EFFECT OF BALLOON PYLOROMYOTOMY ON INTRAGASTRIC PRESSURE FOLLOWING LAPAROSCOPIC SLEEVE GASTRECTOMY

Thesis

Submitted For The Partial Fulfillment Of M.D Degree in General Surgery

By

Ahmad Yahia Ibrahim Abdel Dayem

M.B.,B.Ch (M.Sc)

Under Supervision of

Prof. Dr. Mohammad Essam El Qousy

Professor of General Surgery

Faculty of Medicine

Cairo University

Prof. Dr.Ibrahim Galal Khalifa

Professor of General Surgery

Faculty of Medicine

Cairo University

Dr. Tarek Osama Higazy

lecturer of General Surgery

Faculty of Medicine

Cairo University

Faculty of Medicine

Cairo University

2014

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List of abbreviations:

%EWL ……..……..……..Percent Excess Weight loss.

ASA score ……...……American Society of Anesthesiologists.

BMI ……..…….Body Mass Index.

BPD…….. Biliopancreatic Diversion.

DS…….. Duodenal Switch.

ECG ……..Electrocardiography.

GERD ……..Gastroesophageal Reflux Disease.

LAGB …….Laparoscopic Adjustable Gastric Banding.

LES……. Lower Esophageal Sphincter.

LSG……... Laparoscopic sleeve gastrectomy.

PPI ……..……Proton Pump Inhibitors. .

RYGB……..…….. Roux-en-Y gastric bypass.

SBTT……... Small Bowel Transient Time.

Abstract

Background: Laparoscopic sleeve gastrectomy (LSG) has taken the bariatric surgical scene by storm over the past 5 to 10 years. LSG effectively treats most of the co-morbid medical problems associated with obesity. The one exception is GERD. Patients with GERD experience less resolution of their symptoms after LSG than do patients with LAGB, even when the LABG patients lost less weight overall. **Methods:** pyloric balloon dilatation was done to 20morbidly obese patients undergoing sleeve gastrectomy & the results were compared to another group of 20 LSG patients in which no pyloromyotomy was done. **Results:** the pre operative GERD prevalence was **45%**, and by the end of the study was **80%**, yet the difference was not significant **(*P value= 0.3*).** The incidence of GERD resolution post operative was **5%,** while the new onset GERD cases were **40%**. **Conclusion:** pyloromyotomy has reduced the gastric pressure to an extent that was adequate to relieve heart burn & other symptoms of GERD *but only* in the immediate post operative period, was not sustained for a long period & also it was not enough to prevent staple line leak

Key words: laparoscopy – sleeve gastrectomy – reflux disease - pyloromyotomy

Acknowledgement

First and foremost, thanks to ALLAH, who helped me to achieve this work.

I wish to express my deepest gratitude to Prof. Dr. Essam El Zousy Prof. of General Surgery, Faculty of Medicine, Cairo University to whom I am grateful for his generous cooperation, very close supervision, and valuable advices.

I am greatly indebted to Dr. Ibrahim Galal Khalifa Prof of General Surgery, Faculty of Medicine, Cairo University, for his generous help and support through the work.

I am greatly thankful to Dr. Tarek Osama Higazy Lecturer of General Surgery Faculty of Medicine Cairo University, for his kind observation and precious guidance.

I would like to thank Dr Azar Samir, Dr Amr Ayyad, Dr Mohammad Yahia, Dr Hany Armia & Dr Mohammad Mostafa who helped me so much in this work .

Last but not least, thanks for my great mother, my wife & my sister for the continuous encouragement, emotional support and understanding.

Aim of the study

In the current study, we are studying the addition of a simple procedure during the original sleeve gastrectomy *i.e. balloon dilatation of the pylorus (**pyloromyotomy**)* aiming at reduction of increased intraluminal pressure in gastric tube. This study is concerned mainly by the impact of this procedure on GERD & staple line leak.

Chapter one

Anatomical background

The **stomach** is the most dilated part of the digestive tube, and is situated between the end of the esophagus 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 the diaphragm.

The **shape and position** of the stomach are so greatly modified by changes within itself and in the surrounding viscera that no one form can be described as typical. The chief modifications are determined by

(1) the amount of the stomach contents,

(2) the stage which the digestive process has reached,

(3) the degree of development of the gastric musculature, and

(4) the condition of the adjacent intestines.

It is, however, possible by comparing a series of stomachs to determine certain markings more or less common to all [3].

Lower Esophageal Sphincter (LES):

The lower esophageal sphincter (LES) begins approximately 3 cm cranial to the junction with the stomach. Here the number of muscle fibers of the circular layer of the tubular esophagus increase and superimpose on each other, producing a progressive muscular thickening. This is consistent with the rearrangement of

the muscle bundles across the junction to the stomach. The muscle bundles at the side of the greater gastric curvature change direction to form the oblique gastric sling fibers. Those at the side of the lesser curvature retain their previous horizontal orientation to become the short muscle clasps

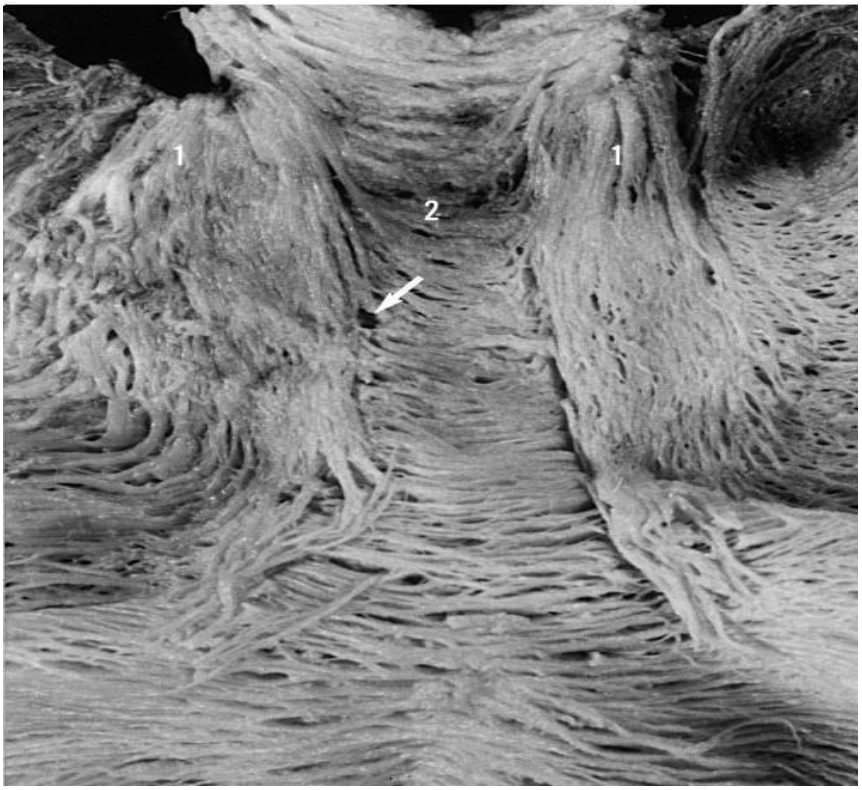

Figure (1): Muscle structures at esophagogastric junction (at lower esophageal sphincter) (view from luminal aspect). Esophagus and stomach opened alongside greater gastric curvature, the sidewalls everted, and mucosa and submucosa stripped off. Muscle fascicles of the gastric sling *(1)* and clasps *(2)* exposed and showing the fascicular relationship [1].

The gastric sling fibers begin at the terminal esophagus, hook around the esophagogastric junction, and form the angle of His. They then run down at the anterior and posterior aspect of the stomach and fan outward in the direction of the greater gastric curvature. There they form slings and end between the fibers of the

inner muscle layer of the gastric antrum. The short bundles on the lesser curve side that Liebermann-Meffert calls clasps anchor firmly in the connective tissue along the inner margin of the sheath of the gastric sling fibers. To some extent, these clasps are suspended from or partly supported by fibers of the gastric sling, **Figure (2)** [1].

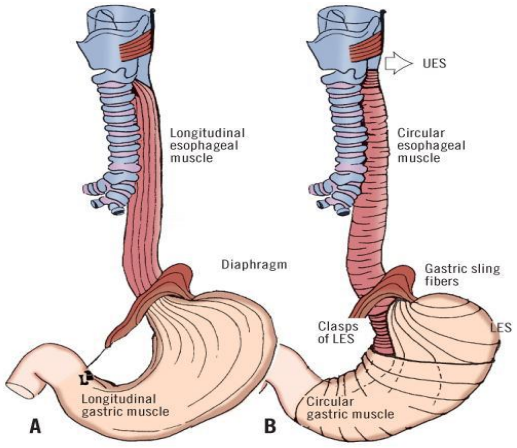

Figure (2): The arrangement and disposition of the musculature of the pharynx, esophagus, and stomach viewed from the left lateral aspect. *UES,* Upper esophageal sphincter; *LES,* Lower esophageal sphincter [1].

The stomach presents two **openings,** two **borders** or **curvatures,** and two **surfaces.**

Openings:

The opening by which the esophagus communicates with the stomach is known as the **cardiac orifice,** and is situated on the left of the middle line at the level of the tenth thoracic vertebra. The short abdominal portion of the esophagus (*antrum cardiacum*) 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 esophagus is continuous with the lesser curvature of the stomach, while the left margin joins the greater curvature at an acute angle, termed the **incisura cardiaca.**

The **pyloric orifice** communicates with the duodenum, and its position is usually indicated on the surface of the stomach by a circular groove, the **duodenopyloric constriction.** This orifice lies to the right of the middle line at the level of the upper border of the first lumbar vertebra.

The wall of the pylorus has a basic layer configuration similar to that of the preceding alimentary canal. From the lumen outwards are mucosa, submucosa, circular muscle, and longitudinal muscle fibres, **figure (3)**. Functionally, the pylorus is not a simple "gate" as its name implies. In the pylorus the two muscle layers are very much more developed. They appear at different stages in embryonic development. The circumferential system appears first when the embryo is at the 23- 41 mm length stage. The longitudinal muscle does not develop until the 41-75 mm stage [2].

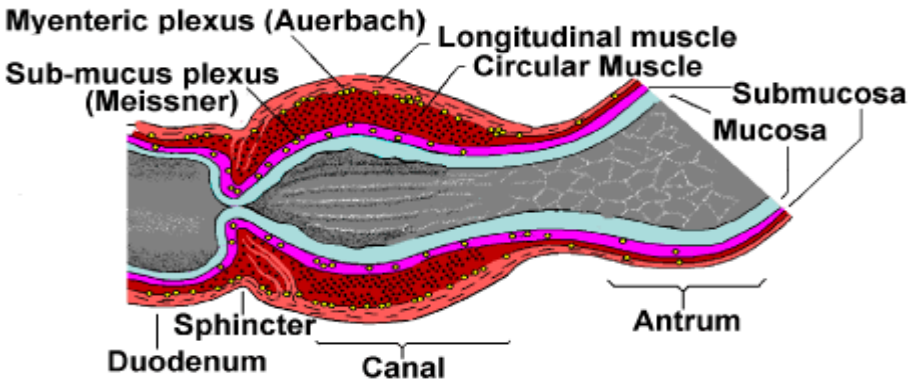

Figure (3): Pyloric physiology. (2).

With further development two neural plexuses appear, the Myenteric Plexus of

Auerbach between the two muscle layers, and the Sub-Mucosal Plexus of Meissner. These are quite complex, the ganglion density in the pyloric region is 10 times that in the middle third of the oesophagus [2]. The Auerbach plexus appears to have a coordinating function, particularly in the sphincter. Fibres from the longitudinal muscle layer extend into the sphincter and provide an active opening action i.e. the sphincter does not just open passively [2].

Curvatures:

The **lesser curvature** (*curvatura ventriculi minor*), extending between the cardiac and pyloric orifices, forms the right or posterior border of the stomach. It descends as a continuation of the right margin of the esophagus in front of the fibers of the right crus of the diaphragm, and then, turning to the right, it crosses the first lumbar vertebra and ends at the pylorus. Nearer its pyloric than its cardiac end is a well-marked notch, the **incisura angularis,** which varies somewhat in position with the state of distension of the viscus; it serves to separate the stomach into a right and a left portion. The lesser curvature gives attachment to the two layers of the hepatogastric ligament, and between these two layers are the left gastric artery and the right gastric branch of the hepatic artery [3].

The **greater curvature** (*curvatura ventriculi major*) is directed mainly forward, and is four or five times as long as the lesser curvature. Starting from the cardiac orifice at the incisura cardiaca, it forms an arch backward, upward, and to the left; the highest point of the convexity is on a level with the sixth left costal cartilage. From this level it may be followed downward and forward, with a slight convexity to the left as low as the cartilage of the ninth rib; it then turns to the right, to the

end of the pylorus. Directly opposite the incisura angularis of the lesser curvature the greater curvature presents a dilatation, which is the left extremity of the **pyloric part;** this dilatation is limited on the right by a slight groove, the **sulcus intermedius,** which is about 2.5 cm, from the duodenopyloric constriction. The portion between the sulcus intermedius and the duodenopyloric constriction is termed the **pyloric antrum.** At its commencement the greater curvature is covered by peritoneum continuous with that covering the front of the organ. The left part of the curvature gives attachment to the gastrolienal ligament, while to its anterior portion are attached the two layers of the greater omentum, separated from each other by the gastroepiploic vessels [3].

Surfaces:

When the stomach is in the contracted condition, its surfaces are directed upward and downward respectively, but when the viscus is distended they are directed forward, and backward. They may therefore be described as anterosuperior and postero-inferior.

Antero-superior Surface

The left half of this surface is in contact with the diaphragm, which separates it from the base of the left lung, the pericardium, and the seventh, eighth, and ninth ribs, and intercostal spaces of the left side. 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 part of this surface.