Turk J Gastroenterol *2015; 26: 228-31*

The importance of upper gastrointestinal endoscopy in morbidly obese patients

UPPER GI

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Original Article

ABSTRACT

Background/Aims: Obesity is an epidemic and its prevelance and number of patients underwent bariatric surgery continue to increase worldwide. This study aimed to evaluate endoscopic findings and co-morbidities, to investigate the prevelance of *Helicobacter pylori (H. pylori)* infection and the relationship between body mass index (BMI) and gastroesophageal sphincter incompetency in obese patients.

Materials and Methods: An upper gastrointestinal system endoscopy and mucosal sampling were performed in all patients hospitalized for bariatric surgery. Age, gender, BMI, co-morbidities and endoscopic findings were recorded. Gastroesophageal sphincter incompetency was classified according to Hill classification. The patients were divided into two groups: group I, endoscopically normal and group II, endoscopically abnormal.

Results: Total 127 patients were enrolled into prospective study. Of these, 93 (%73.2) were female and the mean age was 38.9±12.5 years (range: 16-68). Abnormal endoscopic findings and *H. pylori* were detected in 80.4% and 44.9% of patients, respectively. In group II, patients were older, BMI higher and *H. pylori* more prevalent (all statistically significant). Diabetes mellitus, hypertension and dyslipidemia were the most frequent common co-morbidities. Rate of multiple co-morbidities were more common in group II. Gastroesophageal sphincter incompetency in total group was observed in a rate of 46.5% and was weakly correlated with BMI.

Conclusion: Four-fifths of obese patients have at least one endoscopic abnormal finding, three fourth at least one co-morbidity and half *H. pylori* positivity. Upper gastrointestinal system endoscopy should be performed routinely in all patients to predict and prevent complications following bariatric surgery.

Keywords: *Helicobacter pylori*, obesity, endoscopy, bariatric surgery

INTRODUCTION

Obesity is an epidemic with an increasing prevalence worldwide. According to World Health Organization estimation, there are over 500 million obese adults [BMI (body mass index)>30 kg/m^2] across the world (1). Obesity is known to increase susceptibility to several conditions including type 2 diabetes mellitus (DM), hypertension (HTN), dyslipidemia, coronary artery disease, some cancers, sleep apnea syndrome, gastroesophageal reflux disease (GERD) and esophageal motility disorders (2,3). Initial treatment of obesity includes diet, life-style changes, exercise and some medicines, but given the long-term outcomes, effective treatment appears to be achieved by bariatric surgery (4). Body weight reductions along with improvements in obesity related co-morbidities are achieved following bariatric surgery (5). Endoscopy is recommended as a routine practice in all patients to identify and treat endoscopic abnormalities and *H. pylori* positivity prior to bariatric surgery (6). A high prevelance of lower esophageal sphincter (LES) incompetency and hiatal hernia secondary to increased intraabdominal pressure frequently leads to GERD symptoms in obese persons (7). Despite the many studies in the lit-

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Received: March 15, 2015 **Accepted:** March 16, 2015

erature, the relationship between obesity and gastroesophageal sphincter incompetency (GSI) and *H. pylori* infection has not been fully clarified (7-10).

The purpose of the present study is to evaluate endoscopic findings and co-morbidities, to investigate the prevelance of *H. pylori* infection and the relationship between BMI and GSI, and to compare endoscopically normal and abnormal groups in terms of several parameters.

MATERIALS AND METHODS

The current prospective study was approved by the institutional review board (BAV. 71306642-050.01.04-811) and conducted between June 2010 and February 2014. The study was carried out according to ethical principles for medical research involving human subjects outlined in the Helsinki Declaration. Written informed consent was obtained from all patients. The study included 127 patients who presented to our University Hospital for obesity surgery. The patients' demographics, BMI and co-morbidities (DM, HTN, sleep apnea syndrome, congestive heart failure, ischemic heart disease, hypothyroidism, dyslipidemia, chronic obstructive pulmonary disease, asthma and chronic renal failure) were recorded. All patients underwent upper gastrointestinal system endoscopy prior to obesity surgery. Endoscopic interventions were performed by two gastroenterologists (A.D. and B.B.) with relevant experience using the PENTAX EG-290-Kp videogastroscope (Pentax, Tokyo, Japan). Endoscopy was extended up to the second duodenal portion in all patients and all endoscopic data were recorded. The diagnosis of esophagitis was based on the criteria described in Los Angeles Classification (11). In addition, we carefully examined the structure of gastroesophageal junction to assess the GSI, using a retroflexed view during gastric inflation. The GSI was graded from I to IV according to the Hill classification (12,13) (Table 1). In fact, although gastritis is a histopathologic diagnosis, existence of mucosal erosions, hyperemia and edema were considered as endoscopic gastritis. Whether the patients were positive for *H. pylori* was investigated systematically by obtaining two mucosal samples each from antrum and corpus. Histopathological analysis was performed by a pathologist (N.Ü.) specialized in the gastrointestinal tract using Giemsa stain. The patients were divided to into normal (group I) and abnormal group (group II) in terms of existence of at least one abnormal endoscopic finding.

Statistical analysis

SPSS for Windows 19.0 (SPSS, Chicago, IL, USA) was used for statistical analyses. Suitability of parameters to normal distribution was assessed with Kolmogorov-Smirnov test. Descriptive statistical methods (mean, standard deviation and percentage) as well as Student's t test for inter-group comparisons of normally distributed data and Mann-Whitney U test for inter-group comparisons of non-normally distributed quantitative data were used for the evaluation of the study data. Chi-square test and Fisher's exact tests were used to compare qualitative data. Pearson correlation coefficient was used to determine the correlation between variables (BMI and GSI grading). The results were evaluated using hazard ratio and 95% confidence interval. In these analyses, $p<0.05$ was considered statistically significant.

RESULTS

Of the 127 patients, 93 (73.2%) were females and mean age was 38.9±12.5 years (range 16-68). Mean BMI was 48±8.08 (range 35-80). Of the patients, 25 (19.6%) were endoscopically normal (group I) and 102 (80.4%) were abnormal (group II).

Endoscopic abnormalities

Most common endoscopic finding was endoscopic gastritis (64.6%). Endoscopic abnormalities are summarized in Table 2.

Co-morbidity

Of the 127 patients, 43 (33.9%) had no co-morbidity, while 84 (66.1%) had at least one co-morbidity. In 27 (21.3%) patient three and more co-morbidities were documented (Table 3). Despite multiple co-morbidities were more common in group II, no statistically significant difference was observed between two groups ($p<0.05$).

Helicobacter Pylori

H. pylori was positive in 57 (44.9%) patients.

Comparison of both groups

Rate of *H. pylori* positivity, mean age and mean BMI were significantly higher in the group II (Table 4).

Table 1. Hill Classification of gastroesophageal sphincter incompetency

Grade I.	The prominent fold of tissue along the lesser curvature apposed closely to the endoscope.
Grade II	The fold was present but less well defined than in grade I, and some periods of opening and rapid closing around the endoscope were found
Grade III	The fold was not prominent and often failed to close around the endoscope, gripping it tightly.
Grade IV	There was no fold and the lumen of the esophagus was open. The squamous epithelium of the esophagus could be seen below

Table 2. Abnormal endoscopic findings in morbid obese patients

Endoscopic abnormality	Patient number/Rate
Endoscopic gastritis	82 (64.6%)
Gastroesophageal sphincter incompetency	59 (46.5%)
Reflux esophagitis	29 (22.8%)
Hiatal hernia	14 (11%)
Duodenitis	12 (9.4%)
Peptic ulcer	7 (5.5%)
Gastric polyp	1 (0.8%)

Table 3. Frequency of co-morbidities in total group

Co-morbidities	Patient number/Rate
Diabetes mellitus	46 (36.2%)
Hypertension	45 (35.4%)
Dyslipidemia	46 (36.2%)
Sleep apnea syndrome	13 (10.2%)
Hypothyroidism	10 (7.8%)
COPD/Asthma	7 (5.5%)
Chronic kidney disease	4 (3.1%)
Ischemic heart disease	2 (1.5%)
Congestive heart failure	1 (0.8%)

COPD: Chronic obstructive pulmonary disease

Table 4. Comparing of both groups in terms of age, sex, BMI, *H. pylori* positivity and co-morbidities

	Group I	Group II	p value
Age (mean±SD)	34.2±12.1	40.1±12.4	0.034
Sex (F/M)	20/5	73/29	NS
BMI (mean±SD)	43.9±5.2	49.1±8.3	0.004
H. pylori-positivity n, (%)	5 (20%)	50 (51%)	0.005
Co-morbidities n, (%)	19 (76%)	65 (63.7%)	NS
Number of Co-morbidities 1/2/3	11-4-4	17-25-23	NS

NS: not significant (p>0.05)

The relationship between BMI and gastroesophageal sphincter incompetency

Gastroesophageal sphincter incompetency was found in 59 (46,5%) of the patients. According to Hill classification, 10 (7.9%) patients had Hill I, 32 (25.2%) patients had Hill II, 14 (11%) patients had Hill III and 3 (2.4%) patients had Hill IV class sphincter morphology. Generally mean BMI was higher in patients with GSI in comparison with those without GSI (46.7±6.5 vs. 49.6±9.3; p=0.038). However, GSI grading was weakly correlated with BMI (r=0.27, p=0.003). GSI grading and BMI findings are summarized in Figure 1.

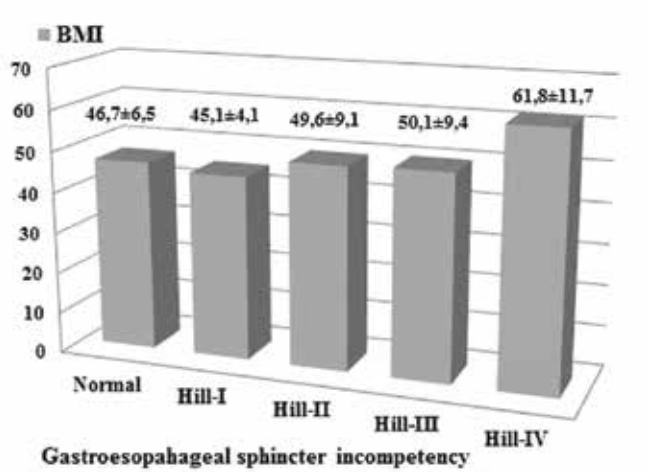

Figure 1. Correlation between gastroesophageal sphincter incompetency and BMI (r=0.27, p=0.003).

DISCUSSION

Many studies recommend performing upper gastrointestinal endoscopy before obesity surgery as a routine practice. At least 10% of patients are known to have abnormal endoscopic findings that affect the type and timing of surgery (14). Sharaf et al. have reported that the type and timing of surgery was altered by endoscopic findings in as high as 61.5% of the patients (15). Prevelance of abnormal findings identified with routine upper gastrointestinal endoscopy from six studies ranged from 14 to 91% (14). In current study, the proportion of patients with abnormal endoscopic findings was 80.4%, consistent with the reports in literature such as the studies by Sharaf et al. (89.7%) and Madan et al. (91%) (6-16). The higher mean BMI in our study may explain the higher rate of endoscopic abnormalities. The most common endoscopic findings were endoscopic gastritis, lower esophageal sphincter deficiency, reflux esophagitis and hiatal hernia, as consistent with the literature (3,6,14). Assessment of presence of endoscopic findings with respect to demographics demonstrated a significant relationship with age, consistent with the study by Munoz et al. (3). BMI and *H. pylori* rates were also significantly higher in patients with abnormal endoscopic findings. *H. pylori* prevalence was reported as 82.5% in a study in Turkey (17) but was 44.9% in morbid obese patients in our study, which was lower compared to the overall Turkish population. *H. pylori* prevalence in obese individuals is still disputable, reported from different studies to range from 8.7 to 85.5% (10). *H. pylori* prevalence was lower in obese groups compared to control groups in all studies but the exact cause is unknown (10,18). Additionally, we found that *H. pylori* prevalence was increased in patients with higher BMIs and endoscopic abnormalities. Interestingly, Kamada et al. (19) studied a *H. pylori*-positive Japanese population and demonstrated significant weight increase in patients who received *H. pylori* eradication therapy compared to those who did not. Animal studies have shown that leptin levels increased, ghrelin levels decreased, weight gain was prevented, glucose tolerance improved and fasting plasma glucose levels decreased in the presence of *H. pylori* colonization (10,18). While genetic modification is an important predisposing factor for obesity, it is acknowledged that human genome has not changed significantly over the last century. Excessive calorie intake and sedentary life style are major risk factors for obesity and DM but these do not explain the worldwide obesity epidemiology. According to a recent hypothesis, the leading factors for obesity are environmental chemicals, stress, immunologic changes, micronutrient deficit and intestinal microbiota (20). In our series, co-morbidity was also common among obese patients and a significant relationship was demonstrated between number of co-morbidities and endoscopic abnormalities.

The significant relationship between GERD and obesity and higher GERD prevalence with increasing BMIs have also been

described in the literature (21). The causes of this are believed to be increased intraabdominal pressure, deficiency of the lower esophageal sphincter, increased prevelance of hiatal hernia, impaired esophageal motility due to abnormal visceral stimulation and bile and pancreatic enzyme reflux due to vagal abnormalities (21,22). Herbella et al. (9) reported increased LES pressure in obese persons, but Ayazi et al. (7) demonstrated that LES pressure is less pronounced in obese individuals and that LES defects increase with higher BMIs. In our study, GSI grading was weakly correlated with BMI.

In conclusion, four-fifths of obese patients have at least one endoscopic abnormal finding, three-fourths have at least one comorbidity, and half have *H. pylori*-positivity. *H. pylori* frequency in obese patients is lower in comparison with general population, but more prominent in the obese patients with abnormal endoscopic findings. Therefore, upper gastrointestinal system endoscopy should be performed routinely in all patients to predict and prevent complications following bariatric surgery. Eradication of *H. pylori* in obese patients can be useful to prevent *H. pylori* related complications.

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

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

Author contributions: Concept - B.B., A.D.; Design - A.D., B.B.; Supervision - A.D.; Resource - B.B., Y.K., T.Ö., N.B.K.; Materials - B.B., Y.K., N.Ü., S.B.; Data Collection &/or Processing - B.B., Y.K.; Analysis &/or Interpretation - B.B., Y.K.; Literature Search - B.B., A.T.İ.; Writing - B.B., Y.K., A.D.; Critical Review - A.D.

Conflict of Interest: No conflict of interest was declared by the authors.

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

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