

Helicobacter Pylori Infection and Sleeve Gastrectomy Complications; are they Related? Local Centre Experience

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ABSTRACT

Background: Laparoscopic sleeve gastrectomy (LSG) has been increasingly considered a definitive surgical procedure for obesity because of its promising midterm data. Half of the world's population is infected with *Helicobacter pylori* (*H. pylori*), and this gram-negative bacterium is the major cause of gastric carcinogenesis and other gastric diseases. The aim of this study is to determine the prevalence of *H. pylori* infection and correlate it with the rate of postoperative complications patients undergoing LSG.

Methods: A prospective randomized study was done on 100 of morbidly obese patients, who had LSG between January 2014 and July 2014, and had their intraoperative excised gastric tissue sent for histopathological assessment. Histopathology reports of the patients who underwent LSG were collected to detect the rate of *H. pylori* infection and if it's related to postoperative complications. **Results:** A total of 100 patients were enrolled. 45 patients (45%) were *H. pylori* positive, while 55 were negative (55%). Mean follow-up was 7.34 months. No intraoperative complications or conversion to open surgery were recorded. No mortality occurred in both groups. Mean operative time was 95.12, Mean hospital stay was 3 with no significant difference between the two groups. A total of 1 (1%) patient was found to have postoperative bleeding, which was in the *H. pylori* positive group. **Conclusion:** *H. pylori* infection seems to be not related to LSG complications, however longer term follow up and larger number of patients will be of value in future studies, to detect the complications in the gastric remnant after LSG.

Keywords: *Helicobacter Pylori*; Sleeve gastrectomy

INTRODUCTION

Obesity has become pandemic, and costs for the treatment of obesity related co-morbidities have dramatically increased worldwide ¹. The medical management of obesity has repeatedly been shown to be ineffective at reducing overall weight and sustaining weight loss in adults and children ^{2,3}. Bariatric surgery has been utilized as a treatment strategy in morbidly obese adults resulting in consistent and sustained weight loss and an overall reduction in obesity related co-morbidities ^{3,4}.

Laparoscopic sleeve gastrectomy (LSG) was initially proposed as a staged approach to biliopancreatic diversion (BPD) with duodenal switch (DS) in high-risk, high-body mass index (BMI) (>50 kg/m²) obese patients ⁵. LSG involves removing a large portion of the stomach, by creating a 150-mL gastric tube, which in turn limits the capacity for food intake. In the past several years, LSG has been increasingly considered a definitive surgical procedure for obesity because of its promising midterm data ⁶.

Half of the world's population is infected with *Helicobacter pylori* (*H. pylori*) ⁷, and this gram-negative bacterium, which colonizes the gastric epithelium, is the major cause of gastric carcinogenesis and other gastric diseases, such as, chronic gastritis, gastroduodenal ulcers, and gastric mucosa associated lymphoid tissue lymphoma ⁸. In fact, *H. pylori* was named a "definite biological carcinogen" by the World Health Organization in 1994 ⁹. The accurate detection of *H. pylori* is essential for managing infected patients and for eradicating the bacteria. Since the discovery of *H. pylori*, several diagnostic methods have been developed for the aim of accurate detection of this organism. These tests include noninvasive method—serology, urea breath test, or stool antigen test—and invasive methods, such as, culture, histological examination, and rapid urease test, which require upper gastrointestinal endoscopy to obtain gastric biopsy samples ^{10,11}.

Even though studies relating *H. pylori* infection and obesity have been inconclusive, a few recent publications suggest that *H. pylori*

might potentiate obesity through its effects on ghrelin and leptin hormone secretions by gastric mucosal cells^{12,13}.

Surface epithelial degeneration is a probable result of direct tissue injury by bacterial products. Auto-destructive products, produced by neutrophil and monocyte activation such as reactive oxygen metabolites and proteases, result in local tissue atrophy. This is followed by pangastritis, multifocal atrophy, and intestinal metaplasia. The latter changes weaken the mucosa and its defenses, predisposing an individual to future peptic ulceration¹⁴. Accordingly, leaks and bleeding post LSG may be attributed to *H. pylori* induced mucosal damage.

H. pylori has also been observed to have effects on vitamin B12 absorption. Because of the superficial gastritis it causes and subsequent glandular atrophy, it has been labeled as the main culprit in patients with cobalamin deficiency^{15,16}, which may be the cause of post LSG vitamin B12 deficiency and neuropathy, which may be prevented by successful *H. pylori* eradication after histological detection in LSG specimens.

The aim of this study is to determine the prevalence of *H. pylori* infection and correlate it with the rate of postoperative complications in obese patients undergoing LSG.

Early diagnosis and subsequent treatment of *H. pylori* infection may prevent gastritis, gastric lymphoma, and carcinoma as well as mid and long term surgical and nutritional complications of LSG.

MATERIALS AND METHODS

A prospective observational study was done on 100 of morbidly obese patients, who had LSG between January 2014 and July 2014, at Kasr Al Aini Hospital, Cairo University, who had their intraoperative excised gastric tissue sent for histopathological assessment.

Inclusion criteria were a body mass index greater than 40 kg/m² or greater than 35 kg/m² associated with relevant comorbidities, failed medical treatment of >5 years, and age 18 – 60 years. Exclusion criteria were contraindications to laparoscopic surgery, a second bariatric operation, previous gastric surgery, giant hiatal hernia, severe gastroesophageal reflux disease, pregnancy, psychiatric disease.

Preoperative examinations included complete blood laboratory tests, electrocardiogram, chest x-ray, pulmonary function test and abdominopelvic ultrasound scan. Informed consent was obtained before the operation. Early and late complications were recorded. Early complications were those occurring during the first 30 postoperative days, and late complications were later on.

For the purpose of this study, the gastric histopathology reports of the patients who underwent LSG were collected; postoperative recovery course, complications, outpatient clinic follow-up, and readmissions were all recorded, if any. Statistical analysis of the data was carried out using SPSS software version 18.0.

Surgical technique:

As mentioned earlier the operation was performed laparoscopically. After pneumoperitoneum induction at a 15 mmHg value by a Veress needle, five trocars were introduced. Dissection of gastric greater curvature started at 3 cm from the pylorus and was conducted upwards until the angle of His by means of Ligasure (Covidien, Mansfield, MA). Resection of the stomach was performed by Echelon 60 Endopath (Ethicon Endo- Surgery, Cincinnati, OH) with green and gold cartridges, under a 36-Fr calibration bougie. Resected stomach was extracted from the abdominal cavity through a dilated 12-mm trocar incision. At the end of operation, a drain was placed alongside the staple line: it was removed generally on 1st postoperative day before discharge. The patients were discharged home with prescription of a 40mg per day oral (Proton Pump Inhibitor) PPI therapy for six months.

Specimen evaluation:

All the sleeve gastrectomy specimens were analysed by the same pathologist who was unaware of clinical information. Biopsy specimens were fixed in 10% formalin and embedded in paraffin.

The sections were subsequently stained with ematoxylin and eosin. Giemsa staining was used to detect the existence of *H. pylori*. Histological grading was based on the Sidney classification¹⁷. Accordingly, the following histopathologic variables were examined on each case: *Helicobacter pylori* density, polymorphonuclear neutrophil activity, degree of chronic inflammation, degree of glandular atrophy, presence of intestinal metaplasia. Each variable

was graded as mild, moderate or severe using Dixon et al. visual analogue scale ¹⁷.

Helicobacter pylori density was grade as none, mild when few microorganism were present, moderate when bacteria were present in separate foci and severe when near complete or complete surface layering with *H.pylori* was observed. Polymorphonuclear neutrophil activity was classified as none, mild when up to two crypts were involved per biopsy, moderate when up to 50% of crypts were involved and severe when more than 50% of crypts were affected. Chronic inflammation was defined as gastric mucosa infiltration by both lymphocytes and plasma cells. It was graded as none, mild when chronic inflammatory cells were scattered, moderate when chronic inflammatory cells infiltrate were diffuse and severe when chronic inflammatory cells were diffuse and dense separating the gastric glands. Glandular atrophy was scored as none, mild, moderate and severe using the visual analogue score. Intestinal metaplasia was graded as none, mild when one focus-up to four crypts- was replaced by intestinal type epithelium, moderate when multiple foci were affected comprising less than 50% of gastric epithelium, and severe when more than 50% of gastric epithelium was replaced by intestinal metaplasia.

RESULTS

A total of 100 patients (76 females, 24 males) were enrolled. Their mean age was 34.81 ± 9.8 years (range 17-62), mean BMI 43.92 ± 4.8 (range 36-55). Forty-five patients (45%) were *H. pylori* positive, while 55 were negative (55%). Mean follow-up was 7.34 ± 2.8 months (range 2-13). Demographic and follow up data are summarized in Table 1. No significant differences were observed between *H. pylori* positive and *H. pylori* negative group in terms of age, sex, weight, BMI and incidence of comorbidities. No intraoperative complications or conversion to open surgery were recorded. No mortality occurred in both groups. Mean operative time was 95.12 ± 16.4 minutes (range 60-130). Mean hospital stay was 3 ± 1.26 days (range 1-6) with no significant difference between the two groups.

A total of 1 (1%) patient was found to have postoperative complications, one case of postoperative bleeding, which was in the *H. pylori* positive group. A conservative treatment was successful. No significant differences were observed in the complications rate between the two groups Table 2

All patients who tested positive for *H.pylori* were treated by triple therapy, started 2 weeks postoperatively, and no repeat testing was done.

Table 1: Demographic and follow up data for the two groups.

Demographic data	All patients (n=100) (100%)	H.pylori positive (n = 45)(45%)	H.pylori negative (n = 55)(55%)	P-value
Gender (n, %)				0.925
Female	76 (76)	34 (75.56)	42 (76.36)	
Male	24 (24)	11 (24.44)	13 (23.64)	
Age (years)				0.671
Mean \pm SD (range)	34.81 ± 9.80 (62-17)	34.33 ± 11.26 (62-17)	35.20 ± 8.52 (55-20)	
BMI (Kg/m ²)				0.527
Mean \pm SD (range)	43.92 ± 4.8 (55-36)	42.96 ± 4.65 (55-36)	43.56 ± 4.90 (55-36)	
Follow up (months)				0.088
Mean \pm SD (range)	7.32 ± 2.75 (13-2)	6.80 ± 2.75 (13-2)	7.75 ± 2.70 (13-2)	

Table 2: Postoperative results of the two groups

<i>postoperative data</i>	<i>All patients (n=100) (100%)</i>	<i>H.pylori positive (n = 45)(45%)</i>	<i>H.pylori negative (n = 55)(55%)</i>	<i>P-value</i>
Operative time (min) Mean ± SD (range)	95.21 ± 16.41 (130-60)	97.47 ± 16.20 (130-60)	93.36 ± 16.50 (130-60)	0.215
Hospital stay (days) Mean ± SD (range)	3.06 ± 1.26 (6-1)	3.04 ± 1.30 (6-1)	3.07 ± 1.25 (6-1)	0.912
Overall morbidity (bleeding) n (%)	1 (1%)	1 (1%)	0 (0%)	0.925

DISCUSSION

It is well established that the health benefits of bariatric surgery extend beyond weight loss^{18,19}. Nonetheless, several lines of evidence suggest that weight loss is an important contributor to the health outcomes associated with bariatric surgery^{20,21}.

Sleeve gastrectomy (SG) is a vertical gastrectomy that leaves a narrow gastric tube along the lesser curvature of the stomach and is first described as a part of a duodenal switch bariatric surgery at 1990⁵. Laparoscopic sleeve gastrectomy (LSG) was subsequently performed by Dr. Gagner and proposed as a stage of a bariatric protocol for high-risk patients to reduce the risk profile of laparoscopic duodenal switch²². However, LSG rapidly became a stand-alone bariatric surgery worldwide because of its simplicity and efficacy²³. Known complications related to stapler line include leakage in 2% and bleeding in 1% of cases. Gastric infection by *H. pylori* is implicated in the pathogenesis of various benign and malignant gastric diseases²⁴. For example, *H. pylori* related gastritis causes approximately 50% of low-grade gastric mucosa-associated lymphoid tissue (MALT) lymphoma. In addition, it is linked to the development of gastric adenocarcinoma through chronic gastritis progressing to premalignant lesions namely intestinal metaplasia and dysplasia that eventually culminate in malignant transformation²⁵.

While different trials have investigated the correlation between *H.pylori* infection and morbid obesity with contradictory results²⁶⁻²⁹, a few articles have been published dealing with the influence of *H.pylori* on postoperative outcome of laparoscopic bariatric surgery. Recently, another three studies³⁰⁻³² investigated the role of *H.pylori* on postoperative outcome of sleeve gastrectomy.

In a study done by Albawardi et al.³⁰ who examined specimens of 89 sleeve gastrectomy specimens, and found 44% infection rate with *H.ylori* among Emirati population, and although they had a higher complication rate (8%) compared to our results, they found no correlation between *H.pylrori* infection and post SG complications, which is similar to our conclusion.

In a similar recent study conducted by Rossetti et al³² who examined 184 gastric specimens of morbidly obese patients who had SG, and recorded an infection rate lower than ours 39.1%, he had a complication rate of 2.7%, and found no correlation between the complications and *H.pylori* infection, which is similar to our study results.

Many factors can affect the rate of postoperative complications. Some are related to the technique of the operation, the type of staplers and the use of reinforcement³³.

Our results support the evidences emerged from the literature as no correlation was documented between *H. pylori* and occurrence of postoperative complications, which was one case of bleeding in our study and was managed conservatively with complete recovery. No complications were detected in the patients of both groups, during the follow up period which extended up to 13 months.

Performing routine oesophagogastroduodenoscopy for LSG patients is still controversial, especially in the absence of any upper gastrointestinal symptoms, although it may be of value for detection of hiatal hernia and *H. pylori* infection, and subsequently eradication preoperatively.

Although, no correlation was found in our study between *H. pylori* infection and post LSG complications, we recommend routine check for *H. pylori* infection in LSG specimens and

eradication of infection, to avoid future possible serious complication of *H. pylori* infection in gastric remnants.

Longer term follow up and larger number of patients will be of value in the future studies, to detect the incidence of *H. Pylori* related complications in the gastric remnants after LSG.

CONCLUSION

H. pylori infection seems to be not related to LSG complications, however longer term follow up and larger number of patients will be of value in future studies, to detect the complications in the gastric remnant after LSG.

Conflict of Interest: The authors declare that they have no conflict of interest.

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