RADIOLOGICAL AND IMAGING STUDIES OF THYROID LESIONS

THESIS

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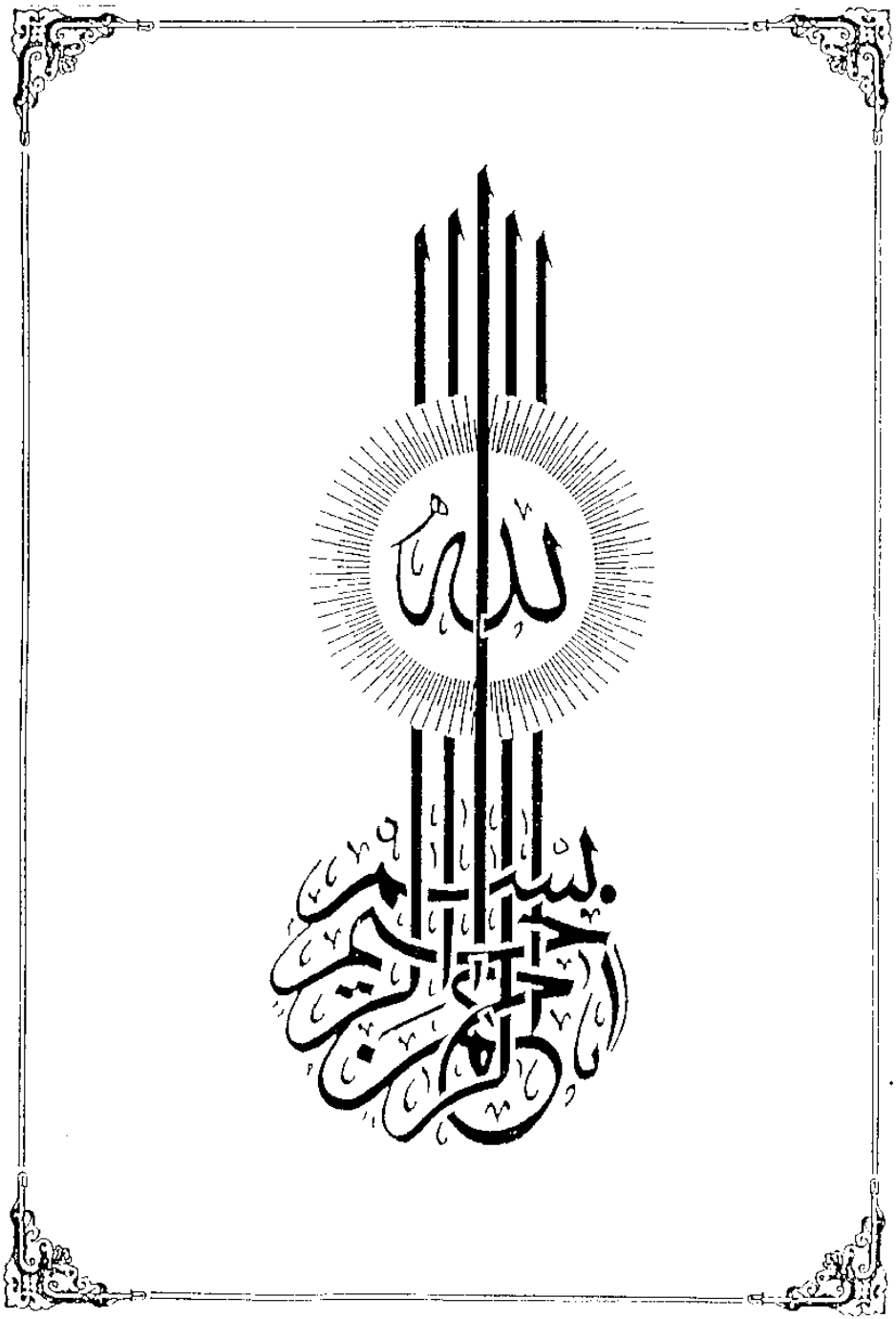

INTRODUCTION
AND
AIM OF THE WORK

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.

For the last few years, the diagnosis was based on clinical examination and little laboratory investigation. (Braverman, et al., 1981) and (Wood, et al., 1980).

For many years ago , radionuclide studies have been the most commonly used imaging method in the evaluation of nodular abnormalities of the thyroid gland. (Heidendal, et al., 1985).They also provide information on substernally extending thyroid tissue or distant metastases (Park, et al., 1987).

Ultrasonography of the thyroid is a safe non invasive modality with no radiation hazards. (Simeone, et al.,1982). 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).

C.T. and ultrasonography are supplemental tests than can influence the management of thyroid nodules by

demonstrating cystic areas or detecting multiple non palpable nodules (Stark, et al., 1983), finding that reduce the chance of malignancy. (Stark, Clark and Moss, 1984).

C.T. is also useful in assessing cervical and mediastinal extension of malignant and benign thyroid neoplasms. (Mancuso, 1982), (Glazer, et al., 1982).

M.R.I. is a safe non invasive procedure for diagnosing thyroid lesions. It can demonstrate pathologic characteristics of pseudocapsular and hemorrhagic degeneration. (Noma, et al., 1987).

In this study, we aim to demonstrate the value of different imaging modalities including:

- Ultrasonography.
- Thyroid isotope scanning.
- Computed tomography.
- Magnetic resonance imaging.

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

Fig. 1: Normal thyroid. Transverse image of left lobe of the thyroid. The normal thyroid has a homogeneously echogenic texture.
(Copy from Fleischer and James, 1984).

Fig. 2 : Thyroid Isthmus by Microview scanner.
This portion of the thyroid also has homogeneously echogenic texture. (Copy from Fleischer and James, 1984).

ANATOMY OF THYROID GLAND

BY ULTRASOUND:

By ultrasound, normal thyroid gland has a homogeneous echogenecity, which is greater than the strap muscles proximal to them.

The thyroid gland is usually asymmetrical in configuration, with one lobe being larger than the other.

The pyramidal lobe lies between the two larger lateral lobes of the thyrcid.

By high resolution, real time sonography thyroid tissue within the isthmus of the gland, lies immediately anterior to the air containing trachea.

Along the medial aspect of the thyroid usually best delineated on longitudinal scans is the inferior thyroid artery (Fig. 1,2) (Fleischer 1986).

The estimation of thyroid size by inspection and palpation is only poorly related to the thyroid volume by ultrasonography, a normal thyroid volume does not rule out the presence of a nodular goiter (Berghout, et al., 1988), Further more, for the evaluation of results

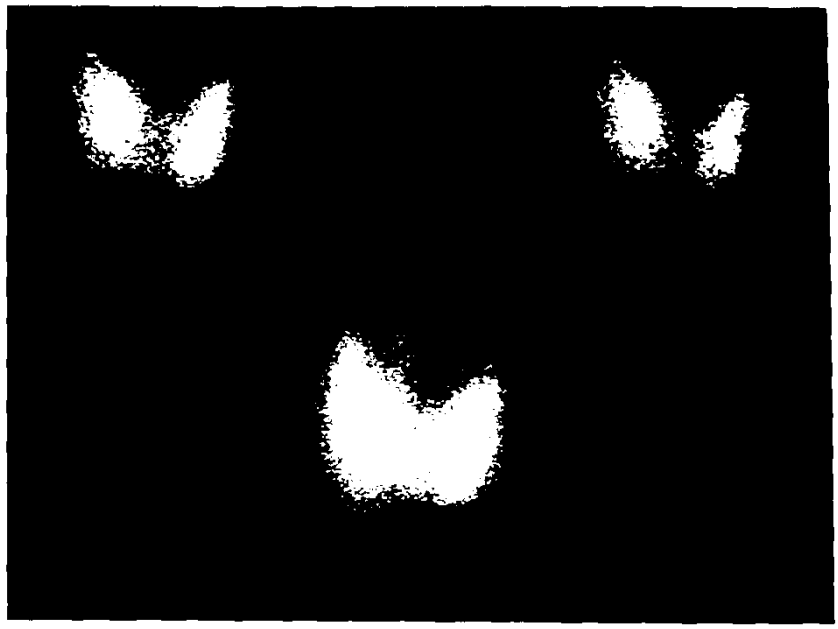

Fig. 3: Normal I-123 thyroid scan. Note symmetrical lobar uptake with minimal background activity. (Copy from Sandler et al., 1986).

of goiter treatment, thyroid measurement is probably superior to clinical estimation of thyroid size (Hansen, et al., 1979, Hegedus, et al., 1987).

Accurate, simple and reproducible measurement is obtained by new ultrasonic scanner for thyroid glands and nodules (Yokoyama, et al., 1986).

Ultrasonography could be of great value in epidemiological surveys to prevent over estimation of goiter prevalence (Gutekunst, et al., 1986).

BY SCINTIGRAPHY:

Normal thyroid gland has a homogeneous appearance with sharply defined border; the lateral margins are either straight or convex.

A pyramidal lobe is visualized in the thyroid scans in approximately 17% of normal patients and in approximately 43% of patients with toxic goiters (Fig. 3). (Levy, et al., 1982).

In searching for ectopic foci of thyroid tissue, use of either I-131 or I-123 is important because TC-99m pertechnetate concentrates to highly variable extent in the vicinity of ectopic thyroid tissue (the salivary gland and esophagus in neck, esophagus and

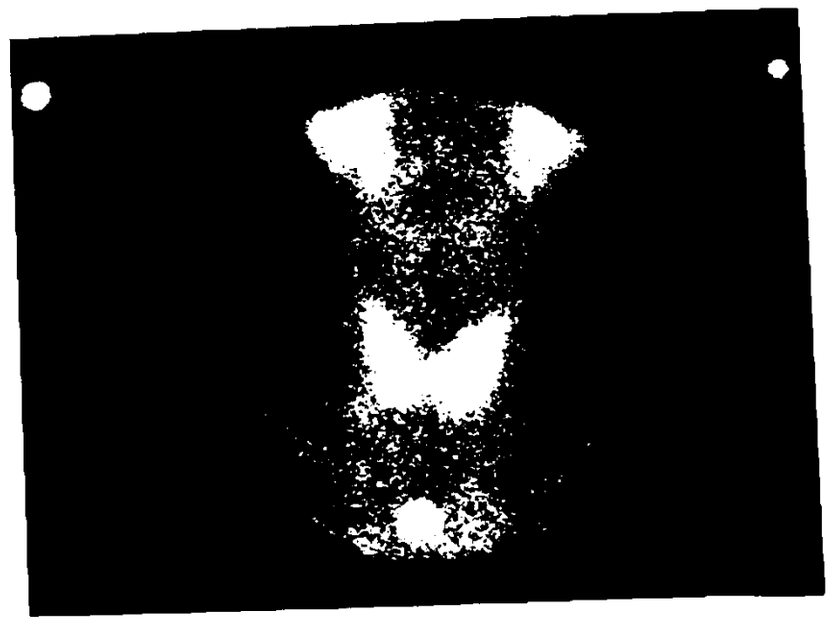

Fig. 4: Pertechnetate thyroid scan (Euthyroid). There is a normal thyroid-salivary and thyroid-background ratio. (Copy from Sandler et al., 1986).

blood pool of the mediastinum, colon and bladder in the pelvis). (Fig. 4)

When the thyroid uptake is low, scintigraphy may fail to visualize the gland.

Non visualization of thyroid :

1- Increased iodine pool.
2- Acute thyroiditis, often local signs and symptoms occur.
3- Chronic thyroiditis: in some cases, low iodine uptake is associated with an elevated trapping index, and the gland is better visualized with TC-99 m pertechnetate.
4- Suppressing or antithyroid medication.
5- Surgical or radioiodine ablation.
6- Congenital abscence of one or both lobes (rare) (Harbert, 1984).

C.T. OF THE NECK:

The thyroid gland is characterized by markedly higher attenuation values than surrounding soft tissue, with values of between 40 and 60 H.U. (normal soft tissue: 20 to 30 H.U.), water: 0 to 15 H.U., this difference is accentuated after the administration of intravenous contrast.

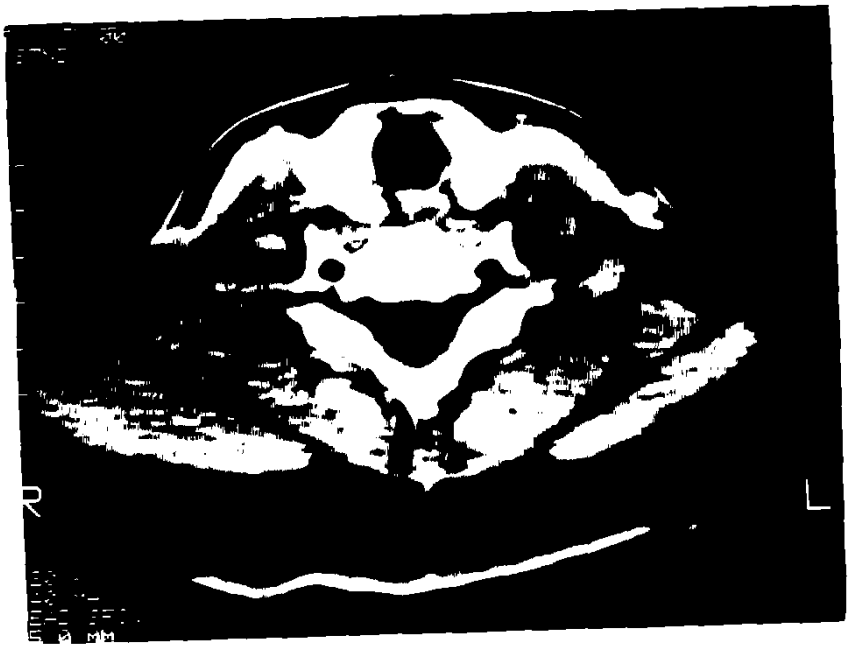

Fig. 5: Computed Tomography. Normal thyroid gland. (Copy from our work).