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EVALUATION OF THE FUNCTION OF PARATHYROID
GLAND AFTER THYROIDECTOMY

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M.D. Degree in General Surgery

By

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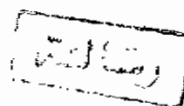
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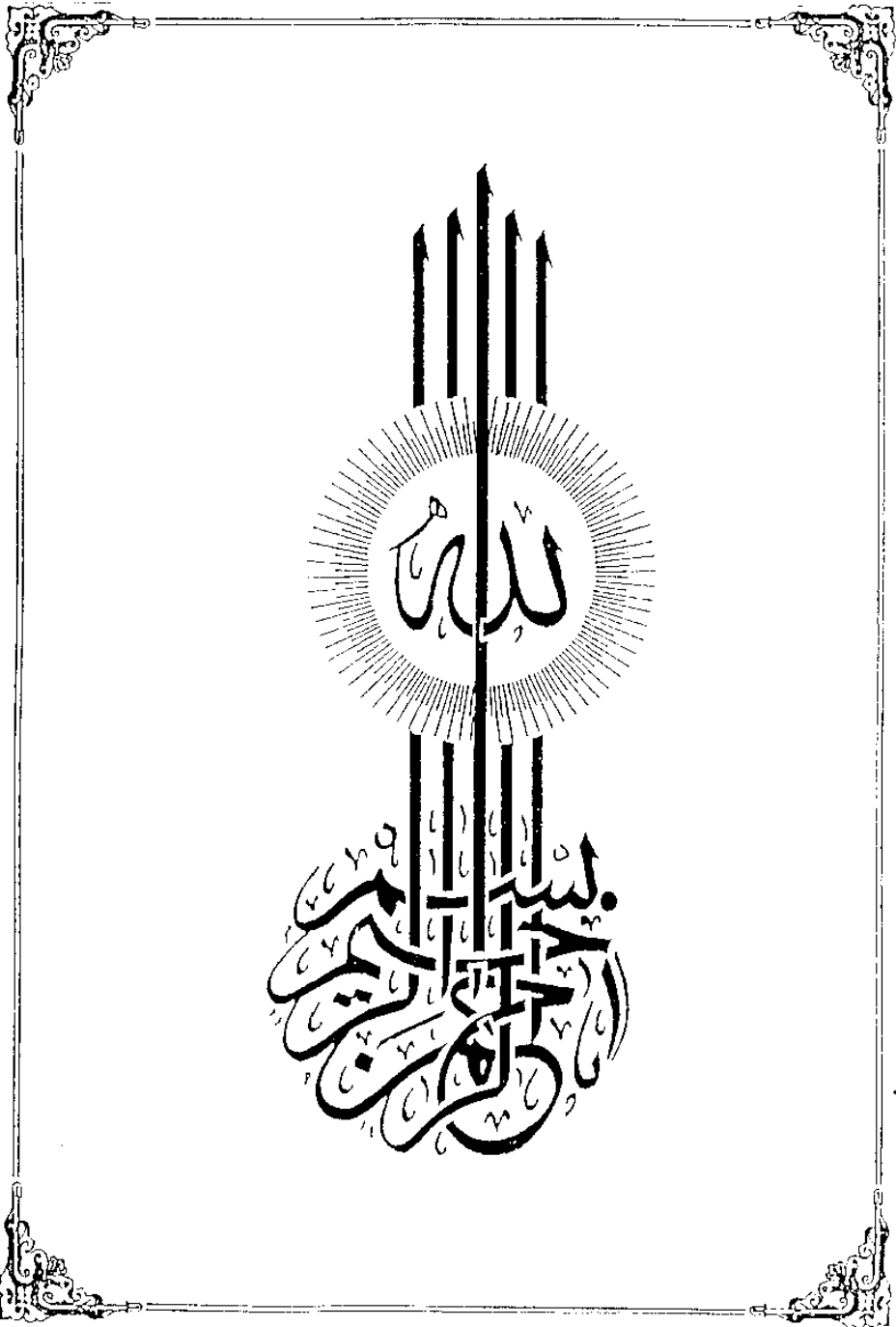
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Introduction

INTRODUCTION

The various complications of thyroid surgery have long been known to surgeons embarking on the surgical treatment of goitre. These complications may be severe enough to jeopardize the life of the patient or to create a physical or physiological incapacity which will limit his normal activities. Because of the severity of these complications it becomes necessary that their incidence be reduced to an absolute minimum in this age of modern surgery. Moreover, if surgery is to continue to play a dominant role in the treatment of thyroid disease, the complications of this form of treatment must be less than those of other equally effective forms of treatment.

Surgery of the thyroid gland has a long history, and the earliest accounts contain reference to the complications.

McGovern's paper (1952) contains the statement that the first extirpation of the goitre was performed in Baghdad in the later part of the tenth century by Abdul or Albucasis "who knew very

well how to control heamorrhage by ligature and hot iron". McGovern (1952) also stated that the first extirpation of goitre carried out in America was by Smith in Merryland in 1835. An interesting account of the Mayo brother's first thyroid operation performed in 1890 is included in their biography by Clapesattle (1941). The patient had an enormous goitre which was causing symptoms of severe pressure. The goitre was scooped out and hemorrhage controlled by large sponges saturated with turpentine. These were left in the wound and removed several days later.

As surgeons learned to control hemorrhage from the gland, more aggressive operations were undertaken and two other complications became evident namely, paralysis of the vocal cords and tetany. Meusman (1951) quoted from Wolfler's report of 1882 from Billroth's clinic that 13 of 44 thyriodectomized patients has paralysis of the vocal cords. According to Halsted (1919) the classic work of Kocher associated tetany as a complication of thyriod surgery, but it was not

until the work of Vassale and Generali (1936) that this complication was associated with extirpation of parathyroid gland secondary to removal of the goitre.

Thyroidectomy is frequently performed in Demerdash hospital with a different surgical technique. The aim of this work is to assess the function of the parathyroid gland after thyroidectomy in relationship to the surgical technique and indication of thyroidectomy.

ANATOMY OF THE THYROID GLAND

The thyroid gland is one of the ductless glands in the body. It occupies the lower anterior part of the neck.

The gland consists of two lateral lobes, usually connected by an isthmus across the median plane. Occasionally the isthmus is absent, the gland being in two separate parts (Grant, 1972).

The gland is situated opposite the sixth and seventh cervical and 1st thoracic Vertebrae. Its weight is about 20-25 gr. in the adult person. It is slightly heavier in the female in whom it becomes enlarged during menstruations and pregnancy (Davis, 1973). An additional conical lobe, the pyramidal lobe is present in about 40% of individuals (Hamilton 1976). However, Schwartz (1979) found this ration is about 80% at operation.

An accessory thyroid gland may occur between the levels of the suprahyoid region and the aortic arch, while accessory thyroid tissue may occur along the course of thyroglossal duct (Grant, 1972).

The lobes of the thyroid gland:

Each lobe is more or less conical in shape with the apex pointing upwards and laterally reaching the walls of the pharynx and the middle of the oblique line of the thyroid cartilage. The base of lower end lies at the level of the fifth or sixth tracheal ring near the medial end of the clavicle.

The inferior extension of this pole may reach to a level below the suprasternal fossa (Substernal). Each lobe is about 5 cm. long, its greatest width is about 3 cm and its thickness is about 2 cm., (Davies, 1973), In order to accomodate with the adjacent strurture each lobe is moulded to form 3 surfaces, namely antero lateral, postero lateral and medial surfaces.

a) The antero lateral surface:

It is convex and covered by the sternothyroid, strenohyoid and omohyiod muscles. The anterior border of the strenomastiod overlaps the corresponding lobe in each side. In cases of enlargement of the gland, the lobes may press upon the infrahyoid muscles until they are almost unrecognisable.

The gland is separated from the infrahyoid by its own capsule and false connective tissue capsule.

b) The medial surface:

It is related to the oesophagus and trachea, the recurrent and external laryngeal nerves, the inferior constrictor and crico thyroid muscles (McGregor, 1969).

c) The postero lateral surface:

It is related to the common carotid artery, longus colli muscle and sympathetic chain.

The isthmus connects the two lobes towards their lower poles. It measures about 1.25 cm transversely and the same vertically. It is firmly adherent to the second third and fourth tracheal rings, and the pretracheal fascia is fixed between the isthmus and trachea. This fixation and the investment of the whole gland by the pretracheal fascia are responsible for the movement of the gland up and down with larynx during swallowing (Last, 1978). This isthmus has important vascular

relations. The cricothyroid branches of the superior thyroid artery anastomosis above it, while it is related below to the inferior thyroid venous plexus. Anteriorly it is separated by the pretracheal fascia from the sternothyroid and the sternohyoid muscle with the anterior jugular vein, the subcutaneous fascia and skin more superficial.

Two borders can be identified, anterior and posterior the anterior border is thin and runs obliquely downwards and medially. It is related to the anterior branch of the superior thyroid artery, this border separates the lateral from the medial surfaces.

The posterior border, blunt and separates the posterolateral from the medial surfaces.

It is related to the terminal part of the inferior thyroid artery.

This border is also related to the parathyroid glands. On the left side the lower most part of this border is related to the thoracic duct.

The pyramidal lobe:

When present it springs from the isthmus on either side of the median plane, but more commonly from the left. It extends upwards towards the hyoid bone. A fibrous tissue band or slip of the infrahyoid musculature called the levator glandulae thyroideae may attach the pyramidal lobe or the isthmus of the gland to the body of hyoid bone. The levator glandulae thyroideae, if present, is innervated by a branch of the external laryngeal nerve (Last, 1978). Occasionally the pyramidal lobe is completely detached or divided into parts. The fibro muscular band may be present without the pyramidal lobe. It represent remnants of the thyro glossal duct.

Capsules of the thyroid gland:

Two capsules can be identified around the thyroid gland. The first or true capsule is a thin adherent condensation of the connective tissue around the gland which also deepen to divide the gland into masses of irregular shape and size. The second capsules (false) is made by the pre tracheal

fascia. The space between the two capsules is traversed only by the arterial and venous trunks (McGrgor 1969).

Suspnsory ligment of Berry:

This is a thickening of the false capsule (pretracheal Fascia) and connects the inner and postevior part of the gland to the cricoid cartilage thus anchoring the gland to the larynx (McGregor, 1969).

Blood supply of the thyroid gland:

The gland has an abundant blood supply in the range of 4 to 6 ml per gram per minute, or approximately 50 times as much blood per gram as in the body as a whole (Saliston, 1978).

A) The arterial Supply:

1. Inferior thyteroid artery:

It is a branch of thyrocervical trunk which arises from the front of the first part of the sub-clavian artery. It ascends in front of the medial border of the scalenus anterior muscle

behind the internal jugular vein. j'

At the level of the cricoid cartilage or the sixth cervical vertebra it turns medially. It comes into close relation to the middle cervical ganglion and recurrent laryngeal nerve.

The inferior thyroid artery is distributed mainly to the lower and posterior regions of the lateral lobes of the thyroid glands, (Hamilton, 1976). In an anatomical study made by Hant (1968) on the thyroid gland at operations, the auther found that the inferior thyroid artery was absent in 5% of cases on the left side and 2% on the right. In 1% of cases the right inferiar thyroid artery divided into multiple branches lateral to the common carotid artery that fanned out before entering the gland at multiple points.

2. The superior thyroid artery:

This branch arises from the anterior aspect of the external carotid artery, just below the level of the hyoid bone. It may arise from the common carotid artery (Davies 1973) the artery runs