Role of Computed Tomography in Diagnosis of Neck Lesions

Thesis
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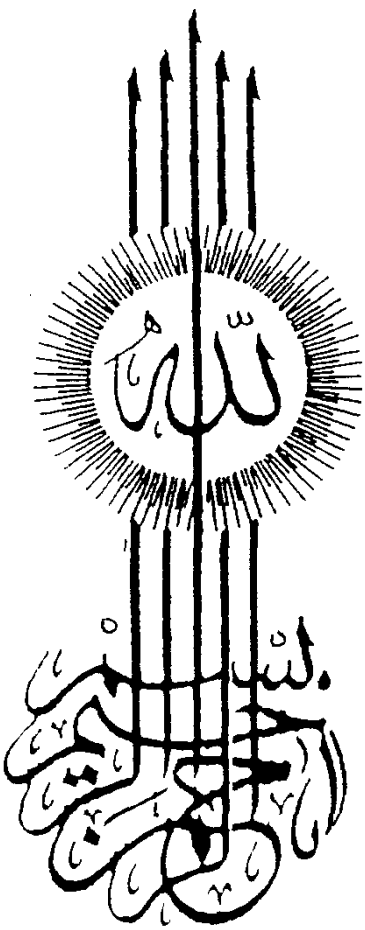

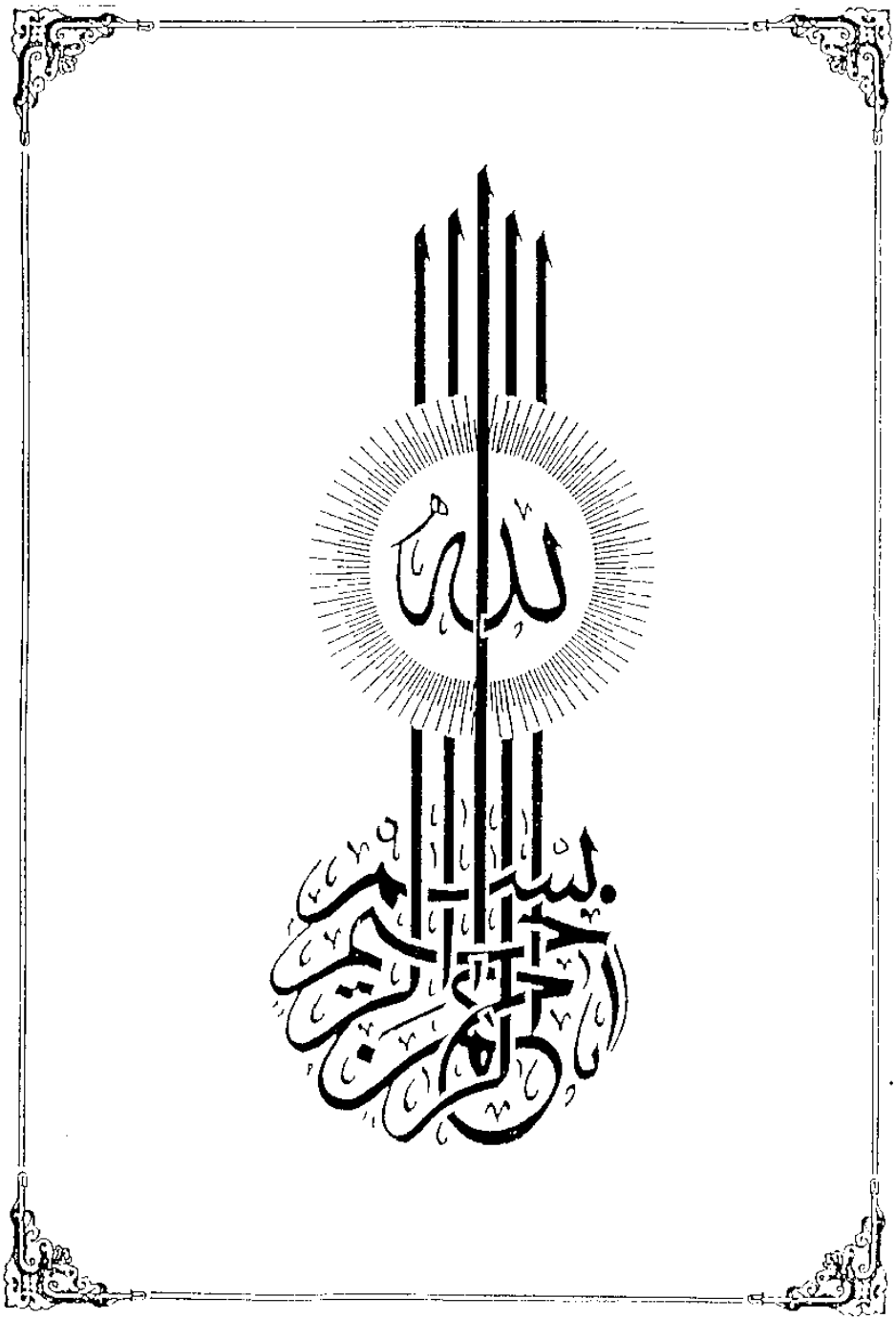

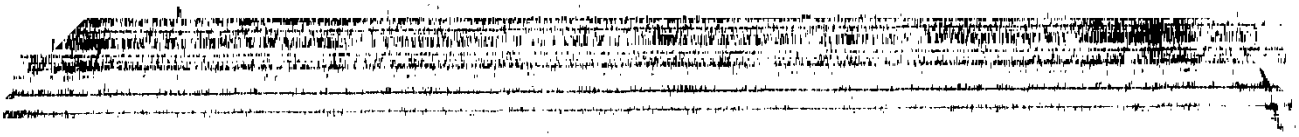

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Hisham Mahmoud Ahmed

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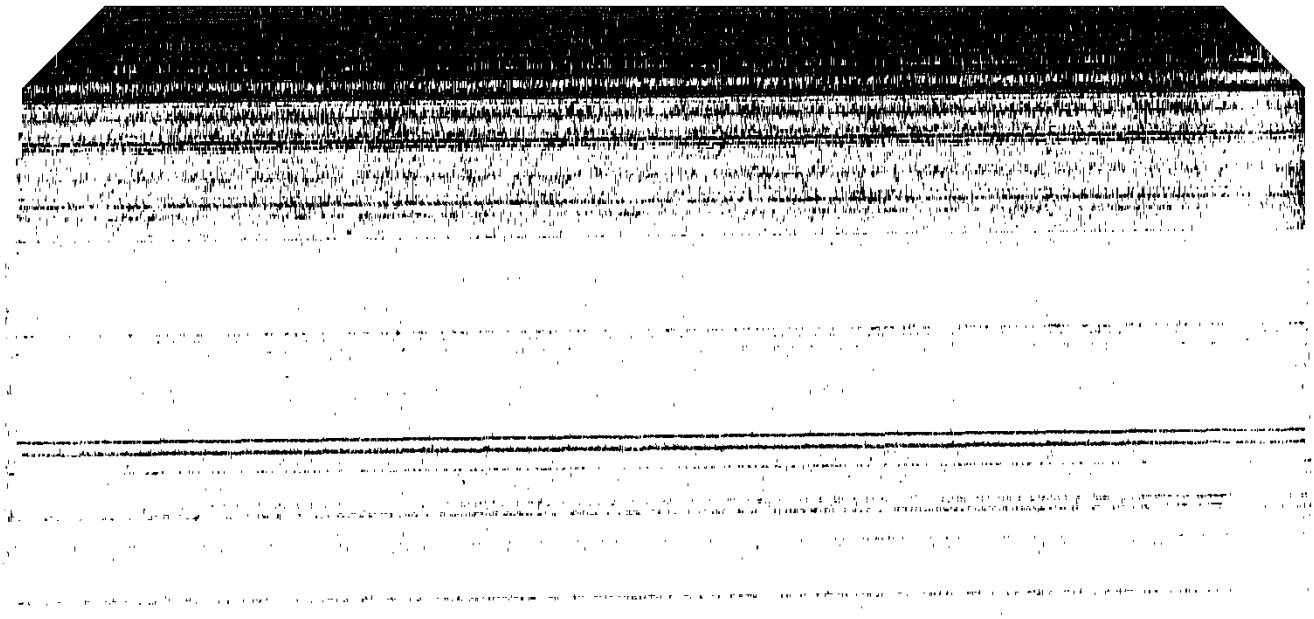


INTRODUCTION AND AIM OF WORK

Accurate scanning and good spatial resolution are both essential to obtain a good morphological representation of the neck. Indeed, the motility of the pharyngolaryngeal structures necessitates a short scanning time, and the narrowness of the fatty spaces and the small differences in density between muscles, vessels, and nerves required high spatial and densitometric resolution.

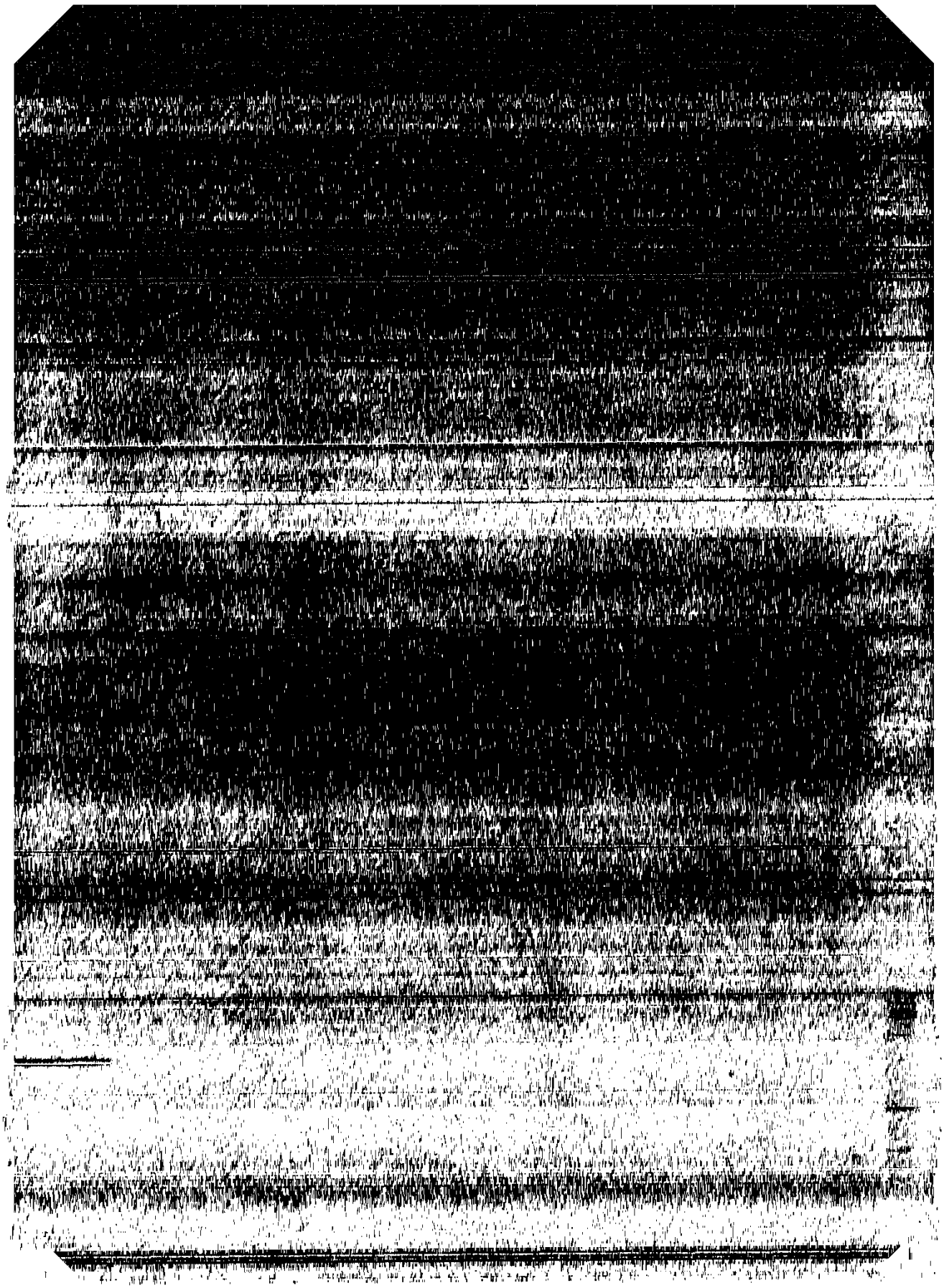
Computed tomography (C.T.) of the neck represents a major advance in laryngology, thyroid and parathyroid glands, lymph nodes, cervical spine and other pathological lesions originating from different anatomical parts of the neck.

The ability of C.T. to show accurately mucosal, deep laryngeal tissues, and associated lymphatic chain involvement makes it an ideal imaging method for evaluation of laryngeal tumour.

C.T. is also a valuable adjunct to the detection and staging of pharyngeal malignancy.

The aim of this study is to emphasize the importance and efficiency of high resolution C.T. in diagnosing different neck lesions, as well as to clarify the value of other radiological and imaging modalities and their limitations.

Review Of Literature



REVIEW OF LITERATURE

The radiologic evaluation of the neck has undergone considerable change in the past decade, and the single factor most responsible, for this change has been the CT scanner.

A perspective on the continued work to improve the roentgenographic evaluation of the neck can be gained by a brief historical review of these different procedures. In 1956) Gay and Wilkins worked on the soft tissue lateral radiography of the neck. They stated that this method provided a baseline diagnostic study, inexpensive, easy to obtain, non-invasive and permits an overview of the laryngeal cartilagenous framework.

In (1957) Powers et al provided the most accurate means of assessment of laryngeal anatomy at the mucosal level using contrast laryngography, which also assessed accurately the laryngeal dynamics especially if combined with cineradiography. In (1960) Ogura declared that laryngography is more informative method concerning the mucosal changes and extension of the tumours than the other radiological methods.

Computed tomography (CT) was developed and evaluated in the late 1960s as a clinical tool for diagnosing intracranial pathologic conditions. When a large aperature scanner that accomodated the entire body was built in (1972), spine scanning was first undertaken.

In (1972) Hemmingsson easily assessed the motility and pliability of laryngeal structures using laryngography, diminished pliability of the structures associated with irregular mucosa signifies its infiltration, he also declared that this is one of the most important signs of malignancy and is evident only when the mucosa is coated with cotrast medium.

On (1975) the CT diagnosis of syringomyelia was demonstrated by Dichiro, and in the following years many new applications were discribed. With the early scanners soft tissue resolution was not achieved; therefore, the description by Dichiro and

Schellinger in (1976) of a technique to enhance or opacify the subarachnoid space with small amounts of metrizamide further stimulated interest in CT scanning of the spine. Doppman published an article in (1977) that deals specially with CT and parathyroid adenomas, in this article, 3 out of 10 parathyroid adenomas were successfully identified using C.T.

In (1979) Olofsson and Sokjer examined 30 cases of laryngeal lesions using laryngography, they stated that the main limitations of laryngography is that it does not provide a histological diagnosis, and can only delineate structural changes. It also may not delineate exactly the lower order of the tumour, which may be growing beneath an intact mucosa.

Thirty-five patients with malignant tumours affecting the larynx have been examined by Parsons et al in (1980) using the EMI CT5005 scanner, twenty-seven had primary largngeal neoplasms, five had tumours arising in adjacent structures but invading the larynx and three who had undergone total laryngectomy were investigated for possible recurrence, their findings were compared with conventional radiological methods and clinical assessment.

The introduction of magnetic resonance head scanning in Britain by Holland et al. (1980), Hawkes et al. (1980), and Doyle et al. (1981) added a new modaility to those which could be applied to parapharyngeal tumours and neck masses in general.

In the report published in the Journal of Computer Assisted Tomography (1981) by Whitely from the University of Maryland, 14 preoperative patients were studied, 7 of them had positive localization of parathyroid adenoma by C.T. The most comprehensive work in the field of pre-operative assessment of parapharyngeal neck massess as regards the size, extent, origin and probable histology has been recorded by Som et al. (1981), who described a combined CT and sialographic technique for the purpose of demonstrating these lesions. From July (1981) to October (1982), Mancuso et al. examined Forty-one patients (39

prospectively and 2 retrospectively) on a Siemens Somatom II C.T. unit at the University of Utah Medical Center, all but 2 patients had known or suspected squamous cell carcinoma involving the upper aerodigestive tract or cervical nodes, the other tissue types included one case each of malignant fibrous histiocytoma, histiocytic lymphoma, and breast carcinoma. Their scans were obtained either as a part of initial pre-treatment diagnostic staging or as a restaging study, the latter in patients with known or suspected recurrence or persistence of tumour, in addition two patients with retropharyngeal nodes were evaluated retrospectively.

In June (1982), fifty cases with different laryngeal lesions were examined by El-Pakhawy et al., using laryngography, they declared that laryngography is a tedious technique, time consuming and unpleasant to the patients, idiosyncrasy to the local anesthesia and iodine compounds may occur. However, inspite of these side reactions they found it safe technique, as the patients were resuscitated easily with no harmful or permanent damage.

Silverman et al. in July (1982) used the automated thin-section scanning to study 11 patients with laryngeal neoplasms, in which the machine is programmed to obtain 1.5mm contiguous scans with automatic table incrementation between them.

In August (1982) Golding examined twenty patients with swellings of the parotid region by computer tomography CT, histological confirmation of the findings was available in eleven patients where CT demonstrated a tumour mass.

Choi and Briant in September (1982) examined six patients with masses localized to the carotid sheath and with well-circumscribed surrounding fatty matrix, C.T. examinations and carotid angiograms were done to these six patients and correlated with the clinical history.

In October (1982) Silverman and Korobkin examined 3 patients with laryngoceles by computed tomography (CT) besides the other conventional radiographic techniques.

Reede et al. in November (1982) analyzed the computed tomographic (CT) scans of 44 patients who presented with nonthyroid, parathyroid lesions involving the soft-tissue structures of the neck. Among these patients, there were 26 with nodal masses, 6 with vascular lesions, 5 with neural lesions, and 8 with diseases involving the connective tissues.

In April (1983) Mafee et al. examined seven patients with known carcinoma of the larynx by computed tomography (CT). Whole-mount sections of the extirpated larynx cut in the horizontal plane were compared with the corresponding level of the preoperative CT sections to demonstrate the validity of CT scanning in the evaluation of tumours of the larynx.

In July (1983), Agha evaluated fourteen patients with recurrent laryngeal nerve paralysis (RLNP) by laryngography, computed tomography (CT), or both.

Scans of the upper oropharynx (30 patients) and lower oropharynx and floor of the mouth (35 patients) in a normal population were reviewed by Muraki et al in September (1983), to determine the range of normal variation in this region, all patients were free of clinical or historical evidence of oropharyngeal disease, they were being examined for cervical metastatic disease due to lower aerodigestive tract primary tumours, suspected parotid gland disease, and a variety of other diseases.

Some et al. in April (1984) had modified their technique in CT sialography but introducing dynamic CT scanning in the assessment of parapharyngeal neck masses.

Reid in June (1984) examined twenty-three patients of primary laryngeal carcinoma using high-resolution 2-mm thick sequential CT scans to judge the value of CT in early tumour detection and the ability of CT to establish tumour extent reliably, particularly early cartilage invasion. **Radecki, et al. in July (1984)** compared high-resolution real-time ultrasound and computed tomography in 48 patients with a clinical diagnosis of thyroid abnormality and also correlated with biopsy or surgery.