



Cross-sectional Study

The evaluation of the relationship between Helicobacter pylori infection and frequency of postoperative complications of laparoscopic sleeve gastrectomy in Shahid Bahonar Hospital in Kerman between 2018 and 2020; a cross-sectional study



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ABSTRACT

Introduction: Among the bariatric surgery procedures, laparoscopic sleeve gastrectomy (LSG) is one of the most common methods for effective and permanent weight loss among patients with severe obesity. Nonetheless, the LSG can be associated with long-term and short-term complications for the patient. The present study is aimed to investigate the effect of Helicobacter pylori on the complications of LSG, to answer the question of whether eradication of Helicobacter pylori in patients undergoing surgery can be effective in reducing postoperative complications.

Methods: In the present analytical-cross sectional study, which has been conducted in Shahid Bahonar Hospital in Kerman during 2018–2020, a total of 100 patients (including 38 males and 62 females) with an average age of 34.8 ± 2.4 years and an average BMI of 41.1 ± 3.1 underwent LSG surgery. After the operation, the gastric mucus specimens were taken from all patients for pathological examination of Helicobacter pylori infection.

Results: According to the results, 28 patients (28%) tested positive for Helicobacter pylori infection (HP positive), and 72 patients (72%) tested negative in this regard (HP negative). The results indicated no significant¹ difference between the HP positive and HP negative patients in terms of demographic characteristics (age, gender, BMI). Overall, 11 patients (11%) exhibited postoperative complications of the LSG including 7 cases (7%) of the SSI, 2 cases (2%) of intraoperative² bleeding, and 2 cases (2%) of leakage [No mortality was reported]. Out of the 11 patients with postoperative complications, 6 patients were HP positive including 4 cases of SSI, 1 case of bleeding, and 1 case of leakage.

Conclusions: As indicated by the obtained results, the HP infection has seemingly no impact on the LSG postoperative complications. Nevertheless, it is necessary to conduct further studies on a larger number of patients with a longer follow-up time focusing on the effect of other parameters, such as BMI and underlying diseases.

Abbreviations: LSG, Laparoscopic Sleeve Gastrectomy; BMI, Body Mass Index; H.pylori, HP, Helicobacter Pylori; SSI, Surgical Site Infection; HTN, Hypertension; DM, Diabetes Mellitus; HLP, Hyperlipidemia; GERD, Gastroesophageal reflux disease.

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1. Introduction

The prevalence of obesity is considerably increasing around the world and is associated with several risk factors, each of which can affect the physiology and health of the body and reduce the lifetime [1,2]. In this regard, surgical procedures have had the highest impact on effective and permanent weight loss among patients with severe obesity. Among these surgical procedures, gastric bypass surgery (34.2%) and sleeve gastrectomy (42.1%) are the two most commonly used methods. The bariatric surgery procedures cause weight loss through two mechanisms, namely reduced intestinal absorption and restricted nutrient intake [3–5]. The LSG is known as one of the most commonly used surgical methods among bariatric surgery procedures, which has a simpler process and has led to better outcomes in terms of weight loss and reduction of the obesity-related risk factors [1]. In the LSG surgery, nearly 85% of the stomach along the greater curvature is removed, resulting in the restriction of the nutrient intake, thus leading to weight loss [6]. Nevertheless, the bariatric surgery procedures can be associated with acute and metabolic complications among which the short-term complications such as bleeding, infection, and gastrointestinal leakage and long-term complications such as malabsorption of the vitamins and minerals (especially B12, iron, calcium, and vitamin D) can be mentioned [7,8]; Therefore, methods to reduce these complications are always discussed. In a joint study, which was conducted in multiple medical centers on 4776 surgeries, the researchers reported weight loss among the obese patients, 0.03% mortality during the first 30 postoperative days, and critical complications in 4.1% of the patients, which are similar to the other important surgeries [4]. *Helicobacter pylori* is a gram-positive microorganism found in the stomach and nearly 50% of people are infected by this bacterium [9–11]. The colonization of this bacterium in the stomach can cause chronic gastritis although, due to the balance between the bacterium and the host, this infection might remain asymptomatic or even might progress toward more dangerous complications such as gastric and duodenal ulcers, atrophic gastritis, MALT lymphoma,³ or adenocarcinoma. In addition, a few studies have shown that HP can potentially affect the obesity process by influencing the secretion of the ghrelin and leptin hormones [1,2]. The necessity of performing the HP diagnostic tests and its eradication treatment as a routine process before the bariatric surgeries is still debatable and also the effect of HP on the postoperative complications is still under study [12–15]. Although there are a few studies that have attempted to relate the postoperative complications to the HP infection, these studies have been aimed to investigate the impact of the HP infection on the LSG postoperative complications and the relationship between these two factors. But the present study is aimed to investigate the relationship between the HP infection and the short-term postoperative complications among the patients undergoing LSG surgery. Considering the growing increase in the rate of bariatric surgeries in Iran and the emergence of its complications as well as the relatively high prevalence of HP infection among the Iranian people, the present study was designed to investigate the relationship between these two variables, to answer the question of whether eradication of *Helicobacter pylori* in patients undergoing LSG can be effective in reducing postoperative complications.

¹ In the whole article, wherever the term "no significant difference" is used, it means that the difference is so small that the effect of the variable can be ignored.

² Although these two cases of bleeding occurred during surgery, in this article, it is considered as a postoperative complication; Because intraoperative bleeding always requires postoperative measures. Given the contradiction of the term "intra-operative" with the title of the article, this explanation is necessary to avoid confusing readers.

³ Mucosa-Associated Lymphoid Tissue lymphoma, Also known as MALToma.

2. Materials and methods

The present cross-sectional retrospective study was conducted on a total of 100 patients undergoing LSG surgery in Shahid Bahonar Hospital in Kerman during 2018–2020. For this purpose, 38 male and 62 female patients with an average age of 34.8 ± 2.4 years and an average BMI of 41.1 ± 3.1 were selected randomly and included in the study. At the end of the surgery, the gastric mucus specimens were taken by endoscopy from all patients to perform pathological examinations for HP infection. Then, Patients were divided into two groups, *Helicobacter pylori* positive and negative, and both groups were followed up for almost three months in terms of the short-term postoperative complications including SSI, bleeding, and leakage. Subsequently, the information obtained from each patient, including the demographic characteristics (age, gender, BMI), past medical history (HTN, DM, HLP, ...), pathological report of the HP infection, and the follow-up report of the short-term postoperative complications, were collected in the data collection forms for data analysis.

- The study has been reported in line with the STROCCS criteria [16].
- This research is registered on [researchregistry.com](https://www.researchregistry.com) with the UIN: [researchregistry7414](https://www.researchregistry.com/record/7414)

3. Results

The present study was conducted on a total of 100 patients undergoing LSG surgery (38 males and 62 females). The average age and the average BMI of the patients were 34.8 ± 2.4 and 41.1 ± 3.1 , respectively. Among these patients, 28 (28%) were reported as HP positive and 72 (72%) as HP negative. The average follow-up time of the patients was 12.8 ± 1.2 weeks. Also, 29 patients (29%) had Past Medical History (PMH). The data of the frequency of the Underlying diseases (PMH) among the patients are presented in Table (1).

The two HP positive and HP negative groups exhibited no significant difference in terms of gender, age, BMI, past medical history, and frequency of postoperative complications. Out of 100 patients, 11 patients (11%) showed LSG postoperative complications including 7 cases (7%) of SSI, 2 cases (2%) of intraoperative bleeding, and 2 cases (2%) of leakage [No mortality was reported]. Among these 11 patients, 6 (54.5%) were HP positive. As for the frequency of the postoperative complications among the HP-positive patients, 6 out of 28 patients (21.4%) showed these complications. Further data in this regard can be seen in Tables (2) and (3).

4. Discussion and conclusion

Despite the increasing popularity of bariatric surgeries as well as the relatively high prevalence of HP infection, only a few studies have been conducted so far on the relationship between the HP infection and the postoperative complications of bariatric surgery procedures and most of these studies have rejected the effect of the HP infection on the postoperative complications of the bariatric surgeries [12–15], which is consistent with findings of the present study. Similarly, in the present study, it seems that there is no significant difference between the two

Table-1
Frequency of the Underlying diseases (PMH) among the patients.

Past Medical History	Frequency
HTN	11 (11%)
HLP	6 (6%)
Hypothyroidism	3 (3%)
Diabetes Mellitus	3 (3%)
Psychiatric disease	4 (4%)
GERD	2 (2%)
Total	29 (29%)

Table-2

Frequency of the postoperative complications among the patients.

Postoperative complication	Frequency
SSI	7 (7%)
Incisional	6 (6%)
Collection	1 (1%)
Leakage	2 (2%)
Bleeding	2 (2%)
Total	11 (11%)

Table-3

Frequency of the postoperative complications in terms of H.pylori positive and negative.

Postoperative complications	Frequency	
	Helicobacter Pylori Infection	
	H.P+	H.P-
	N = 6	N = 5
SSI [7]	4 (66.6%)	3 (60%)
Incisional [6]	3 (50%)	3 (60%)
Collection [1]	1 (16.6%)	0 (0%)
Leakage [2]	1 (16.6%)	1 (20%)
Bleeding [2]	1 (16.6%)	1 (20%)
Total [11]	6 (100%)	5 (100%)

HP⁺ and HP⁻ groups in terms of the short-term postoperative complications of the LSG surgery; Emphasizing that this is not a definitive conclusion but a hypothesis to contribute to new strategies and broader research. Nevertheless, it is necessary to conduct further studies on a larger number of patients with a longer follow-up time focusing on the effect of other parameters, such as BMI and underlying diseases [10]. The results of this study may help answer the question, "Is it necessary to eradicate Helicobacter pylori infection before LSG surgery?" However, The importance of performing the eradication treatment of the HP infection among the patients who are a candidate for LSG surgery is still debatable.

[It must be noted that **statistical** analysis (including p-value calculation) and obtaining valid statistical results were not possible in this study due to the **small sample size** and other limitations. Of course, this issue does not harm the validity of the figures and results mentioned in this study.]

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Ethical approval

Before starting the study, the necessary permits and the code of ethics have been obtained from the ethics committee of Kerman University of Medical Sciences. (The code approved by the ethics committee: IR.KMU.AH.REC.1397.053).

Author contribution

Mohammad Amin Heydari: Designing and conducting the study, collecting and analyzing the data, and writing and preparing the article.

Hadi Hadavi: Designing the main framework of the study, and analyzing the data and results.

Maryam Kouhestani: Analyzing the data and results, and editing the article.

Maryam Iranpour: Contributing to the execution of the study, and analyzing the data.

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Declaration of competing interest

All authors declare no conflict of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amsu.2022.103548>.

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