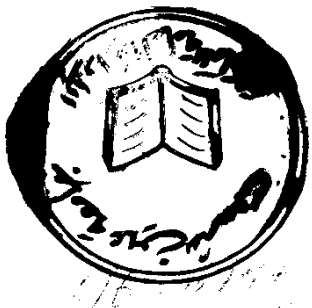
COMPARATIVE STUDY OF DIFFERENT IMAGING TECHNIQUES USED IN THE DIAGNOSIS OF THYROID DISEASES

THESIS

Submitted in Partial Fulfilment
For The M.D.Degree
In Radiodiagnosis

By

NADER HUSSEIN OMAR
M.B., B.ch.; M.Sc.



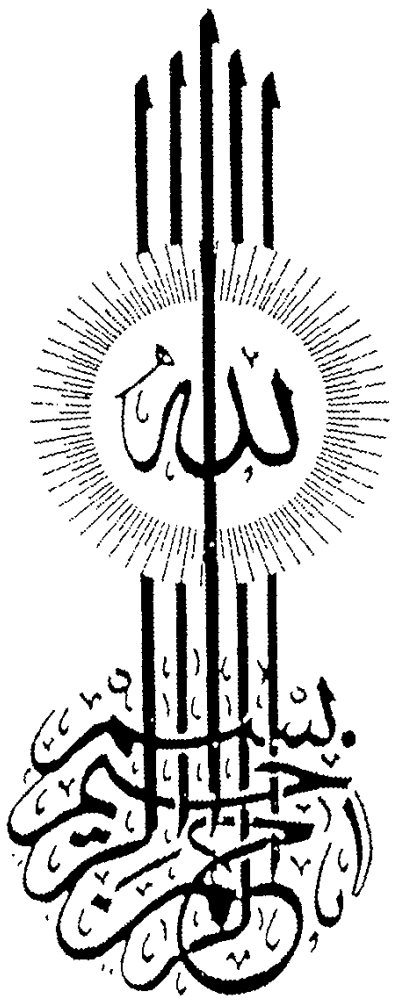
Supervisors

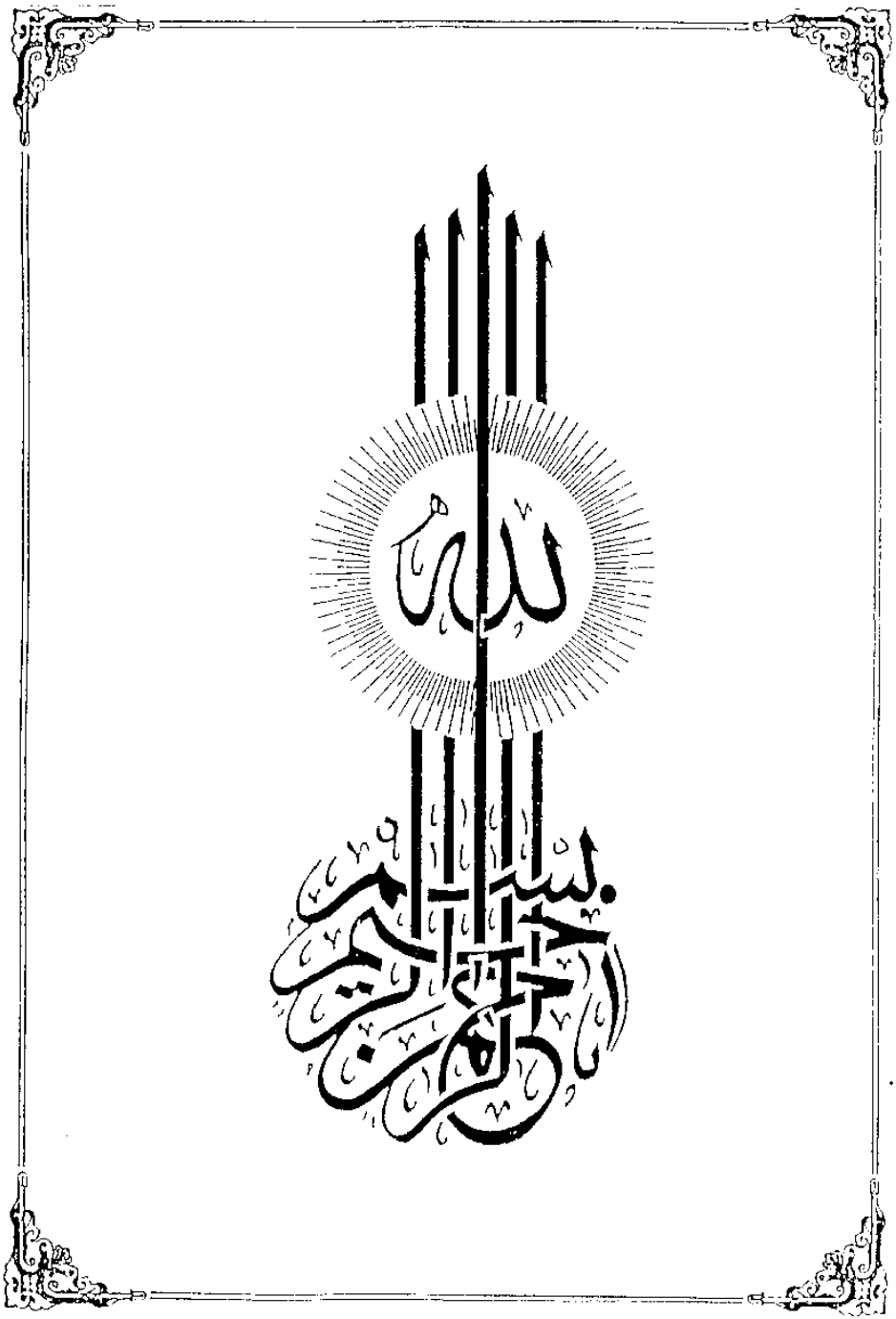
Prof.Dr.SALWA TAHA ISMAIL
Professor of Radiodiagnosis
Ein Shams University

Prof.Dr.ABU-BAKR EL-SADIK MOSTAFA HASSAN
Professor of Surgery
Ein Shams University

DR.SAMIR M.N.ABU-TALEB
Major-general and Chairman
of The Dept. of Nuclear Medicine
Maadi Armed Forces Hospital

Faculty of Medicine
Ein Shams University
1992





TO MY MOTHER

MY BELOVED WIFE

AND OUR CHILDREN

For their love and support

ACKNOWLEDGEMENT

First, thanks to ALLAH who gave the power to carry out the present work honestly and faithfully.

The expression of one's gratitude is sometimes beyond words and is only felt by the sincere.

To my Prof. Dr.Salwa Taha, Professor of Radiodiagnosis, Ein Shams University, I sincerely feel indebted, for her encouragement and for continuous advice, support and guidance throughout this work.

I would like to thank Prof. Dr. Abu Bakr El Sadik, Professor of Surgery, Ein Shams University,for his great help and support.

I am greatly indebted to major-general Dr. Samir Abu Taleb, Chairman of Department of Nuclear Medicine, Maadi Armed Forces Hospital for his advice & devotion towards me.

I would also like to thank the staff at the Computer Center, Faculty of Pharmacy, Cairo University for their great efforts in typing this work.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION AND AIM OF WORK

INTRODUCTION AND AIM OF WORK

The thyroid diseases present with a wide range of clinical findings ranging from classic symptoms and signs to various non specific manifestations.

In the assessment of thyroid disease, palpation of the gland, in combination with the patient's history and physical examination, are still the first step in thyroid diagnostics **[ReMine and Mc Conahey, 1977; Cerletty, et al., 1978]**. Yet there is a great deal dependent on personal skill and opinion hence fallacies could occur **(Ingbar, 1985)**.

A variety of laboratory tests have been developed to assess thyroid functions and thyroid lesions. The fact that these tests are so many is in itself confusion, not to mention their availability in a developing country along with their lack of specificity and sensitivity **(Kaplan, 1989 and Ingbar, 1985)**.

At times thyroid imaging is needed in order to complete the diagnosis. For several decades and yet still radionuclide studies have been used to assess the function of the thyroid gland and to study the nodular abnormalities **(O'Holleran, et al., 1982 and Heidental, et al., 1985)**. They also provide information on substernally extending thyroid tissue **(Park, et al., 1987)**. But bearing in our mind that scintigraphy has proved to be unsatisfactory in assessing the nature of the

hypofunctioning nodule **(Solbiati, et al., 1985)**, their availability in a developing country and their cost effectiveness, limits their use for screening purposes of various thyroid disease.

Ultrasonography of the thyroid is a safe non-invasive modality with no radiation hazards **(Simeone, et al., 1982)** and readily available in developing countries. High frequency ultrasound is an effective means for assessing the internal morphology of the gland, detecting nodules and guiding aspiration biopsy **(Rafto and Gefter, 1988)**. Also has provided additional information in differentiating cystic from solid thyroid nodules **(Silverman, et al., 1984)** and detecting multiple nonpalpable thyroid lesions **(Katz, et al., 1984)**.

CT provided a complementary method for defining the morpho logy of thyroid gland and the anatomic extent of thyroid abnormalities in relation to the normal structures of the neck and mediastinum **(Silverman, et al., 1984)**.

CT is also useful in determining the infiltration of thyroid masses into surrounding tissues **(Higgins, et al., 1986)**. demonstrates regional L.N., also bone or cartilage involvement **(Takashima, et al., 1988)**.

In this study, we aim to emphasis the role of different imaging modalities including radionuclide thyroid scintigraphy, US and CT in the diagnosis of thyroid lesions and the value of these modalities as a guidance to the management of different thyroid diseases.

ANATOMY OF THE THYROID GLAND AND HISTOLOGICAL CONSIDERATION

ANATOMY OF THE THYROID GLAND

The thyroid gland is a brownish-red, highly vascular organ, situated in the front and sides of the lower part of neck, opposite the fifth, sixth, seventh cervical and the first thoracic vertebrae. It is ensheathed by the pretracheal layer of the deep cervical fascia, and consists of right and left lobes connected across the median plane by a narrow portion, called the isthmus (**Warwick and Williams, 1989**).

Its weight is somewhat variable, but is usually 20 gm in an adult (**Halmi, 1986**). It is slightly heavier in the female, in whom it becomes enlarged during menstruation and pregnancy (**Warwick and Williams, 1989**).

The thyroid gland is convex anteriorly and concave posteriorly as a result of its relation to the anterolateral portions of the trachea and larynx , around which it is wrapped and to which it is firmly fixed by fibrous tissue. The thyroid gland is enveloped by a thickened fibrous capsule which sends septa into the gland substance to produce an irregular and incomplete pseudolobulation. No true lobulation exists (**Kaplan, 1989**).

Normal variations in shape, size, position and configuration of the thyroid are numerous (**Volpe, 1989**).