PATHOLOGICAL AND FUNCTIONAL CHANGES OF THE STOMACH IN NON-ULCER DYSPEPSIA IN ELDERLY PATIENTS

Thesis

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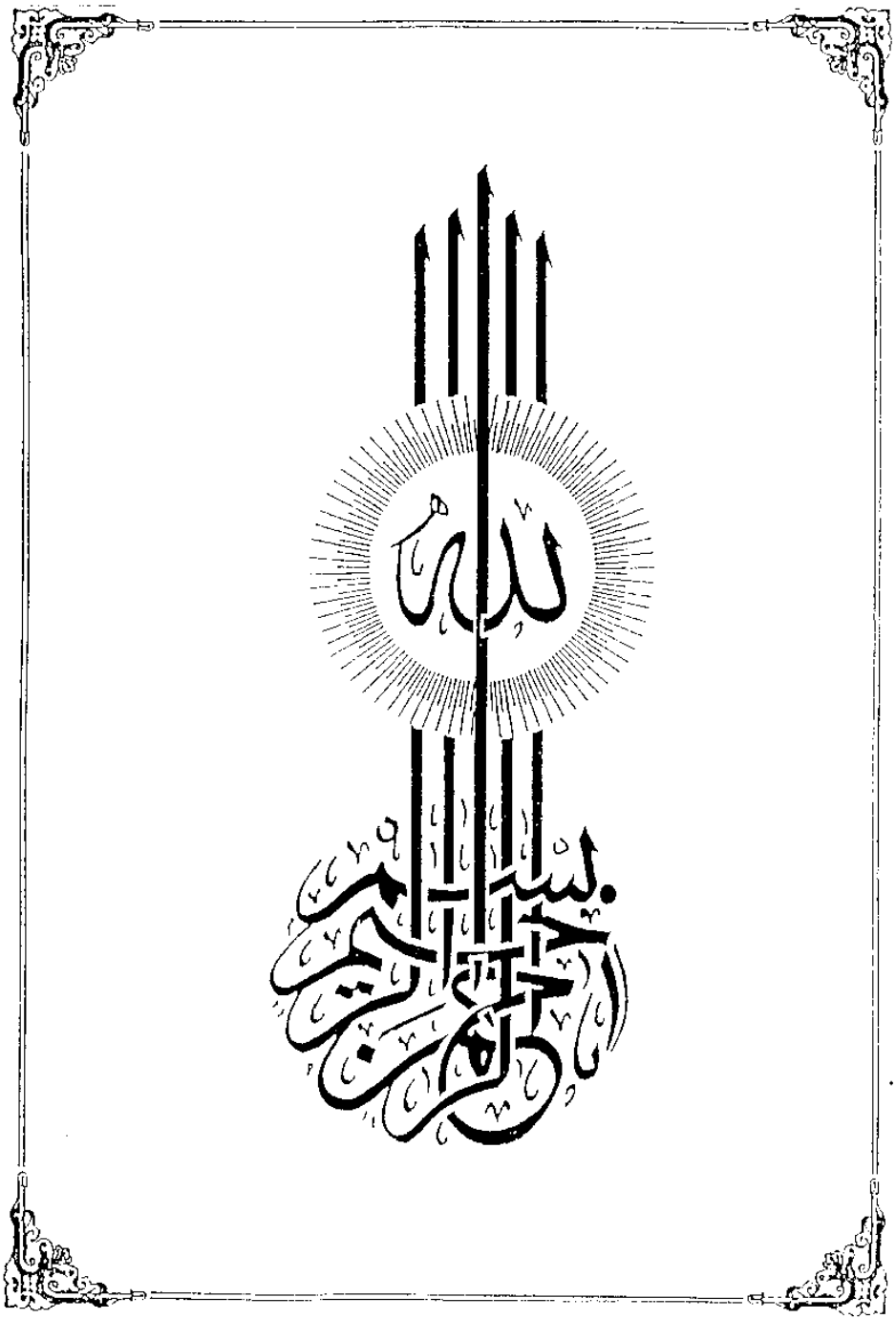
بسم الله الرحمن الرحيم

" يؤتى الحكمة من يشاء ومن يؤت الحكمة فقد اوتى خيرا كثيرا وما يذكر الا اولوا الالباب . "

(البقرة اية ٢٦٩)



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CONTENTS

INTRODUCTION

Dyspepsia is an important medical problem. Its causes are numerous and variable. It may occur as a result of disease of the gastrointestinal tract, such as any overt disease in the gall bladder, appendix or colon. In others, the dyspepsia is a manifestation of a disease of another system as seen in the dyspepsia in cases of cardiac failure or of chronic renal failure.

Non-ulcer dyspepsia is a prevalent disorder in the geriatric group. Large numbers of elderly patients with non-ulcer dyspepsia "NUD" come to hospital, and often, in spite of appropriate examination no clear etiologic explanations for the patients complaints are established.

Chronic gastritis is a frequent finding in patients with NUD, but its diagnosis by gastroscopy is unsatisfactory. The gastric biopsy offered a new mean of obtaining informations about the gastric mucosa in NUD.

Aim of Work:

The chief purpose of this work is to try to achieve an accurate knowledge on the state of the stomach in non-ulcer dyspepsia in geriatrics as based on endoscopical, pathological examination and changes in basal acid secretion.

This work may throw further light on the relationship between pathophysiological changes of the stomach and the prevalence of NUD in geriatrics.

ANATOMY OF THE STOMACH

The stomach is the most expanded part of the alimentary canal. It is located in the left upper abdomen, in the left hypochondriac, epigastric and umbilical regions. The normal stomach varies considerably in size, shape and position depending upon body build and posture, volume of gastric content and relation to neighbouring organs. When filled , its longitudinal measurement is from 25 to 30 cm and its greatest transverse diameter between the curvatures about 12 cm. The capacity of the average stomach varies from 1 to 1.5 liters. (Wein-Shelbaum 1974). The stomach surface areas are about 850 cm^2 in men and 760 cm^2 in women (Cox 1952).

The stomach communicates with the oesophageal lumen via the cardiac orifice which is situated to the left of the midline opposite the 10th thoracic vertebra. At its lower end the gastric lumen communicates with the duodenum through the pyloric orifice which lies to the right of the midline opposite the 1st lumbar vertebra.

Anatomic Divisions: (Wein-Shelbaum 1974).

The stomach is usually divided into: Cardia, Fundus, body, antrum and pylorus.

1. The cardiac portion is the small segment in the immediate vicinity of the oesophago-gastric junction.

2. The fundus is the part lying above an imaginary horizontal line passing through the oesophago-gastric junction.

3. The body is the large segment between fundus and antrum.

4. The antrum is the distal one third to one fourth of the stomach.

5. The pylorus is the region immediately proximal to the duodenum.

It is difficult to be more precise concerning these subdivisions, except for a thickening of smooth muscle at the pylorus. No consistent gross anatomic features separate them.

The length of the lesser curvature is approximately 12 cm and the greater curvature is 3-5 times as long.

Nerve Supply:

The parasympathetic nerve supply arises from the dorsal vagal nucleus in the floor of the fourth ventricle.

It reaches the stomach via the right and left vagal nerves which continue as the posterior and anterior vagal trunks supplying the posterior and anterior walls of the stomach respectively. The anterior and posterior vagi send branches to the coeliac ganglia.

The sympathetic nerve supply, arises from the spinal nerves, from the 6th to the 10th thoracic nerves. They unite to form the splanchnic nerves which end in the coeliac plexus and coeliac ganglia. Sympathetic fibres reach the stomach with its arterial supply.

The parasympathetic and sympathetic innervation include both efferent (motor, secretory) and afferent fibres (sensory) mediating the visceral sensations of pain, hunger and nausea. (Romanes 1968).

Auerbach's or mesenteric plexus: This plexus is present in the muscular layers and consists of both sympathetic and parasympathetic fibres.

Meissner's plexus: is present in the submucosa and contains both types of fibres. Those plexuses may account for the fairly reasonable functioning of the stomach after complete denervation. (Singh 1968).

HISTOLOGY OF THE STOMACH

Micro-Anatomy of the stomach: (Palmer 1952, Morson et al 1974, Wein-Shelbaum 1974).

The stomach wall is composed of four layers:

I- The serosa: Which is the peritoneal covering of the stomach. It covers its anterior and posterior surfaces and is reflected at the lesser curvature as the lesser omentum and at the greater curvature as the greater omentum.

II- The muscular coat: which is composed of three layers of smooth muscle fibres:

a. The inner oblique layer which is continuous with the circular muscle layer of the oesophagus. It is most thick at the fundus, spreads in a fan shaped manner towards the pylorus and is absent at the lesser curvature.

b. The middle circular layer is a complete layer which is most thick at the pylorus forming the pyloric sphincter which is separated from the circular muscle layer of the duodenum by a fibrous septum.

c. The outer longitudinal layer is continuous with that of the oesophagus above and the duodenum below. It is thicker on the lesser curvature, wider and thinner on the

greater curvature and absent in the middle portion of the anterior and posterior wall of the stomach.

III- The submucosa: Is an areolar coat present between the inner muscular layer and the muscularis mucosa of the glandular layer. It contains blood and lymphatic vessels as well as the Meissner's plexus of nerves. Its loose connective tissue and elastic fibrous structure permits the free movement of the glandular layer when the tonus of the muscular coat changes.

IV- The mucosa or glandular layer: The muscularis mucosa is the muscular part of the glandular layer that lies adjacent to the submucosa. It is composed of two or three layers of interlacing muscle bundles. It keeps by its tone the distortion and irregularity of the mucosal pattern when the stomach is empty. The mucosal surface which faces the lumen of the stomach begins at the cardia by a zigzag line which marks the transition between the stratified epithelium of the oesophagus and the columnar epithelial lining of the stomach.

The superficial lining epithelium is composed of columnar or cylinderical cells, the nucleus of each cell is

single, ovoid and situated near the base. These columnar cells extend deep in the gastric glands.

The lamina propria contains capillaries, a few smooth-muscle cells extending upwards from the muscularies mucosae, fibroblasts and a scattering of mast cells, lymphocytes, plasma cells and eosinophils. Normal gastric mucosa is responsible for transmission of large numbers of normal leucocytes into the gastric lymen. There is some evidence that lymphocyte infiltration increases with age. (Hou 1926, Morson et al 1974).

The gastric glands:

Constitute the essential secretory part of the stomach. Three types of gastric glands can be differentiated:

1. The cardiac glands: which are present in a narrow zone around the cardiac orifice. They are coiled and lined with mucous cells.

2. Fundic, oxyntic or gastric glands: These are present in the fundus and the greater part of the body. They account for 2/3 or 4/5 of the mucosal area. They are straight or branched. Their lumen is Narrow and extends deeper to the muscularis mucosa. They contain 3 types of

cells: mucous neck cells, chief or zymogen cells and parietal cells.

3. Pyloric glands: These occupy the distal fourth of the stomach. Here the foveola are deep extending to half of the thickness of the mucosa, the pyloric glands are thus short and simple or branches tubular. It has been shown that the pyloric glands contain endocrine cells as G-Cells, enterochromaffin (E.C.) cells containing 5-hydroxytryptamine (5-HT) and entero-chromaffin like (ECL) cells that predominate in the oxyntic gland area. (Roland et al 1976; Ham 1969).

The parietal cell:

It is a large pyramidal shaped cell with a base on the basement membrane of the gland, a centrally placed nucleus and a fine granular eosinophilic cytoplasm. A characteristic feature of this cell is its secretory canaliculus. The cytoplasm of the parietal cell is particularly rich in mitochondria.

The chief cell:

It is a cub-shaped cell with a basally situated nucleus and a basophilic cytoplasm, the apical portion of the cytoplasm contains many round and oval zymogen granules.