ORIGINAL ARTICLE

Early Effects of *Helicobacter pylori* Infection in Patients Undergoing Bariatric Surgery

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Hypothesis: Following weight loss surgery, many patients initially experience nonspecific foregut symptoms. *Helicobacter pylori* infection of the gastric remnant may be associated with foregut symptoms.

Design: Inception cohort.

Setting: University hospital.

Patients: Ninety-nine consecutive patients being evaluated for weight loss surgery.

Intervention: All patients underwent preoperative esophagogastroduodenoscopy and *H pylori* testing.

Main Outcome Measures: Foregut symptoms were documented at routine post–weight loss surgery follow-up visits.

Results: Preoperatively, 24% of patients tested positive for *H pylori*. Postoperative foregut symptoms were significant in 48% of the *H pylori*–positive group, and 19% of the *H pylori*–negative group ($P=.02$). This increase remained even after controlling for age, sex, preoperative presence of antritis, type of surgery performed, and body mass index (odds ratio, 3.6; 95% confidence interval,1.1-11.8). Patients with prolonged symptoms who tested positive for *H pylori* were given an eradication treatment.

Conclusions: The prevalence of *H pylori* infection in patients undergoing weight loss surgery is high, and a significant proportion of them have postoperative foregut symptoms. Consideration should be given to *H pylori* treatment in these patients.

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THE PREVALENCE OF OBESITY and morbid obesity has been steadily increasing in the United States. Current estimates are that more than 30% of the US adult population has a body mass index (BMI) above 30 kg/m^2, and 5% above 40 kg/m^2.[1] This trend has resulted in an increase in the demand for weight loss surgery; it is estimated that 120 000 procedures were performed in 2003.[2] The majority of procedures are variants of the Roux-en-Y gastric bypass (RYGBP), which leaves a bypassed remnant of stomach in which the activity and function is unknown, and that is inaccessible endoscopically. *Helicobacter pylori* infection is present in 20% to 50% of inhabitants of industrialized countries[3] and is a causative factor in gastroduodenal ulcer disease as well as in gastric cancer.[4-6] The role of *H pylori* infection in the gastric remnant after RYGBP is unknown.

METHODS

All patients undergoing evaluation for weight loss surgery between September 2001 and September 2002 underwent a routine esophagogastroduodenoscopy (EGD) with antral biopsy and *H pylori* testing using a rapid urease method (PyloriTek; Serim Research Corp, Elkart, Ind). Patients who proceeded with weight loss surgery underwent routine postoperative assessments at 1-, 2-, 6-, and 12-month visits. Data were collected retrospectively on patient demographics and postoperative symptoms of nausea, bloating, epigastric pain, food intolerance, and food fear.

Patients with moderate or prolonged foregut symptoms underwent diagnostic studies to exclude common etiologies (eg, biliary abnormalities, anastomotic stricture). Patients with established causes for their foregut symptoms other than *H pylori* were included in the analysis based on symptoms following adequate treatment of the primary cause. Patients with symptoms for longer than 1 month who tested positive for *H pylori* were treated with a 2-week course of clarithromycin, amoxicillin, and lansoprazole. Their clinical course was monitored until resolution of symptoms or identification of a clear etiology. Statistical analysis was performed using statistical software with nonparametric testing for continuous variables, and the Fisher exact test and multivariate logistic regression for categorical variables.

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RESULTS

Ninety-nine consecutive patients underwent routine preoperative endoscopy with antral biopsy; the group comprised 16 men and 83 women. The median age was 40 years (range, 18-66 years), with median BMI 48 kg/m^2 (range, 34-65 kg/m^2). Seventy-six patients underwent weight loss surgery during the study period; weight loss procedures included laparoscopic RYGBP (67) and open gastric bypass (9).

Postoperative follow-up information was available for 74 patients (97%); there were 10 men and 64 women. Median age was 39.5 years (range, 18-66 years) and median BMI was 49 kg/m^2 (range, 34-65 kg/m^2). Median follow-up was 6 months (range, 1-16 months). Twenty-four individuals (24%) tested positive for *H pylori* based on rapid urease testing. Detailed endoscopic findings were available for 79 patients. Fifteen patients had mild to moderate antritis. Only 3 (20%) of the patients with endoscopically identified antritis tested positive for *H pylori*. Conversely, prevalence of antritis was similar between patients testing positive for *H pylori* (13%) and patients who tested negative (16%). None of the patients had any identified gastroduodenal ulcer disease or symptoms and therefore were not offered *H pylori* eradication at the time of endoscopy. Two patients in the *H pylori*–positive group had a stricture of the gastrojejunostomy that required dilatation. Foregut symptoms remained in these patients even after gastrojejunostomy patency was reestablished. Of the 76% of patients who tested negative for *H pylori*, 1 patient had cholelithiasis identified and her foregut symptoms dissipated following cholecystectomy.

Moderate or persistent foregut symptoms were identified in 10 patients (48%) who tested positive for *H pylori*, and 11 patients (19%) who tested negative ($P = .02$, Fisher exact test). Baseline characteristics are presented in the **Table**. The higher incidence of postoperative foregut symptoms remained despite controlling for age, sex, preoperative endoscopically identified antritis, type of surgery performed, and BMI, with multivariate regression yielding an odds ratio of 3.6 (95% confidence interval [CI], 1.1-11.8).

Two of the 10 symptomatic patients who tested positive for *H pylori* had persistent foregut symptoms. Both were given *H pylori* eradication therapy and experienced subsequent resolution of their symptoms.

Baseline Characteristics for Patients With and Without Postoperative Foregut Symptoms

	Patients Positive for *Helicobacter pylori* (n = 21)	Patients Negative for *H pylori* (n = 53)
Median age, y (range)	39 (28-59)	40 (18-66)
Median BMI (range)	49 (34-63)	48 (39-65)
Type of surgery		
Laparoscopic gastric bypass	17	48
Open gastric bypass	4	5
Foregut symptoms, No. (%)	10 (48)	10 (19)*

Abbreviation: BMI, body mass index (calculated as weight in kilograms divided by the square of the height in meters).
*$P = .02$, Fisher exact test.

COMMENT

The number of weight loss surgeries and, in particular, gastric bypass procedures performed is likely to increase in the future, given the trend toward obesity in the United States.[1] It is estimated that in 2003, more than 120 000 such procedures were performed.[2] A large cohort of patients will exist with a gastric remnant whose contribution to gastrointestinal tract function and symptoms is unclear. The *H pylori* infection rate in our study was 24%, falling within the estimates of 20% to 50% prevalence in developed countries.[3] The prevalence in our series is lower than other published results in patients undergoing weight loss surgery, which identified rates of 30% to 67%.[7-9] However, *H pylori* incidences vary depending on age, socioeconomic status, and ethnicity, and reported rates likely mirror the population base at a specific institution. Alterations in immune function associated with obesity have been hypothesized to increase infection rates. The association between *H pylori* infection rates and obesity has only been noted at younger ages, and is perhaps a better marker of social class than BMI at an older age.[10,11]

The association between *H pylori* infection and foregut symptoms can be viewed as a combination of gastroduodenal ulcer disease and/or nonulcer dyspepsia. The former seems unlikely given that the interval between endoscopy (without evidence of gastroduodenal ulcer disease) and symptoms was only 2 to 4 months. Few cases of early duodenal ulcer perforations have been described following gastric bypass, with most occurring postoperatively from several months to years.[12] This suggests that most of these foregut symptoms are likely attributable to nonulcer dyspepsia.

There are several reasons why patients infected with *H pylori* should be treated. First, eradication should decrease the risk of gastroduodenal ulcer disease in the remnant, and thus decrease early postoperative symptoms attributable to ulcers in the patient as well as ulcer complications in the future. Second, there may also be a lower incidence of postoperative marginal ulcers. This has been suggested from the observation of lower marginal ulcers in patients who had screening and preoperative *H pylori* eradication,compared with patients who did not undergo screening.[9] Third, if the majority of symptomatic patients are grouped as having nonulcer dyspepsia, there is evidence of moderate benefit of *H pylori* eradication in this patient population.[13] Fourth, *H pylori* is a class I carcinogen in the development of gastric cancer with odds ratios of 2.0 to 5.9.[5,6] There have thus far only been case reports of gastric cancer occurrence in patients after gastric bypass.[14] However, as this patient population ages, this entity is likely to be more common. Since the endoscopic route for gastric cancer detection is relatively lost, delays in diagnosis and treatment can be expected.

The Maastricht Consensus Report for the management of *H pylori* includes recommendations for *H pylori* eradication therapy in prolonged dyspepsia in adults

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younger than 45 years (test-and-treat approach); first-degree relatives of gastric cancer patients; and concerned patients who request treatment.[15] There has not been any evidence that eradication will offer any benefits to the latter 2 groups. Given these broad recommendations for eradication therapy, it seems reasonable to consider treatment of all patients who test positive for *H pylori* who will be undergoing weight loss surgery where there may be the benefits of lower early postoperative foregut symptoms, as well as reduction in long-term gastroduodenal ulcer disease and gastric cancer incidence.

Helicobacter pylori infection was detected in 25% of patients undergoing weight loss surgery at our institution. This group had a higher incidence of early postoperative foregut symptoms, and eradication should be considered for symptom relief and for lowering the long-term risks of ulcer disease and cancer.

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REFERENCES

1. Flegal KM, Carroll MD, Ogden CL, Johnson CL. Prevalence and trends in obesity among US adults, 1999-2000. *JAMA*. 2002;288:1723-1727.
2. National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases. Working Group on Bariatric Surgery, Executive Summary. May 2002.
3. Suerbaum S, Michetti P. *Helicobacter pylori* infection. *N Engl J Med*. 2002;347:1175-1186.
4. Moayyedi P, Malfertheiner P. *Helicobacter pylori* and nonmalignant disease. *Helicobacter*. 2002;7 Suppl 1:30-36.
5. Eslick GD, Lim LL-Y, Byles JE, Xia HH-X, Talley NJ. Association of *Helicobacter pylori* infection with gastric carcinoma: a meta-analysis. *Am J Gastroenterol*. 1999;94:2373-2379.
6. *Helicobacter* and Cancer Collaborative Group. Gastric cancer and *Helicobacter pylori*: a combined analysis of 12 case control studies nested within prospective cohorts. *Gut*. 2001;49:347-353.
7. Renshaw AA, Rabaza JR, Gonzalez AM, Verdeja J-C. *Helicobacter pylori* infection in patients undergoing gastric bypass surgery for morbid obesity. *Obes Surg*. 2001;11:281-283.
8. Papavramidis ST, Theocharidis AJ, Zaraboukas TG, et al. Upper gastrointestinal endoscopic and histologic findings before and after vertical banded gastroplasty. *Surg Endosc*. 1996;10:825-30.
9. Schirmer B, Erenoglu C, Miller A. Flexible endoscopy in the management of patients undergoing Roux-en-Y gastric bypass. *Obes Surg*. 2002;12:634-8.
10. The EUROGAST Study Group. Epidemiology of, and risk factors for, *Helicobacter pylori* infection among 3194 asymptomatic subjects in 17 populations. *Gut*. 1993;34:1153-4.
11. Kyriazanos ID, Sfiniadakis I, Gizaris V, et al. The incidence of *Helicobacter pylori* infection is not increased among obese young individuals in Greece. *J Clin Gastroenterol*. 2002;34:541-546.
12. Macgregor AMC, Pickens NE, Thoburn EK. Perforated peptic ulcer following gastric bypass for obesity. *Am Surg*. 1999;65:222-225.
13. Moayyedi P, Soo S, Deeks J, et al. Systematic review and economic evaluation of *Helicobacter pylori* eradication treatment for nonulcer dyspepsia. *BMJ*. 2000;321:659-664.
14. Lord RV, Edwards PD, Coleman MJ. Gastric cancer in the bypassed segment after operation for morbid obesity. *Aust N Z J Surg*. 1997;67:580-582.
15. Malfertheiner P, Megraud F, O'Morain C, et al, the European *Helicobacter Pylori* Study Group. Current concepts in the management of *Helicobacter pylori* infection,the Maastricht 2-2000 Consensus Report. *Aliment Pharmacol Ther*. 2002;16:167-180.

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