PATHOLOGY, DIAGNOSIS & MANAGEMENT OF HYPERPARATHYROIDISM

ESSAY

Submitted For Partial Fulfilment
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'General Surgery'

BY

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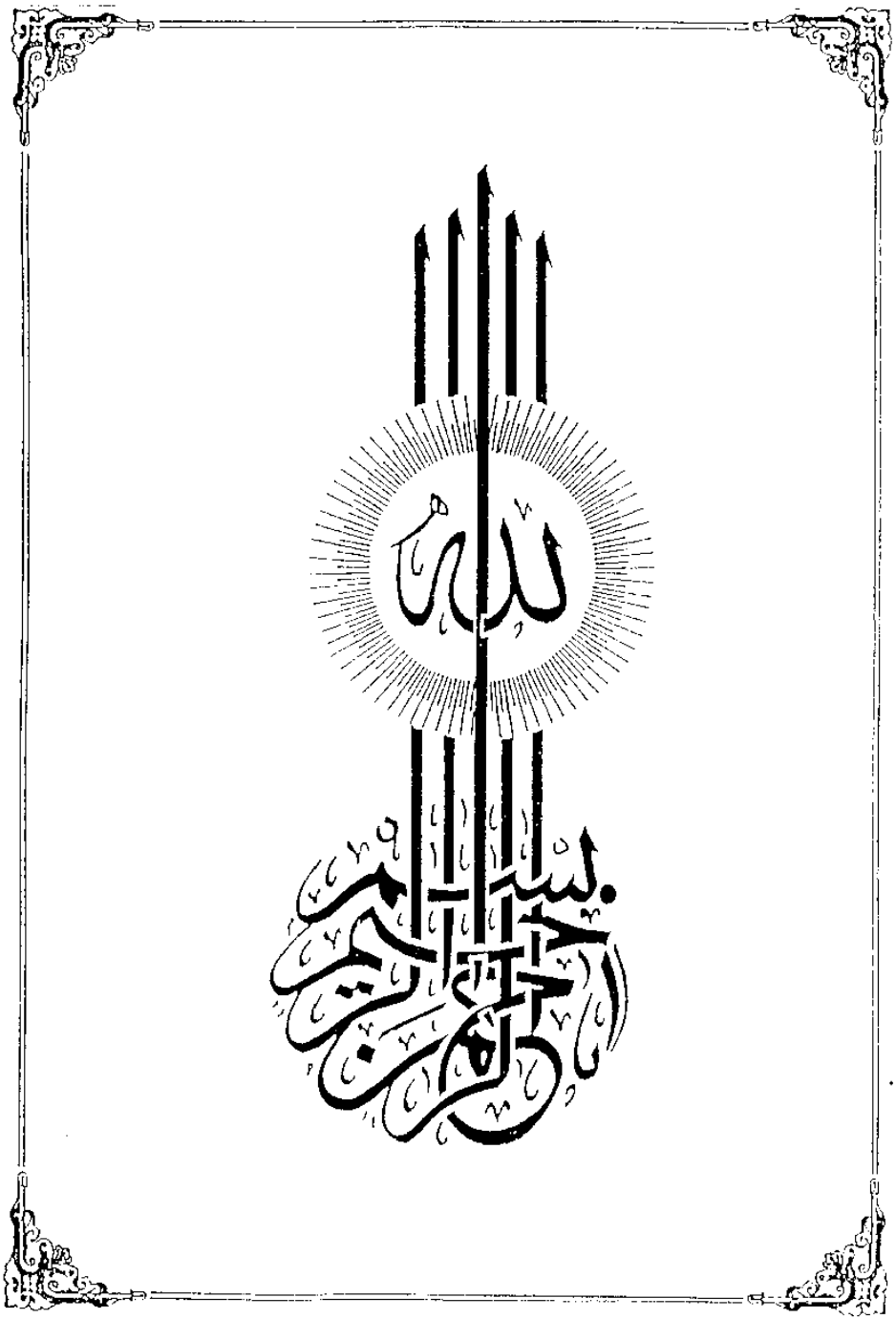

C O N T E N T S

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INTRODUCTION

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This essay aims to study the review of literature of hyperparathyroidism as regards pathology, diagnosis and management. Prevelance of hyperparathyroidism has increased due to application of recent methods of investigations. The prevalence is about 1/1000 of general population.

Primary hyperparathyroidism is caused by single adenoma in 80% of cases, hyperplasia in 17% of cases, and rarely by multiple adenomas, carcinoma, or in association with multiple endocrine neoplasia syndrome Secondary hyperparathyroidism results from low serum calcium from any cause, while tertiary hyperparathyroidism occurs in renal failure when parathyroid hyperplasia become, autonomous of Hyperparathyroidism presents itself by urinary tract symptoms in 60 of patients Other patients complain of either gastrointestinal, musculoskeletal, or neurological symptoms.

In hyperparathyroidism usually there are hypercalcaemia, hypophosphatemia, a normal or raised alkaline phosphatase, hypercalcuria and a raised serum parathromone.

Hyperparathyroidism is not the commonest cause of hypercalcaemia, and other causes of hypercalcaemia should be excluded before diagnosis.

The golden chance to find the parathyroid glands lies in the first surgical exploration of the neck. Re-exploration is difficult and hazardous because of extensive scarring and obliteration of dissection planes. So, for successful exploration, the normal & abnormal locations of the parathyroid glands should be understood and Methylene blue is given by intravenous infusion to facilitate per operative identification of the glands.

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ANATOMY OF THE PARATHYROID GLANDS

a) Gross anatomy
b) Development anatomy
c) Microscopic anatomy

ANATOMY OF THE PARATHYROID GLANDS

The parathyroid glands are yellowish-brown, ovoid or lentiform structures. They vary in size but comm - only measure about 6 mm longitudinally, 3-4mm transversly and 1-2 mm anteroposteriorly (Gray, 1973).

Gilmour (1938) found that roughly 80 percent had four glands, 6 percent had five, and 13 percent had three, two glands or six glands were present, very rarely.

Gilmour also described the position of the gland as in Fig.(1),in about 75 percent of the cases the upper gland lay on the posterior portion of the middle third of the thyroid gland usually toward the super - ior part of this area, either in a groove on the thyroid or on a projecting nodule. It usually lay above the inferior thyroid artery but occasionally behind it or between it and the thyroid gland. The inferior glands were of course more variable. In 50% of cases the lower parathyroid was found on the lateral or posterior surface of the lower pole of the thyroid gland, or not more than 0.5 cm below the lower pole.

The next most common location, in 12.8 percent was 1 cm below the lower pole of the thyroid.

The parathyroids may be included within the thyroid capsule, lay beneath it, or carried partially into the substance of the thyroid by the thyroid vessels but they never completely covered by thyroid tissue . Other writers have described normal parathyroids lying within thyroid (Kaplan, 1979).

Blood Supply of the Parathyroid Glands :

. Arterial supply : A special small parathyroid artery supplies each gland. The lower parathyroid artery comes from the inferior thyroid artery and is a guide to the gland if it lies below the lower margin of the thyroid.

The upper parathyroid artery arises from the inferior thyroid artery or from anastomesing artery joining the superior and inferior thyroid arteries and only very occasionally from the superior thyroid artery.

There is a good collateral arterial supply from the tracheal vessels and adequate parathyroid function persists even if all 4 major thyroid arteries are ligated. (D.J. DuPlessis, 1975).

The collateral blood supply to the parathyroids is through the fascial connections between the thyroid, trachea and oesophagus (Custis, 1931).

In spite of this, there is very much controversy about the role of the superior thyroid artery and the collateral arterial supply to the parathyroid glands, Dozois and Beahrs (1977) deny the importance of the collateral circulation, and Kaplan (1979) gives more importance to the role of the superior thyroid artery in supply of the superior gland and rarely the inferior parathyroid glands.

The arterial supply of each parathyroid gland is in the form of an end artery that enters at a distinct hilus and runs centrally within the gland giving off lateral branches to all parts of its substance(Haloted and Evans, 1907).

Venous drainage :

The superior, middle and inferior thyroid veins drain the parathyroid glands, but the inferior thyroid vein is the main route of drainage. (Haloted & Evans, 1907).

Lymphatic drainage :

Associated with those of the thyroidisthymus.

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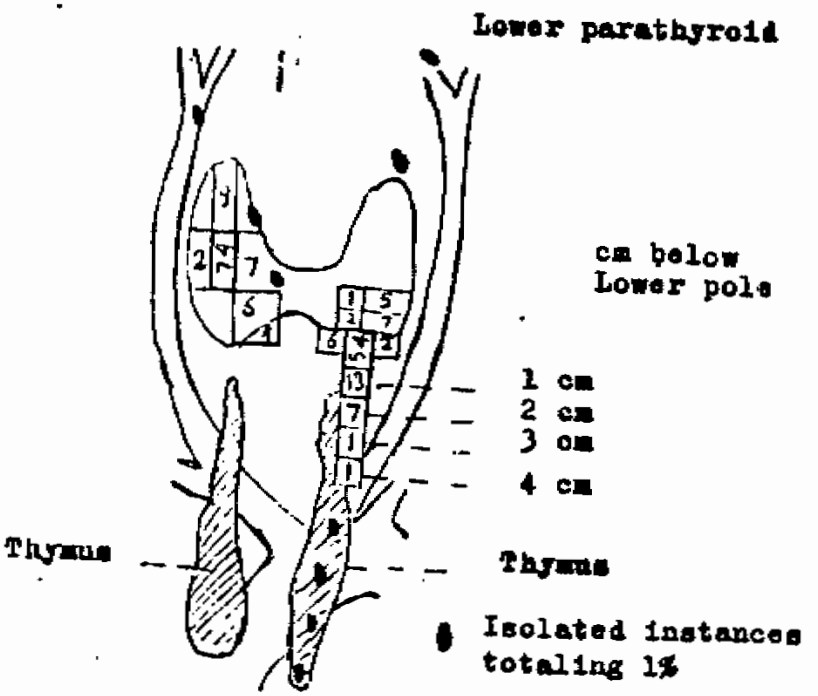

Fig. (1) Most frequent locations for normal parathyroids. The locations for the upper parathyroid are shown at the left and for the lower at the right. The relative frequency with which the glands are found in the various locations is indicated on the diagram. (from Gilmour, 1937).

DEVELOPMENTAL ANATOMY

Langman (1974) and Carliss (1976) mentioned that the human embryo has five pairs of pharyngeal pouches. Ordinarily two pairs of parathyroid glands are formed. Those from the dorsal portion of pharyngeal pouch III are the caudal parathyroid buds (parathyroid III),and those from pouch IV are the rosteral parathyroid buds (parathyroid IV). The third and fourth pouches are characterized at their distal extremity by so-called dorsal and ventral wings.

The third Pouch : The epithelium of the dorsal wing of the third pouch differentiates into parathyroid tissue, while that of the ventral forms primordium of the thymus (Langman, 1974). Further growth of the thymus and parathyroid tissue occurs with obliterations of the lumen of the pouches,then both of glands primordia loose their connection with the pharyngeal wall. The thymus migrates in a caudal and medial direction to reach its final position in the thorax pulling parathyroids with it. The parathyroid tissues of the third pouch finally comes to rest on the dorsal surface of the thyroid gland occasionally this parathyroid tissue is pulled down too far and may then he found at the lower pole of the thorax even close to the thymus.

The Fourth Pouch : The superior parathyroid gland or parathyroid IV develops from this pouch as a proliferation of endodermal cells as described by Snell (1972). They take up their final position on the posterior aspect of the thyroid gland on each side at about the level of their isthmus. If the primordium of the parathyroid IV in the fourth pharyngeal pouch is trapped between the lateral and median thyroid prior to their embryologic fusion, Wang (1976), believed that it results in intrathyroid position.

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