THYROID GLAND SWELLINGS

Essay

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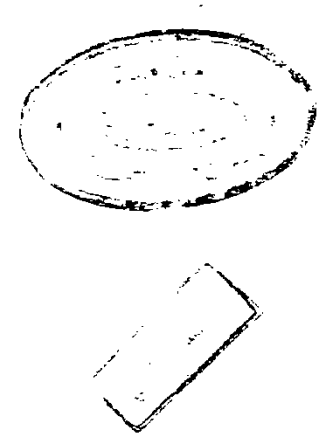

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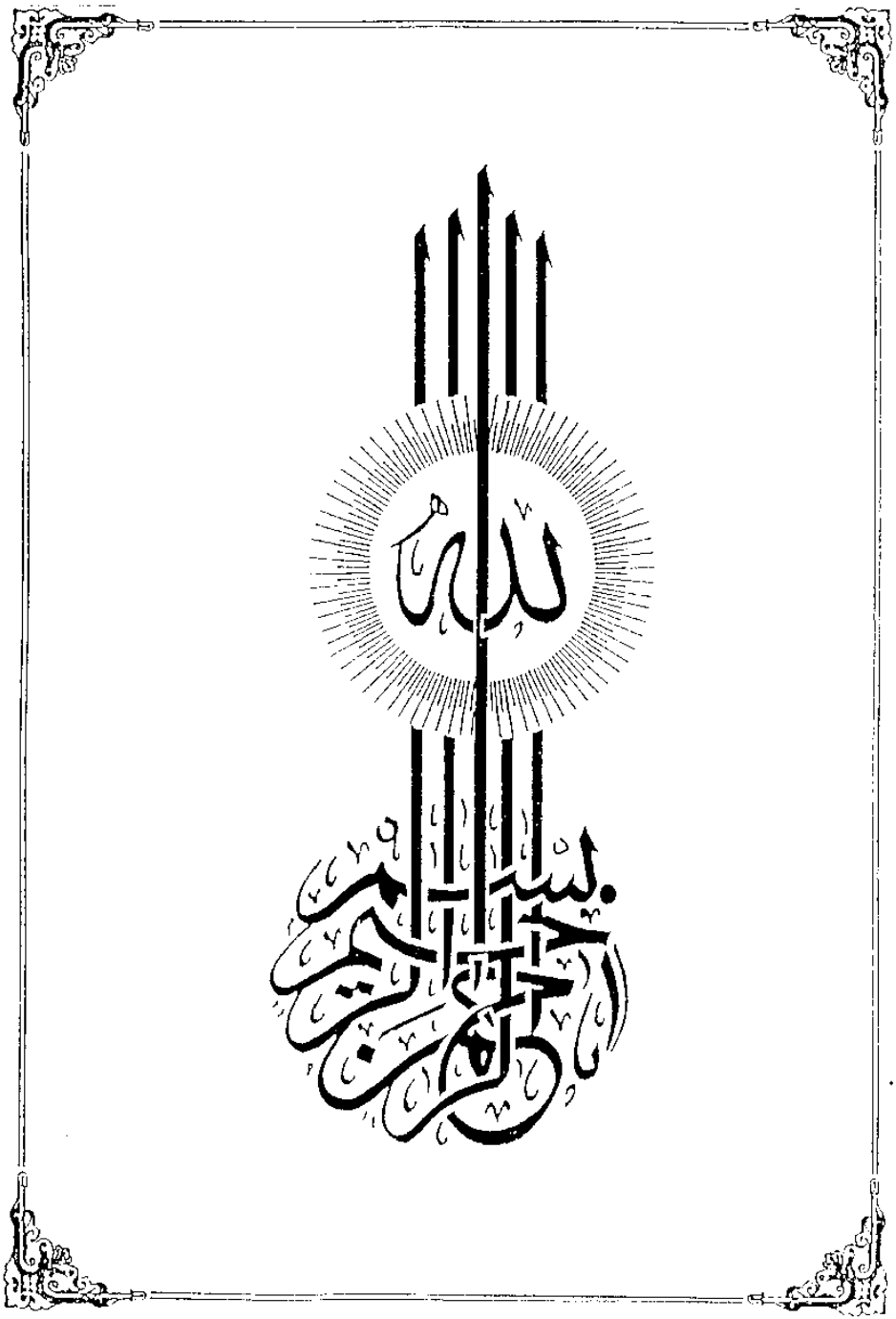

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INTRODUCTION

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The thyroid gland is one of the components of endocrine system.

The enlargement of the thyroid gland may be associated with hyperthyroidism, euthyroidism or hypothyroidism.

The revision includes different pathological types of thyroid gland swellings which are resulting from congenital anomalies, thyroiditis, nontoxic goiter, hyperthyroidism, benign or malignant tumours of the thyroid gland.

In this work, special attention is given to the etiological factors, pathological features, clinical manifestations, recent methods of investigations to reach the accurate diagnosis and the proper treatment of different types of thyroid gland swellings.

ANATOMY

ANATOMY OF THE THYROID GLAND

A) Gross Anatomy :

The thyroid gland is a brownish-red, highly vascular organ, situated anteriorly in the lower part of the neck, at the level of the fifth, sixth, seventh cervical and the first thoracic vertebrae. It consists of right and left lobes connected across the median plane by a narrow region, termed the isthmus.

The weight of the gland is variable, but is usually about 25 gm. It is slightly heavier in the female. (Williams and Warwick, 1984).

Relations of the Gland :

The gland is covered anteriorly by skin, superficial fascia which more laterally contains platysma, by the anterior part of sternocleidomastoid muscles and between these, by the investing layer of deep cervical fascia, the sternohyoid and upper belly of the omohyoid muscles, sternothyroid muscles and the anterior layer of pretracheal fascia. The anterior jugular veins pass vertically downwards on each side of the midline in the

superficial fascia before turning laterally to join the external jugular veins. (Hamilton W.J., 1976).

The Lobes :

The lobes are conical in shape, the apex of each, ascending and diverging laterally to the level of the oblique line of the thyroid cartilage; the base lie on a level with the fourth or fifth tracheal ring.

Each lobe is about 5 cm long; its greatest transverse and anteroposterior dimensions being about 3 cm and 2 cm. The posteromedial aspect of each lobe is attached to the side of the cricoid cartilage by aligamentous band, called the lateral ligament of the thyroid gland. The lateral or superficial surface is convex. (Williams and Warwick, 1984).

The medial surface lies adjacent to the inferior constrictor and cricothyroid muscles and associated laryngeal cartilages as well as to the upper trachea and oesophagus. The recurrent laryngeal nerve ascend in the groove between the trachea and oesophagus to pass behind the cricothyroid joint and under the lower border of the inferior constrictor muscle. (Hamilton W.J., 1976).

The posterolateral surface is related to the carotid sheath and overlaps the common carotid artery. The anterior border closely related to the anterior branch of the superior thyroid artery. The posterior border, blunt and rounded, is related below to the inferior thyroid artery and an anastomosing branch which connects it to the posterior branch of the superior thyroid artery. The para thyroid glands are usually related to the posterior border. The lower end of the posterior border of the left lobe is closely related to the thoracic duct. (Williams and Warwick, 1984).

The Isthmus :

The isthmus connects the lower thirds of the lobes together; it measures about 1.25 cm in breadth and usually covers the second and third rings of the trachea. In the middle line of the neck it is covered by skin and fascia, and close to the middle line, on either side, by the sternothyroids. Across its upper border runs an anastomotic branch uniting the two superior thyroid arteries; at its lower border the inferior thyroid veins leave the gland. (Henry Gray, 1976).

Pyramidal Lobe :

It is a third lobe of conical shape, frequently arises from the cranial part of the isthmus, or from the adjacent portion of either lobes, but most commonly the left, and ascends as far as the hyoid bone. A fibrous or muscular band is sometimes found attached to the body of the hyoid bone, and to the isthmus of the gland, or its pyramidal lobe. When muscular it is termed the Levator glandulae thyroidae. (Henry Gray, 1976).

Accessary Thyroid Glands :

Small detached masses of thyroid tissue sometimes occur in the vicinity of the lobes or superior to the isthmus.

Vestiges of the thyroglosal duct may persist between the isthmus and the foramen caecum of the tongue, and may give rise to accessory nodules or cysts of thyroid tissue, situated in or near the median plane, and even in the substance of the tongue. (Williams and Warwick, 1984).

Blood Supply :

The thyroid gland has an abundant blood supply with a normal flow rate of about 5 ml/gm/minute. The four major

arteries are the paired superior and inferior thyroid arteries.

1. The Superior Thyroid Artery :

It is the first branch of the external carotid artery, arising opposite the thyrohyoid membrane. It runs downwards and forward to the opex of the lateral lobe of the thyroid gland.

Reaching the superior pole of the gland, the artery divides into two branches. The larger anterior branch descends along the anterior border of the gland and ramifies on its anterior surface, anastomosing with the branch from the opposite side; the posterior branch descends on the posterior surface of the gland and anastomose with the inferior thyroid artery. (Woodburne A.M., 1976).

2. The Inferior Thyroid Artery :

It is the largest branch of the thyrocervical trunk , which arises from the subclavian artery. It runs upward and medially behind the carotid sheath, pierces the prevertebral layer of fascia behind the thyroid gland, and then usually loops downward,

dividing into two or more branches as it nears the gland. As it passes medially behind the gland, it crosses the recurrent laryngeal nerve, which runs more vertically; it may cross in front of the nerve, behind it, or send branches on both sides of it. (Hollinshead W.H., 1974).

3. The Thyroidea Ima Artery :

It may arises from the brachiocephalic artery or from the arch of the aorta in (10%) of individuals. It ascends on the ventral surface of the trachea and then distributes to the isthmus of the gland. (Woodburne A.M., 1976).

The Venous Drainage :

It contains three veins :

1. Superior thyroid vein which arises over the antero-lateral surface of the gland, then crosses the common carotid artery, and empties into the internal jugular vein.
2. Middle thyroid vein which arises from the venous plexus on the lateral surface of the gland, leaving the gland near its lower pole, and empties into the internal jugular vein.

3. Inferior thyroid vein which descends on the surface of the trachea below the isthmus of the gland and, behind the manubrium sterni empties into the brachiocephalic vein. (Woodburne A.M., 1976).

The Lymphatic Drainage :

Lymphatic channels begin in a subcapsular plexus from which vessels accompany the arterial blood vessels. The upper parts of the lateral lobes and superior part of the isthmus drain into the upper deep cervical nodes. The lower parts of the gland are drained by a lymph vessel which ends in the lower deep cervical and pretracheal nodes. (Hamilton W.J., 1976).

Although some lymph channels pass directly to the deep cervical nodes, the subcapsular plexus drains principally to the juxta thyroid nodes - i.e. pretracheal (Delphic) and paratracheal nodes, and nodes on the superior and inferior thyroid veins, and then to the deep cervical and mediastinal group of the nodes. (Harding A.J. and David H., 1983).

Nerve Supply :

The gland receives its innervation from sympathetic and parasympathetic divisions of the autonomic nervous system.

1. Sympathetic Supply :

It is supplied by postganglionic nerve fibres which arise in the superior, middle and inferior cervical ganglia and follow a peri-arterial course to the gland. They are distributed mainly to the blood vessels but a few may end on follicular cells.

2. Parasympathetic Supply :

The fibres are derived from the vagus and reach the gland via branches of the laryngeal nerves. (Hamilton W.J. 1976).

B) Applied Anatomy :

The thyroid gland's relation to the external laryngeal and the recurrent laryngeal nerves is of major surgical significances.

1. The External Laryngeal Nerve :

It innervates the cricothyroid muscle whose action is to render tense the vocal folds.