Does Helicobacter pylori *infection influence the major postoperative complication rate after sleeve gastrectomy? A retrospective cohort study in an endemic region*

Kürşat Rahmi Serin[1], Ümit Akyüz[2], Burçin Batman[1], Derya Salim Uymaz[1], Hasan Altun[1]

[1]*Department of General Surgery, Ulus Liv Hospital, İstanbul, Turkey*
[2]*Department of Gastroenterology, Fatih Sultan Mehmet Training and Research Center, İstanbul, Turkey*

Cite this article as: *Serin KR, Akyüz Ü, Batman B, Salim Uymaz D, Altun D. Does* Helicobacter pylori *infection influence the major postoperative complication rate after sleeve gastrectomy? A retrospective cohort study in an endemic region. Turk J Gastroenterol 2018; DOI: 10.5152/tjg.2018.17533.*

ABSTRACT

Background/Aims: Helicobacter pylori *infection is very common in Eastern countries. Little is known about the impact this infection has on bariatric surgery outcomes. This retrospective cohort study conducted on obese Turkish adults who underwent sleeve gastrectomy at a single center aimed to determine the prevalence of* H. pylori *infection and the effect of this infection on the rate of early major postoperative complications.*

Materials and Methods: *All consecutive patients who underwent sleeve gastrectomy for obesity between 2014 and 2015 and who had complete data were enrolled. A single surgeon performed all procedures. All resected specimens were sent to pathology for analysis.*

Results: *Of the 460 patients who met the eligibility criteria, 326 (71%) were female. The average (±standard deviation) age and body mass index were 37.5±10.0 years and 42.7±7.7 kg/m2, respectively. Histology revealed that 150 (33%) patients had* H. pylori *infection. The* H. pylori*-infected group developed two complications (leakage and intra-abdominal collection). The uninfected group developed three complications (all bleeding related). The two groups did not differ significantly regarding postoperative complication rates (1.3% vs. 1.0%; p=0.717).*

Conclusion: H. pylori *infection did not affect the rate of early complications after sleeve gastrectomy. This suggests that* H. pylori *screening or eradication policy is not essential for asymptomatic candidates who have undergone sleeve gastrectomy.*

Keywords: Helicobacter pylori*, sleeve gastrectomy, complication, gastric leakage*

INTRODUCTION

Helicobacter pylori (HP) infection is very common in Eastern countries, with nearly 40%-60% of the population being infected (1,2). Since the first description of HP infection by Marshall and Warren in 1982, it has been known to be associated with many diseases and even malignancies, including iron deficiency anemia, gastritis, dyspepsia, peptic ulcer, gastric carcinoma, and mucosa-associated lymphoid tissue (MALT) lymphoma (3,4). While HP can be treated with an antibiotic regimen, resistance to the antibiotics used for its treatment is increasing.

At present, little is known about the impact of HP infection on surgical patients, especially those undergoing gastric surgery. Regarding those undergoing bariatric surgery, it has been suggested that HP eradication should be offered before gastric bypass surgery because postoperatively, it is not possible to access the distal part of the stomach; thus, HP may increase the risk of marginal ulceration (5). Recently, sleeve gastrectomy (SG), where >75% of the stomach is vertically resected, has become the preferred bariatric procedure because it is not associated with marginal ulceration and the remaining part of the stomach is accessible. However, some surgeons remain concerned about the impact of HP infection after SG; it is thought that HP infection can induce inflammation and edema of the stapled line, which, in turn, can cause leakage, bleeding, or infection. Nevertheless, at present, the clinical practice guidelines for the perioperative nutritional, metabolic, and non-surgical support of the bariatric surgery patient, established by the American Association for Clinical Endocrinologists (AACE), The Obesity Society (TOS), and the American Society for Metabolic and Bariatric Surgery (ASMBS), suggest that while

ORCID IDs of the authors: *K.R.S. 0000-0001-9023-9151; Ü.A. 0000-0001-8500-2408; B.B. 0000-0003-2245-3337; D.S.U. 0000-0002-2590-5872; H.A. 0000-0003-4978-5585.*

Corresponding Author: ***Ümit Akyüz; umitakyuz@yahoo.com***
Received: ***July 6, 2017*** *Accepted:* ***January 28, 2018*** *Available online date:* ***June 12, 2017***

DOI: ***10.5152/tjg.2018.17373***

routine HP eradication could be considered in endemic areas, it is generally not recommended (6). As a result, at our tertiary-care referral hospital in Istanbul, Turkey, it is now a practice not to treat patients who have undergone SG and are subsequently found to be infected with HP upon histological examination of the resected specimen.

In this retrospective cohort study, we sought to determine the prevalence of HP infection in obese Turkish adult patients who underwent SG as well as determine the impact of HP infection on the early postoperative complications of SG.

MATERIALS AND METHODS

This study was approved by our Institutional Ethics Committee and was conducted according to the principles of the Declaration of Helsinki and its amendments. The need for informed consent from the patients was waived because of the retrospective nature of this study.

Patient selection

The medical records of our hospital cohort were reviewed to identify all consecutive patients who underwent SG for obesity between January 2014 and August 2015. Patients were selected for bariatric surgery according to the AACE/TOS/ASMBS guidelines (6). All patients with complete data were included in this study. Patients were excluded if they had previously undergone an abdominal surgery or a revisional bariatric surgery, had severe gastroesophageal reflux disease, had undergone preoperative upper endoscopic evaluation, and/or had undergone HP eradication therapy. Notably, at our hospital, patients do not undergo routine upper gastrointestinal endoscopy (UGE); UGE is used only in symptomatic patients.

Surgical technique

A single surgeon performed all procedures. Laparoscopic SG was performed using the five-trocar technique. In this technique, the patient is positioned in the reverse Trendelenburg position with split legs. Intermittent pneumatic compressing stockings are applied, and the surgeon stands between the patient's legs to perform the procedure.

The first entry is performed using an optic trocar (12 mm) that is placed slightly left of the midline above the umbilicus. A pneumoperitoneum is created by CO_2 insufflation after the insertion of the trocar and set to 15 mmHg. A 10-mm 30° angled scope is used. The other trocars are placed in the left upper quadrant (12 mm), right upper quadrant (15 mm), lateral left abdomen (5 mm assistant trocar), and subxyphoid region (5 mm for the Nathanson retractor). The liver is retracted using a Nathanson retractor.

The gastrocolic and gastrosplenic ligaments are separated from the greater curvature using Sonicision (Covidien, Mansfield, MA). Because there are adhesions between the back wall of the stomach and pancreas, especially near the pylorus, the procedure is started far away from the pylorus to enable easy access to the omental bursa. The whole greater curvature from the pylorus to the angle of His is dissected near the stomach. The left crus is used as a landmark for dissection. Retrogastric adhesions are separated for complete mobilization of the stomach.

A 36-Fr gastric calibration bougie is inserted downward to the pylorus by the anesthesiologist to guide stapling; the bougie is placed parallel to the lesser curvature. For stapling, a long laparoscopic Endo GIA XL Stapler (Covidien, Mansfield, MA) and black and purple articulating 60-mm Tri-Staple cartridges (Covidien, Mansfield, MA) are used. Generally, we prefer black cartridges for the antrum due to the thickness of the stomach in this region and prefer purple cartridges for the corpus and fundus. After the anesthesiologist moves the tip of the bougie up to half of the stomach, the methylene blue test is routinely used to test for leakage. The gastric bougie is then removed under laparoscopic view by the anesthesiologist. The whole staple line is reinforced using V-Loc sutures (Covidien, Mansfield, MA) by suturing the stomach to the omentum to prevent twisting of the former. A drain is not routinely used unless there are bleeding or stapling problems. The resected specimen is extracted through the right trocar incision using digital dilatation and without using a specimen endobag.

Pathology

All resected specimens were sent to pathology for analysis. They were fixed in 10% formalin, embedded in paraffin, and stained with hematoxylin and eosin. The Warthin-Starry special stain was used to detect HP.

Postoperative care and follow-up

Our hospital does not perform routine upper gastrointestinal swallow studies to detect leakage; this test is performed only when there is clinical suspicion of leakage. All patients were put on a liquid diet on postoperative day (POD) 1. Patients were discharged once they were able to maintain hydration and were routinely placed on proton pump inhibitors.

All patients were followed up for at least 30 days (patients attended the clinic at 1 week and at 1 month postoperatively; those who developed complications attended the emergency department). Major postoperative complications (leakage, bleeding, and intra-abdominal collections/abscess) within the first 30 days of surgery were recorded.

Statistical analysis

Continuous and categorical variables were expressed as mean±SD (range) and n (%), respectively. The patients with and without HP infection were compared regarding continuous and categorical variables using Student's *t*-test and X^2 test. All statistical analyses were performed using SPSS version 22 (IBM Corp.; Armonk, NY, USA). $p<0.05$ was considered to indicate significance.

RESULTS

Of the 532 patients who underwent SG during the study period, 26 had incomplete data, 8 had undergone a previous abdominal operation, 4 had undergone revisional bariatric surgery, 5 had severe gastroesophageal reflux disease, 9 had undergone preoperative upper endoscopic evaluation, and 20 had undergone HP eradication therapy; these patients were excluded from the study. Consequently, 460 patients (87%) were included in the study.

All patients in this study fulfilled the criteria for bariatric surgery. The demographic characteristics of the patient cohort are shown in Table 1. Of the 460 patients, 322 (71%) were female and 134 (29%) were male. The mean age, weight, and body mass index (BMI) were 37.53±9.95 (range, 18-69) years, 121.90±24.84 (range 80-218) kg, and 42.69±7.72 (range, 30-80) kg/m^2, respectively. There was no need to convert to open procedure in any patient. The mean follow-up duration of the cohort was 10.7 months.

Histological findings of the resected specimens showed that 150 (33%) patients were infected with HP, and the remaining 310 (67%) patients were negative for HP infection. The two groups did not differ significantly regarding their demographic variables or follow-up duration (Table 1).

None of the patients died. However, five patients in the entire cohort (1.1%) developed early postoperative complications. Of them, two were in the HP-infected group (1.3%) (one developed leakage and the other developed intra-abdominal abscess) and the remaining three were in the HP-uninfected group (1.0%) (all developed bleeding-related complications). None of the uninfected patients had an infectious complication. The HP-infected and -uninfected groups did not differ significantly regarding rates of early postoperative complications (p=0.717; Table 2). The patient with leakage on POD6 underwent diagnostic laparoscopy, and a Jackson-Pratt drain was placed close to the leakage site near the gastroesophageal junction. A covered self-expandable stent was then endoscopically inserted. The drain was removed 6 days later. However, the intra-abdominal abscess recurred on POD14 in this patient. A percutaneous drainage catheter was inserted under computed tomography guidance. This patient was discharged on POD21. The stent and drainage catheter were removed 8 weeks later. The bleeding in two of the three patients from the HP-uninfected group was detected on PODs1 and 2; both patients underwent laparoscopy. No bleeding was detected, and a hematoma was suctioned from both of them. The remaining patient with bleeding was conservatively treated and then followed up. There was no need for blood transfusion. The patient with an intra-abdominal abscess was treated with percutaneous drainage and antibiotic therapy.

Table 1. Demographic characteristics of the patients with and without *Helicobacter pylori* infection

	HP (+) n=150	HP (-) n=310	p	All patients n=460
Sex, n (%), F/M	99 (66%)/51 (34%)	227 (73%)/83 (27%)	0.206	326 (71%)/134 (29%)
Age, mean±SD (range), years	38.44±9.62 (18-60)	37.11±10.09 (18-69)	0.468	37.53±9.95 (18-69)
Weight, mean±SD (range), kg	122.86±25.56 (85-218)	121.43±24.51 (80-218)	0.661	121.90±24.84 (80-218)
Height, mean±SD (range), cm	169.11±9.57 (141-195)	168.47±8.76 (148-195)	0.292	168.68±9.02 (141-195)
BMI, mean±SD (range), kg/m^2	42.95±7.96 (30-68)	42.63±7.59 (31-80)	0.898	42.67±7.72 (30-80)
Follow-up duration, mean±SD (range), months	10.12±6.69 (1-30)	11.02±6.72 (1-32)	0.276	10.73±6.71 (1-32)

BMI: body mass index; HP: *Helicobacter pylori*

Table 2. Early postoperative complications after sleeve gastrectomy in patients with and without *Helicobacter pylori* infection

Complication*	HP (-)	HP (+)	p
Leakage	0	1	0.149
Bleeding	3	0	0.228
Abscess	0	1	0.149
All major complications	3 (1.3%)	2 (1.0%)	0.717

*The complications refer to those occurring within first 30 days of surgery; HP: *Helicobacter pylori*

P values were generated by comparing the HP-infected and -uninfected patients using X^2 test.

DISCUSSION

According to the World Health Organization, a BMI≥30 kg/m^2 is categorized as obesity. It is a cause of serious health problems, including hypertension, diabetes, pulmonary disorders, and musculoskeletal problems (7). Obesity constitutes a serious drain on the healthcare systems of many countries as it is a worldwide problem that has reached epidemic proportions. For example, in Turkey, approximately 20% of the adults are morbidly obese (BMI≥40 kg/m^2) (8). Consequently, many surgical approaches to reduce obesity have been developed. Currently, one of the most commonly used methods throughout the world is the laparoscopic bariatric surgical procedure called SG. It involves vertical resection of >75% of the stomach, thereby obviating the need to bypass the distal part of the stomach, preserving the natural flow of food, and reducing the risk of marginal ulceration (9-11).

The incidence of HP infection exceeds 50% worldwide (12) and in Turkey, it exceeds 60% (13). In the present study, 33% of the patients had HP infection. HP infection is strongly associated with serious gastric diseases. In fact, HP is classified as a class 1 carcinogen that is responsible for causing gastric cancer. Several studies show that it is associated with most (70%-90%) cases of gastric cancer (14,15). Consequently, HP eradication is now indicated for dyspepsia, peptic ulcer, atrophic gastritis, and gastric MALT lymphoma patients. This approach helps in not only safely treating the condition but also reducing the need for surgery. HP eradication is also indicated for those who have undergone resection for gastric carcinoma or have first-degree relatives with gastric carcinoma (3). However, a disadvantage of this widely used approach to gastric diseases is the emergence of and increase in HP resistance to the antibiotics that are used to achieve eradication.

At present, the guidelines devised by AACE/TOS/ASMBS and the European Chapter of the International Federation for the Surgery of Obesity (IFSO) do not recommend the routine prescription of UGE to detect HP infection before bariatric surgery; UGE is recommended only for symptomatic patients before bariatric surgery (6,16). Our hospital follows these guidelines; thus, we do not routinely perform UGE and do not test asymptomatic candidates preoperatively for HP. However, the AACE/TOS/ASMBS and IFSO guidelines remain the subject of some controversy because many surgeons believe that stomach wall edema and inflammation caused by HP infection may increase the risk of complications in patients undergoing SG. In particular, they may promote the most feared, and potentially fatal, complications after SG, i.e., leakage and bleeding from the stapled line. However, the present study conducted on obese Turkish adults who had undergone SG did not support this concern: we showed that the rate of major early postoperative complications was very similar between HP-infected (1.3%) and -uninfected (1.0%) patients (p=0.717). Some other studies also support this conclusion (9, 11). We do not offer an eradication policy for HP-positive asymptomatic patients pre- or postoperatively; moreover, some authors argue that antral resection eradicates HP without medical therapy (17).

Study limitations

This study has some limitations. First, due to its retrospective nature, the possibility of information bias cannot be excluded. Second, it is a single-center study, which means its generalizability to other populations may be limited. Third, the cohort size was relatively small. Given that early postoperative complications are rare after SG, it is possible that the study was not sufficiently powered to detect a difference in complication rates between HP-infected and -uninfected patients undergoing SG (18-20).

In conclusion, this study shows that HP infection does not influence the rate of early postoperative complications after SG. However, large-scale studies that assess the influence of HP infection on SG complications and outcomes during long-term follow-up are warranted.

Ethics Committee Approval: Ethics committee approval was received for this study from the Institutional Ethics Committee.

Informed Consent: N/A.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - H.A., Ü.A.; Design - H.A., Ü.A.; Supervision - H.A., Ü.A.; Data Collection and/or Processing K.R.S.; Analysis and/or Interpretation - B.B., D.S.U.; Literature Search - B.B., D.S.U.; Writing Manuscript - K.R.S., Ü.A.; Critical Review - H.A., Ü.A.

Acknowledgements: The authors wish to thank Mr. Adrian Burton for his help with English editing.

Conflict of Interest: Authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

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