PATHOLOGICAL STUDY
OF
PEPTIC ULCERATIONS

A Thesis
Submitted for Partial Fulfilment of
Master Degree in Pathology

By
REDA FIKRY KAMEL ABDEL MEGUID
(M.B.,B.Ch.)

Supervised By

Prof. Dr. EGLAL ABDEL RAZIK
Professor of Pathology

Dr. SHADIA HUSSEIN
Lecturer of Pathology

Faculty of Medicine
Ain Shams University

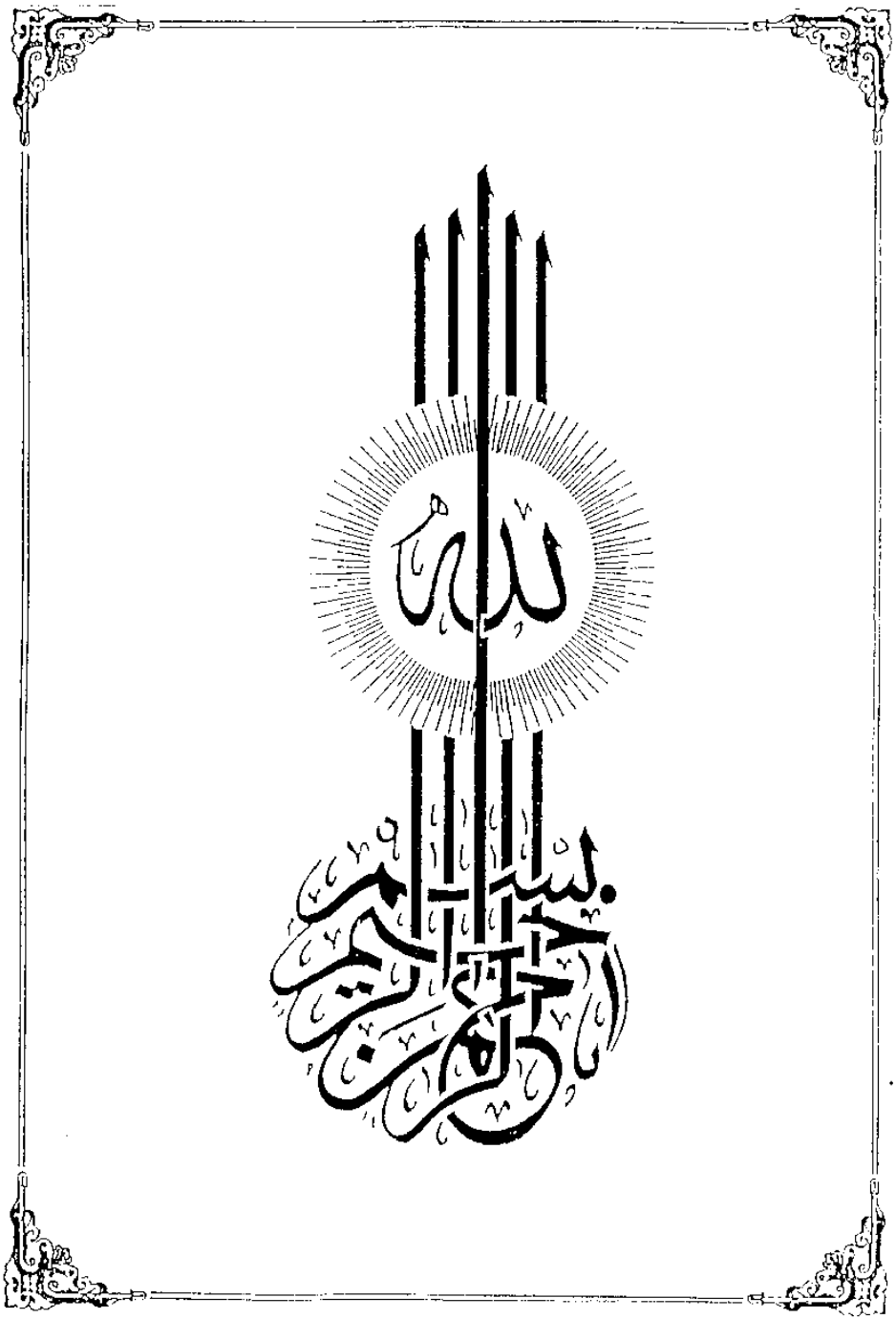
Cairo-1984

ACKNOWLEDGEMENT

I would like to express my deepest gratitude to Prof. Dr. MOURAD ALI SHERIF, Head of Pathology Department, Ain Shams University for his helpful guidance and encouragement.

I would like to express my sincere thanks to Prof. Dr. EGLAL ABDEL RAZIK, Professor of Pathology, Ain Shams Faculty of Medicine for her suggestions, guidance, constant help and generous advice which made this work possible.

I am also greatful to Dr. SHADIA HUSSEIN, Lecturer at Department of Pathology, Ain Shams Faculty of Medicine, for her keen supervision and her valuable cooperation throughout the work.



CONTENTS

INTRODUCTION AND AIM OF THE WORK

Peptic ulcer is the commonest disorder of the human gastrointestinal tract and may be the symbol of our era.

Peptic ulcer deserves special attention due to the disabling pain it causes, the long course it takes, the serious complications it may give, the liability of its recurrence and its disturbing effect on the social and economic power of the patient himself and society.

By far the most important type of ulceration found in the stomach is peptic ulceration, in which the action of gastric juice is primarily concerned (Anderson, 1979).

As regards the etiology of peptic ulcer, it is not understood, more has been written and less is known about the genesis of peptic ulcer than perhaps of any other disease in medicine, (Robbins and Cotran, 1980).

There is no single etiologic factor responsible for this lesion and each factor that influences the final outcome acts only in a contributary capacity (Mc Hardy, 1963).

Peptic ulcers are usually classified into acute and chronic types. Acute ulcerations heal easily and give rise to little trouble. Chronic peptic ulcers are more serious because of their complications. The term peptic ulcer usually refers to this serious chronic type (Anderson and Scotti, 1980).

The aim of the present work is to study the different pathological aspects of peptic ulceration with special interest in its etiology and pathogenesis.

REVIEW OF THE LITERATURE

ANATOMY OF THE STOMACH*

The stomach is the most dilated part of the digestive tube and it 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. Its shape and position are modified by changes within itself and the surrounding viscera and no one form or position is typical. Its mean capacity varies with age, being about 30 ml at birth, increasing gradually to about 1000 ml at puberty and commonly reaching to about 1500 ml in the adult.

1. The gastric orifices:

The opening by which the oesophagus communicates with the stomach is the cardiac orifice and is situated on the left of the median plane, behind the seventh costal cartilage 2.5 cm from its junction with the sternum. It is placed about 10 cm from the anterior abdominal wall and is 40 cm from the incisor teeth. The short abdominal part of the oesophagus is conical in shape and curved sharply to the left, the base of the cone being continuous with the cardiac orifice of the stomach. The right margin of the oesophagus is continuous with the lesser curvature of the stomach, while the left margin joins the greater curvature at an acute angle, termed the cardiac notch. The part of the stomach to the left of and above the cardiac orifice is called the

---

* Williams and Warwick (1980)

fundus.

The opening into the duodenum is the pyloric orifice and its position is usually indicated by a circular groove on the surface of the organ termed the pyloric constriction, which indicates the position of the pyloric sphincter. The pyloric orifice lies about 1- 2 cm to the rihgt of the median plane near the level of the lower border of the first lumbar vertebra (Transpyloric plane) when the body is in supine position and the stomach is empty.

2. The gastric curvatures:

- The lesser curvature: extending between the cardiac and pyloric orifices, forms the right or posterosuperior border of the stomach. It descends as a continuation of the right margin of the oesophagus in front of the decussating fibers of the right crus of the diaphragm and then turning to the right, it curves below the omental tuberosity of the pancreas and ends at the pylorus. The most dependant part of the curve may form a notch named the angular incisure. The lesser curvature gives attachement to the lesser omentum, the two layers of which contain the right and left gastric vessels adjacent to the lesser curvature.

- The greater curvature: is directed antero-inferiorly, and is four or five times as long as the lesser curvature. Starting from the cardiac orifice at the cardiac notch, it forms an arch backwards, upwards and to the left, the

the highest point of convexity (of the fundus) is on the level with the left fifth intercostal space and lies just below the left nipple from this level it may be followed downards and forwards to end at the pylorus. Directly opposite the angular incisure of the lesser curvature the greater curvature presents a bulge which is the left extremity of the pyloric part of the stomach, this is limited on the right by a slight groove which indicates the subdivision of the pyloric part into a pyloric antrum and a pyloric canal. The latter is only 2- 3 cm in lenght and terminates at the pyloric constriction. On the left side of the fundus and the adjoining part of the body, the greater curvature gives attachment to the gastrosplenic ligament, while its lower portion gives attachment to the two layers of the greater omentum.

3. The gastric surfaces:

- Anterosuperior surface: the upper and left part of this surface becomes posterolateral and is in contact with the gastric surface of the spleen. The right half is in relation with the left and quadrate lobes of the liver and with the anterior abdominal wall. When the stomach is empty, the transverse colon may lie on the front of this surface.

- Postero-inferior surface: this is related to the diaphragm, the left suprarenal gland, the upper part of the front of the left kidney, the splenic artery, the anterior surface of the pancreas, the left colic flexure and

the upper layer of the transverse mesocolon. These structures form the shallow stomach bed, but the stomach is separable from them and can slide over them due to the intervening omental bursa (lesser sac). A plane passing through the angular incisure on the lesser curvature and the left limit of the opposed bulge on the greater curvature divides the stomach into a large left portion or body and a small, right, or pyloric part.

4. Blood supply of the stomach:

The arteries supplying the stomach are the left gastric branch of the coeliac artery, the right gastric and right gastro-epiploic branches of the common hepatic artery and the left gastro-epiploic and short gastric branches of the splenic artery. Numerous arteriovenous anastomoses are present in the mucous coat. From these the veins arise and pursue a straight course, between the glands to the submucous tissue, they end either in the splenic and superior mesenteric veins or directlt in the portal vein.

5. Lymph drainage:

Lymphatic channels are numerous and form a plexus in the submucosa from which many small vessels penetrate the muscularis and ramify in the lamina propria, they drain to the left gastric, right gastric and subpyloric lymph nodes and also to paracardial, pancreatico-splenic and right gastro-epiploic nodes.

6. Nerve supply:

The sympathetic supply is mainly from the coeliac plexus through the plexuses around the gastric and gastro-epiploic arteris. Inconstant branches are given to the stomach from the left thoracic splanchnic nerves and from the thoracic and lumbar sympathetic trunks. The sympathetic supplies vasomotor fibers to the gastric blood vessels and provides the main pathway for pain fibers from the stomach.

The parasympathetic supply is derived from the vagus nerves. Usually one or two nerve trunks lie on the anterior and one or two on the posterior aspect of the gastro-oesophageal junction. The anterior nerves comprise mainly left vagal fibres and the posterior right vagal fibres which have emerged from the oesophageal plexus. The vagus has both secretory and motor influences on the stomach. Stimulation evokes a secretion rich in pepsin and increased gastric motility while after vagotomy the stomach becomes flaccid and empties slowly.

EMBRYOLOGY OF THE STOMACH

According to Ming (1973), the part of the foregut destined to become the stomach is identifiable as a dilated segment behind the heart at the end of the fourth week of fetal life. During the second month it moves downward into the abdominal cavity. The foregut also moves to the left and rotates along its long axis so that the dorsal edge turns to the left and the ventral edge to the right. The faster growth of the dorsal edge forms the greater curvature and the slower growing ventral edge becomes the lesser curvature of the stomach. A fundic diverticulum appears during the ninth week of fetal life, which merges with the greater curvature in the twenty-fifth week to further increase the length of its left border.

HISTOLOGY OF THE STOMACH

Bradbury (1976), mentioned that; the stomach wall consists of the following layers:

1. Serous coat: this is derived from the visceral peritoneum and consists of a thin layer of loose connective tissue, attached to the external muscle coat and covered with a single layer of mesothelium; it continues into the omentum.
2. Muscle coat: the muscle coat consists of three rather ill-defined layers, usually described as an outer longitudinal, a middle circular and an inner oblique layer. The middle layer is the most regular coat and is grea-

tly thickened, together with the inner coat at the pyloric sphincter.

3. The submucous layer: consists of loose connective tissue containing fat cells, lymphocytes, esinophil leucocytes and mast cells. It contains also the blood vessels and lymphatics and a ganglionated nerve plexus.
4. The mucous coat: is separated from the submucosa by a relatively thock muscularis mucosa. This consists of smooth muscle arranged as an inner circular and an outer longitudinal layer, in some parts there is a third outer layer of circular fibres. Strands of muscle extend from the inner layer into the stroma between the glands and their contraction helps in emptying the glands.

Romanes (1971), stated that the mucous membrane of the stomach is a thick, smooth surfaced layer which is thrown into longitudinal folds when the stomach is contracted, but is flattened out as it distends.

Ham (1974), mentioned that with the light microscope the gastric mucosa is seen to be studded with tiny little openings through which the gastric juice wells up when the stomach is actively secreting. These openings are termed gastric pits or foveolae. The pits descend into the mucous membrane to reach the upper ends of the glands in the lamina propria.

The surface epithelium: It provides protection, its cells are tall and all alike. The apex of the cells is filled

with mucous and this mucous is secreted in such a way that it forms continous sheets. The surface epithelium also extends down the sides of pits to line them.

Glands of Lamina propria of the cardia: They are either simple or compound tubular glands that secrete mucus and little enzyme and are, therefore, of little practical importance.

Glands of the mucous membrane of the Fundus and the Body: These glands produce nearly all the enzymes and hydrochloric acid secreted in the stomach, they also produce some of the mucus. The glands here are straight except near the muscularis mucosa, where they may be bent. Each tubular gland consists of 3 segments, the deepest part is the base, the middle part is the neck and the upper part is the isthmus. The isthmus is continuous with a pit. Several glands contain 4 main kinds of secretory cells, but these are not evenly distributed in the different segments.

The isthmus contains 2 types of cells, surface epithelial cells and parietal cells, the latter vary from being rounded to triangular in shape. The neck of a gland is made up chiefly of mucous neck cells which have a more or less triangular shape. Individual parietal cells are scattered between groups of mucous neck cells.

The base or body of a gland is made up mostly of Chief (zymogenic) cells. Parietal cells are sprinkled among the Chief cells.

The Chief cells are columnar with basophilic material rich in cytoplasmic nucleoproteins in the basal part of the cytoplasm and secretion granules in the supranuclear area. These cells produce the enzymes of the gastric secretion.

The parietal cells are large and ovoid with a central nucleus and the cytoplasm has a marked affinity for acid dyes such as eosin. These cells produce the hydrochloric acid.

Glands of the pylorus: The pits in the pyloric portion of the stomach are deeper than those in the body and the fundus. Furthermore, the glands that open into the pits are much shorter than those in the body and the fundus. Pyloric glands are coiled, consist of only one type of cell and do not produce enzymes but only mucus.