CANCER THYROID

An Essay Submitted for Partial Fulfillment
for the M.S. Degree in General Surgery

By

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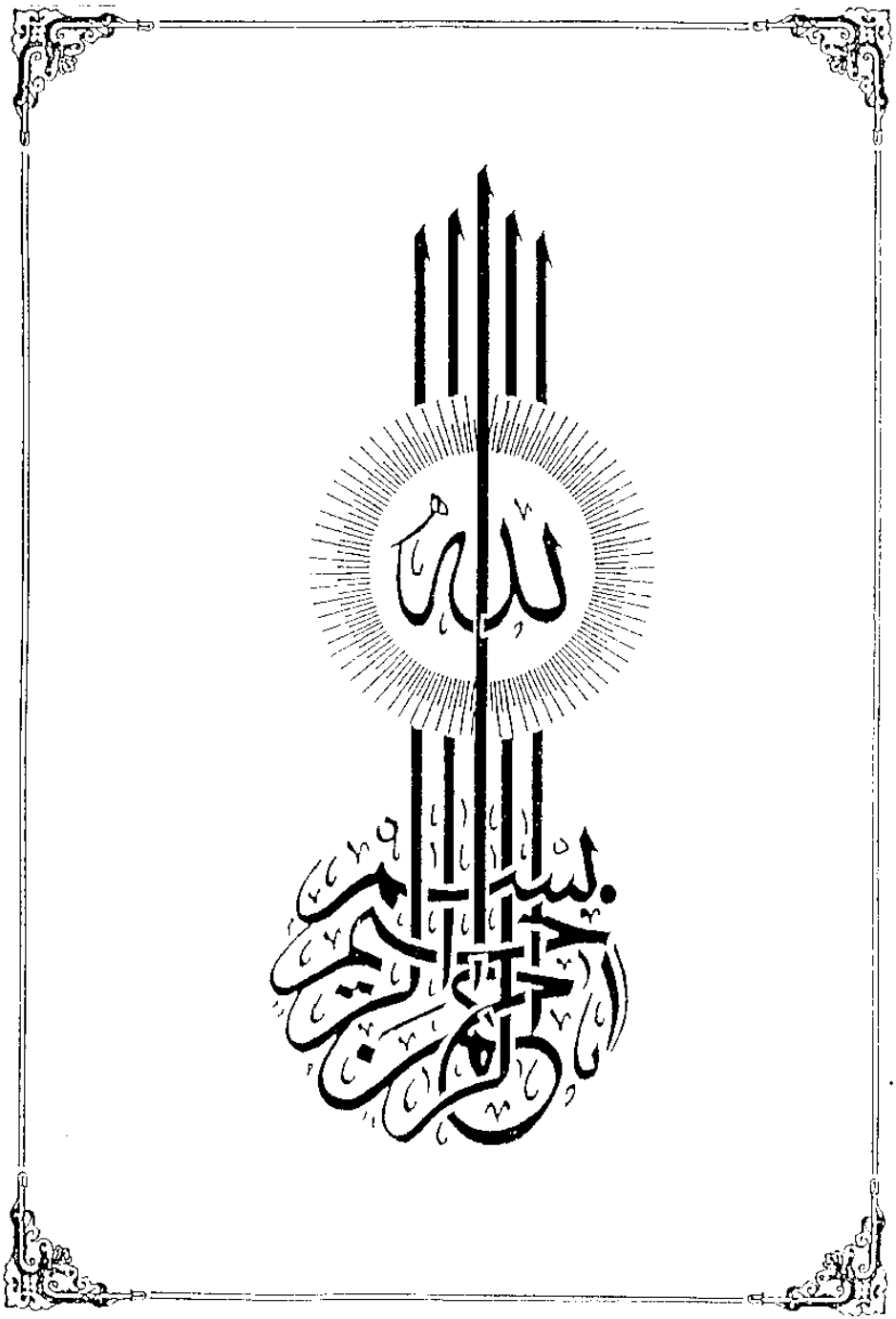
IN DEDICATION TO THE

LOVING MEMORY OF

MY DEAR FATHER



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INTRODUCTION

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Malignancy, as it affects the thyroid gland continues to attract universal and international concern largely due to the fact that it still poses a major problem and threat to mankind as judged by its ever increasing incidence in human society today. The problem is being even more compounded by the recent advances in modern science towards the evolvement of a more modern and scientifically advanced civilized society.

In the United States alone, about 9000 new cases were identified in 1984 and there were about 1000 reported deaths from same lesion, making cancer of the thyroid gland about twenty-fifth among the anatomic sites of malignant tumours.

There are virtually no known limitations to its human affliction. In the present study, the incidence of cancer thyroid and its relation to different aetiological factors, as well as its variation with age, sex, biological behaviour and its relation to other thyroid diseases and other endocrine glands were reviewed, the different pathological types in order of frequency and their histopathological pictures were assessed. Special attention was given to clinical presentation, diagnosis, differential diagnosis, treatment and prognosis of the lesion. Brief mention was made about cancer thyroid and its bearing on other organ system pathology.

The present literature also assesses the recent trends in the non-surgical managementt of thyroid cancer. In an exercise of this nature the author made use of materials largely provided in the form of "Reference work", and I have duely registered my indebtedness and gratitude to the respective authors as evident in my reference column. The original materials are authentic and any errors or shortcomings in their compilation remain the responsibility of the present author.

A better understanding of the disease as regards histogenesis, predisposing and aetiological factors, diagnosis and treatment owes much credibility to the recent advances made in modern science, which from all accounts, guarantees a promising outlook for the lesion.

HISTORICAL REVIEW OF THE THYROID GLAND

ANATOMY OF THE THYROID GLAND

At the end of the nineteenth century, "Hedenus" performed total thyroidectomy for goitre in 1800 while "Reverdin" produced experimental myxedema in 1882 by partial or total thyroidectomy.

Murray and Howitz (1890s), successfully treated myxedema with thyroid extract.

"Theordore Kocher" is dubbed the father of thyroidectomy for successfully excising a goitrous thyroid in 1878. He performed similar such operations over 2000 times with only a 4.5 per cent mortality and a morbidity of 30 per cent - Cachexia strumi priva i.e. myxedema - amongst his initial 100 thyroidectomies (i.e. 30 of his initial 100 thyroidectomies). Consequently, the Noble prize was conferred on him in recognition of his extensive work in 1909, marking the epoch of thyroid surgery (Kaplan, 1984).

"Payr" in 1906 is reported to have successfully transplanted a portion of the thyroid gland from a woman into the spleen of a myxedematous daughter with "successful" results.

Isolation of the principal hormone thyroxine (T_4) was accomplished by "Kendall" in 1914.

Anatomy of the thyroid gland:

The thyroid gland consists typically of two lateral lobes, a connecting median isthmus and an ascending pyramidal lobe. One lobe, usually the right, may be smaller than the other (7 per cent) or even be completely absent (1.7 per cent). The

isthmus is absent in about 10 per cent of thyroid glands, and the pyramidal lobe is absent in about 50 per cent (Skandalakis et al., 1983). A minute epithelial tube or fibrous cord, the thyroglossal duct, almost always extends between the thyroid gland and the foramen cecum of the tongue.

The thyroid gland normally extends from the level of the 5th cervical vertebra to that of the 1st thoracic vertebra. It may lie higher, (i.e. lingual thyroid), but rarely lower than normal (Falor et al., 1983).

Embryologically, the gland appears in about the third week as an epithelial thickening of the floor of pharynx at the level of the first pharyngeal pouch indicated by the foramen cecum, a dimple-like depression at the base of the adult tongue. As the thyroid primordium descends, it acquires mesodermal contributions such as the parafollicular C cell, which ultimately secretes calcitonin (Ingbar et al., 1974).

Cranial growth of the tongue, together with the elongation of the embryo carries the origin of the thyroid gland far cranial to the gland itself. The gland however remains connected with the foramen cecum by the thyroglossal duct that passes through or anterior to the hyoid bone. By the fifth week of gestation this duct usually obliterates or becomes fragmented; persistence of any portion is not unusual giving rise to cyst formation. Drainage or aspiration of these cysts is futile and often results in formation of a fistula, usually infected.

All fragments of the duct, the foramen cecum and the midportion of the hyoid bone should be removed (Sistrunk procedure). Current evidence suggests that the primary origin of the calcitonin-producing cells of the thyroid gland is the neural crest of the embryo. From the neural crest these cells migrate to the ultimobranchial body (Pearse and Polak, 1971) and later become part of the thyroid gland. Welbourn (1977) believes that tumours of these cells account for 6 to 8 per cent of thyroid malignancies (Apudomas). C-cells belong to a group of neural-crest derivatives known as A.P.U.D. cells, the acronym coming from Amine Precursor Uptake and Decarboxylation.

The normal gland weighs 20 - 25 gm and is attached to the anterior and lateral aspects of the trachea by loose connective tissue. Thefunctioning unit is the lobule supplied by a single arteriole and consisting of 20 - 40 follicules which are lined by cubical epithelium. The resting follicle contains colloid in which thyroglobulin is stored (Rains and Ritchie, 1983).

The thyroid gland is enveloped by a thickened fibrous capsule which sends septa into the gland substance forming pseudolobulations. This is the true capsule of the thyroid. No true lobulations exist.

External to the true capsule is a more or less well developed layer of fascia derived from the pretracheal fascia. This is the false capsule, the perithyroid sheath, or surgical capsule. Anterior and laterally this fascia is well developed; posteriorly it is thin and loose, permitting enlargement of the thyroid gland

posteriorly. There is a thickening of the fascia that fixes the back of each lobe to the cricoid cartilage. These thickenings are the ligaments of Berry. The false capsule, or fascia, is not removed with the gland at thyroidectomy.

Anteriorly the thyroid lobes are in relation to the infra-hyoid muscles; the superior parathyroid glands being embedded in the posterior surface of the lateral lobes of the gland between the true capsule and false fascial or surgical capsule. The inferior parathyroids may be between the true and false capsules, within the thyroid parenchyma, or lying on the outer surface of the fascia.

The two recurrent laryngeal nerves are in intimate relation to the thyroid gland, lying adjacent to its posterior medial aspect near or in the small groove between the trachea and oesophagus. The nerves contain the motor fibres innervating the abductor muscles of the true vocal cords.

The right nerve branches from the vagus as it crosses anterior to the right subclavian artery. The recurrent nerve loops around the artery from posterior to anterior and ascends in or near the tracheoesophageal groove, passing posterior to the right lobe of the thyroid gland to enter the larynx behind the crico-thyroid articulation and the inferior cornu of thyroid cartilage (Chang -Chien, 1980). The left recurrent nerve arises where the aorta crosses the vagus nerve. It loops under the aorta and ascends in the same manner as the right nerve. Both nerves

cross the inferior thyroid arteries near the lower border of the middle third of the gland. Several variations may occur in the course of the recurrent nerves, thereby increasing further the liability of injury to the nerve during thyroid surgery (Holt et al., 1977). The nerve is found to consist of more than one single trunk, sometimes as many as four or five, at the level of the usual thyroidectomy dissection in 50 per cent of meticulous cadaver dissections.

Thus it is important for the surgeon to avoid damaging not just one vertically oriented nerve but any vertically oriented nerves in this anatomical location.

A common bifurcation of the recurrent laryngeal nerve could be found unexpectedly in close proximity to the superior pole of the thyroid. The two branches are thought to innervate adductor and abductor musculature of the cords and are far from its anatomical location.

In about 1 per cent of patients the right recurrent nerve arises from the vagus trunk and usually passes from behind the carotid sheath curving medially, forwards and upwards and may be mistaken for the inferior thyroid artery.

The left nerve may be rarely "non-recurrent" in the presence of a right aortic arch and a retroesophageal left subclavian artery.

In the lower third of its course, the recurrent laryngeal nerve ascends behind the pretracheal fascia at a slight angle