GASTRIC EMPTYING TIME IN PATIENTS WITH NON ULCER DYSPEPSIA

Thesis

Submitted FOR Partial Fulfilment Of Master Degree in Internal Medicine

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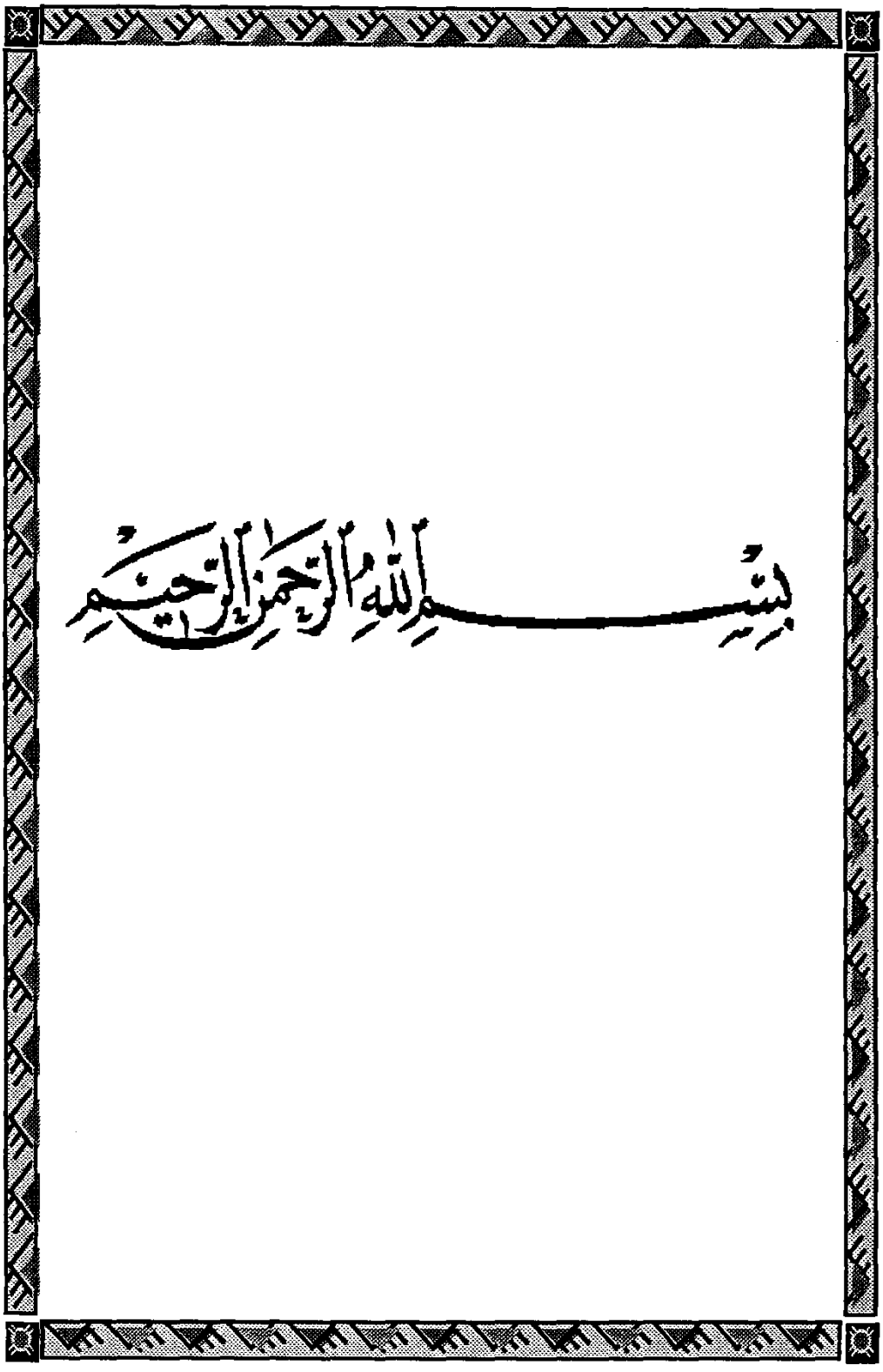
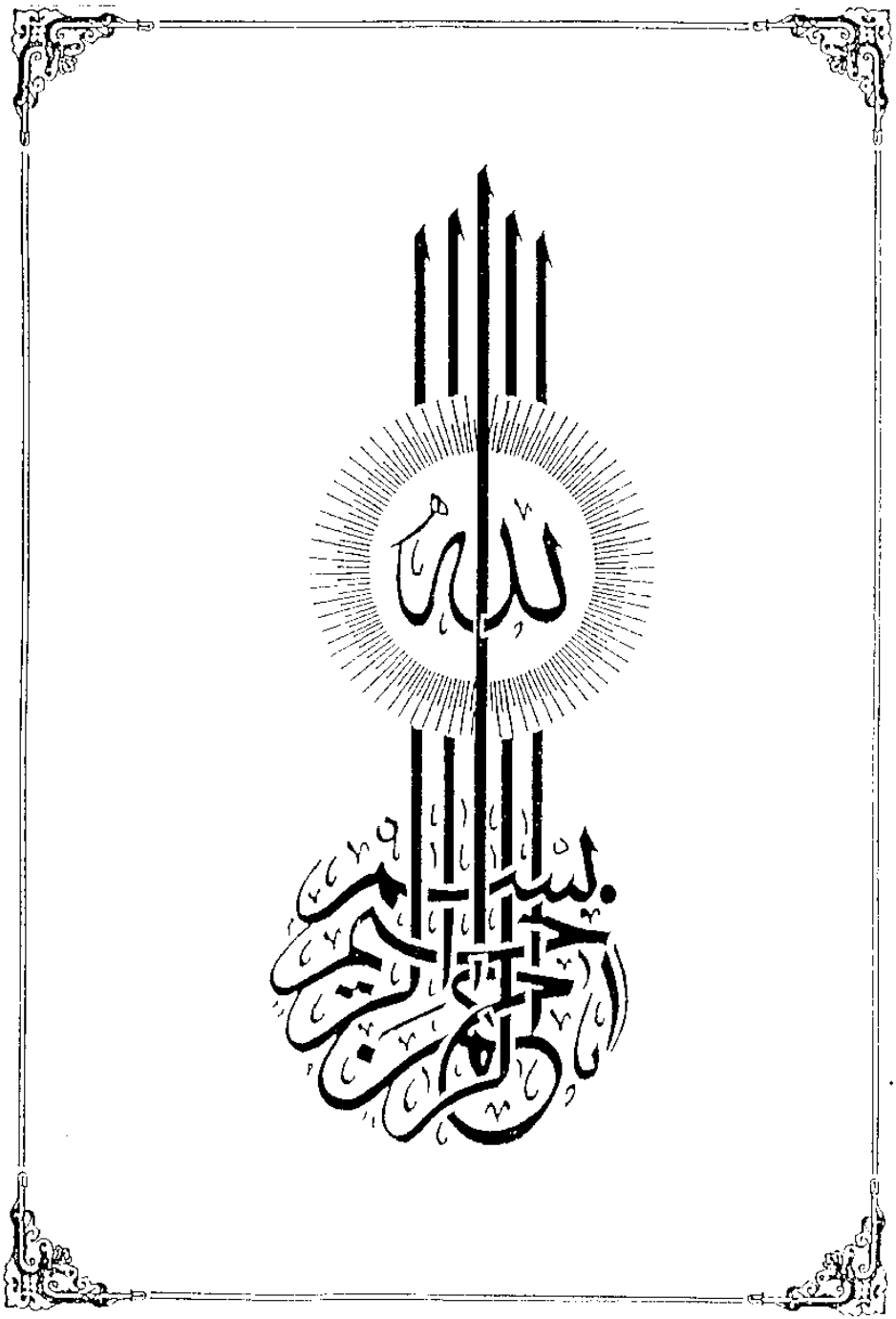
1995





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ACKNOWLEDGEMENT

I would like to express my deep appreciation and thanks to my Prof. Dr. Sohier Sheir professor of internal medicine Faculty of medicine, Ain Shams University for her unlimited support, continuous encouragment and great help.

I'm extremely greatful to my Prof. Dr. Mohsen Maher professor of internal medicine Faculty of medicine Ain Shms University for his help this work could not be possible.

A special gratitude and deep appreciation are acknowledged to Dr. Mohamed A. M. Makhlouf Assistant Professor of internal medicine Aln Shams University for his shiny help and unlimited support.

Finally I would like to express deep appreciation to all my colleagues in the Ultrasound Department. They are always supportive and helpful in performing the Ultrasound examination in this work.

Azza Emam Mohamed

1995

AIMS OF THE WORK

INTRODUCTION AND AIM OF THE WORK

Introduction:-

Non ulcer dyspepsia is one of the commonly used gastro-entrologic diagnosis in out patient care. It is a clinical syndrome defined by upper abdominal symptoms without identifiable cause by conventional diagnostic evaluation. ***(Azpiroz F., 1990).*** These symptoms include upper abdominal pain, discomfort, nausea, vomiting, early satiety, anorexia, post-prandial abdominal bloating and excessive repetitive post-prandial belching. ***(Kellow J. E., 1992).*** This type of symptoms suggest that they might be due to disordered gastroduodenal motility. ***(Waldron B. J., 1990).***

New diagnostic test such as gastrointestinal manometry and gastric emptying studies may help in a better characteriziation of patient with non ulcer dyspepsia by demonstrating specific motor abnormalities such as post-prandial hypomotility and delayed gastric emptying. ***(Azpiroz F., 1990).***

Aim of the work:-

The aim of the work is to study the emptying time in patients with non ulcer dyspepsia and dyspepsia associating an ulcer by real time ultrasonography.

REVIEW OF LITERATURE

ANATOMY OF THE STOMACH

The stomach is the most dilated portion of the gastro-intestinal tract. It is delimited on the upper surface by lower oesophegeal sphincter and on the lower surface by the pylorus. ***(Andre J., P., M. 1992).*** It is J-shaped in most individuals and has a capacity of approximately 1500 ml in adults. However its shape varies with degree of distension and body posture. ***(Kumar D., 1993).***

The stomach has been divided into various anatomical regions which consist of the cardia, fundus, body, antrum and pylorus. There is a notch like indentation known as the incisura angularies on the lesser curvature. The portion or the stomach distal to the incisura is the antrum. The pyloric region has a wide antrum narrowing to a canal 2.5 cm long. The terminal part of which is surrounded by pyloric sphincter. The term pylorus is frequently used to indicate the pyloric canal with its surrounding sphincter. The long axis of the pyloric region runs upward and to the right. ***(Kumar D., 1993).***

Blood and lymph vessels and nerves of the stomach:

The arterial blood supply of the distal oesophegus, stomach and proximal duodenum is largely branches of the coeliac axis through quite variable branches. The normal anatomic relation-ship is present only in 55% of population. ***(Netler F. H., 1975).***

There are four groups of lymph drainage of the stomach:-

1- Region close to the cardiac orifice to the paracardiac lymph nodes.

2- Fundus and body to the pancreatico-splenic lymph nodes.

3- Upper part of pyloric portion to the left gastric lymph nodes.

4- Lower part of pyloric portion to the right gastroepiploic lymph nodes. ***(Mahran Z., 1993).***

*Efferent from all these regional lymph nodes pass to the coeliac group of para aortic lymph nodes. ***(Weinberg S., & Greaney E. N., 1950).***

Nerve supply:-

Sympathetic innervation of the stomach originates from the anteromediolateral column of the 7th, 8th, 9th thoracic roots of spinal card. After travelling the coeliac plexuses they innervate the stomach through the intra mural autonomic nerve plexuses. ***(mallet Guy P. A., 1983).***

Parasympathetic supply of the stomach arises from branches of the anterior and posterior vagal trunks. The vagus nerve may actually form up to five branches or trunks as they enter the abdominal cavity. The terminal vagal fibres to the stomach synapse in the myentric and submucosal plexuses. Post ganglionic fibres from these plexuses are distributed to the muscular tissue and mucous membrane. The pyloric region is supplied by the anterior vagal trunk. ***(Romans G. J., 1981).***

Musculature of the stomach:-

The musculature of the stomach is composed of three layers outer longitudinal-middle circular and inner oblique fibers. The longitudinal fibres are in continuity with the longitudinal muscle of the oesophegus and radiate down-wards from the cardia. At the pylorus they are continuous with the longitudinal fibers of the duodenum. The circular fibers form a uniform layer throughout and lie beneath the longitudinal fibres.

At the pylorus, these fibres form a circular ring which projects into the cavity. The oblique fibres are mainly confined to the greater end of the stomach. Where they descend upon its antenior and posterior surfaces. The presence of a gastric transverse band representing an anatomical separation between the body and the antrum. It has been suggested that band of separation may play a role in the regulation of emptying. ***(Moore J. P., et. al., 1986).***

Pyloric sphincter:-

The pyloric sphincter is a thick band of muscle that separates the stomach from the duodenum. The fibres appear to be continuous with the middle circular layer of the stomach but actually are separated from it by a thin fibro-connective tissue layer. The sphincter actually extends distally into the duodenum for a few millimeters, Causing a redundant fold of duodenal mucosa to over lie its distal end. ***(Daniel E., E., et. al., 1985).***

This redundant mucosa facilitates the closure of the pylorus. Contraction of circular muscle layers close the sphincter while contraction of longitudinal muscle layers open it. ***(Meyer J. H., 1991).***

PHYSIOLOGY OF THE STOMACH

Function of the stomach:-

The stomach has two main functions; a secretory and a motor function. The two functions usually go hand in hand in perfect harmony so that when secretion is stimulated, motility is also augmented. In the fed state, both secretion and motility are increased while in the fasting both are diminished. ***(Abd-El Hamed H., 1994).***

The secretory function of the stomach:-

There are five main cell types responsible for the secretory function of the stomach recognized in the gastric glands.

1- Chief or Zymogen cells secrete pepsinogen which is apo-enzyme that when activated by exposure to acid becomes the potent proteolytic enzyme pepsin. ***(Harschawitz B., 1967).***

2- Parietal or Oxyntic cells present through gastric of the fundus and the copus and they secrete hydrochloric acid at a concentration of 0.16N or 160 MEQ. / L. with pH 0.8, at this Ph the hydrogen ion concentration is about 3 million times that of the arterial blood. ***(Guyton A. C., 1962).***

3- The surface epithelial cells are mucous secreting cells. They line all the gastric mucosa. The mucous neck cells migrate to the surface and mature into surface epithelial cells. They may give rise to cheif or parietal cells and thus may be considered multipotentials.***(Hunt L.E., & Hunt E., 1962).***

4- Argentaffin or Enterochromaffin cells stores 5-hydroxytryptamine and probably important in regulating intestinal motility, vasoactivity and release of substances

such as serotonin, substance P and enkephalin. ***(Solica E., et. al., 1981).***

Another type of cells present are somatostatin D cells which are important inhibitors of many gastrointestinal hormones including gastrin. ***(Larson L. I., et. al., 1979)*** .

5- Gastrin cells (G cells) are pear shaped relatively densely distributed in the pylorus. They have been identified in the duodenum and small intestine and are responsible for secretion of gastrin. ***(Solica E., et. al., 1981).***

Motor function of the stomach :-

Functionally the stomach can be divided into two distinct Portions. The proximal and distal stomach. The proximal stomach includes the fundus and a segment of the body and largely serves as a reservoir. It is electrically silent. ***(Kelly K., 1981).*** And its muscuature exhibits tonic mechanical activity. ***(schulze-Delrieu-K.,& Wall J. P., 1985).*** The proximal stomach muscle produces very little change in muscle tension even when stretched to about twice its lenghth. ***(Schulze-Delrieu-K., & Shirazi S. S., 1981).*** This phenomenon of gastric accomodation is also known as adaptive relaxation. The distal stomach consist of the lower two thirds of the body and antrum and is electrically active and can generate intense peristaltic contractions, It serves as a pump for grinding and emulsifying food and for delivering chyme to the small bowel.

1- Receptive reservoir function :-

The stomach is an expansile reservoir. Swallowing and distension of the oesophagus lead to reflex relaxation of the fundus called receptive relaxation. ***(Cannon W. B., Lieb C., 1912 - Azpiroz F., & Malagelada J. R., 1985 a).*** In the interdigestive state the proximal stomach is tonically contracted all the time to maintain

a positive intrafundic pressure of 5 mm Hg. Slow rhythmic variations in the proximal tone occur at a rate of 1 per minute and are refered to as a tonic contraction. The intrafundic pressure thus oscilates slightly within a narrow range . ***(Abd-El Hamed H., 1994).***

In response to intragastric distension the proximal stomach loses its resting tonicity and actively relaxes to accommodate the food bolus without increasing the intra fundic pressure this process of active relaxation has been called adaptive relaxation and usually lasts 15-30 minutes. This is very important as, if intra fundic pressure rises, the gastric content will enter the small intestine too quickly or if lower oesophageal sphincter is incompetent, they will flow back to the oesophagus. ***(Andrée J., 1993).***

To differentiate between the receptive relaxation which takes a short time and the long lasting adaptive relaxation both kinds of relaxation occur during feeding and complement each other. Receptive relaxation is always maximal but adaptive relaxation varies according to the kind and amount of food. Both are mediated by vagal non adrenergic - non cholinergic fibres so they are abolished by vagotomy. ***(Abd-El Hamed H., 1994).***

2- Digestion and dispersion of food Trituration:-

The break down of food in the stomach involves mechanical and chemical processes. The mechanical digestion occurs through repeated to and fro movement of gastric contents in the distal stomach. ***(Meyer J. H., et. al., 1979).***