

Is *Helicobacter Pylori* Associated with an Increased Complication Rate after Sleeve Gastrectomy?

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Introduction: Few studies have reported the prevalence and consequences of infection with *Helicobacter pylori* among obese patients undergoing sleeve gastrectomy. This study reviewed whether infection with *H. pylori* has any association with postoperative complications. This study also examined whether there was any difference in postoperative percent excess weight loss (%EWL).

Materials and Methods: In this retrospective study, the pathology reports of 400 patients who underwent sleeve gastrectomy between 2008 and 2013 at the authors' institution were reviewed. Data examined included the demographics, perioperative and postoperative complications, and %EWL in the follow-up period.

Results: In 68 of 400 patients (17%), *H. pylori* was positive in the specimen. In the *H. pylori* negative group, 332 patients were eligible for follow-up. No perioperative and postoperative (30 days) complications were registered in the *H. pylori* positive group. There was one postoperative leak in the *H. pylori* negative group. No other complications were reported in patients during the 36 months follow-up. There were no significant differences between groups in terms of %EWL during postoperative follow-up.

Conclusions: In this study, the prevalence of *H. pylori* infection among sleeve gastrectomy patient was 17%. *H. pylori* did not seem to have any influence on postoperative outcomes or %EWL. *H. pylori* did not increase perioperative complications.

Introduction

SLEEVE GASTRECTOMY (SG) has already proved to be a safe and feasible procedure with good postoperative results and improvement in comorbidities.¹ *Helicobacter pylori* infection has been associated with several pathologic changes such as gastritis and ulcers, and has also been implicated in gastric malignancies such as mucosa-associated lymphoid tissue (MALT) lymphoma.²⁻⁴

The prevalence of *H. pylori* infection is 30–50% in the United States.⁵ Among bariatric surgery patients tested preoperatively, studies report a prevalence ranging from 20% to 50%.^{6,7} Understanding the effects of *H. pylori* infection, specifically among the obese population, is of utmost importance. However, there have been few reported studies that have tried to link postoperative complications with *H. pylori* infection.^{6,7}

The purpose of this study was to analyze the prevalence of infection in the patient population (reported in the histology examination from the gastric specimen), and whether there was any association with postoperative complications (gastritis, ulcers, leaks) after minimally invasive SG and the presence of *H. pylori*. Secondarily, the authors also examined

whether there was any difference in outcome related to postoperative percent excess weight loss (%EWL).

Material and Methods

This study was a retrospective review of a prospectively maintained database with 400 patients who underwent a minimally invasive SG—either laparoscopic or robot assisted—at the University of Illinois Hospital and Health Sciences System between January 2008 and December 2013. This study was conducted under Institutional Review Board approval.

All patients met the standard eligibility criteria for bariatric surgery. Specifically, following the National Institutes of Health, patients had a body mass index (BMI) > 35 kg/m² with weight loss recalcitrant to nonsurgical measures with two or more comorbidities, or had a BMI ≥ 40 kg/m² without comorbidities.⁸ All patients received a medical supervised diet and formal psychological evaluation to assess commitment and potential for adherence.

The following variables were obtained from the electronic medical records obtained from University of Illinois Hospital

TABLE 1. PREOPERATIVE PATIENT DEMOGRAPHICS AND COMORBIDITIES (N=400)

	<i>Helicobacter pylori</i> positive	<i>H. pylori</i> negative	p-Value
Gender (female)	59	271	0.428
Gender (male)	9	61	0.428
Age in years	42.4 (SD 10.2)	41.3 (SD 10.8)	0.437
Initial BMI in kg/m ²	51.5 (SD 8.2)	50.6 (SD 8.6)	0.446
Diabetes	20 (29.4%)	122 (36.0%)	0.299
Hypertension	32 (47.1%)	175 (51.3%)	0.521
Dyslipidemia	18 (26.5%)	103 (30.5%)	0.510
GERD	9 (15.3%)	80 (25.6%)	0.087
Sleep apnea	24 (35.3%)	108 (32.0%)	0.591
Tobacco	2 (2.9%)	8 (2.4%)	0.78

BMI, body mass index; GERD, gastroesophageal reflux disease; SD, standard deviation.

and Health Sciences System: age, gender, height, weight, BMI, operative time, length of hospitalization, peri- and postoperative complications, *Helicobacter pylori* test via specimen, and %EWL at 6, 12, 24, 36, and > 36 months. Data on comorbidities such as hypertension, type 2 diabetes, gastroesophageal reflux disease (GERD), dyslipidemia, and sleep apnea were also obtained. Patients were divided in two groups regarding the *H. pylori* testing. Statistical analysis was performed to determine differences between both groups regarding preoperative BMI, peri- and postoperative complications, length of stay, and %EWL at the aforementioned time intervals.

Preoperative evaluation

Patients received a preoperative evaluation by a bariatrician, a medically supervised diet, and a psychological examination. Subsequently, patients were also assessed by the bariatric surgery team to determine eligibility and potential complications. The preoperative evaluation includes a barium swallow test mainly to address anatomy and to rule out large hiatal hernia, large polyps, severe GERD, gastric pathology, and tumors. The preoperative evaluation does not routinely include endoscopy or *H. pylori* serology.

Intraoperative management

Standard antibiotic and antithrombotic prophylaxis were provided. Either laparoscopic or robotic-assisted SGs were performed.

Postoperative management

Patients started ambulation a few hours after the procedure. On postoperative day 1, an oral tolerance trial was

performed with most patients being discharged on postoperative day 2. A postoperative barium swallow test was not routinely performed. In some patients, a barium swallow was used if patients complained of intractable nausea or vomiting after postoperative day 1. This was performed to rule out complication (mainly stricture).

The test for *H. pylori* was performed on the stomach specimen. If the results were positive, patients were advised in the outpatient clinic to undergo treatment with triple therapy lasting 10 days.

Data analyses

Data analyses were conducted using SPSS Statistics for Windows v22.0 (IBM Corp., Armonk, NY). Comparisons between groups were performed with independent sample Student's *t*-test for continuous variables and Fisher's test for discrete variables. Confidence intervals were set at 95%, and a two-sided *p*-value of <0.05 was considered statistically significant.

Results

Demographics and medical characteristics

Data were collected from 330 women (83.7%) and 70 men (16.3%). The mean age was 41 years (range 18–70 years).

Patients were divided in two groups (positive or negative) regarding *H. pylori* testing. A total of 68 (17%) patients tested positive for *H. pylori* via the postoperative histopathology report. The mean BMI in *H. pylori* positive patients was 51.5 kg/m² (SD 8.1); in the *H. pylori* negative group, the mean BMI was 50.6 kg/m² (SD 8.6). In the *H. pylori* positive group, 68 patients were eligible for follow-up, and 27, 22, 11, 15, and 2 patients were followed up at 6 months, 1 year, 2 years, 3 years, and >3 years respectively. In the *H. pylori* negative group, 332 patients were eligible for follow-up, and 153, 97, 40, 12, and 19 patients were followed up at 6 months, 1 year, 2 years, 3 years, and >3 years respectively.

There were 10 smokers in the series. The incidence of *H. pylori* in the smoking population was 10%, showing no correlation with complications in the subgroup. Regarding nonsteroidal anti-inflammatory drugs (NSAIDs), 127 patients in the population had arthritis, and they were prescribed NSAID medication prior to surgery. No association was observed regarding complications after SG with *H. pylori* and the use of NSAID medications.

There were no significant differences between groups in terms of comorbidities, as summarized in Table 1.

There were no perioperative, early postoperative (30 days), or long-term complications registered in the *H. pylori* positive group. In the *H. pylori* negative group, there was one complication. One patient had a suture leak on postoperative day 5 that required a reoperation, drainage, and a stent

TABLE 2. PERIOPERATIVE OUTCOMES (N=400)

	<i>H. pylori</i> positive (n=68)	<i>H. pylori</i> negative (n=332)	p-Value
Mean operative time	77.5 min (SD 24.1)	86.2 min (SD 24.6)	0.41
Early complications (30 days postop)	0 (n=68)	1 leak (n=332)	
Mortality	0	0	
Mean length of stay	2.7 days (SD 0.9)	2.9 days (SD 3.9)	0.59

TABLE 3. %EWL IN *H. PYLORI* POSITIVE GROUP VERSUS *H. PYLORI* NEGATIVE GROUP AT DIFFERENT TIMES OF FOLLOW-UP

Follow-up	<i>H. pylori</i> positive (n=68)	<i>H. pylori</i> negative (n=332)	p-Value
Mean %EWL at 6 months	39.6% (27)	44.0% (153)	0.346
Mean %EWL at 1 year	50.1% (22)	51.4% (97)	0.102
Mean %EWL at 2 years	47.8% (11)	51.3% (40)	0.304
Mean %EWL at 3 years	27.6% (15)	53.9% (12)	0.068
Mean % EWL at > 3 years	30.2% (2)	42.6% (19)	0.243

Values are described as percentage of percentage of excess weight loss (number of patients seen).

%EWL, percentage of excess weight loss.

placement. The patient recovered without any further complications. The sole patient with a leak had no history of *H. pylori* or eradication treatment.

There were no significant differences between groups regarding complications and mortality rate (0%). There were no long-term complications reported in the patients during the time of follow-up (Table 2).

The mean operative time in the *H. pylori* positive group was 77.5 min (*SD* 24.1 min), and in the *H. pylori* negative group it was 86.2 min (*SD* 24.6 min) with no significant differences ($p=0.41$). The mean length of stay in the *H. pylori* positive group was 2.7 days (*SD* 0.9), and in the *H. pylori* negative group it was 2.9 days (*SD* 3.9) with no significant differences ($p=0.59$).

There were no significant differences in the mean %EWL at 6, 12, 24, 36, and >36 month follow-up between the two groups. Data are summarized in Table 3.

Discussion

The prevalence of *H. pylori* in the obese population has been reported to be about 20–50%,^{6,7,9} which is higher than the prevalence in the patient population of this study (17%). The effect of *H. pylori* on weight loss after bariatric surgery was not significant according to Azuma and Nwokolo.^{10,11} They correlated the presence of *H. pylori* and hormones levels (ghrelin and leptin) and showed no significant differences in terms of weight loss.

Although the current study does not involve hormones levels, the presence of *H. pylori* did not show any difference in %EWL at different times of follow-up (Table 3).

Regarding complications associated with *H. pylori*, some authors have found that preoperative infection is associated with marginal ulcers in patients undergoing a Roux-en-Y gastric bypass.^{9,12} Knowing the potential changes that this may cause, it is possible that histological consequences from *H. pylori* may be related to certain complications after bariatric surgery. A comparison of patients with and without marginal ulcers within 10 months after surgery demonstrated that marginal ulceration was more common among patients who tested positive for *H. pylori* even when adequately treated.¹² Other studies looking at complications following gastric bypass surgery in patients with *H. pylori* infection also suggest some relation between postoperative complications and the presence of *H. pylori*.^{9,13} Although this may imply a

benefit to preoperative screening and treatment, there are also conflicting studies. One study found no association with *H. pylori* seropositivity and postoperative ulcer formation after gastric bypass.¹⁴ Similarly, Rawlins *et al.* looked at complication rates of gastric bypass patients who tested positive for *H. pylori* preoperatively and found no significant difference with those who tested negative.¹⁵

When looking at complications after SG and *H. pylori* infection there were two reports in the literature that showed no statistically relation.^{6,7} One study including 89 SG patients demonstrated a prevalence of *H. pylori* of 44% based on specimen analysis. This series did not demonstrate a statistically significant relationship with regard to postoperative complications.⁶ In a larger study consisting of 682 patients who underwent SG, 7.8% were found to be *H. pylori* positive.⁷ The authors analyzed several complications, including leak, neuropathy, bleeding, and pulmonary embolism. The authors reported five cases (0.8%) of postoperative leak, with only one patient being *H. pylori* positive, suggesting no relation with *H. pylori*. Other complications, such as neuropathy (1.2%), were not associated with the presence of *H. pylori*.⁷

The present study corroborates these results, demonstrating that complications were not associated with *H. pylori*. There was no clear association between *H. pylori* and postoperative complications, especially leaks or ulcers, during the time of follow-up.

Conclusion

The prevalence of *H. pylori* in this study was 17%, which is lower than that found in previous studies. According to the findings, *H. pylori* status does not seem to have any influence on postoperative complications and %EWL. This may, however, be due to the limited sample size. Larger studies may therefore be needed in the future. In the authors' experience, preoperative screening of *H. pylori* is not routinely recommended for patients undergoing a SG.

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Author Disclosure Statement

No competing financial interests exist.

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