

Helicobacter pylori and Endoscopic Alterations in Severely Obese Patients Who Have Been Scheduled for Bariatric Surgery

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Abstract

When the only effective therapeutic intervention for severely obese patients is bariatric surgery, the most frequently used method is a Roux-en-Y gastric bypass (RYGB). *Helicobacter pylori* (*H. pylori*) is the cause of most peptic ulcers and gastric cancers. Many experts recommend routine investigation and eradication of the infection before RYGB. The prevalence of *H. pylori* and endoscopic alterations among patients scheduled for RYGB had not been studied before in our environment, so we decided to conduct this research.

Materials and methods: Severely obese adult patients with no gastric symptoms who were scheduled for RYGB and preoperative upper endoscopy were included in this study.

Results: From March 2007 to July 2014, 83 patients were included. 87.95% were women. Mean age was 46.9 +/- 11.4 years (17-62 years). *H. pylori* was found in 57.83% (95% CI 47.09 - 66.96%) which is similar to the percentage of infections found in people who are not obese. 60% had some degree of erosive esophagitis including esophageal varices in two patients, and GIST in one patient. None had severe atrophy (OLGA III or IV).

Conclusion: All patients had some alterations found during endoscopy. Two patients had esophageal varices. The prevalence of *H. pylori* is similar to that among people who are not obese. Routine upper endoscopy is recommended for all patients prior to RYGB.

Keywords

Helicobacter, obesity, bariatric surgery, chronic gastritis.

INTRODUCTION

Today obesity is a serious public health problem worldwide. One third of the population of the United States is obese (Body mass index (BMI) greater or equal to 30 kg/m²) (1, 2). In 2007, 46% of the adult population of Colombia was overweight and approximately 14% was obese (3). Obesity is associated with increased morbidity and mortality due to multiple causes including cardiovascular disease, cancer and liver diseases (4). Dietary management and exercise can induce weight loss of 5% to 10% in patients with severe obesity. Although achieving this level of weight loss has favorable impacts on metabolic and cardiac comorbidities (5), the benefits are not durable. Consequently, the best

option for this group of patients is bariatric surgery (BS) which has greater efficiency and more durable benefits (6). The conference Consensus from the National Institutes of Health in the United States on gastrointestinal surgery for severe obesity says that the BS is indicated for patients with BMIs greater than or equal to 40 and for patients with BMIs greater than or equal to 35 if there are comorbidities such as impaired glucose tolerance, type 2 diabetes, hypertension or dyslipidemia sleep apnea (7). Since *H. pylori* has important effects on gastric endocrine including decreased production of ghrelin that causes loss of appetite (8), it had been thought that this organism may protect against obesity (9). Nevertheless, the lower rate of expression of ghrelin mRNA in individuals infected with *H. pylori* com-

pared with uninfected individuals has other implications (10). This hormone has anti-inflammatory and anti-apoptotic properties which protect the gastric mucosa. When its expression decreases, inflammation gastric glandular atrophy occur, especially in the gastric body. Eradication of *H. pylori* restores the protective effect of this substance (10).

Decreasing rates of *H. pylori* infection and a parallel increase in obesity have been found in developed countries in recent decades suggesting a causal association (11). *H. pylori* is clearly associated with peptic ulcers, gastric MALT and gastric cancer (GC) (12). Because of these potential consequences, some experts recommend routinely checking for the bacteria and eradicating the infection before performance of BS (13-15). Furthermore it has been found that eradication marginally decreases the incidence of ulcers in these patients from 6.8% to 2.6% (15). Nevertheless, preoperative upper endoscopy is controversial among surgeons. Some routinely recommend it before performing bariatric surgery especially when the type of surgery such as gastric bypass with Roux en Y reconstruction prevents the possibility of follow-up direct endoscopic examination of the stomach and duodenum (16). In these cases upper endoscopy also serves to rule out conditions such as esophagitis or peptic ulcers that might prevent or postpone surgery.

Although long-term benefits from this course of action have not been demonstrated (17), some authors believe that preoperative upper endoscopy is cost-effective (18). The most recent joint guidelines of the American Association of Endocrinology, American Obesity Society and American Society for Bariatric Surgery is unclear with respect to preoperative investigation of *H. pylori*. It says that it should be considered in areas of high prevalence of infection (19). In Colombia it has been found that between 77% and 83% of the adult population suffers from *H. pylori* infections (20-22). To date there are no studies in our country that specifically investigate the prevalence of asymptomatic *H. pylori* in severely obese people nor have endoscopic abnormalities in these patients been investigated.

Keeping all of this in mind together with the steadily increasing performance of bariatric surgery worldwide and here in Colombia (6) and with the characteristics of Roux en Y anastomosis that leaves 90% of the stomach hidden and inaccessible to routine endoscopic examination, we decided to undertake this study. Upper gastrointestinal endoscopy was routinely performed on patients without gastrointestinal symptoms who were scheduled for Roux en Y anastomosis. The first objective of this study was to determine the prevalence of *H. pylori* in obese, asymptomatic patients and compare it with the prevalence of *H.*

pylori in a control group of patients. The control group consisted of patients who were not obese who were recruited through a trial with *H. pylori* eradication therapies. The second objective was to establish endoscopic and histological findings from the patients in the study.

MATERIALS AND METHODS

The study was conducted in the Gastroenterology and Endoscopy Unit of the Clínica Fundadores in Bogotá, Colombia. This is a retrospective study involving severely obese patients (BMI greater than or equal to 40) who had been scheduled for Roux en Y anastomosis. These patients characteristically had no upper gastrointestinal symptoms but were referred for routine preoperative upper endoscopy to verify patients' histories prior to the procedure.

Exclusion Criteria

Patients were excluded from the study if the endoscopy was incomplete or if a histopathological study was not available. Patients were also excluded if they had upper gastrointestinal symptoms such as dyspepsia, gastroesophageal reflux, dysphagia, melena, or hematemesis or if they had previously undergone upper endoscopy or *H. pylori* eradication therapy.

An Olympus endoscope 160 was used to perform upper endoscopy. Patients were required to fast for at least eight hours prior to the procedure. Procedures were performed with patients in the left lateral position in the usual manner (23). All examinations were scheduled without sedation. If a patient could not tolerate the procedure, the procedure was rescheduled with sedation which always administered by an anesthesiologist in the endoscopy suite. Patients were sedated with 0.5mg/kg propofol and 0.5 micrograms/kg of remifentanyl. Patients' vital signs and pulse oximetry were constantly monitored. Two ten to twenty mg doses of aerosol lidocaine were administered to all patients. At least four biopsy samples were taken during each procedure. One sample was taken from the upper curve of the antrum two cm from the pylorus, and one from the lower curve two cm from the pylorus. Another sample was taken from the anterior wall of the proximal corpus, and another from the posterior wall of the proximal corpus. A final biopsy sample was taken from the angular incisure. Biopsies were immersed in 2% formalin. Each sample was placed in a separate vial and properly marked.

Hematoxylin and eosin was used for histological evaluation. If no polymorphonuclear leukocytes or *H. pylori* cells were identified, Giemsa stain was also used. Identification of *H. pylori* cells with a rapid urease test produced in-house

according to established recommendations was used to diagnosis the infection (24). The test has a sensitivity of 95% and a specificity of 100 % as determined by our previous study (25). *H. pylori* infections had already been studied with the same method in a cohort of 300 patients who were not obese who had been recruited for a study to eradicate the micro-organism (26). Atrophy was assessed with the OLGA (Operative Link for Gastritis Assessment) system (27). Esophagitis was classified according to the Los Angeles classification (28). This study is listed as an investigation without risk according to Resolution 08430 of 1993 of the Ministry of Health of Colombia because it is a retrospective study which reviewed data from clinical records and therefore does not require written informed consent. The protocol was approved by the ethics committee of the Clínica Fundadores.

Statistical Analysis

Data was entered into Excel 2010 and calculations were performed using Stata 2013. The study variables were analyzed with descriptive statistics. Nominal and ordinal categorical variables were analyzed using frequency distributions and percentages. Numerical variables were expressed as measures of central tendency and dispersion. Continuous variables were expressed as frequencies and averages.

RESULTS

The study period was March 2007 to July 2014. Eighty-three patients were identified from our database. Of these, 73 (87.95%) were women. The average age was 46.9 +/- 11.4 with an age range from 17 to 62 years. The prevalence of *H. pylori* was 57.83% (95% CI: 47.09% to 66.96%). The prevalence of *H. pylori* in the control group was 59.5% (95% CI: 54.7% to 64.4%).

Patients in the study population had the following comorbidities: twelve patients (14.45%) had diabetes mellitus, sixty patients (72.28%) had arterial hypertension, sixty-three patients (75.9%) had high aminotransferase levels (1.5 times the upper limits of normal of 20 U/L for women and 30U/L for men), and all patients were diagnosed with fatty liver disease by ultrasound. Seventy patients (84%) underwent endoscopy without sedation. Chronic gastritis was found in all patients. Fifty-five patients (66%) were assessed with OLGA. Of these 15 were grade 0, 36 were grade I, and four were grade II. No patients were grade III or IV.

Two patients were found to have esophageal varices: one large varice was found in a 51 year old patient, and small varices were found in a 49 year old patient. Subsequent

studies showed that both had Child A cirrhosis and diabetes mellitus Type 2. Neither had any history of alcohol or drug use that cause cirrhosis (amiodarone, methotrexate or naturopathic medicine). Other etiologies were ruled out. Both patients tested negative for surface antigen of hepatitis B and anti-hepatitis C, and both tested normal for ferrokinetics, ceruloplasmin, and alpha-1 antitrypsin.

We concluded that the etiologies of their cirrhosis were NAFLD/NASH secondary to obesity and diabetes.

Esophageal candidiasis was found in two diabetic patients. One patient had a subepithelial elevation of 10 mm in the gastric antrum. EUS showed that it originated in the second layer (muscularis mucosae). This lesion was resected endoscopically without complications using the injecting and cut method (29). The pathology was reported to be GIST (gastrointestinal stromal tumor). No patients had any malignant lesions or Barrett's esophagus. The main demographic characteristics and endoscopic and histopathological findings are shown in Tables 1 and 2.

Table 1. Characteristics of patients and findings

Patients	n = 83
Age (years)	46±11.4
Age Range (years)	17-68
Sex	
Female	73 (87.95%)
Male	10 (12.05%)
Helicobacter pylori	
Positive	48 (57.83%); CI 95%: 47.09-66.96
Endoscopic Findings	83 (100%)
Erosive esophagitis	50 (60.24%)
Grade A	40 (48.19%)
Grade B	7 (8.43%)
Grade C	2 (2.41%)
Grade D	1 (1.2%)
Hiatal Hernia	46 (55.4%)
Chronic Gastritis	83 (100%)
Erosive Gastritis	16 (19.28%)
Elevated cardia (hyperplastic polyp histology)	3 (3.61%)
Edematous Gastric Fold	12 (14.46%)
Esophageal candidiasis	2 (2.41%)
Duodenal ulcer	3 (3.61%)
Erosive duodenitis	6 (7.23%)
Esophageal varices	2 (2.44%)
Subepithelial Gastric Elevation	1 (1.2%)
Gastric Polyps (hyperplastic histology)	7 (8.43%)
Very Small Duodenal Polyps (<5mm, histology: adenomatous)	1 (1.2%)

Table 2. Severity of chronic gastritis according to OLGA

	0	I	II	III	IV
OLGA	27,27%	65,45%	7,2%	0	0
N = 55	15	36	4	0	0

DISCUSSION

Abnormalities were found endoscopically in all patients in this study. Chronic gastritis was universal (100%). *H. pylori* was detected in 57.83% (95% CI: 47.09% to 66.96%). Similarly, 59.5% (95% CI 54.7-64.4%) of the control group patients had *H. pylori* infections. They were not obese and were part of the cohort of patients recruited to an *H. pylori* eradication therapy study (26). Although this study was not conducted to test the hypothesis that the absence of *H. pylori* infection predisposes people to obesity, our findings are contrary to that hypothesis. We found that the prevalence of *H. pylori* in severely obese patients was similar to that found in non-obese patients even though according to the hypothesis it should theoretically be less common in such patients (9, 11). The prevalence of infection differs from that found in other studies. A German study found a prevalence of 8.7% (30), a Brazilian study found 53% (31), and a Saudi Arabian study found a prevalence of 85.5% (32). These differences probably reflect the local epidemiology of the infection.

Considering that more than half of the patients in this study had *H. pylori* infections, that 15% to 18% of those infected with this microorganism have stomach ulcers which are benign gastric pathologies, that 1% to 3% of those infected have adenocarcinoma which is malignant (12), and that endoscopic examination of the stomach is excluded for the remainder of the lives of patients who undergo Roux en Y Anastomosis, it seems appropriate to endoscopically exam these patients to make sure the infection is eradicated before the completion of the anastomosis. In addition, the finding of mild OLGA scores in all patients analyzed implies that eradication of the organism before advanced lesions such as atrophy and/or intestinal metaplasia develop could significantly reduce the risk of intestinal type gastric cancer (33). Although the probability for GC developing in patients after performance of Roux en Y Anastomosis has not been established, it has been reported. Moreover, a recent systematic review of studies of patients who had undergone bariatric surgery with mean follow up of 8.5 years has discussed esophageal gastric cancers found during follow-up (34). In that review there were eight patients who developed gastric cancers after undergoing Roux en Y Anastomosis. Three occurred in the gastric reservoir and five occurred in the excluded stomach.

Although obesity is a risk factor for GC (35), *H. pylori* is the main cause of GC (12). Another benefit of *H. pylori* eradication for patients who undergo Roux en Y anastomosis is the lower incidence of perforations of the viscera (36) and the lower incidence of postoperative marginal ulcers although other studies have not found this association, (15, 37). Our study found erosive esophagitis in 48% of the patients which is less than the 66.6% found by Zeni et al (38). Nevertheless, our patients were asymptomatic. In a study of patients scheduled for vertical banded gastroplasty (VGB), preoperative upper endoscopy found erosive esophagitis in 31% of the patients of whom the majority (nearly 70%) were asymptomatic (39). The prevalence of erosive esophagitis found in this study seems high when one considers that among patients with reflux symptoms in Latin America, without discriminating according to BMI, the prevalence of erosive esophagitis was 35% to 47% (40). Eighty percent of our patients had Grade A esophagitis, three patients had severe esophagitis: two were Grade C and one was Grade D. Hiatal hernias were found in 55% of this population. The high prevalence of erosive esophagitis and hiatal hernias in this study of severely obese patients is consistent with the increased risk of reflux disease in obese patients as has been found in various studies (41, 42). It has also been documented that patients whose BMIs are over 20 have a risk of hiatal hernia of 4.2 % (95% CI: 2.4 to 7.6) (42). Nevertheless, the importance of preoperative diagnosis of esophagitis and hiatal hernias is minimal since they do not contraindicate Roux en Y anastomosis (43). The finding of esophageal varices with subsequent diagnosis of cirrhosis highlights the importance of preoperative upper endoscopy, especially if the patient also has diabetes mellitus. It has been known many years that cirrhosis is a complication that can occur among obese and diabetic patients. An estimated 15% of these patients develop NASH and cirrhosis patients. It has also been documented that 5% of severely obese patients who undergo bariatric surgery have cirrhosis (44).

The finding of varices that prompted the investigation that culminated in the diagnosis of cirrhosis allowed early diagnosis since it is currently unclear whether Roux en Y anastomosis can complicate cirrhosis (45). Still, joint guidelines on bariatric surgery considered that it can worsen the entity (19). Recently it has been found that both Roux en Y anastomosis and vertical gastroplasty can be performed without additional complications in carefully selected patients who have cirrhosis (46). Nevertheless, we believe that a preoperative diagnosis of cirrhosis is preferable to finding this pathology accidentally during surgery because when the patient and family are informed about such a finding they can make the final decision about surgery.

Among our research study's weaknesses are its retrospective nature and the lack of postoperative follow-up.

In conclusion, this study found pathologies in all of our patients. Among these were very important esophageal varices in two patients (2.4%) and GIST in one patient. The prevalence of *H. pylori* was similar to that in non-obese population (57% vs 59%). While today potential complications of *H. pylori* in the excluded stomach are unpredictable, considering the low cost of upper endoscopy, its minimal complication rate and the high incidence of GC in our midst, we believe that the upper endoscopy should be routine in patients about to undergo Roux en Y anastomosis. We consider it necessary to continue performing prospective endoscopic studies in patients scheduled for Roux en Y anastomosis.

Conflicts of interest

The authors declare that they have no conflicts of interest. The costs of this research were borne entirely by the researchers.

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