

Original Article

Post *Helicobacter pylori* Treatment Histopathological Findings in Laparoscopic Sleeve Gastrectomy Specimens

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Abstract

Background: Obesity nowadays becomes a major medical and social problem in the world. Obesity is a pandemic health problem recognized as a disease of time and is also an important cause of morbidity and mortality. The aim of this study was to investigate the persistent histopathologic changes after *Helicobacter pylori* (*H. pylori*) treatment in laparoscopic sleeve gastrectomy (LSG) specimens and correlation between high body mass index (BMI) and histopathological findings.

Materials and Methods: Asymptomatic 520 patients were candidate for laparoscopic sleeve gastrectomy (2017-2019) who had not symptom of *Helicobacter pylori* infection, visually normal endoscopy and had positive *H. pylori* urease recently. They treated with triple regimen (clarithromycin, amoxicillin for 2 weeks and proton-pump inhibitor (PPI) for 2 month). Eradication was confirmed by urea breath test (UBT). After operation specimens were evaluated histopathologically.

Results: Females were 58.3% of the patients. Mean BMI were 44.2 (females) and 46.3 (males). Normal LSG specimens were 58.3%. Most common abnormal histopathology findings were; chronic mild active and inactive gastritis (21.3%), chronic moderate active and inactive gastritis (16.0%), chronic severe active and inactive gastritis (3.3%), had not follicular gastritis, lymphoid aggregates (0.6 %), intestinal metaplasia (0.2%) and PPI effect (0.2%). Significant correlation was observed between the higher patients BMI (BMI>45) with abnormal histopathology findings specially moderate and severe degree of chronic active and inactive gastritis.

Conclusion: Patients with higher BMI was at more risk for post *H. pylori* treatment abnormal pathology like chronic active gastritis which is the risk factor for atrophic gastritis may lead to preventable gastric cancer. Patients with higher BMI (≥ 45) and *H. pylori* positive urease test with visually normal endoscopy, mainly candidate for the laparoscopic Roux-en-Y gastric bypass (LRYGB). Permanent endoscopic follow up in these patients are impossible, therefore, endoscopic random tissue mapping even after *H. pylori* treatment is appropriate.

Keywords: Laparoscopic Sleeve Gastrectomy, Histopathological Findings, *Helicobacter pylori*

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Introduction

Obesity nowadays becomes a major medical and social problem in the world. Obesity is a pandemic health problem recognized as a disease of time and is also an important cause of morbidity and mortality. It is estimated that in 2030, medical costs attributed to overweight or obesity will be approximately 860 to 956 billion dollars in the USA¹⁻². Bariatric surgery is increasingly progresses as an important solution. Laparoscopic sleeve gastrectomy (LSG) is a commonly performed weight loss procedure.

Laparoscopic Roux-en-Y gastric bypass (LRYGB) is the standard bariatric surgery in this serious health problem³. After LRYGB surgery, great portion of stomach would be out of endoscope access that can concern of troublesome pathologies. Some studies recommended that endoscopic random biopsies⁴⁻⁶, however biopsy taking complications, economic burden, accurate case selection according to abnormal histopathologic risk factors and associations, it would be valuable⁷⁻⁹. The great portion of the stomach resects in LSG is from fundus, most part of the corpus and antrum, rather same parts is out of access in RYGB. Therefore, maybe it is appropriate for investigational purposes of risk factors behavior. Some studies state that there is no histopathologic anomaly in most LSG cases, other claim that there is gastric pathology in the least half of them. Some pathologists reported that in obese patients who were undergoing LSG had chronic active and inactive superficial gastritis, atrophy, intestinal metaplasia (IM), *Helicobacter pylori*, lymphoid aggregates and follicles¹⁰⁻¹². Onzi et al, reported in their study the inflammatory alterations in the pre-operative period were mainly foveolar hyperplasia and chronic gastritis associated with *H. pylori*, and they had reduced in the postoperative period. Thus, a significant reduction of weight and BMI occurred and a resolution of comorbidities was observed¹³. Ohanessian et al reported, despite negative preoperative *H. pylori* testing, 3.2% were still histologically positive that raising question about the accuracy of preoperative methods used for *H. pylori* testing and treatment. Preoperative endoscopy may not be needed in sleeve

patients¹⁴. Saafan et al, showed there was a weak correlation between BMI and other covariates¹⁵. Taskin et al. showed a correlation of histopathologic changes in morbid obese patients with weight loss after bariatric surgery. Operating on younger patients with lower BMI and inactive gastritis with the LSG method could contribute to achieving more successful results¹⁶.

Obesity increases inflammation in intestines and stomach¹⁷. In obese individuals, the intestinal flora is different from the individuals with normal weight. High-tissue permeability in the gastrointestinal lumen for toxic and irritant materials and some bacteria may cause gastrointestinal pathologies, primarily ulcers⁵. High prevalence of *Helicobacter pylori* infection and its role as a known risk factor of gastric cancer and LSG rapid developing as a main bariatric operation, such considerations highlight the importance of this studies¹⁸. The aim of this study was to investigate the spectrum of post *Helicobacter pylori* treatment histopathologic findings detected in LSG specimens. In addition, assess routine preoperative esophagogastroduodenoscopy for *Helicobacter pylori* screening. Also histopathologic surveyed of LSG specimen to find that it enough in patients with no significant clinical history and normal endoscopy.

Methods

The prospective nonrandomized clinical trial study was done at Loghman Hakim general hospital in 2017-19. Patients who were candidate for LSG underwent screen esophagogastroduodenoscopy and we used rapid urease test to detect *H. pylori*. A total of 714 patients who reported no history of prior peptic disease symptoms or who had minimal symptoms and no history of *H. pylori* infection with no visual findings in their upper gastrointestinal (GI) endoscopy that only they had positive *H. pylori* urease test included in this study. For reducing of confounding risk factors, patients should not smoker, alcohol drinking, frequent NSAID and caffeine use for 6 months. Afterward, 194 patients who were not successful were excluded. Ethics committee approval for the research was obtained from the ethics committee. Finally, 520 patients included. Patients were informed about the study and their written consents were obtained. All

included patients treated with standard *H. pylori* regimen included triple therapy (proton pump inhibitor (PPI), clarithromycin and amoxicillin) for 2 weeks and PPI for 2 month¹⁷ which considered to be the best-tolerated and safest. For close supervision of patient bounding to treatment, good justification of patient and his or her family and close friends about regimen and soluble complications and intermittent calls were done. confirming the eradication realized by urease breath test (UBT) because it is available, noninvasive, inexpensive and highly sensitive and specific. For reduction of false negative results, the test performed 2 weeks after PPI withheld¹⁸ after negative UBT test result, patients underwent the LSG during 2-4 weeks later. All gastric specimens examined by our histopathology department macro- and microscopically and results were reported in automation system. Statistical analyses were performed using SPSS version 24. Chi-square test and Fishers exact test were applied for evaluate statistical correlations. The ethical committee of the Shahid Beheshti University of Medical Sciences approved this study (IR.SBMU.RETECH.REC.1399.408).

Results

General characteristics of participants are shown in the table 1 shows the demographic, anthropometric and clinical characteristics of LSG patients (N=520). A total of 56.2% of participants were females. Mean age for females and males were 38.3 and 39 years and mean BMI for females and males 44.2 and 46.3. Comorbidities as HTN and DM2 and hypothyroidism were present in 39.9%, 40.2%, 16.7%, 14.4% and 14.4 for females, 18.2% of males respectively. Distribution of histopathologic findings a total of 58.3% of the histopathology sample were normal and no pathologic alteration was reported. Almost 5% of specimens reported positive for *H. pylori* colonization. The most common abnormal histopathology were mild chronic active and inactive gastritis (21.3%), chronic moderate active and inactive gastritis (16.0%), chronic sever active and inactive gastritis (3.3%), lymphoid aggregates (0.6%), intestinal metaplasia (0.2%) and no ulcer or malignant lesions and proton pump effect (0.2%) were reported. We categorized the abnormal

histopathology included mild changes like mild inflammation, mild chronic inactive gastritis, mild chronic active gastritis, moderate changes like moderate inflammation, moderate chronic inactive gastritis, moderate chronic active gastritis and severe changes like severe inflammation, severe chronic inactive gastritis, severe chronic active gastritis. lymphocyte aggregation and intestinal metaplasia was recorded.

Normal pathology was seen mainly in BMI<45, but moderate and severe pathologies ware BMI≥45. There were statistically significant correlation between BMI≥45 and moderate and severe pathology (P=0.000 and Pearson correlation coefficient 38.76). *H. pylori* positive colonization cases had normal pathology less than abnormal pathology but there was no significant statistical correlation between *H. pylori* and pathology with Fisher exact test. There were no statistically significant correlation between age and gender with abnormal pathologies.

Discussion

Helicobacter pylori induce progressive inflammatory changes in the gastric mucosa that may lead to gastric cancer. Understanding the long-term effects resulting from the cure of this infection needed to design cancer prevention strategies¹⁸. The persistence of chronic inflammation in gastric mucosa, after successful eradication therapy are common findings in clinical practice⁵. Some studies based on *H. pylori* histopathology findings was according to endoscopic biopsies with its limitations^{5,7}. Dogan et al observed that the prevalence of active follicular gastritis, chronic active gastritis and *H. pylori* positivity, were high in morbidly obese in Turkish patient population. No significant difference was found between the pathological diagnosis in obese patients with LSG operation in terms of age and sex. Studies have shown that obesity has seen in gastric pathologies. The treatment of gastric pathologies is important in the follow-up of patients and in the success of bariatric surgery¹⁹. We found a significant in our patients that had no pathologic alteration. Results had differences from other studies that reported a high prevalence of positive histopathology (almost 100%) in patients undergoing LSG. Histopathologic findings in LSG in an American database showed that the most

Table 1: General demographic characteristics of patients

	Female	Male
Age (years)		
M±SD	38.3±11.4	39±11.3
Range	15–65	15–60
BMI		
M±SD	44.2±5.1	46.3±2.1
Range	35-50	38–56
H. pylori colonization		
Yes (%)	2	
3		
Hypertension		
Yes (%)	39.9	40.2
Diabetes mellitus		
Yes(%)	16.7	14.4
Hypothyroidism		
Yes (%)	14.4	18.2

Table 2: Distribution of histopathologic findings

Histopathology of LSG Specimen n (%)	
Normal histopathology (58.3)	303
Abnormal histopathology	217(41.7)
Chronic active and inactive gastritis (mild)	111 (21.3)
Chronic active and inactive gastritis(moderate)	83(16)
Chronic active and inactive gastritis(sever)	17(3.3)
Lymphoid aggregate	3 (0.6)
Intestinal metaplasia	1(0.2)
PPI effect	2(0.4)
Ulcer	0
Malignancy	0

prevalence diagnosis in LSG had “no significant pathologic change”, but this was seen in our study just in 35.2% of cases. The most common pathology found in their series of 250 LSG were lymphoid aggregates (31.2 %), chronic inflammation (12 %), and gastritis (12 %) ^{11,20}. We also found that the most common pathology finding in our study was chronic gastritis (including both inactive and active gastritis) however; this was seen in a relatively less percentage of cases ²¹. Some pathologists interpret chronic gastritis when see presence of occasional plasma cells in samples, while others require a significant expansion of lamina propria to diagnose chronic gastritis ²¹⁻²². The other reason may be based on different databases. We found small percentage of patients in our study that had *H. pylori* positive (5%). The most important difference between our study and

prior ones was, all of prior studies paid to report their histopathologic findings ²³⁻²⁴, but in our study we select one of the most challenging groups specially, asymptomatic *H. pylori* positive patients with normal endoscopy that after appropriate treatment and confirming test studied the pathologies. Thus differences were inevitable. There exists a noticeable deficiency in the published literature that examined the relationships between different histopathology of LSG specimens and BMI.

A study in USA found no significant difference between LSG specimens with abnormal pathology (i.e. not containing *H. pylori* or gastric metaplasia) vs. specimens with significant pathology (i.e. containing *H. pylori* or gastric metaplasia) ²⁵. Likewise, others reported no significant relationship between BMI and presence or absence of gastric atrophy, *H. pylori*,

lymphoid follicle and lymphoid aggregates^{11,20,26}. An exception was in the intestinal metaplasia, which was associated with lower BMI (40.8) when compared to other abnormal specimens (atrophy, *H. pylori*, lymphoid follicle and lymphoid aggregate) that did not have intestinal metaplasia (BMI 44.9, $p < 0.0001$)¹⁸. However, another study observed that patients with gastrointestinal stromal tumor (GIST), intestinal metaplasia or lymphoid aggregates had generally higher BMI compared to patients without these particular conditions or compared to patients with normal histopathology, but the differences were not statistically significant^{14,27}. Likewise, in that study, patients with follicular gastritis generally exhibited higher BMI than patients without such pathology or compared to patients with normal LSG specimens (BMI of follicular gastritis patients 48.3 vs. other histopathology (46.6) vs. normal (46.5), but again, and differences were not statistically significant⁵.

In Safaan study, among 1555 patients who had LSG, after controlling for confounding variables (age, gender, *H. pylori*, diabetes mellitus type 2, hypertension), there was no significant association between BMI and either the different benign or pre-malignant histopathology identified in their gastric specimens. Moreover, there was a weak correlation between BMI and the other covariates (age, gender, *H. pylori*, HTN, DM2)¹⁵. Onzie et al deliberated the histologic inflammatory pattern found in the preoperatively morbidly obese patients who underwent LSG was not reproduced in the evaluation of the same patients after 6 months post-operative¹³. A statistically significant reduction of weight and BMI after 6 months post-operative of patients who underwent LSG occurred. A reduction in incidence of comorbidities was verified after the LSG was performed, indicating an improvement in the quality of life of these patients¹⁴. Most of the previous studies that histopathology investigated, were retrospective and there was not noticeable study targeted *H. pylori* effect on gastric histopathology. According to some studies histopathology gastric can lead to LSG outcome failure¹⁶ therefore evaluate the risk factors effect one by one with reduction of confounding elements will be helpful for guidelines in this course. The correlation between post *H. pylori*

treatment persistent histopathologic changes (gastritis) and BMI is asserted in this study. There was no statistical significant correlation between post treatment *H. pylori* colonization and persistent histopathologic changes. The lymphoid aggregations was rare in our study but were more in the BMI ≥ 45 . We had only one IM which discovered in 45 years old man with BMI=48.3 without *H. pylori* colonization although it was not valuable statistically but this pathology after appropriate *H. pylori* treatment was noticeable clinically.

Our study was mono-centric, we recommend the multi-centric and large samples and investigate several risk factors.

Conclusion

In patients with higher BMI (≥ 45) and *H. pylori* positive with visually normal endoscopy who were scheduled for LRYGB, the conditions that permanent endoscopic follow up will be impossible, gain benefit from random tissue mapping even after *H. pylori* treatment.

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