DIAGNOSIS & MANAGEMENT OF THYROID SWELLINGS

An Essay

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OF THE MASTER DEGREE OF

(GENERAL SURGERY)

By

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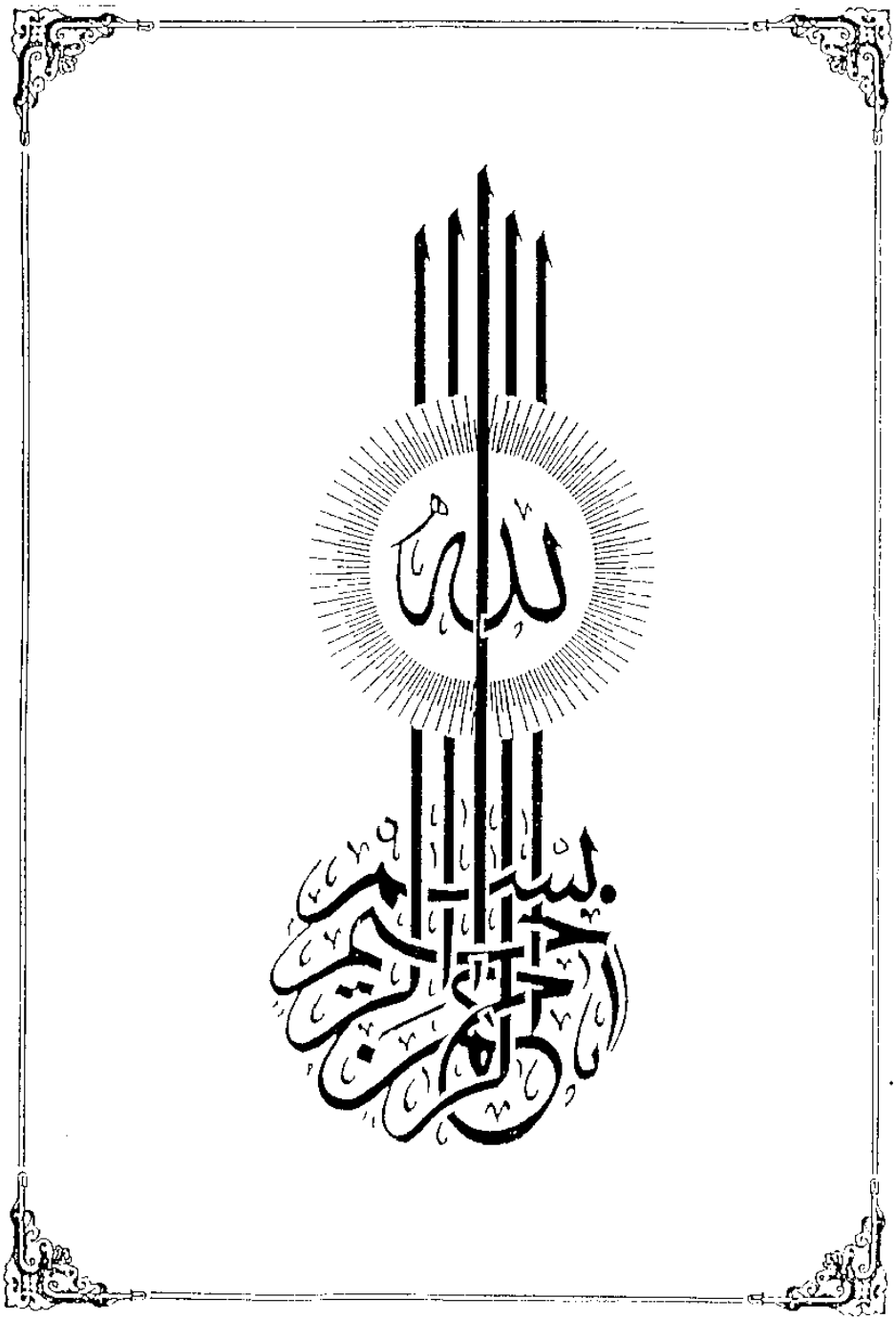
" TO MY MOTHER "



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1986

C O N T E N T S

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EMBRYOGENESIS OF THE THYROID GLAND

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I- Normal development :

The thyroid gland appears by the end of the 3rd week of gestation as an endodermal thickening in the midline of the floor of the pharynx between the tuberculum impar and the copula of the tongue, at the level of the first pharyngeal pouch, later this thickening either form a diverticulum or may grow as a solid column of cells which becomes canalized to form the thyroglossal duct. The duct grows inferiorly behind the tuberculum impar of the tongue into the underlying mesenchyma. The distal part becomes bilobed, as a result of epithelial proliferation, the bilobed terminal swellings expand to form the isthmus and two lateral thyroid lobes. Fig.(1) in the earliest stage, the thyroid gland consists of a solid mass of cells, later as a result of invasion by surrounding vascular mesenchymal tissue, the mass becomes broken into plates and cords of cells and finally into clusters of cells. By the 3rd month colloid starts to accumulate in the center of each cluster, so that follicles are formed. The fibrous capsule and the surrounding connective tissue develop from the surrounding mesenchyma. (Snell, 1975).

By the 7th week : the gland reaches its final position in relation to the larynx and the trachea. Some

felt that, cranial growth of the tongue together with elongation of the embryo, carries the origin of the thyroid gland far cranial to the gland itself,and they consider that, a lingual thyroid is not undescended but rather is abnormally ascended (Skandalakis et al. 1983). The intial attachment of the thyroglossal duct in the floor of the pharynx is indicated by the foraemen cecum seen in the dorsum of the tongue in some individuals,about 34%, it is not grossly visible (Skandalakis et al., 1983). The duct passes down exactly in the middle line between the genioglossi muscles as far as the upper border of the thyroid cartilage. It then diverges slightly to one or other side of the middle line and its course is represented after birth by the pyramidal lobe and the band of fibrous tissue or muscles (Levator glandulae thyroidae) connecting that lobe to the Hyoid bone. (Duplessis, 1984) Fig. (2)a.

As the duct descends, it either passes in front through or behind the body of the hyoid bone (Snell, 1975). Frazer has shown that the duct passes in front of the body of the hyoid, then takes a recurved course up behind this bone before continuing down. (Duplessis, 1984). Fig. (2)b.

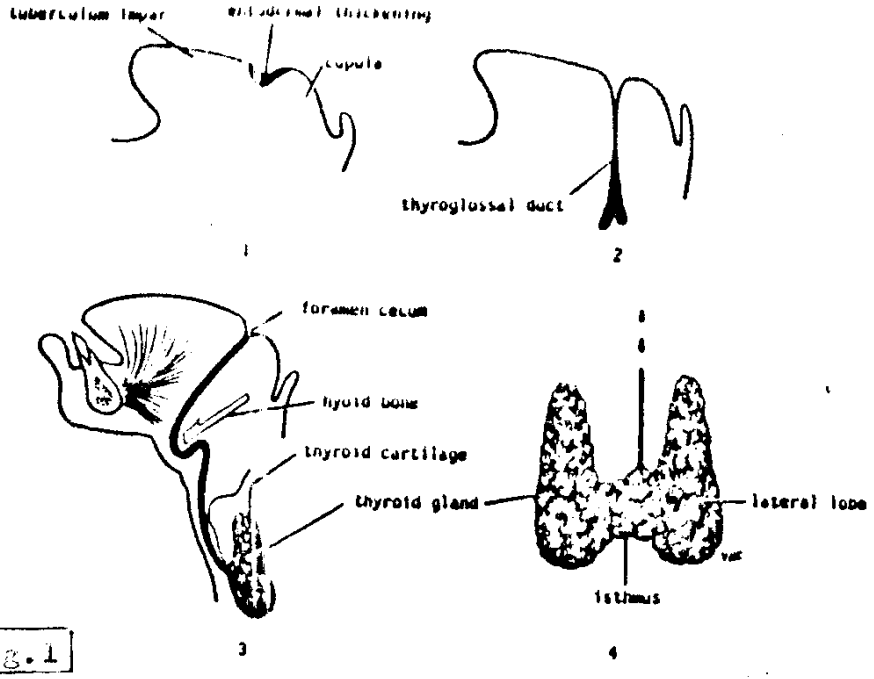

Fig. 1

The different stages in the development of the thyroid gland.

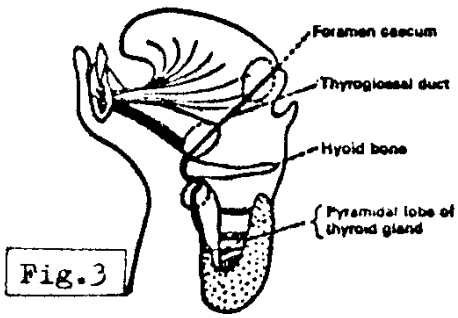

Fig. 3

Thyroglossal duct, and sites occupied by thyroglossal cysts.

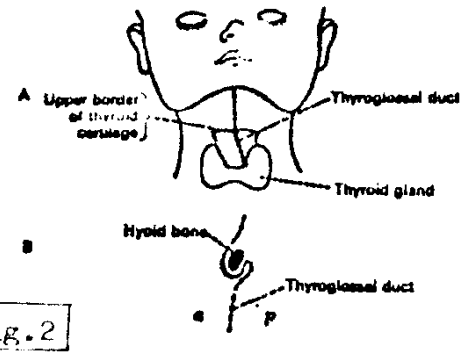

Fig. 2

—A. Course of thyroglossal duct, anterior view; note divergence to left below upper border of thyroid cartilage. B. Lateral view, showing relationship between duct and hyoid bone. a, Anterior; p, Posterior.

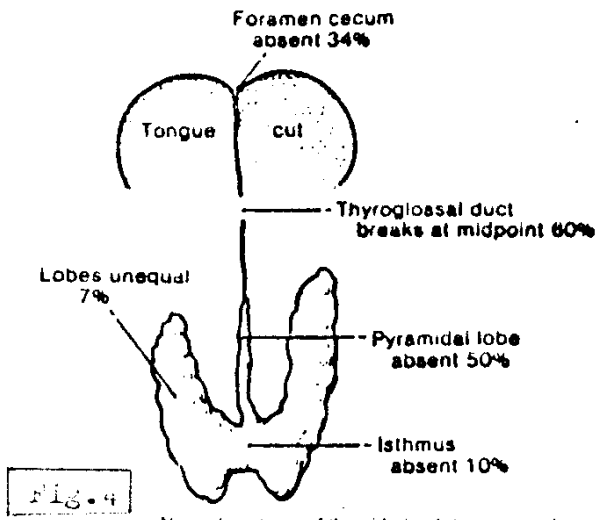

Fig. 4

Normal vestiges of thyroid gland development. None are of clinical significance, but their presence may be of concern to the surgeon.

By the 5th to the 7th week of gestation, the thyroglossal duct becomes obliterated and fragmented(Skandalakis, et al., 1983).

The endodermal cells of the ventral portions of the (4th) and the (5th)?pouches proliferate to form ultimobranchial bodies. The ultimo branchial body is believed to be incorporated into the developing thyroid gland while it descends in the neck and its cells become dispersed as the (Calcitonin) cells. Present 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 and later become part of the thyroid gland (Pearse and Polake, 1971). C-cells belong to a group of neural crest derivatives known as APUD cells (Amin precourser uptake and decarboxylation). A number of endocrine producing cells in the gut, the pancreas and the adrenal gland belong to the APUD system .

II- Abnormal development :

(1) Athyreosis : This rare situation results if the median endodermal thickening in the floor of the primitive pharynx fails to develop, this will result in myxdaema.

(2) Ectopic thyroid tissues : ectopic thyroid tissues Lie somewhere in the line of development of the gland other than the normal situation, it is often the only thyroid tissue present, for example a lingual thyroid, lies in the base of the tongue, in the region of the foramen cecum. It may cause dysphagia, impairment of speech, respiratory obstruction or haemorrhage, also thyroid tissue may be suprahyoid, subhyoid or prethyroid. these usually forms a swelling in the upper part of the neck and may be mistaken for a thyroglossal cyst, such partially descended glands are rare (Gray and skandalakis, 1972).

(3) Accessory thyroid : may occur in the line of development of the gland, in association with a normal thyroid gland thus thyroid tissue may occur at the foramen cecum, in the tongue, at the level of the hyoid bone, etc. infrequently, the entire gland part of it descends more cauded which result in thyroid tissues located in the superior mediastinum behind the strnum, adjacent to the aortic arch and between the aorta and the pulmonary trunk , Within the upper part of the pericardium or in the interventricular septum of the heart, most intra-

thoracic goitre, however, are not true anomalies but rather extrension of pathologic elements of a normally situated gland into the superior or posterior mediastinum. (Kaplan, 1984)

(4) Strauma ovarii : is not ectopic thyroid tissue but part of an ovarian teratoma. very rarly carcinogenic changes occure or hyperthyroidism develops.

(5) Lateral Aberrant thyroid: there is no evidence that aberrant thyroid tissue ever occure in a lateral position. Normal thyroid tissue found laterally, separate from the thyroid gland, must be considered and treated as metastasis in a cervical lymph nodes from an occult thyroid carcinoma, almost invariably of papillary type . (Wade, 1984)

(6) Thyroglossal cysts : between the foramin cecum of the tongue and the thyroid gland; there is small epithelial tube usually fragmented at several places, occasionally this epithelial fragments hypertrophy, secrete fluid and forms cyst. These cysts occur anywhere on the line of the duct. They are often connected to the foramen cecum by remains of the duct, above the thyroid cartilage, cysts like the duct are exactly central. below the thyroid

cartilage cyst, like the duct, are slightly to one side, usually to the left (Hamilton Baiely, 1980). The common situations, in order of frequency, are beneath the hyoid, in the region of the thyroid cartilage, and above the hyoid bone, also it may be present beneath the foramen cecum and at the level of cricoid cartilage. Fig. (3).

(7) Thyroglossal fistula : is never congenital, as the thyroglossal duct never open on the skin of the neck at one stage of its development, such fistulae are therefore of secondary origine due to aspiration, opening or bursting of a thyroglossal cyst.

(8) A rare anomaly is the absence of one of the lateral lobes of the gland. (Duplessis, 1984).

ANATOMY OF THE THYROID GLAND

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1- The gland lies in the lower part of the front of the neck clapsing the trachea and overlapping the sides of the larynx, normaly it extends from the level of the 5th cervical vertebra to that of the 1st thoracic vertebra. (Skandalakis, 1983). The gland is composed of two lateral lobes, a connecting isthmus and an ascending pyramidal lobe, the normal gland weights 20-25grm. (Wade, 1984).

1. Lateral lobes, the lobes measure 5 x 2.5 x 2.5cm (Duplessis, 1984). one lobe, usually the right may be smaller than the other (7%) or even completely absent (1.7%). (Skandalakis, 1983).

Each lobe has; (a) two poles, a superior pole which reaches the middle of the side of the thyroid cartilage and a lower pole which reaches the level of the 6th tracheal ring.

(b) two borders, an anterior sharp border, which separates the lateral from the medial surface and a blunt posterior border which separates the posterior from the medial surface

(c) three surfaces, it is roughly triangular on section;

a) the superficial (lateral) surface; it is convex and is covered by, the skin, superficial fascia (including the platysma muscle), the investing layer of deep cervical fascia and the sternomastoid muscle, the sternohyoid, superior belly of omohyoid and the sternothyroid, arranged from without inwards, (b) the medial surface, it is moulded