A PATHOLOGICAL STUDY OF DISEASES OF THE THYROID GLAND IN AIN SHAMS UNIVERSITY HOSPITAL IN THE LAST TEN YEARS

Thesis

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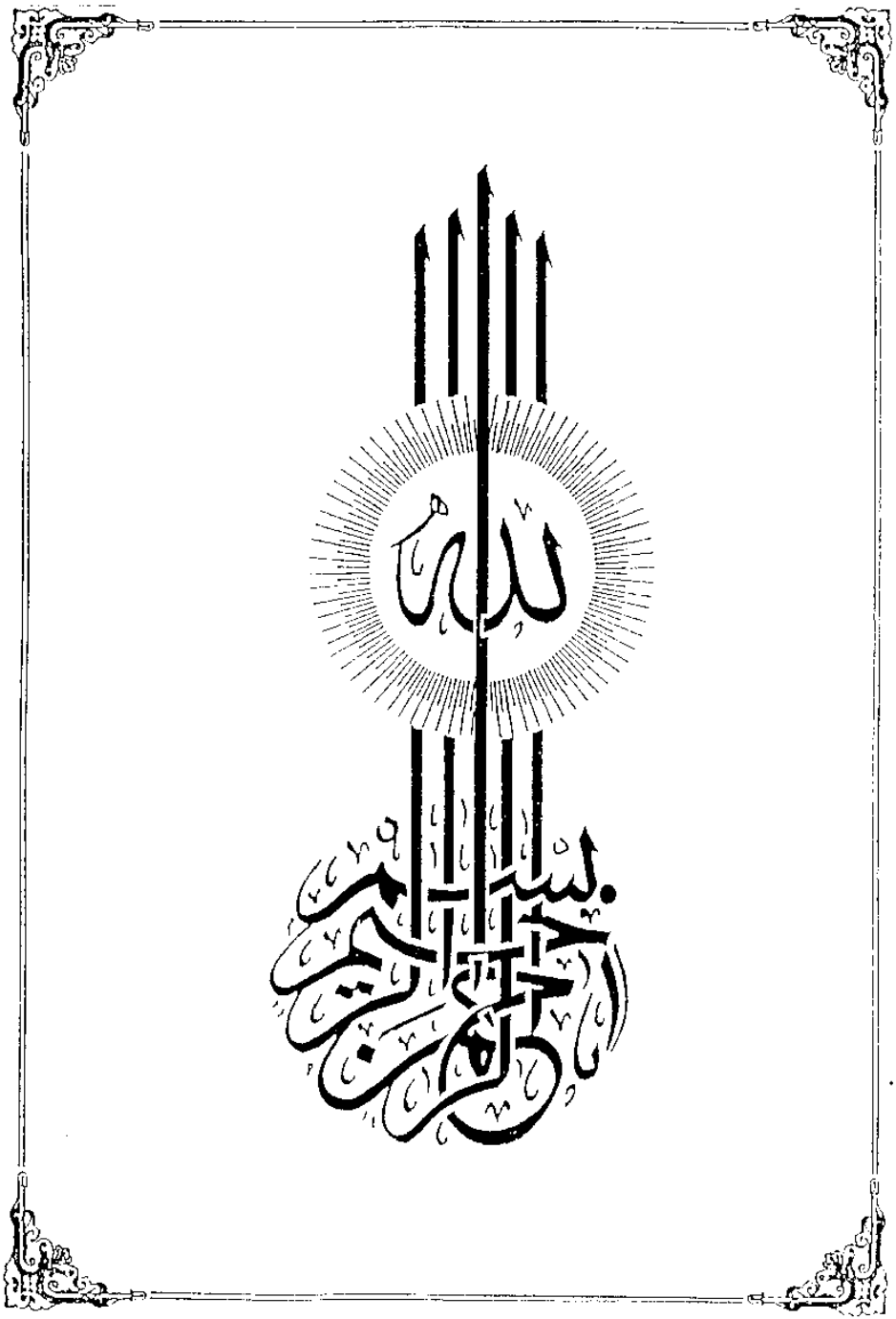

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INTRODUCTION

The ductless glands are members of the endocrine system and they are the chemical regulators of the body by virtue of the hormones they produce.

The endocrine system shares with the nervous system the function of biological integration, the hypothalamus is the most significant link between the central nervous system and the endocrine system.

The thyroid gland is one of the members of the endocrine system and it is one of the most labile of organs, its weight and microscopic structure will vary with age, six and geographic location as well as a number of other factors such as emotional stress, pregnancy, lactation, infection and toxaemia, in a way which is quite unknown for such organs as the liver and the kidney.

The pathological thyroid differs from the normal in degree rather than in kind of changes and it is often hard to draw a line between the two. It would be nice to classify diseases of the thyroid (as in case of diseases of pitutary and adrenal), On basis of hyper and hypo function however, probably this is not quite easy.

AIM OF THE WORK

The aim of the present work is to study the different diseases of the thyroid gland presenting to Ain Shams University Hospitals in the last ten years in an attempt to find an incidence for the different diseases of the thyroid and correlate the clinical diagnosis with the pathological findings in each of the cases studied.

REVIEW OF LITERATURE

A. Embryology:

The human thyroid originates embryologically from an invagination of the pharyngeal epithelium with some cellular contributions from the lateral pharyngeal pouches. Progressive descent of midline thyroid anlage give rise to the thyroglossal duct, which extends from the foramen cecum at the base of the tongue to the isthmus and this duct will give rise the isthmus and the lower part of the lobes. The rest of the lobes develop from the fourth branchial cleft.

The human fetal thyroid becomes detectably functional around 14 to 16 weeks and during the latter part of gestation develops the capacity to synthesize and secrete thyroid hormones. The thyroid gland enlarges progressively during fetal development and neonatal life and reaches the adult size.

Congenital Anomalies:

1. Congental aplasia or hypoplasia leading to critinism.

2. Congenetal hyperplasia leading to congenetal thyrotoxicosis.
3. Ectopic thyroid tissue occuring anywhere along the course of the thyroglossal tract e.g. lingual thyroid, thyroid tissue associated with a thyroglossal cyst, and some times mediastinal ectopic thyroid tissue.
4. Aberrant thyroid tissue occuring away from the line of the thyroglassal tract e.g. entrathoracic thyroid tissue.
5. Congenital enlargment of the thyroid gland (congenital goiter).

B. Anatomy of Thyroid Gland:

The gland is composed of two lateral lobes connected by an isthmus. The lobes measure 2 inches x 1 inch the isthmus measures 1½ inches x ½ inch each lateral lobe extends vertically from the middle of the side of the thyroid cartilage to the sixth rings of the traches. The isthmus covers the second, third and fourth rings of the trachea. A triangular projectim of gland tissue called the pyramidal lobe extends upwards from the left side of the upper border of the isthmus, and is

connected to the hyoid bone above by a fibrous band or a muscle slip. Each lateral lobe is roughly triangular on section. The superficial surface is covered by the infrahyoid or ribbon muscle, the sternomastoid overlapping. The medial surface is related to two tubes (oesophagus and trachea), two nerves (recurrent and external laryngeal), two muscles (inferior constrictor and cricothyroid muscles). The posterior surface overlaps the common carotid artery and covers the terminal part of the inferior thyroid artery.

Blood Vessels:

There are two arteries (which carry many sympathetic nerves with them) and four veins, on each side.

Superior Thyroid Artery:

This is the first branch given off from the anterior surface of the external carotid and it enters the gland superficially. It runs downwards to the upper pole of the lateral lobe where it breaks up into branches to the front of the gland, branches to the back of the gland and branch

to anastomse with its fellow of the opposite side along the upper border of the isthmus. The superior thyroid artery supplies mainly the connective tissue and capsule of the gland.

Inferior Thyroid Artery:

This is a branch of the thyrocervical trunk and is a posterior relation of the gland entering it from its deep or posterior surface.

The inferior thyroid artery supplies the parenchyma or gland substance proper.

Thyroid Ima Artery:

It is an occasional vessel from the arch of the aorta or the innominate artery, and when present it enters the lower part of the isthmus.

Aceessory Thyroid Arteries:

Small vessels to oesophagus and trachea send branches to the gland.

Veins:

The veins of the thyroid gland do not accompany their arteries.

The Superior Thyroid Veins:

Leaving the upper part of the gland, and taking as its guide the outer border of the omohyoid, crosses the common carotid artery to terminate in the internal jugular vein.

The Middle Thyroid Vein:

Leaving the gland about its middle, follows the inner border of the omohyoid across the carotid ending in the internal jugular vein.

The Inferior Thyroid Vein:

Leaving the isthmus at its lower border, run down in front of the trachea to end in the innominate of the same side. The thyroid gland has two fibrous capsules, a true and a false capsule. The true capsule is made up from a peripheral condensation of the connective tissue of the gland, while the false capsule is supplied by fibrous sheet derived from a neighbouring fascia which is the pretracheal fascia.

Lymphatics:

The gland is drained by two sets of lymph-vessels, ascending and descending. Each consists of medial

and lateral channels.

Ascending Vessels: These are medial and lateral:

The medial vessels; leave the upper border of the isthmus and go to the lymph node situated on the cricothyroid membrane (the prelaryngeal lymph node).

The lateral vessels; leave the upper pole of the gland and run with the superior thyroid artery to the deep cervical lymph nodes situated at the bifurcation of the common carotid.

Descending Vessels: These are also medial and lateral.

The medial vessels ; pass to the pretracheal lymph node.

The lateral vessels; pass from the deep surface of the thyroid to small lymph nodes placed on the recurrent nerve - the nodes of the recurrent chain.

N.B.:

The normal adult thyroid gland weighs about 20 gms. but it weighs more in women than in men, more in summer than in winter, more during pregnancy and lactation and it has a very rich blood supply, Its estimated blood flow of 4-6ml./g./min. is even higher than that of the kindy.

C. Histology:

Structure of the thyroid gland is not fixed because it is continually being played upon by various influences (e.g. endocrine) and responding to varying demands for thyroxine.

The pathological thyroid gland differs from the normal in degree rather than in kind of change and it is often extremely hard to drow a line between the two.

Light microscopy shows the gland to consist of neuomerous acini or follicles about 200 u in diameter. The wall of the follicle is lined by a cuboidal epithelium whose height varies with the degree of glandular stimulation.

In the resting phase the acini or follicles are large, lined by flattened cells, and filled with deeply stained homogeneous colloid.

In the secretory phase the acini are lined by cuboidal epithelium and the colloid is stained modereately darkly (normal thyroid).

In the resorptive phase the acini are lightly stained vaculated, with increase glandullar activity the follicles becomes smaller, the cells columnar in shape and the colloid less abundant.

Electron microscopy reveals many filamentous microvilli projecting from the apices of the acinar cell into the colloid iodenation of protein may occur within the lumen of the follicle or in the acinar cells. Between the follicles ther are parafollicular or "C" cells. These are derived from the ultimobranchial bodies which fuse with the thyroid in mammals but remain separate in the neck or mediastinum in fishes and birds. The follicular cells synthesize the thyroxine hormone and triiodothyroxine, the para follicular cells produce calcitonin.

D. Physiology:

Function:

The main thyroid function is to maintain the oxidative metabolism in most tissues of the body. It is also necessary for normal growth and maturation this is done by means of its iodine-containing

hormone, thyroxine. Removal of thyroid gland is followed not only by a loss of heat production but in the growing animal by poor physical, mental and sexual development.

The normal daily output of hormones from the adult thyroid gland is equivalent to about 0.2 g. of dry thyroid the same activity could be provided by 0.06 mg. of L-triiodothyronine, 0.3 mg. of thyroxine, such quantities would therefore be suitable maintenance doses in treatment of patients with myxoedema. If the nromal iodene content of the gland falls below 0.1 per cent, morphological changes at once become apparant in the acinar epitheleum, and the gland becomes enlarged in consequence.

Iodine Metabolism :

Iodine is an essential raw material for the synthesis of thyroid hormones.

The normal daily intake of iodine in food and water is about 150 ug. All iodine is converted to iodide in the gut and in this form is completely and rapidly absorped into the blood and extrace-llular fluid, about one third of which is taken up