VALUE OF COMPUTED TOMOGRAPHY IN EVALUATION OF PATIENTS WITH MALIGNANT LYMPHOMA

THESIS

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THE MASTER DEGREE
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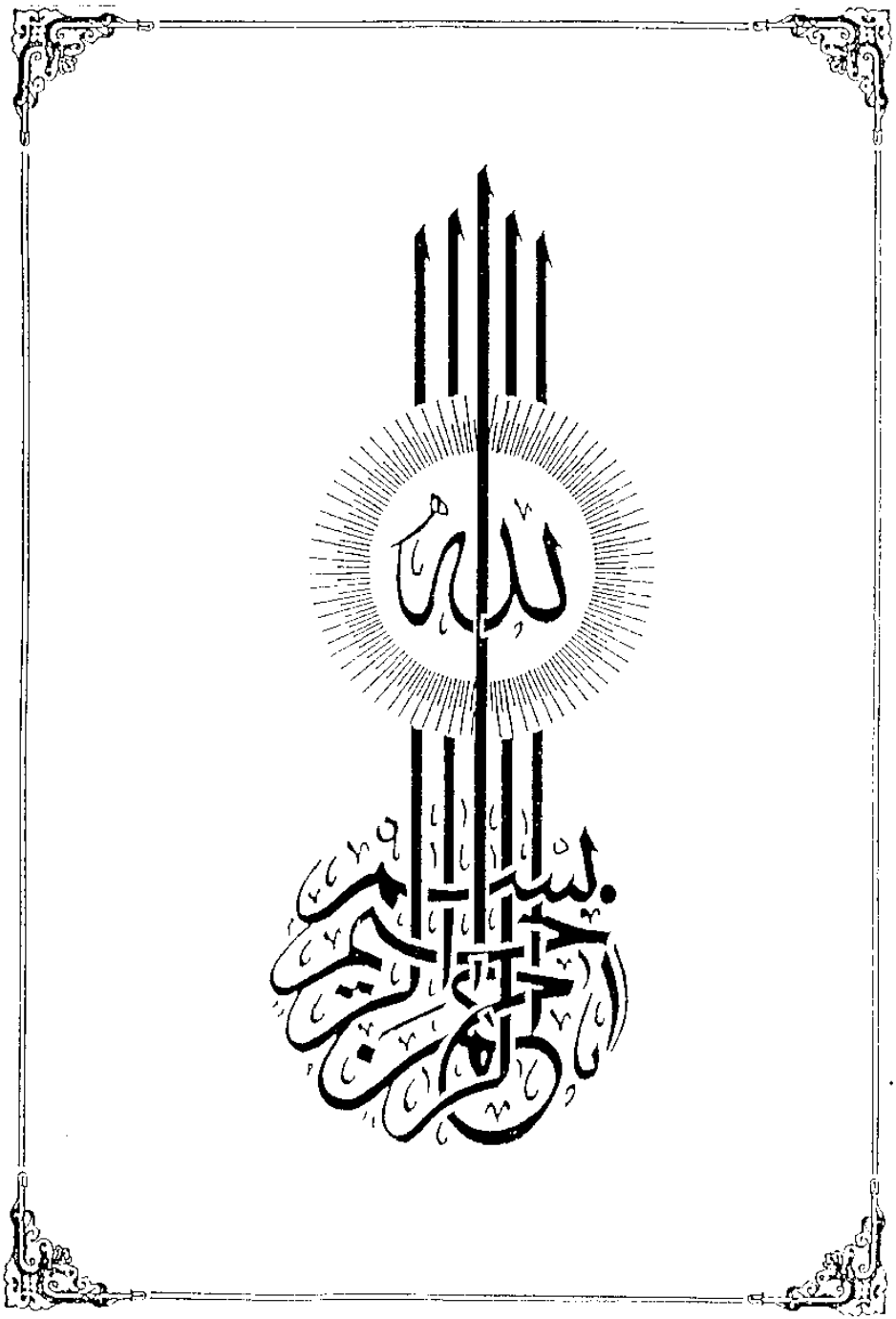
TO MY PARENTS



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INTRODUCTION AND AIM OF WORK

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Incidence of malignant lymphoma is increasing in Egypt during the past few years so it is important to show the role of modern radiographic techniques in evaluation of those patients.

Accurate staging is vital for planning long term management. The major task of staging is to determine whether the patient has limited nodal or extranodal diseases, which is radiocurable (stage I or II) or disseminated disease which requires systemic therapy (stage II or IV). Patients in stage I and II who recieve intensive radiotherapy and who have no new manifestations for 5 years, have at least 95% chance of being cured. Possibilities of extension are reduced by prophylactic irradiation diagnosed at proper early follow up. (Youssef, 1980).

The aim of this study is to show the value of computed tomography in the staging of malignant lymphoma, detection of lymph nodes not detected by other radiological techniques, detection of occult disease in remission or relapse patients and follow up of treatment therapy.

CT ANATOMY

C.T. ANATOMY

All lymphatic vessels open into lymph nodes which are situated in strategic positions throughout the body which can be easily detected by computed tomography if abnormally enlarged.

THORACIC DUCT AND CISTERNA CHYLI TRIBUTAIRES

Thoracic duct

Left jugular trunk
Left subclavian trunk
Left bronchomediastinal trunk

Right lymphatic duct

Right jugular trunk
Right subcalvian trunk
Right bronchomediastinal trunk

Cisterna chyli

Left lumbar trunk
Right lumbar trunk
Intestinal trunks

LYMPH NODES OF THE HEAD AND NECK

Deep cervical

Superior (including jugulodigastric)
Inferior (including jugulo-omohyoid)

Draining superficial tissues in the head

Occipital
Retro-auricular (mastoid)
Parotid
Buccal (facial)

Fig. 2 : CT abdomen anatomy (Quoted from Alfidi et al., 1977).

Draining superficial tissues in the neck

Submandibular
Submental
Anterior cervical
Superficial cervical

Draining deep tissues in the neck

Retropharyngeal
Paratracheal
Lingual
Infrahyoid
Prelaryngeal
Pretracheal

LYMPH NODES OF THE UPPER LIMB AND MAMAMRY GLAND

Draining the upper limb

Axillary
Apical
Central
Lateral
Pectoral (anterior)
Subscapular (posterior)
Infraclavicular
Supratrochlear
Cubital

Drainage the mamary gland

Pectoral
Subscapular
Apical
Parasternal
Intercostal

LYMPH NODES OF THE THORAX (Fig. 1)

Draining thoracic walls

Superficial
Pectoral
Subscapular
Parasternal
Inferior deep cervical
Deep
Parasternal
Intercostal

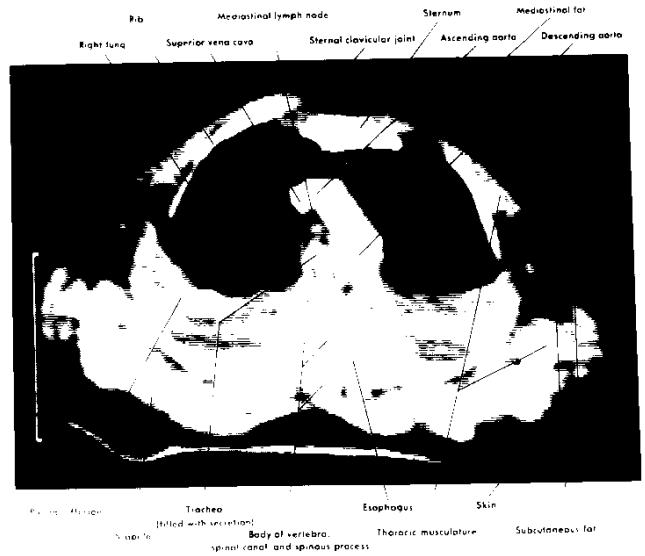

Fig. 1 : CT chest anatomy (Quoted from Alfidi et al., 1977).

Phrenic
Diaphragmatic

Draining thoracic contents

Brachicephalic
Posterior mediastinal
Tracheobronchial
Paratracheal
Superior tracheobronchial
Inferior tracheobronchial
Bronchopulmonary
Pulmonary

LYMPH NODES OF THE ABDOMEN AND PELVIS (Fig. 2).

Lumbar

Pre-aortic
Coeliac
Gastric
Left gastric
Right gastro-epiploic
Pyloric
Hepatic
Pancreaticosplenic
Superior mesenteric
Inferior mesenteric
Lateral aortic
Common iliac
External iliac
Internal iliac
Inferior epigastric
Circumflex iliac
Sacral
Retro-aortic

LYMPH NODES OF THE LOWER LIMB

Superficial inguinal
Upper
Lower
Deep inguinal
Popliteal

(Ross et al., 1973)

These nodes vary considerably in size; pelvic or para-aortic nodes measuring two cm or greater are considered abnormal, retrocrural are considered abnormal if larger than six mm in diameter, obturator nodes are considered abnormal if greater than 1.5 cm mediastinal nodes measuring one cm or greater are considered abnormal. More detailed clinical and pathological correlations are needed before strict size criteria can be applied. (Moss et al., 1983).

Pelvic and retroperitoneal lymph nodes can be identified on computed tomography by their relationship to normal abdominal and pelvic vascular structures, such as the external and common iliac vessels, abdominal aorta and inferior vena cava.

The lumbar lymph nodes are also commonly divided into three separate nodal chains. These include nodes that are anterior, posterior and lateral to the aorta (para aortic) similar nodes positioned adjacent to the inferior vena cava (para caval); and nodes between the aorta and the cava (aortocaval). In the lumbar region, lymphadenopathy characteristically obscures the fat planes between the aorta and cava. When lymphadenopathy is massive, all three nodal chains merge to form a mantle of lymphadenopathy. Lesser degrees of lymphadenopathy can cause asymmetry of contours of muscles or vascular structures.

Retrocrural nodes are located beneath the reflections of the diaphragmatic crura. They can be differentiated from vascular structures (the azygos or hemiazygos veins) by their lack of enhancement with intravenous contrast.

Pancreatic, celiac and superior mesenteric lymph nodes are usually not identified with confidence unless enlarged or imaged against a background of a fatty mesentery. At the intestinal margin, the peritoneum divides into two layers which encase the small bowel and surround the superior mesenteric artery, lymph nodes and adjacent fat. Thus, the small bowel mesentery is a compartment that contains mainly fat but through which are scattered vascular and lymphatic channels and numerous mesenteric lymph nodes. In patients with abundant fat, the mesentery is seen on computed tomography as a structure having a density closely approximating abdominal and subcutaneous adipose tissue. Normal mesenteric lymph nodes measuring less than one cm in diameter can be identified, but usually only two or three are clearly demonstrated on any one C.T. section. (Jeffrey: 1983).

Lymph nodes of the thorax lie in different situations as parasternally with the internal thoracic vessels, intercostally in the posterior parts of the intercostal spaces, along the descending aorta, on the

diaphragm, on the thoracic trachea and main bronchi, in the hilus of the lung and in the angles of bifuraction of the larger bronchi, and in the anterior mediastinum beside the left brachicoephalic vein, (Romanes, 1977). Circumcardiac lymph nodes form a chain around the pericardial attachment to the diaphragm. Normally, they cannot be shown on computed tomography (Moss et al., 1983).

Lymphatic tissue is found in a number of situations in the body in addition to the lymph nodes e.g. in gastrointestinal tract, liver, spleen, kidneys or spine (Ross et al., 1973).