

SIMPLE GOITRE

THESIS

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BY

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Anatomy of the thyroid gland :

The thyroid gland is a brownish-red highly vascular ductless organ, situated at the front and sides of the lower part of the neck opposite the fifth, sixth and seventh cervical and the first thoracic vertebrae. It is enclosed in a sheath of pretracheal layer of the deep cervical fascia.

"Pretracheal fascia is a layer of deep fascia covering the front and sides of the trachea extending down to the thorax. Its upper part splits to enclose the thyroid gland and fixes it to the larynx and trachea. That is why the thyroid gland moves with the larynx up and down during degultition, and it is attached to the arch of the cricoid cartilage and oblique line of the thyroid cartilage superiorly".

Internal to the sheath it is enclosed in its own fibrous capsule, and between these lie the arteries and veins of the gland, the latter forming a network from which the various thyroid veins arise.

The gland varies greatly in size and is always relatively larger in women and children than in men. Its weight is somewhat variable, but is usually about 25 gm.

The gland consists of right and left lobes connected across by a narrow portion termed the isthmus.

Lobes :

The lobes are conical in shape, the apex of each is directed upwards and laterally and reaching the level of oblique line of the thyroid cartilage. The base is *on the level of the fourth or fifth tracheal ring. Each lobe is* about 5 cm long, its greatest width is about 3 cm, and its thickness about 2 cm (anteroposterior dimension). It has an upper and lower poles, medial, lateral, posterolateral surfaces and postero-medial aspect. The postero-medial aspect of each lobe is attached to the side of the cricoid cartilage by a ligamentous band called lateral ligament of the thyroid gland. The lateral (superficial) surface :-

It is a convex surface, covered just superficial to the pretracheal fascia by :

The sterno-thyroid muscle :

Origin: From the back of manubrium and 1st. Costal Cartilage.

Insertion : Into the oblique line on the lamina of thyroid cartilage.

N.S. Ansa-Cervicalis C₁, C₂, C₃

More superficially the upper part of this surface is covered by sternohyoid muscle and superior

belly of omohyoid, the lower part is covered by the anterior fibres of sternocleidomastoid muscle.

The sternohyoid muscle :

Origin : From the back of manubrium and back of medial end of clavicle.

Insertion : Into lower border of the body of hyoid bone.

N.S.: Ansa-cervicalis (C_1, C_2, C_3).

Superior belly of omohyoid :

Origin: Lower border of the body of hyoid bone at its junction with greater horn.

Insertion : Intermediate tendon.

N.S. : Ansa-cervicalis (C_1, C_2, C_3).

Sternocleidomastoid :

Origin: 2 heads.

1. Sternal head : From the upper part of the anterior surface of the manubrium.
2. Clavicular head: From the upper surface of medial third of the clavicle.

Insertion: Lateral surface of the mastoid process and lateral third of superior nuchal line.

N.S. : - Spinal root of accessory nerve (Motor)
- C_2 (Proprioceptive).

The medial surface : Is moulded inferiorly on the trachea and oesophagus with the recurrent laryngeal nerve between them, while superiorly it is fitted to the cricoid and thyroid cartilages with the cricothyroid and inferior constrictor muscles and the external brach of the superior laryngeal nerve intervening.

The postero-lateral surface : Is related to the carotid sheath and overlaps the common carotid artery, more posterior to the artery is the longus coli muscle.

The anterior border, which is closely related to the anterior branch of the superior thyroid artery, is thin and inclines obliquely from above downwards and medially.

The posterior border ; which is blunt and rounded, intervenes between the posterior and medial surface and is closely related below to the inferior thyroid artery and an anastomosing branch which connects that vessel to the posterior branch of superior thyroid artery.

In addition the parathyroid glands are usually related to this border. The lower end of the posterior border of the left lobe is related to the thoracic duct.

The upper pole : is extending up to the level of oblique line of the thyroid cartilage, it lies hidden beneath the upper end of the sternothyroid muscle between it and the ala of the thyroid cartilage due to the attachment of this muscle to the oblique line of the thyroid cartilage, the upper pole cannot extend forwards over the thyrohyoid muscle.

The lower pole : It is broader than the upper pole, it extends downwards to the level of the 4th or 5th tracheal ring(may reach the 6th ring).

The isthmus :

Connects together the lower parts of the two lobes, it measures about 1.25 cm transversely, and the same vertically and usually covers the second and third rings of the trachea, though it is often placed at a higher, and occasionally at a lower level. Its situation and size, present however many variations.

Anteriorly :-

- It is separated by the pretracheal fascia from the sternothyroid.
- More superficially it is covered by the sternohyoid, the anterior jugular vein, the fascia and the skin.

- An anastomotic branch uniting the two superior thyroid arteries runs along its upper border.
- At its lower border the inferior thyroid veins leave the gland.

The Pyramidal lobe :

A third conical lobe called the pyramidal lobe is often present, it extends upwards towards the hyoid bone from the upper part of the isthmus or from the adjacent part of either lobes (more commonly the left). It is occasionally quite detached or may be divided into two or more parts.

A fibrous or muscular band is sometimes attached above to the body of the hyoid bone, and below to the isthmus of the gland or its pyramidal lobe, when muscular it is termed levator of the thyroid gland (levator glandulae thyroideae).

This band is the remnant of the thyroglossal duct from which the greater part of the thyroid gland is developed. It originates as an epithelial downgrowth from the region of the Foramen Caecum in the tongue and passing inferiorly anterior to the body of the hyoid bone hooks up posterior to it and descends in the middle line of the neck to expand into the thyroid

gland. The suprahyoid part of this structure only rarely persist as a rudiment.

Small detached portions of the thyroid tissue are sometimes found in the vicinity of the lobes or above the isthmus, they are called accessory thyroid glands.

Remnants of the thyroglossal duct may persist between the isthmus and the foramen caecum of the tongue and may give rise to accessory nodules of the thyroid tissue or cysts, situated in or near the median plane, even in the substance of the tongue.

Blood supply of the thyroid gland :

The superior thyroid artery (1st. branch from the anterior aspect of the external carotid) arises from the front of the external carotid artery just below the level of the greater cornua of the hyoid bone and divided into terminal branches at the apex of the lobe of the gland. It may arise from the common carotid artery.

Relations :

From its origin beneath the anterior border of the sternomastoid muscle it runs downwards and forwards in the carotid triangle along the lateral border of the thyrohyoid muscle and is covered by the skin.

platysma and fascia, it then passes under cover of the Omohyoid, sternohyoid and sternothyroid. To its medial side are the constrictor pharyngis inferior and the external branch of the superior laryngeal nerve, but the nerve frequently lies on a more posterior plane.

Branches :

It gives the sternomastoid and superior laryngeal branches then it pierces the pretracheal fascia as a single vessel to reach the summit of the upper pole. It divides on the gland into an anterior branch that runs down to the isthmus and a posterior branch that runs down the back of the lobe and anastomosis with an ascending branch of the inferior thyroid artery from the lower pole. The anterior branch sends a branch across the upper border of the isthmus to anastomose with the artery of the opposite side. During thyroidectomy the ligation of the superior thyroid artery must be close to the thyroid gland to avoid injury to the external laryngeal nerve.

Inferior thyroid artery :

It arises from the thyro-cervical trunk, a branch from the front of the first part of subclavian artery.

It runs upwards in front of the medial border of the scalenus anterior, it then turns medially at the level of cricoid cartilage in front of the vertebral vessels and behind the carotid sheath and its contents, and usually behind the sympathetic trunk, the middle cervical ganglion of which generally rests upon the vessel, it finally descends on the longus coli to the lower border of the lobe of the thyroid gland.

As it approaches the thyroid gland, the relation of the artery to the recurrent laryngeal nerve is of surgical importance. At a little distance from the gland the artery usually passes behind the nerve; but near the gland, on the right side the nerve may lie with equal frequency anterior or posterior to or intermingled amongst the branches of the artery before they pierce the pretracheal fascia.

While on the left side the nerve is most commonly posterior to the artery before it pierces the pretracheal fascia. The relationship between the terminal branches of the artery and those of the nerve is very variable.

Branches :

The inferior thyroid artery gives off oesophageal and inferior laryngeal branches then it divides outside the pretracheal fascia into four or five branches that pierce the fascia separately to reach the lower pole of the gland. The recurrent laryngeal nerve always lies behind the pretracheal fascia, and if this structure remains intact during thyroidectomy, the nerve will not have been divided. It is closely behind the fascia, however, and may be bruised or caught in a ligature, hence the advisability of ligating the inferior thyroid artery well lateral to the gland before it begins to divide into its terminal branches.

There are two main glandular branches: (a) inferior branch which supplies the lower part of the lobe (b) ascending branch which ascends on the posterior border and supplies the posterior part of the lobe and the parathyroid glands. It anastomoses with the superior thyroid artery.

Thyroidea-ima artery :

Arises from the branchio-cephalic trunk or the arch of the aorta ascend in front of the trachea to the isthmus of the thyroid gland in which it ends.

Venous return :

The veins form a plexus on the surface of the gland and on the front of the trachea, from this plexus the superior, middle and inferior thyroid veins arises.

1. The superior thyroid vein :

Accompanies the superior thyroid artery runs across the common carotid artery to join the internal jugular vein in 50 % of the individual or to join the common facial vein in the remaining 50 %.

2. The middle thyroid vein :

It is short and wide and passes directly from the middle lobe, it crosses the front of the common carotid artery and ends in the lower part of the internal jugular vein under cover of the superior belly of Omohyoid.

3. The inferior thyroid vein :

From the isthmus and lower poles the inferior thyroid vein form a plexus that lies in the pretracheal fascia in front of the cervical portion of the trachea, from this plexus the left vein descends and joins the left brachio-cephalic vein and the right vein passes obliquely downwards and to the right across the branchio-cephalic artery to open into the right brachiocephalic vein.