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RADIOLOGICAL & IMAGING DIAGNOSIS OF MALIGNANT TUMOURS OF THE STOMACH

THESIS

SUBMITTED FOR PARTIAL FULFILMENT

OF THE MASTER DEGREE

RADIO-DIAGNOSIS

BY

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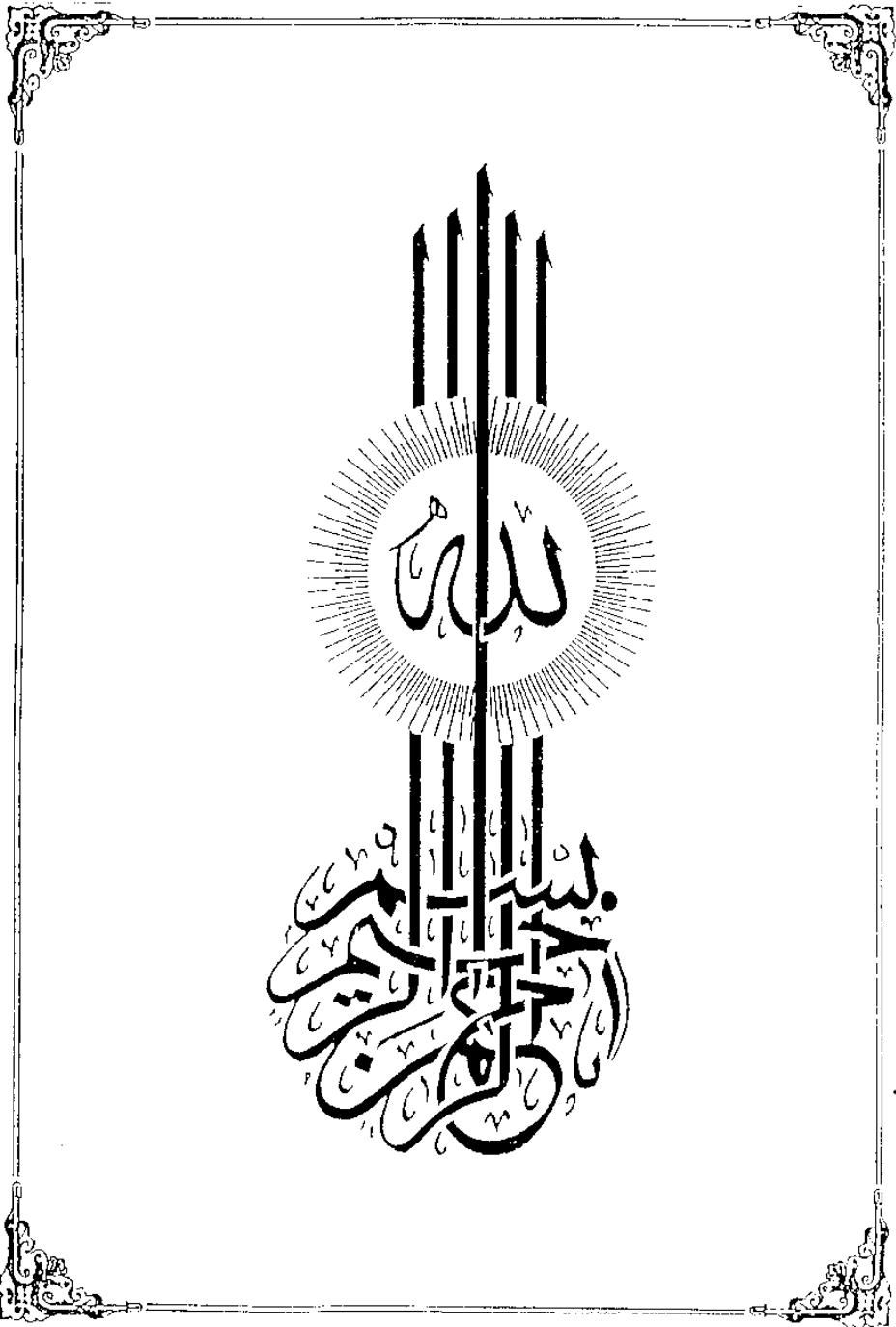
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A C K N O W L E D G E M E N T

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**INTRODUCTION
AND
AIM OF
WORK**

INTRODUCTION AND AIM OF WORK

Radiology was and still is one of the most fruitful techniques of diagnosis of malignant neoplasms of the stomach.

Conventional gastrointestinal study with barium and endoscopy plays very important roles in the early diagnosis (Haaga, 1983).

Double contrast examination of the gastric mucosa has resulted in the detection of gastric cancer at an early stage when the tumor is located to the gastric mucosa (Sutton, 1980).

Barium upper gastrointestinal radiographs and endoscopy more often than not give little information relative to staging of any gastric cancer detected (Berk, 1985).

CT not only can demonstrate the gastric wall and perigastric tissues but also can demonstrate the direct extension of tumor into contiguous organs and the presence of distant metastasis (Sussman, 1988).

Conventional ultrasonography has a low accuracy in detecting and staging gastric malignancy so endoscopic ultrasonography has been developed to improve the diagnostic accuracy of ultrasound by means of direct

imaging of the target lesion through the gastrointestinal lumen (Tioe et al., 1986).

The aim of this work is to discuss the different radiological & imaging modalities for diagnosis and staging of gastric malignant lesions and to describe the manifestations detected in each one.

CHAPTER 1
ANATOMY OF STOMACH

C H A P T E R 1

RADIOLOGICAL ANATOMY OF STOMACH

1- Position:

The stomach is the most dilated part of the digestive tube, and is situated between the end of the oesophagus and the beginning of the small intestine. It lies in the epigastric, umbilical and left hypochondriac regions of the abdomen, and occupies a recess bounded by the upper abdominal viscera, and completed in front and on the left side by the anterior abdominal wall and diaphragm (Warwick, 1976).

2- Shape:

The shape of the stomach vary considerably, tending to be short, high and transversely oriented in broad individuals (Steerhorn - shaped stomach), and elongated and vertically oriented in thin individuals (J - shaped stomach) (Romanes, 1981).

3- Subdivisions:

The stomach is described as consisting of fundus, body, pyloric antrum and pylorus (Figure 1).

The fundus is that part which projects upwards in contact with the left dome of the diaphragm above the level of the cardiac orifice. It is usually full of gas. The body extends from the fundus to the level of the

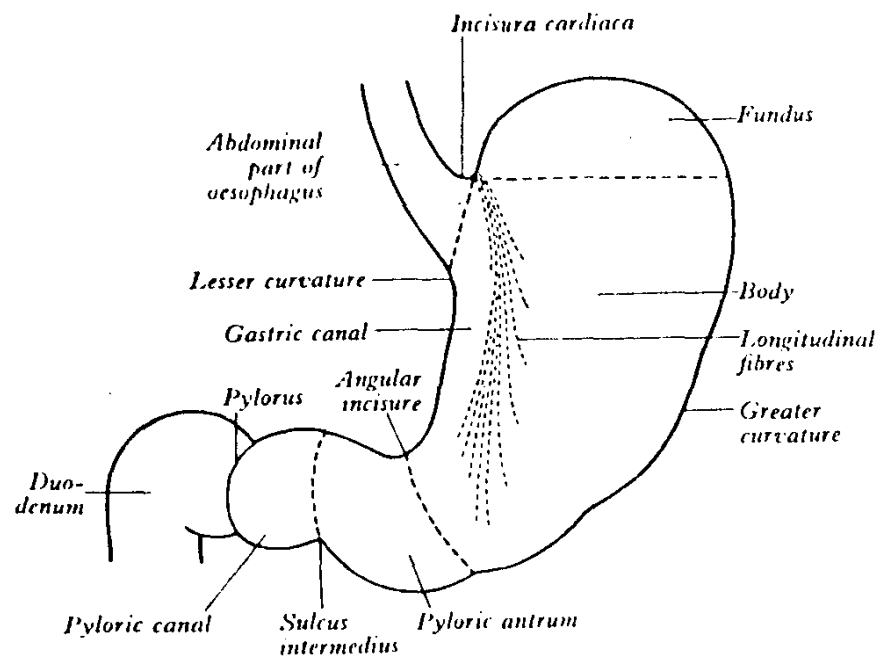


Fig. (1): The subsidiary parts of the stomach.
(from Warwick, 1976).

incisura angularis, a constant notch in the lower part of the lesser curvature. The pyloric antrum extends from this level, narrowing gradually towards the pylorus. The pylorus is probably thicker than the rest of the stomach wall and the pyloric canal is held closed by the tonus of the pyloric sphincter (Last, 1984).

4- Capacity:

Its mean capacity varies with age, being about 30 ml at birth, increase gradually to about 1000 ml at puberty, and commonly reaching to about 1500 ml in the adult (Warwick, 1976).

5- The Gastric Curvatures:

The greater and lesser curvatures extends from the cardiac to the pyloric opening. The greater curvature is on the left, tends to be convex, and is much the longer. The lesser curvature is on the right, is much shorter, and tends to be concave. The lesser curvature usually exhibits a notch, the incisura angularis or angular notch, at its most dependent point. The notch is nearly always evident in radiograms of the barium filled stomach, taken in the erect position (Cray, 1976).

6- The Gastric Surfaces:

The stomach have anterior and posterior surfaces meeting at the greater and lesser curvatures. The anterior

surface is covered by peritoneum of the greater sac, and is in contact with the inferior surface of the left lobe of the liver, the diaphragm and the anterior abdominal wall.

The posterior surface covered for a small area to the left of the oesophageal entrance by peritoneum of the anterior wall of the omental bursa, is in contact with a number of viscera, which collectively are referred to as the "stomach bed". These include the diaphragm, the spleen, the upper part of the left kidney, the left suprarenal, the body and tail of the pancreas, the transverse mesocolon and to a variable extent the transverse colon (Romanes, 1981).

7- Peritoneal Relations:

The part of the lesser omentum between the liver and the stomach is known as the gastrohepatic ligament. The two layers of the lesser omentum separate at the lesser curvature of the stomach, cover the anterior and posterior surfaces, with the exception of the "bare" area and meet at the greater curvature.

The two layers continue to the left from the upper part of the greater curvature as the gastrophrenic and gastrosplenic ligaments, and they continue downward from the lower part of the greater curvature as the anterior

two layers of the greater omentum. The peritoneal covering of the anterior surface of the stomach is continued upward for a short distance on the anterior aspect of the oesophagus (Cray, 1976).

8- Vessels And Nerves:

A. Arterial Supply:

The stomach receives arterial blood from the branches of coeliac axis which arises from anterior aspect of the aorta usually at the level of the twelveth thoracic vertebrae.

The branches are:

1- The left gastric artery gives off an oesophageal branch then pass from left to the right along the lesser curvature.

2- Splenic artery supply:

a. Short gastric arteries to the fundus.

The short gastric arteries (vasa brevia) are 5-7 small vessels that spring from splenic artery towards its termination and are distributed to the fundus of the stomach (Rains, 1981).

b. The left gastroepiploic artery which runs along the greater curvature.

3- Hepatic artery courses cranially close to the pylorus and gives off:

- a. The right gastric artery to the lesser curvature.
- b. Gastroduodenal artery which descends behind the pylorus to terminate as the right gastroepiploic artery and superior pancreatico-duodenal artery, the latter anastomosis with the inferior pancreatico duodenal artery, branch of the superior mesenteric artery.

The arterial supply of the stomach is illustrated in figure (2).

- 2- The gastric vein are distributed in a manner similar to the arteries and end in the portal vein directly or in one of its main tributaries (Margulis, 1973).

These corresponding to the right and left gastric arteries terminate in the portal vein and those corresponding to the left gastroepiploic vein and vasa brevia (short gastric arteries) join the splenic vein, while the left gastroepiploic vein empties into the superior mesenteric vein (Rains, 1981). Radicles of the left gastric vein communicate with oesophageal vein forming an important anastomosis between systemic and portal venous systems (Margulis, 1973).

3- The Lymphatic Vessels:

The lymphatic vessels of the stomach arise as lymphatic follicles in the submucosa and subperitoneal layers