Presentation and Management of Common Neck Swelling, including Thyroid and Parathyroid Glands

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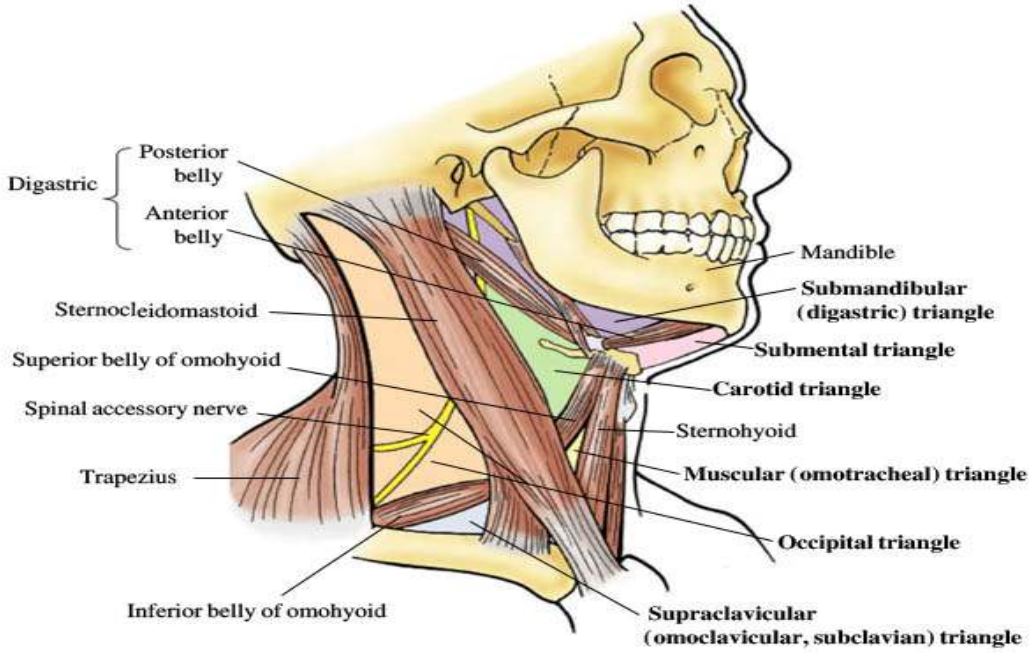
Anatomical view of the neck:

- Sternocleidomastoid muscle (SCMM) divides the neck into:
  - Anterior triangle.
  - Posterior triangle.
- Submandibular triangle is located above the digastic muscle.
- Carotid triangle.
- Subclavian triangle is below the inferior belly of the omohyoid muscle.
- The *deep* layer of the cervical fascia splits to envelope the SCMM (i.e. investing it).
- Tensing the SCMM and fascia helps to see whether a mass is deep or superficial.
  - Superficial pathology appears more obvious with tension.
  - Deep swellings become less apparent and reduced in size with tension.



Neck Swellings

- A neck swelling may be a local problem, or it sometimes presents as a systemic disease manifestation, e.g. gastric cancer.
- Examples of swellings that are superficial to the deep fascia:
  1. Lymph nodes.
  2. Lipoma.
  3. Sebaceous cyst.
  4. Neurofibromatosis.

- Swellings arising deep to the deep fascia can be classified as follows:
  a. Midline swellings (masses arising from a single midline structure):
    1. Thyroglossal cyst, the most common. ☝
    2. Pharyngeal pouch.
    3. Subhyoid bursa.
    4. Dermoid cyst.
    5. Laryngocecle.
    6. Big ranula.

  b. Lateral swellings (masses arising from paired lateral structures).
    1. Thyroid swelling, the most common. ☝
    2. Enlarged lymph nodes.
    3. Parotid swellings.
    4. Submandibular swelling.
    5. Branchial cyst.
    6. Carotid body tumor.
    7. Cystic hygroma, mainly in pediatric age group.

NOTE:

- *Some midline swellings may arise and then deviate to the right or left according to the pressure applied on them, e.g. pharyngeal pouch.*

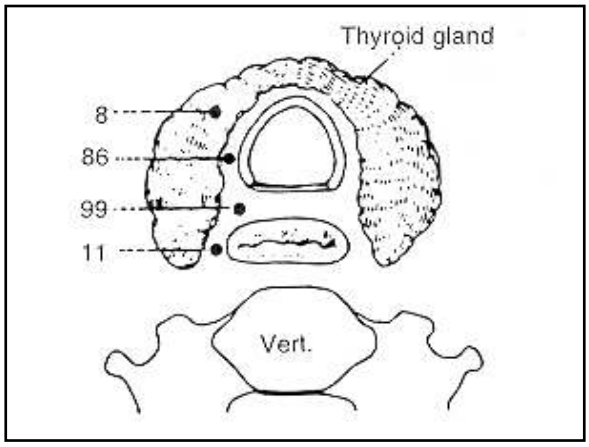
Thyroid Gland

Embryology:

- Arises as a thickening of the median bud of the pharynx at the site of the foramen cecum on the adult tongue.
- Descends to the anterior of the neck as the thyroglossal duct.

Surgical anatomy:

- It weights 15-30 gm.
- Supplied by the superior and inferior thyroid arteries.
- Venous drainage occurs through the superior, middle and inferior thyroid veins.
- The recurrent laryngeal (RL) nerves have a very close relation with the gland. The commonest position of the RL nerve is tracheoesophageal (60%). ☝
- Superior laryngeal nerves.



Physiology:

- TSH:
  - The main driver of the gland.
  - The most sensitive test of thyroid function. ☝
- Triiodothyroxin (T_3).
- Thyroxin (T_4):
  - The end product of thyroid gland, nobody can live without it. ☝
  - Interchangeable with T_3 in peripheral blood.

Any person can only be in one of three conditions:

1. Hyperthyroid.
2. Euthyroid.
3. Hypothyroid.

Symptoms and signs:

Hyperthyroidism	Hypothyroidism
➢ Restlessness. ➢ Heat intolerance. ➢ Increased sweating. ➢ Nervousness. ➢ Palpitations. ➢ Weight loss, although they eat a lot. ➢ Goitre. ➢ Tremors. ➢ Tachycardia. ➢ Eye signs. ➢ Thyroid thrill and bruit. ➢ Proximal muscles fatigability.	➢ Tiredness. ➢ Cold intolerance. ➢ Mental lethargy. ➢ Slow movement and reflexes. ➢ Slow pulse rate. ➢ Increased weight with low appetite. ➢ Bradycardia ➢ Dry skin and hair. ➢ Hoarse voice. ➢ Bradycardia. ➢ Periorbital puffiness and edema. ➢ If untreated, an adult patient usually dies from heart block. ☝

NOTE:

- *Hypothyroidism is the only disease that can be diagnosed over the phone due to a husky and slow voice of the patient.*

Goitre:

- It is an enlarged thyroid gland.
- Types:
  - Simple goiter.
  - Toxic goiter.
  - Neoplastic goiter.
  - Thyroiditis, either viral or bacterial.
  - Other rare goiters.

Common thyroid diseases:

- Grave's disease.
- Toxic nodular goiter:
  - Many nodules distributed in both lobes.
  - These nodules shower the body with increased amount of T_4.
- Toxic (hot) nodule.
- Benign neoplasms.
- Malignant neoplasms.

Grave's disease:

- A medical disorder that may manifest several different conditions, including goitre and hyperthyroidism and eye signs.
- The most common cause of hyperthyroidism. ☝
- Occurs most frequently in women of middle age (8:1 compared to men).

Clinical features:

- Hyperactive state (symptoms and signs of hyperthyroidism).
- Very clear eye signs such as:
  - Exophthalmus.
  - Ophthalmoplegia.
  - Tearing.
- The eye signs are *irreversible*. ☝

Treatment

1. Medical:
   - Antithyroid drugs.
   - Takes a long time.
2. Radioactive iodine:
   - Can't be used in child-bearing woman.
3. Surgery:
   - Total thyroidectomy and thyroxin replacement.
   - Complications:
     a. RL nerve injury; unilateral lesion causes stridor and hoarseness, but if it is bilateral, the patient may need a ventilator to breath. The damage may be temporary, lasts 6-12 months, or permanent.
     b. Hypocalcemia; due to the removal of parathyroid glands, either temporary (lasts at most for six months) or permanent.
     c. Hematoma; may compress the trachea and compromise the respiration.
     d. External laryngeal nerve injury causes voice fatigue.

Thyroid Neoplasms

A. Benign:

- Follicular adenoma
  - Treated by surgical removal.

B. Malignant:

- Papillary carcinoma:
  - 70-80% of thyroid cancer.
  - Has a good prognosis.

- Follicular carcinoma:
  - 10-20%.

- Medullary carcinoma:
  - 5-7%.
  - If the patient has pheochromocytoma, you have to treat it first.

- Malignant lymphoma:
  - Treated by radiation, *not* surgery.

- Anaplastic carcinoma:
  - A killer disease. The patient usually dies within six month after the diagnosis.
  - The surgical intervention is only palliative by cutting the isthmus.

Differentiated thyroid cancer (DTC):

- Includes papillary, follicular and medullary carcinoma.
- Doesn't count the lymph nodes.
- To know the prognosis, apply the AGES system then classify the patient as having low or high risk.
- Low risk patients live for a long time, while the five-year survival rate in those who are at high risk is 25%.
- AGES:
  - Age; above 50 has poor prognosis.
  - Grade; I-III.
  - Extension beyond the capsule.
  - Size of the tumor; below 4 cm has a good prognosis.

Parathyroid Gland

- The most common cause of hypercalcemia in a non hospitalized patient is primary hyperparathyroidism, while in a hospitalized patient, it is malignancy.
- Patients with hyperparathyroidism may present with classical symptoms, or they may have vague symptoms such as tiredness, constipation, fatigue, and if neglected, they may develop renal calculi.
- The most common cause of primary hyperparathyroidism is adenoma (85%).
- Diagnosis is done by serum calcium and parathyroid hormone levels, US and neck scintiscans.
- The treatment is total parathyroidectomy.

The Salivary Glands

- The salivary glands are exocrine glands which produce saliva.
- The parotid, submandibular and sublingual glands are paired glands.
- There are other small unnamed glands scattered beneath the buccal mucous membrane, over the palate, lips, cheek, tonsil, and tongue. It is not uncommon to see mixed salivary tumors in these small glands.
- The smaller the gland, the more likely to get malignant.
- The parotid secretes serous secretion, sublingual produces a mucous secretions, and the submandibular gland secretion is a mixture of the two.
- The commonest surgical diseases of the salivary glands are infection and calculus formation in the submandibular gland, and tumors of the parotid gland.

The Parotid Gland

- The largest salivary gland.
- It is wedged between the mandible and the SCMM.
- The important relation is medially where the styloid process and its muscles separate the parotid from the internal jugular vein, internal carotid artery, last four cranial nerves and the lateral wall of the pharynx.
- The facial nerve has a very important relation with the gland.
- Parotid duct (called *Stensen's* duct) is 5 cm long, arises from the anterior part of the gland, runs over the messeter muscle about 1 cm below the zygomatic arch to penetrate the buccinator muscle and opens opposite to the second upper molar tooth.
- Structures traversing the gland:
  1. External carotid artery.
  2. Retromandubilaur vein.
  3. Facial nerve.
- Mumps is the commonest medical disease of the parotid gland.
- Malignant tumors of the parotid usually produce facial palsy.
- Sialogram:
  - Injection of a dye in the duct to asses it.
  - The filling defect is usually caused by a stone.
- Parotidectomy is superficial, deep or total.

Submandibular Gland:

- It is made up of large superficial and small deep lobes which connect with each other around the posterior border of the mylohyoid.
- It is crossed superficially by the cervical branch of the facial nerve and the facial vein, and the facial artery is related to the gland posteriorly and superiorly where it grooves.
- Relation with the lingual nerve is *"double crossing"*; the nerve reaches the tongue by passing from the lateral side of the duct below and then medial to it.
- *Wharton's* duct arises from the deep part of the gland and opens at the side of the frenulum linguae.
- Unlike the parotid, *the whole gland must be removed*.
- Intraglandular lymph node and *enblock neck dissection* is done if there is squamous cell carcinoma.
- Bimanual examination differentiates between an enlarged submandibular lymph node and submandibular gland.
- Stone in the Wharton's duct can be felt bimanually.

Sublingual Gland:

- It is a small gland lying below the mucosa of the floor of the mouth and in front of the deep part of the submandibular gland.
- Medially, the submandibular duct and the lingual nerve separate it from the base of the tongue.
- It drains by many ducts in the floor of the mouth and in the submandibular gland.

For extra reading
Lawrence's Essentials of General Surgery
Chapter 21
399-412

Lawrence's Essentials of Surgical Specialties
Chapter 5
239-244

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