

## Original Paper

**Digestive  
Surgery**Dig Surg 2015;32:238–242  
DOI: 10.1159/000381811Received: December 13, 2014  
Accepted after revision: March 18, 2015  
Published online: May 19, 2015

# Preoperative Endoscopy and Its Impact on Perioperative Management in Bariatric Surgery

Georg Wiltberger<sup>a</sup> Julian Nikolaus Bucher<sup>a, b</sup> Moritz Schmelzle<sup>a, c</sup>  
Albrecht Hoffmeister<sup>d</sup> Arne Dietrich<sup>e</sup><sup>a</sup>Department of Visceral-, Transplantation-, Thoracic- and Vascular Surgery, University Hospital Leipzig, Leipzig,<sup>b</sup>Department of Surgery, Munich University Hospital at Großhadern (LMU), Munich, <sup>c</sup>Department of General-, Visceral- and Transplant Surgery, Berlin University Hospital, Berlin, <sup>d</sup>Department of Medicine, Dermatology and Neurology, Division of Gastroenterology and Rheumatology, and <sup>e</sup>Department for Bariatric Surgery, University Hospital Leipzig, Leipzig, Germany

## Key Words

Bariatric surgery · Preoperative · Endoscopy · Gastroscopy · Perioperative management

## Abstract

**Background:** The role of preoperative upper-gastrointestinal endoscopy for bariatric surgery is still understood only with controversy. The aim of this study was to evaluate the prevalence of endoscopic findings and its impact on perioperative management. **Methods:** Patients who underwent bariatric surgery at our center between 2010 and 2013 were systematically analyzed from a prospective database. **Results:** Two hundred and twelve patients with a median body mass index of 50 kg/m<sup>2</sup> (range 29–87) underwent 216 bariatric procedures at our center between 2010 and 2013. All patients received preoperative upper endoscopy. In 159 cases (75%), the endoscopy was performed at our center. These cases were included in this study. In 37 cases (23%), no abnormal findings were detected. In 122 cases (76%), upper endoscopy revealed pathologies. No further treatment was necessary in 24 cases (15%). Medical treatment was changed in 81 cases (51%). The operation was delayed due to medical treatment and re-endoscopy in 13 cases

(8%). The surgical approach was changed in 4 cases (3%). **Conclusion:** Routinely performed preoperative endoscopy before bariatric surgery revealed a high prevalence of gastrointestinal diseases with a significant impact on perioperative management in two thirds of the cases. Therefore, we recommend routine gastroscopy about 2–4 weeks prior to surgery.

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## Introduction

Obesity is a worldwide epidemic disease with a prevalence of more than 20%. Germany has the highest prevalence of obesity in Europe [1, 2]. It is associated with an increased risk of comorbidities such as type 2 diabetes, cardiovascular disease, gastroesophageal reflux disease (GERD) and several types of cancer [3, 4].

Bariatric surgery remains the most effective treatment for morbid obesity when conservative therapy is insufficient and therefore is becoming more and more accepted. Consequently, in Germany the number of primary procedures for obesity has increased rapidly from 596 in 2005 to 6,195 in 2011 [5].

KARGER 125

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0253-4886/15/0324-0238\$39.50/0E-Mail [karger@karger.com](mailto:karger@karger.com)  
[www.karger.com/dsu](http://www.karger.com/dsu)Georg Wiltberger, MD  
Liebigstraße 20  
DE-04103 Leipzig (Germany)  
E-Mail [Georg.Wiltberger@medizin.uni-leipzig.de](mailto:Georg.Wiltberger@medizin.uni-leipzig.de)

Because of morbid obesity and its frequent comorbidities, an accurate preoperative evaluation for risk reduction of this highly elective surgical therapy is mandatory. However, the value of preoperative upper gastrointestinal endoscopy is still uncertain and yet not generally recommended [6].

Several studies showed only low prevalence of abnormal findings (10–34%), whereas other studies reported an increased prevalence of gastrointestinal diseases in morbidly obese patients, which may have an impact on the perioperative therapy or even on the surgical procedure [7–11].

The aim of this study was to evaluate the prevalence of abnormal findings in preoperative endoscopy and its potential impact on perioperative management.

## Material and Methods

Information on patients who were scheduled for bariatric surgery between October 2010 and April 2013 was analyzed retrospectively from our prospective database (n = 212). All patients receiving the upper endoscopy at our interdisciplinary endoscopy unit were included into the study (n = 159). Fifty-three patients were excluded from the study since they underwent endoscopy elsewhere (preferably locally when living outside the city) and hence the results were not documented.

Prior to surgery, all patients attended an interdisciplinary weight loss program for more than 6 months, including frequent physical exercise, behavioral education and diet counseling; however, this did not lead to a significant weight loss. In all patients, preoperative upper endoscopy was performed by highly experienced physicians. Biopsies were taken routinely and additionally if indicated by macroscopic pathologies. The endoscopic and histological findings were prospectively recorded in the study database. All patients who underwent preoperative upper endoscopy in an external hospital were excluded from this study.

The updated Sydney System was used to classify the grade of gastritis [12]. Esophagitis was classified according to Savary and Miller [13]. *Helicobacter pylori* (*H. pylori*) colonization was tested using the rapid urease test and histological staining (silver staining). In case of a positive *H. pylori* staining with no ulcer, postoperative eradication was recommended but did not cause a shift in the operation. In case of positive *H. pylori* staining with ulceration, eradication and re-endoscopy was performed.

Retrospectively we stratified the cases in five groups, according to the endoscopic findings and their impact on perioperative management:

Group 1: no pathological findings in upper endoscopy; Group 2: pathological findings which had no influence on the perioperative management; Group 3: pathological findings that altered the perioperative management but did not shift the operation; Group 4: pathological findings leading to delayed surgery; Group 5: the surgical approach was changed because of endoscopic findings.

## Results

Between October 2010 and April 2013, 212 patients (female n = 142) with a median age of 47 (range 19–71) and a median body mass index (BMI) of 50 kg/m<sup>2</sup> (range 29–87) underwent either laparoscopic Sleeve Gastrectomy (n = 56), laparoscopic Roux-en-Y Gastric Bypass (LRYGB) (n = 150), laparoscopic Redo Procedure (Sleeve to bypass n = 8) or laparoscopic Duodenal-switch with Biliopancreatic Diversion (n = 2).

In 37 cases (23%), no abnormal findings and in 122 cases (76%) abnormal findings were detected as shown in table 1. In the latter group, 24 cases (15%) were not treated, the perioperative medical treatment was changed in 81 cases, the operation was delayed due to medical treatment and mandatory re-endoscopy in 18 cases and abnormal findings changed the surgical approach in 4 patients.

Reflux esophagitis was found in 36 cases (23%) of which 28 cases (18%) were classified as reflux esophagitis Grade I and 8 (5%) as reflux esophagitis Grade II. No reflux esophagitis Grade III was found in any patient. Barrett's esophagus was found in 14 cases (9%) and this was confirmed by histology. Of these, one case was high-grade intraepithelial dysplasia with areas that were identified as a well-differentiated adenocarcinoma. It was staged as T1a N0 (according to UICC) by endoscopic ultrasonography and treated initially by endoscopic mucosectomy. However, a complete resection was not achieved. Therefore, the patient was scheduled for a modified laparoscopic, transhiatal extended cardia-resection with reconstruction as LRYGB.

Hiatal hernias were found in 34 cases (21%) of which most cases (n = 31; 19%) were small and needed no further treatment. In 3 cases (2%) of larger hiatal hernias, an additional hiatus repair was performed.

Gastric or duodenal ulcers were found in 83 cases (53%) of which 71 (45%) were superficial ulcers. In this case, a high dose of proton pump inhibitors (PPI) were given but no shift of the operation was necessary. In 12 cases (8%), deep ulcers were detected and this finding led to a shift of the operation. *H. pylori* colonization was detected in 35 cases (22%) and pre- or postoperative eradication was indicated, without a shift of the operation if no deep ulceration was present. All 12 patients with deep ulcers had positive *H. pylori* colonization and received preoperative eradication therapy and re-endoscopy before surgery.

No esophageal or gastric varices were detected in any patient, whereas in 8 cases (5%), gastric polyps were detected. Histological analysis showed no evidence of malignancy.

**Table 1.** Results of upper GI endoscopy prior to planned bariatric surgery

	Total	Pathological findings and consequences for planned surgery				
		none	minor pathology, operative planning unchanged	relevant pathology, operative planning unchanged	relevant pathology, operative planning changed	relevant pathology, operative procedure changed
Patient characteristics						
n	159 (100)	37 (23)	24 (15)	81 (51)	13 (8)	4 (3)
Female	104 (65)	25 (68)	13 (54)	58 (72)	6 (46)	2 (50)
Age, median (mean)	48 (46)	48 (44)	46 (44)	48 (47)	51 (51)	54 (53)
BMI, median (mean)	50 (52)	50 (55)	50 (53)	48 (51)	54 (54)	48 (49)
Reflux esophagitis						
Grade I	28 (18)	0	11 (46)	14 (17)	2 (15)	1 (25)
Grade II	8 (5)	0	2 (8)	3 (4)	1 (8)	2 (50)
Grade III	0	0	0	0	0	0
Barrett's esophagus						
No dysplasia	13 (8)	0	0	10 (12)	1 (8)	2 (50)
High grade dysplasia	1 (0.6)	0	0	0	0	1 <sup>AC</sup> (25)
Hiatal hernia						
Small	31 (19)	0	16 (67)	11 (14)	3 (23)	1 (25)
Large	3 (2)	0	0	0	0	3 (75)
Gastritis						
Superficial erosions	71 (45)	0	0	62 (77)	6 (46)	3 (75)
Ulcers	12 (8)	0	0	0	12 (92)	0
Hp	35 (22)	0	0	27 (33)	8 (61)	0
Gastric polyps	8 (5)	0	2 (8)	6 (7)	0	0
Perioperative management						
High dose PPI	98 (62)	0	0	81 (100)	13 (100)	4 (100)
Hp-eradication	35 (22)	0	0	27 (33)	8 (61)	0
Delay of surgery	14 (9)	0	0	0	13 (100)	1 (25)
Change of planned procedure	4 (3)	0	0	0 (1) <sup>a</sup>	0	4 (100)

Results in total numbers or % of group/total. Hp = Helicobacter pylori infection; AC = invasive adenocarcinoma.

<sup>a</sup> One patient with intraoperative diagnosis of gastric carcinoma, modification of the planned procedure towards subtotal gastrectomy.

In one patient, a gastric adenocarcinoma was not detected by preoperative endoscopy. However, intraoperatively, a tumor mass was seen and gastric carcinoma was confirmed by intraoperative frozen section. The surgical approach was adapted intraoperatively and the patient received a subtotal gastrectomy with Roux-en-Y reconstruction.

## Discussion

An accurate preoperative evaluation may be useful in order to reduce perioperative complications in obese patients. However, the role of preoperative endoscopy is still

discussed controversially. The central aim of this study was to evaluate the prevalence of preoperative endoscopic findings in patients scheduled for bariatric surgery and its potential impact on perioperative management. Our results showed that gastrointestinal disorders in obese patients are frequent and had an influence on the perioperative course in 62% of the cases.

Although no official guideline recommendations exist, we consider preoperative upper endoscopy essential for the detection of gastrointestinal diseases before bariatric surgery. This approach is supported by other studies that found abnormalities in preoperatively performed endoscopy in 77–91% of the patients [7, 14, 15]. Major findings in these studies were distal esophagitis in 38.9

and 24% of the cases. In our study, however, only 19% of the cases with pathological findings revealed distal esophagitis, which could be explained by the frequent, self-dependent use of PPIs in our cohort. Generally, in obese patients, the rate of esophagitis is higher than in the normal weight population [15].

The rates of pathological findings that influenced the perioperative course (e.g. additional medical treatment, postponing the date of the operation or change in the surgical approach) differs from 0.4 to 9% in the current literature. The study of de Moura Almeida et al. included 162 patients who underwent preoperative endoscopy before bariatric surgery and revealed that gastric ulcers only led to a delayed operation in 1.9% of all patients [7]. Furthermore, none of the 14 detected hiatal hernias (8.6%) led to a change in surgical approach.

In the series of studies by Zeni et al. [8], preoperative upper endoscopy revealed pathological findings, which delayed or altered the perioperative course before undergoing LRYGB in 15 patients (9%). Most findings were large and/or symptomatic hiatal hernias (5%), leading to simultaneous hernia repair. Furthermore, gastroduodenal ulcers led to delayed surgery and re-endoscopy to confirm the success of medical treatment in 4 patients (2%). In 2 patients (1%) pathological findings changed the surgical procedure and in one patient, a gastrointestinal stromal tumor (GIST) was detected and subtotal gastrectomy had to be performed. In another patient, a gastric polyp was treated with a partial gastrectomy [8]. In contrast to these studies, our results showed a higher rate of pathological results having an influence on perioperative management. In 12 cases (8%), severe ulcerations with positive *H. pylori* colonization were detected and the operation had to be shifted for eradication therapy and re-endoscopy.

According to the pathological findings that changed the surgical approach, our results showed similar rates as reported by Zeni et al. [8]. In 3 patients (2%), the surgical approach had to be adapted due to major hiatal hernias (simultaneous hernia repair) and in one patient due to esophageal adenocarcinoma. The latter patient received a modified laparoscopic transhiatal extended resection of the cardia with a reconstruction as LRYGB after insufficient endoscopic mucosectomy.

In a further study of Loewen et al., 447 consecutive patients underwent routine upper endoscopy before bariatric surgery. Endoscopic findings were classified according to the suggestion of Sharaf et al. in a modified manner into four groups: Group 0 without abnormal findings;

Group 1 was divided into two subgroups, whereas Group 1 had abnormal findings that did not change the preoperative course and Group 1a had abnormal findings that changed the medical management but did not change the surgical approach or shift the operation; Group 2 had abnormal findings that changed the surgical approach or delayed surgery and Group 3 with absolute contraindications for surgery [16]. In contrast to other studies, only 30% of all evaluated patients had abnormal findings and 2 patients (0.4%) had pathological results that postponed surgery [17].

In summary, our study showed that routinely performed preoperative upper endoscopy in patients scheduled for bariatric surgery revealed a high prevalence of gastrointestinal diseases. Furthermore, we could show that these pathological findings had a potential impact on perioperative management in two thirds of all cases.

For this reason, we recommend routine gastroscopy about 2–4 weeks prior to planned surgery. This may be even more important for centers doing mainly Sleeve-Gastrectomy. Here, for patients with GERD, bypass surgery should be considered an alternative.

## Acknowledgments

Grant and financial support: none.

## Disclosure Statement

The authors have received no grants and financial support to disclose; they do not have any conflicts of interest.

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