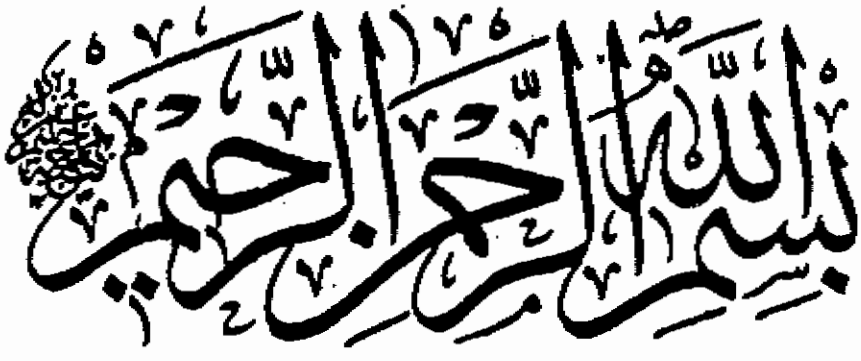

THE VALUE OF ULTRASONOGRAPHY IN THE DIAGNOSIS AND MANAGEMENT OF NON MALIGNANT THYROID SWELLINGS

THESIS

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M.Sc.
General Surgery

By

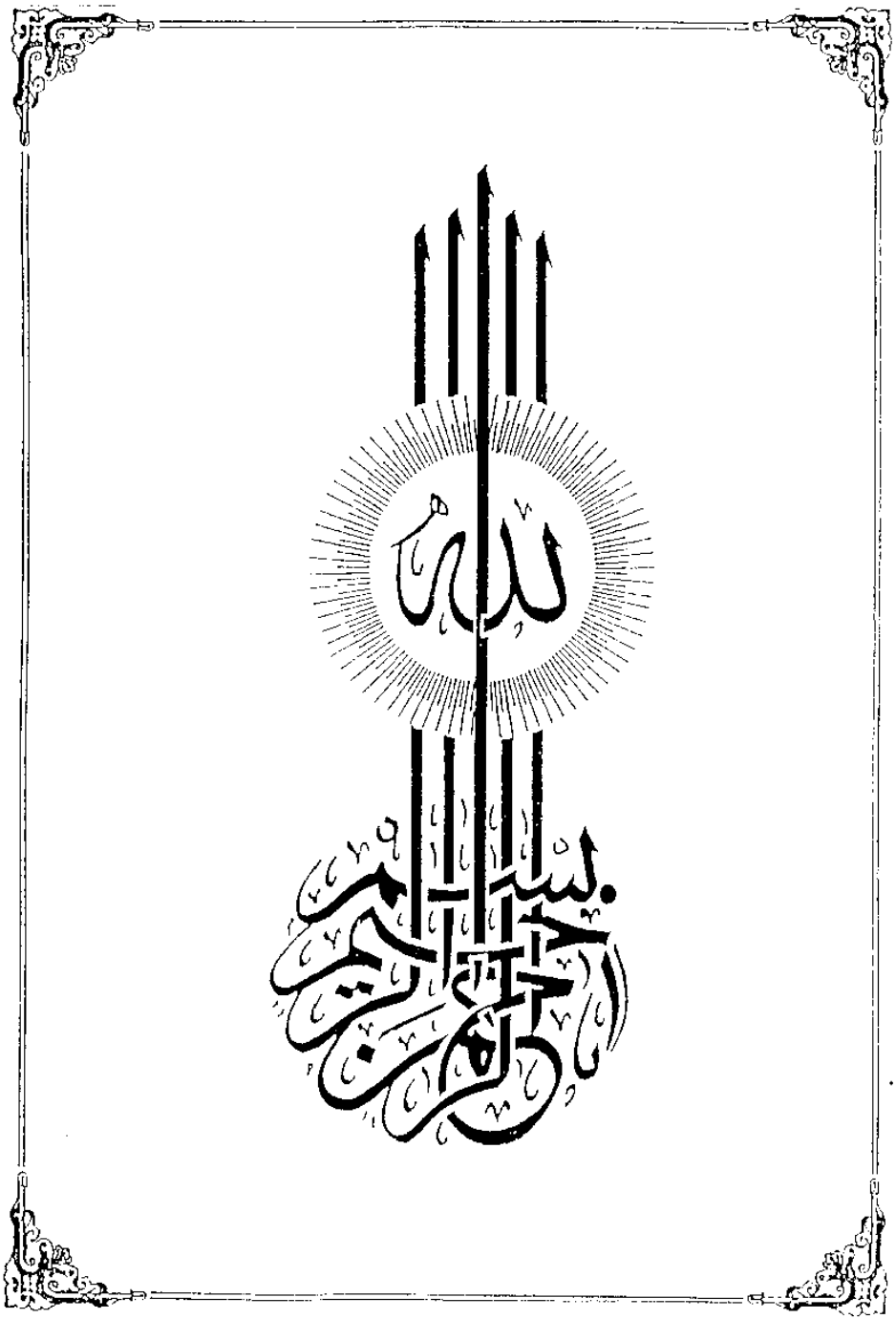
MOHAMED ABDOU FREIG HAMED
(M.B., B.Ch.)

Supervised By

PROF. DR. TAWFIK SOUIDAN
Prof. of General Surgery, Ain Shams University

ASS. PROF. DR. SALWA TAHA ISMAIL
Assistant Professor of Diagnostic Radiology, Ain Shams University

DR. HASSAN SHAKER
Lecturer of General Surgery, Ain Shams University



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The proper diagnosis of thyroid swelling is sometimes problem facing the surgeon as 50% of cases diagnosed clinically as a solitary thyroid nodule prove to be multinodular on exploration of the neck. So, in this study, we aim to evaluate the use of the high resolution real-time ultrasonography as a recent imaging modality in the diagnosis follow-up and guidance to the precise management and justifiable operative intervention of the thyroid swelling. Moreover, a comparison between ultrasonographic, clinical and operative diagnosis is discussed.

REVIEW OF LITERATURE

SURGICAL ANATOMY

Development of The Thyroid Gland:

The thyroid develops as a median downgrowth of a column of cells from the pharyngeal floor between the first and second pharyngeal pouches which becomes marked by the foramen caecum of the tongue. The canalized column becomes the thyroglossal duct, which is displaced forwards by the developing hyoid bone. Below the hyoid, the duct lies slightly to one side, more commonly the left. The duct bifurcates to form the thyroid lobes and a portion of the duct forms the pyramidal lobe *(Botha, 1986)*. The ultimobranchial body arises from a diverticulum of the 4th pharyngeal pouch of each side and amalgamates with the corresponding lateral lobe *(Wheeler, 1988)*. The parafollicular cells have now been demonstrated to come from the neural crest and are part of Amine content Precursor Uptake and Decarboxylation (APUD). The cells migrate to the ultimobranchial bodies and to the glandular structures derived from the lowest branchial pouches *(Kaplan, 1979)*.

In man, most of these cells are situated in the thyroid but they may be present in the thymus or parathyroid glands *(McGeown, 1975)*.

Gross Anatomy:

The thyroid gland occupies an important position in the center of the visceral compartment of the neck, lying astride the trachea, just above the thoracic inlet. Normally, it weighs about 25 g. The gland has two lobes, shaped roughly like slender pears, hugging the anterolateral aspect of the cervical trachea from the level of the thyroid cartilage to the 5th or 6th tracheal ring. The right lobe is often larger than the left and the lobes are joined together across the midline by a thin isthmus plastered quite firmly to the anterior surface of the trachea at the level of the second and third tracheal rings *(Bother, 1986)*.

A variable-sized, but usually small, pyramidal lobe arises from the isthmus somewhere along its upper border near the midline. It is present in about 80% of the cases. Its importance comes from the fact that it must be removed during subtotal thyroidectomy.

Otherwise it may undergo hypertrophy with recurrence of the goitre *(Sedgwick, 1974)*.

The important anatomical features with surgical relevance are:

1. THE MUSCULOFASCIAL COVERINGS:

The strap muscles are ensheathed by the general investing layer of cervical fascia and this unites them in the midline. These muscles are applied to the anterior surface of the gland, but separated from it by a loose condensation of fascia derived from the pretracheal fascia. This false capsule covers the gland which is enclosed by its diaphanous true capsule with its very rich blood supply clearly visible just beneath its surface.

In the surgical approach to the thyroid gland, the musculofascial envelope is incised down the midline which is relatively a vascular, and the space between the two capsules of the gland is entered. This loose plane is easily developed and the gland is exposed by retracting the strap muscles. The nerve supply of these

muscles, the sternohyoid and its deeper neighbour, the sternothyroid, comes from cervical roots 1,2 and 3 via branches from the ansa cervicalis. These branches enter the muscle and its lateral border and on the deep surface and though it is not often necessary, the muscles may be divided transversely to facilitate access to the gland. Provided they are resutured, there does not appear to occur any impairment of function *(Davidson, 1975)*.

2. THE VASCULAR SUPPLY:

As would be expected from its endocrine function, the blood supply of the thyroid gland is very rich in the hyperthyroid state, and there may be an enormous increase in the volume of blood circulating through the gland. Each thyroid lobe is supplied by a superior and an inferior thyroid artery and drained by three veins *(Botha, 1986)*.

The Superior Vascular Pedicle:

It contains the superior thyroid artery, which is a branch of external carotid artery, and its

accompanying vein which drains into the internal jugular vein. The external laryngeal nerve is closely related to this pedicle. The superior vessels enter the upper pole of the gland at its apex, then branches to the front and back of the gland. These superior vessels are easily dealt with surgically because the loose space between the two capsules is developed at the upper pole of the thyroid lobe. Thus a ligature can be placed close to the upper pole to include both vessels and exclude the external laryngeal nerve.

The Inferior Thyroid Artery:

The inferior thyroid artery and vein do not relate to each other at all. The artery arises from the thyrocervical trunk, passes behind the carotid sheath and then runs transversely across the space between this and the thyroid gland to enter the deep surface of the gland as several separate branches close to the tracheothyroid groove. These terminal branches of the inferior thyroid artery are uncomfortably close to the recurrent laryngeal nerve and the inferior parathyroid gland which should be surgically preserved. If the inferior thyroid artery is to be ligated, it should be

done in its transverse portion just medial to the carotid sheath.

The Inferior Thyroid Veins:

The inferior thyroid veins, of which there are always a few on each side, leave the lower border of the gland and pass through the loose fascial space to join the left brachiocephalic vein. They are fragile and require to be ligated singly.

The Middle Thyroid Vein:

The applied anatomy of the middle thyroid vein is important because it is a short thin walled vessel, leaving the middle of the gland and directly coursing laterally to pass in front of or behind the carotid artery and enter the internal jugular vein. It is the first vessel encountered in thyroidectomy and merits careful ligation when it is met early or during the development of the intercapsular space mentioned above.