead>
<tr>
<th>Occurrence</th>
</tr>
</thead>
</table>
| - 2-3 times more in females than males.  
- Uncommon in children.  
- No evidence for geographical variation.  
- 0.1 - 0.5 % Prevalence rate |

<table>
<thead>
<tr>
<th>Due to &amp; results in</th>
</tr>
</thead>
</table>
| - In 84% of patients, primary hyperparathyroidism is due to an adenoma\(^{11}\), in 15% it results from hyperplasia\(^{12}\), and in less than 1% it results from parathyroid carcinoma.  
- The most common cause of hypercalcemia.  
Most common cause of hypercalcemia in hospitals → malignancy.  
Most common cause in community → primary hyperparathyroidism.  
- (All causes of high Calcium leads to high Phosphate except this condition → causes high Chloride). |

<table>
<thead>
<tr>
<th>Clinical presentation</th>
</tr>
</thead>
</table>
| - In the west 60-70% detected by routine screening.  
- Many are asymptomatic. |

<table>
<thead>
<tr>
<th>Clinical manifestations</th>
</tr>
</thead>
</table>
| 1- Renal stones. Due to hypercalcemia  
لما يجيك بيشنت ريكرنتر أو بيلاترال ستونز أخصوص الباراثيرويد  
2- Bone loss and joint pain.  
العظم ينكسر من ابسط ضربة.  
3- Abdominal groans.  
4- Psychic moans.\(^{13}\)  
5- Fatigue overtones.  
6- Moth Eaten appearance of the skull\(^ {14}\).  
7- Peptic ulcer |

<table>
<thead>
<tr>
<th>Investigations</th>
</tr>
</thead>
</table>
| 1- Serum Calcium. (High)  
2- PTH. (High)  
3- Serum Phosphate. (Low)  
4- Raised Chloride.  
5- Decreased bone density.  
- High Serum Calcium + PTH ⇒ enough to confirm the Dx of 1ry hyperparathyroidism |

<table>
<thead>
<tr>
<th>Management</th>
</tr>
</thead>
</table>
| - All symptomatic patients should be treated.  
- The aim is to remove all hyperactive parathyroid tissue.  
In adenoma → remove the enlarged gland.  
In hyperplasia → remove 3.5 glands, leave only half a gland for the patient to maintain the function. |

**Thyroglossal cyst:**

\(^{11}\) In adenoma, usually only 1 parathyroid gland is enlarged.

\(^{12}\) In hyperplasia, all glands are usually affected.

\(^{13}\) هماث كمان دا بروهون للساليكاتري ويبقون مرضي مومين وسبب نتومهم كان  

\(^{14}\) multiple small endosteal lucent lesions or holes, often with poorly defined margins, with sparing of the cortex.
Pathophysiology
The thyroid gland begins its embryological development in the tongue base and as it descends a duct forms and then gets obliterated. A cyst may develop with improper obliteration. Common in children.

Note
If we see a lump, how can we tell if it is a thyroid lump? Ask the patient to swallow. If it doesn’t move with swallowing then it is not a thyroid disease (could be dermoid cyst, lipoma, lymph Node). If it moves then it is one of two: Thyroid lump “goiter” or Thyroglossal cyst. Then you ask the patient to stick his tongue out and if the lump moves then it is a thyroglossal cyst. Because Thyroglossal cysts extend to the tongue.

Treatment
Surgical excision

Neck swellings:

<table>
<thead>
<tr>
<th>Lateral neck swellings</th>
<th>Anterior neck swellings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lymph nodes</td>
<td>Lymph nodes</td>
</tr>
<tr>
<td>Lipoma</td>
<td>Lipoma</td>
</tr>
<tr>
<td>Sebaceous cyst</td>
<td>Sebaceous cyst</td>
</tr>
<tr>
<td>Hemangioma</td>
<td>Hemangioma</td>
</tr>
<tr>
<td>Aneurysm</td>
<td>Aneurysm</td>
</tr>
<tr>
<td>Submandibular gland</td>
<td>Thyroid</td>
</tr>
<tr>
<td>Tail of parotid gland</td>
<td>Thyroglossal Cyst</td>
</tr>
<tr>
<td>Carotid body tumor</td>
<td></td>
</tr>
<tr>
<td>Laryngocele</td>
<td>Branchial cyst</td>
</tr>
<tr>
<td>Pharyngeal diverticulum</td>
<td>Cystic hygroma</td>
</tr>
<tr>
<td></td>
<td>Others</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Recall: THYROID

1. Identify the following structures: 1. Pyramidal lobe 2. Right lobe 3. Isthmus 4. Left lobe
2. Define the arterial blood supply to the thyroid:
   a. Superior thyroid artery (first branch of the external carotid artery)
   b. Inferior thyroid artery (branch of the thyrocervical trunk) (IMA artery rare)
3. What is the venous drainage of the thyroid?
   1. Superior thyroid vein 2. Middle thyroid vein 3. Inferior thyroid vein
4. Name the lymph node group around the pyramidal thyroid lobe? Delphian lymph node group
5. What is the thyroid isthmus? Midline tissue border between the left and right thyroid lobes
6. Which ligament connects the thyroid to the trachea? Ligament of Berry (remember mazen berry)
7. Which paired nerves must be carefully identified during a thyroidectomy?
   Recurrent laryngeal nerves, behind the cricothyroid muscle; damage one causes hoarseness, if bilateral = airway obstruction.
8. What is TRH? Thyrotropin-Releasing Hormone released from the hypothalamus; causes release of TSH .... what is it? Thyroid-Stimulating Hormone released by the anterior pituitary; causes release of thyroid hormones from the thyroid. What are they? T3(active) and T4(levothyroxine).
9. What is the differential diagnosis of a thyroid nodule?
   Multinodular goiter /Hyperfunctioning adenoma/ Cyst/ thyroiditis/ Carcinoma/lymphoma
10. What are the indications for a scintiscan?
    1. Nodule with multiple “nondiagnostic” FNAs with low TSH 2. Nodule with thyrotoxicosis and low TSH
11. In evaluating a thyroid nodule, which of the following suggest thyroid carcinoma: History?
   Signs?
   Symptoms?
12. What is the most common cause of thyroid enlargement?
    Multinodular goiter
13. What are indications for surgery with multinodular goiter?
    Cosmetic deformity, compressive symptoms, cannot rule out cancer
14. Anaplastic Carcinoma What is it also known as?
    Undifferentiated cancer arising in 75% of previously differentiated thyroid cancers (most commonly, follicular carcinoma)
15. How can the differences between etiologies of ACUTE and SUBACUTE thyroiditis be remembered?
    Alphabetically: A before S, B before V (i.e., Acute before Subacute and Bacterial before Viral, and thus: Acute Bacterial and Subacute Viral)
16. What are the common causative bacteria in acute suppurative thyroiditis?
    Staph and streptococcus
17. What are the two types of chronic thyroiditis?
    1. Hashimoto’s thyroiditis 2. Riedel’s thyroiditis (subacute sometimes)
# Summary

## Goiter (thyroid swelling)

<table>
<thead>
<tr>
<th>Thyroid cyst</th>
<th>Multinodular goiter (Simple goiter)</th>
<th>Inflammatory (thyroiditis)</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Painless</td>
<td>● Benign condition</td>
<td>- Autoimmune inflammation (Hashimoto's thyroiditis)</td>
</tr>
<tr>
<td>● Normal thyroid function</td>
<td>● 80% normal thyroid function</td>
<td>Caused by: Chronic thyroiditis</td>
</tr>
<tr>
<td>Diagnosis:</td>
<td>● If it starts to secrete thyroxine we called (toxic multinodular goiter)</td>
<td>Diagnosis: FNA</td>
</tr>
<tr>
<td>● Ultrasound and FNA</td>
<td>Treatment: Surgery if only symptomatic</td>
<td>Treatment: Surgery only if: symptomatic or to R\O malignancy</td>
</tr>
<tr>
<td>Treatment:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Aspiration.</td>
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</tbody>
</table>

## Lymph node swelling (Majority occur in the posterior triangle)

<table>
<thead>
<tr>
<th>1. Inflammatory:</th>
<th>2. Neoplastic</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Acute (tonsillitis)</td>
<td>● Primary (Lymphoma)</td>
</tr>
<tr>
<td>● Chronic (TB)</td>
<td>● Secondary (Metastasis)</td>
</tr>
</tbody>
</table>

## Thyroid tumor

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<tbody>
<tr>
<td>Investigations:</td>
<td>1 Ultrasound 1st diagnostic method.</td>
<td>2- Fine Needle Aspiration (FNA) Most important method.</td>
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</table>
# Types of Thyroid tumor

<table>
<thead>
<tr>
<th>1. Papillary carcinoma</th>
<th>2. Follicular carcinoma</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Young age (children)</td>
<td>- 30–50 year age group</td>
</tr>
<tr>
<td>- Most common endocrine cancer is thyroid cancer</td>
<td>- Blood spread. Doesn’t spread to lymph.</td>
</tr>
<tr>
<td>- Increases risk with exposure to radiation</td>
<td>- Management: Treatment consists of total thyroidectomy with preservation of the parathyroids (radionuclear iodine radiation for metastasis)</td>
</tr>
<tr>
<td>- Lymphatic spread.</td>
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<tr>
<td>- Metastasizes to lung &amp; bone.</td>
<td></td>
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<tr>
<td>- Good prognosis</td>
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<tr>
<td>- Treatment: thyroidectomy, chemotherapy is not used.</td>
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</tbody>
</table>

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</thead>
<tbody>
<tr>
<td>- Associated with MEN 2</td>
<td>- Elderly age.</td>
<td>- Higher risk in Hashimoto’s.</td>
</tr>
<tr>
<td>(important to investigate pheochromocytoma)</td>
<td>- Locally invasive → causing compression (dyspnea) and hoarseness of voice</td>
<td></td>
</tr>
<tr>
<td>- Poor prognosis.</td>
<td>- the worst prognosis.</td>
<td></td>
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<tr>
<td></td>
<td>- Rarely cured</td>
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</tbody>
</table>

## Questions
1- 45 years old female presented with right flank pain, associated with fever and bloody urine. She gave a history of a recent hip fracture. On general inspection you noticed a neck swelling. Upon examination there was a palpable solid mass. What is the most likely cause of the swelling?
   A. Thyroid goiter
   B. Lung carcinoma metastasized to the bone and cervical lymph nodes
   C. Primary hyperparathyroidism
   D. Cervical lymphoma

2- 24 years old male presented to the clinic with a neck swelling. Patient denies having any symptoms of hyper/hypothyroidism and has not noticed such swelling before. Physical exam was done and the swelling was described as hard and resembles a solid mass. FNA was performed and the swelling disappeared after the procedure. What is the best next step?
   A. Reassure the patient and send him home
   B. Do an Ultrasound
   C. Thyroidectomy
   D. Check thyroid function

3- 29 years old pregnant female presented with a painless mild neck swelling. She denies having any hyper/hypothyroidism symptoms. Thyroid function test was normal. The physician reassured the patient and explained that pregnancy can be a cause of physiological goitre. What other condition is known to cause a physiological goitre?
   A. Puberty
   B. Aging
   C. Obesity
   D. Sedentary lifestyle

4- Which of the following can result due to altered thyroid function?
   A. Thyroid cyst
   B. Papillary carcinoma
   C. Simple multinodular goitre
   D. Follicular carcinoma

5- 33 years old obese male with a history of depression and on lithium, presented with difficulty in swallowing solids. on physical exam a large nodular thyroid was palpable. Thyroid function tests was normal. FNA was done no serological marker or inflammatory cells were present. Ultrasound showed enlarged thyroid. Nuclear scan showed a normal warm tissue. How would you manage this patient?
   A. Treat with thyroxine
   B. Aspirate the swelling
   C. Reassurance and physiological support
   D. Surgery is indicated

6- What is the appropriate management of a benign follicular adenoma?
   A. Chemotherapy
   B. Radiotherapy
   C. Anti thyroid medication and monitoring
   D. Lobectomy
7- 39 years old female presented with progressive neck swelling for the past 8 months. On physical exam there was a nodule in the left lobe and lymphadenopathy was present. Thyroid function was normal. What is the most likely diagnosis?

A. Simple nodular goitre
B. Toxic nodular goitre
C. Follicular adenoma
D. Thyroid malignancy

Answers:
1: C  2: A  3: A  4: C  5: D  6: D  7: D