

Value of Preoperative Upper Endoscopy in Patients Undergoing Laparoscopic Gastric Bypass

Tallal M. Zeni, MD¹; Constantine T. Frantzides, MD, PhD¹; Claudius Mahr, DO²; E. Woody Denham, MD¹; Mick Meiselman, MD²; Michael J. Goldberg, MD²; Susannah Spiess, MD²; Randall E. Brand, MD²

¹Minimally Invasive Surgery Center, Department of Surgery, ²Department of Gastroenterology, Evanston Northwestern Healthcare and Northwestern University, Evanston, IL, USA

Background: Preoperative evaluation of patients undergoing laparoscopic Roux-en-Y gastric bypass (LRYGBP) has included esophagogastroduodenoscopy (EGD) with little data to substantiate its use.

Methods: A retrospective analysis was conducted of patients from Feb 04 to Mar 05 who underwent preoperative EGD and subsequently LRYGBP.

Results: 169 patients underwent EGD prior to surgery. Their mean age was 41.1 years (range 14-66), mean BMI 49.7 (range 35-78), and 82% were females. There were no complications from EGD. Significant findings in patients at EGD included gastric ulceration in 3 (2%), duodenal ulcer in 1 (0.7%), Barrett's esophagus in 2 (1.3%), and a GI stromal tumor (GIST) in 1 (0.7%). EGD revealed hiatal hernias in 56 (35.2%), esophagitis in 28 (17%), Schatzki's ring in 5 (3%), gastritis in 43 (27%), gastric polyps in 8 (5%), and duodenitis in 9 (6%). 53 patients (33.3%) had a negative EGD. Ulcer and severe gastritis, esophagitis, and duodenitis diagnosed preoperatively were treated medically before surgery. 9 hiatal hernias were repaired intraoperatively. The patient with the GIST underwent laparoscopic near-total gastrectomy and gastric bypass, while 1 patient with an antral polyp underwent laparoscopic partial gastrectomy in addition to the LRYGBP.

Conclusion: EGD is essential for diagnosis of GI diseases including tumors, ulcers, and hiatal hernias that alter the medical and surgical management of patients undergoing gastric bypass.

Key words: Morbid obesity, esophagogastroduodenoscopy, minimally invasive surgery, laparoscopic surgery, gastrointestinal stromal tumor, gastric bypass, gastrojejunostomy

Introduction

Gastric bypass in various forms has been performed since 1967.¹ In 1991, the National Institutes of Health issued a consensus statement advocating surgery as the most consistent and effective therapy for morbid obesity.²

With the advent of laparoscopic bariatric technique in 1994,³ bariatric surgery has increased dramatically from 6,868 cases in 1996, 45,473 cases in 2001, to 103,000 cases by 2003.⁴⁻⁶ The use of endoscopy in the bariatric patient has included preoperative screening,⁷⁻⁹ intraoperative evaluation of the gastric pouch and gastrojejunal anastomosis,^{10,11} postoperative evaluation of intraluminal bleeding,¹² dilatation of strictures,^{13,14} and evaluation of postoperative symptomatology.^{15,16}

Although preoperative evaluation of patients undergoing laparoscopic gastric bypass has included esophagogastroduodenoscopy (EGD), little data has been provided to substantiate its use. Considering that the gastric bypass precludes endoscopic evaluation of most of the upper gastrointestinal (GI) tract postoperatively, we sought to evaluate our experience, to elucidate the value of EGD in the preoperative setting.

Presented at the 10th World Congress of the International Federation for the Surgery of Obesity, Maastricht, The Netherlands, September 2, 2005.

Reprint requests to: Constantine T. Frantzides MD, PhD, Professor of Surgery, Northwestern University, Director, Minimally Invasive Surgery Center, Evanston Northwestern Healthcare, 2650 Ridge Ave, Burch 106, Evanston, IL 60201, USA. Fax: 847-733-501; e-mail: cfrantzides@enh.org

Materials and Methods

A retrospective analysis of patients from Feb 04 to Mar 05 who had undergone preoperative EGD and subsequently laparoscopic Roux-en-y gastric bypass (LRYGBP) was conducted. Preoperative endoscopy was performed by the Evanston Northwestern Healthcare (ENH) Department of Gastroenterology and included authors MM, MG, SS, and RB. The LRYGBP was performed by either author (CTF or EWD). The technique for LRYGBP by CTF has been previously described.¹⁷ The gastrojejunostomy (GJ) anastomosis was performed by the transoral introduction of a 25-mm circular EEA anvil through the gastric pouch staple-line (US Surgical, Norwalk, CT). Hiatal hernia repair, when indicated, was performed by either an anterior or posterior primary cruroplasty. Demographic data, BMI, endoscopic findings, operative findings and postoperative course were documented. Patients who underwent LRYGBP without preoperative endoscopy from Oct 03 to Feb 04 were also reviewed.

Results

A total of 159 patients underwent EGD prior to LRYGBP between Feb 04 and Mar 05 (Group 1). Their mean age was 41.1 years (range 14-66), mean BMI was 49.7 (range 35-78), and 82% were females. Before the institution of routine preoperative endoscopy, 38 patients at ENH underwent LRYGBP between Oct 03 and Feb 04 (Group 2). Their demographics and mean BMI were nearly identical to Group 1. There were no complications from the EGD in Group 1.

Esophagitis was found in 28 patients (17%), Schatzki's ring in 5 patients (3%), and Barrett's esophagus in 2 patients (1.3%) (Figure 1). Neither of the latter two patients with Barrett's esophagus had dysplasia but one did have a hiatal hernia that was repaired intraoperatively.

EGD revealed hiatal hernias in 56 patients (35.2%). The majority were small or asymptomatic (83.9%) and did not alter the bariatric operation. Nine (16.1%) large or symptomatic hiatal hernias associated with gastroesophageal reflux disease were repaired.

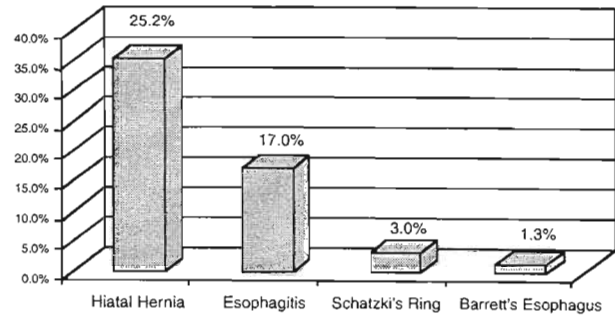


Figure 1. Esophageal pathology found on preoperative EGD.

Gastric ulceration was found in 3 patients (2%) (Figure 2). Two of these patients received triple therapy preoperatively, and the third was treated solely with proton pump inhibitors based on *H. pylori* status. All three patients underwent repeat endoscopy prior to surgery revealing healing of the ulcers. Gastritis was found in 43 patients (27%) and was treated if it was moderate to severe or if *H. pylori* testing was positive. However, documentation of gastritis did not delay surgery.

A GI stromal tumor (GIST) was found in one patient (0.7%). This patient underwent an uneventful laparoscopic near-total gastrectomy in addition to the gastric bypass. The patient later presented with a gastrojejunal anastomotic ulcer 6 months postoperatively that subsequently healed with medical therapy.

Gastric polyps were found in 8 patients (5%); in 1 patient (12.5%), it was felt that resection was required. Therefore, a laparoscopic partial gastrectomy in addition to the gastric bypass was performed in this patient. The polyp was found to be benign on pathological examination.

Duodenitis was found in 9 patients (6%), while duodenal ulceration was noted in 1 patient (0.7%) in whom triple therapy was instituted (Figure 3). Of

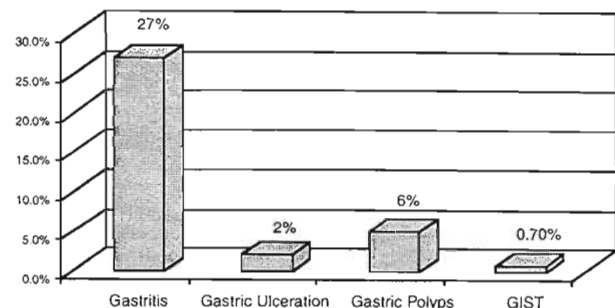


Figure 2. Gastric pathology found on preoperative EGD.

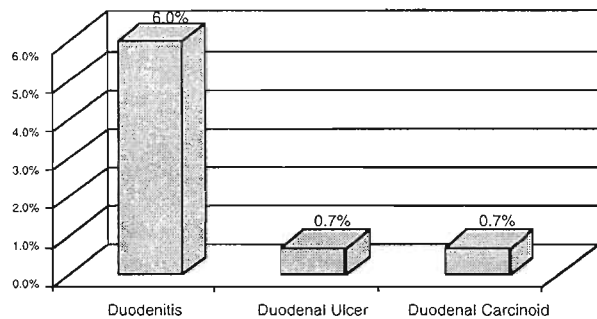


Figure 3. Duodenal pathology found on preoperative EGD.

note, one patient was found to have a 7-mm duodenal carcinoid tumor that was endoscopically resected. The patient will undergo surveillance endoscopy for 6 months before performance of the LRYGBP.

EGD was negative in 53 patients (33.3%). Interestingly, one patient who had a normal preoperative endoscopy and uneventful LRYGBP presented 9 days postoperatively with right-sided abdominal pain and leukocytosis. The patient was found to have a contained microperforation of the duodenum on computed tomography. The patient responded to medical therapy that included intravenous antibiotics and proton pump inhibitors. The patient subsequently had intraluminal bleeding 3 weeks postoperatively that required transfusion and resolved spontaneously.

Postoperatively, intraluminal bleeding occurred in 7 patients (4.4%). All cases were treated with supportive care without the use of endoscopy and resolved spontaneously. GJ anastomotic ulceration confirmed endoscopically occurred in 5 patients (3.1%) in group 1 vs one patient (2.6%) in group 2 ($P=NS$). GJ stricture requiring one dilatation at 1 month postoperatively occurred in 1 patient (0.6%). Follow-up of the patients has ranged from 3 to 20 months.

Discussion

The availability of laparoscopic bariatric surgery and its many benefits have been instrumental in the dramatic increase in the number of operations.⁴⁻⁶ Preoperative evaluation of the upper GI tract by either barium radiography or endoscopy remains controversial. Studies evaluating the use of barium UGI radiography have concluded that it is not useful or cost-effective.^{18,19}

Endoscopy has been evaluated in the preoperative setting in only a few studies.⁷⁻⁹ Sharaf et al⁸ concluded that preoperative endoscopy was cost-effective. Significant findings in their study included hiatal hernias in 40.0%, gastritis in 28.7%, esophagitis in 9.2%, gastric ulceration in 3.6%, Barrett's esophagus in 3.6% and esophageal ulcer in 3.1%.

In another study by Madan et al,⁷ hiatal hernias were diagnosed in 90.3% of patients on preoperative endoscopy and were routinely repaired. They believed that repair may decrease the postoperative incidence of gastroesophageal reflux.

Shirmer et al⁹ evaluated the role of preoperative endoscopy in 560 patients and noted a 4.9% alteration in operative management. Most significant was the finding of previously undiagnosed Barrett's esophagus with severe dysplasia in one patient. Esophagectomy was performed revealing stage 1 esophageal adenocarcinoma. In addition, they noted *H. pylori* positivity in 30.1% of patients tested. In those patients who were treated for *H. pylori*, the marginal ulceration rate was significantly lower at 2.4% vs 6.8% in patients who did not undergo *H. pylori* testing nor treatment before 1997.

In our series, preoperative EGD revealed pathology that either delayed surgery or altered the surgical management in a total of 15 patients (9.4%) (Table 1). Delay of surgery occurred in 3 patients with gastric ulceration and in 1 patient with duodenal ulceration. The patients with gastric ulceration underwent medical treatment followed by repeat endoscopy with demonstration of healing, while the patient with duodenal ulceration underwent triple therapy and was not considered to require repeat endoscopy.

Alteration of surgical management occurred in 9

Table 1. Patients in whom EGD altered management

Finding	n	Treatment
Hiatal hernia	9	LRYGBP, primary hiatal hernia repair
GIST	1	LRYGBP, near total gastrectomy
Gastric polyp	1	LRYGBP, partial gastrectomy
Gastric ulceration	3	Medical treatment, repeat EGD, LRYGBP
Duodenal carcinoid	1	Endoscopic resection, surveillance EGD
Duodenal ulceration	1	Medical treatment, LRYGBP

patients with symptomatic or large hiatal hernias, a patient with a GIST tumor, and a patient with an antral polyp. In this series, we did not feel that repair of asymptomatic or small hiatal hernias was indicated. The GIST was resected with a laparoscopic near-total gastrectomy in addition to the gastric bypass because the patient had only local disease.²⁰

Gastric cancer after gastric bypass has been reported in the literature.²¹ Preoperative EGD was clearly instrumental in diagnosing and thereafter resecting the above GIST that may otherwise have not been treated appropriately. In addition, a patient with a duodenal carcinoid was diagnosed and treated with endoscopic resection. The patient will undergo further surveillance endoscopy before LRYGBP. The final patient underwent partial antral gastrectomy in addition to the LRYGBP.

Although endoscopy has been described in the management of postoperative bleeding,¹² we believe that endoscopy may place the fresh anastomosis at risk. In addition, the 7 patients (4.4%) who had postoperative intraluminal bleeding all resolved spontaneously with or without the need for transfusion.

We did not find a significant difference in the incidence of postoperative ulceration between patients who had preoperative EGD (3.1%) vs those who did not (2.6%). This may be due in part to the small size of this study. In addition, it must be noted that many patients with symptoms including epigastric pain or burning were empirically placed on carafate and a proton pump inhibitor. Only if the patients did not respond to the treatment or experienced recurrent symptoms was endoscopy undertaken postoperatively. Therefore, this review most likely underestimates the incidence of postoperative ulceration; however, it is consistent with other studies.^{22,23} The mechanism of ulceration after gastric bypass is more likely related to ischemia than acid in the majority of patients.^{24,25} *H. pylori* may also play a role in postoperative ulceration.^{9,23}

Postoperatively, endoscopy is useful in evaluating symptomatology. In a study by Huang et al,¹⁵ stomal stenosis was found in 39% of those patients with nausea, vomiting, or dysphagia. Marginal ulcer was found in 27% of those patients who were symptomatic. Although normal endoscopy (43%) was the most common finding in their study, endoscopy is clearly essential in diagnosing and treating the above abnormalities.

We encountered only 1 patient (0.6%) with postoperative anastomotic stenosis, at 1 month postoperatively. This was amenable to one session of endoscopic dilation. Studies typically document a 3.1-17% stenosis rate.^{13,14,22} In a study by Go et al,¹⁴ a stenosis rate of 6.8% occurred at an average of 7.7 weeks postoperatively (range 3-24). Endoscopic dilatation was utilized an average of 2.1 times to relieve the stenosis, with an ultimate 95% success rate and 3% complication rate that included one perforation. Utilizing a 25-mm circular EEA stapler anvil passed transorally and brought out through the gastric pouch staple-line may have resulted in the low stenosis rate seen in our series.

Despite a preoperative normal endoscopy in 1 patient, a contained microperforation occurred postoperatively that was amenable to intravenous antibiotics and proton pump inhibitors. It is unclear, however, whether the patient had an undiagnosed preoperative duodenal ulcer that subsequently perforated or whether iatrogenic injury during the LRYGBP occurred.

In conclusion, preoperative EGD is essential in the diagnosis of GI diseases including tumors, ulcerations, or hiatal hernias that alter the medical and surgical management of patients undergoing gastric bypass.

References

1. Mason EE, Ito C. Gastric bypass in obesity. Surg Clin North Am 1967; 47: 1345-51.
2. Gastrointestinal surgery for severe obesity. National Institutes of Health Consensus Development Conference Draft Statement. Obes Surg 1991; 1: 257-65.
3. Wittgrove AC, Clark GW, Tremblay LJ. Laparoscopic gastric bypass, Roux-en-Y: preliminary report of five cases. Obes Surg 1994; 4: 353-7.
4. Detailed Diagnoses and Procedures, National Hospital Discharge Survey (www.cdc.gov/nchs).
5. Buchwald H, Williams SE. Bariatric Surgery Worldwide 2003. Obes Surg 2004; 14:1157-64.
6. Nguyen NT, Goldman C, Rosenquist CJ et al. Laparoscopic versus open gastric bypass: a randomized study of outcomes, quality of life, and costs. Ann Surg 2001; 234: 279-89.
7. Madan AK, Speck KE, Hiler ML. Routine preoperative upper endoscopy for laparoscopic gastric bypass: is it necessary? Am Surg 2004; 70: 684-6.

8. Sharaf RN, Weinshel EH, Bini EJ et al. Endoscopy plays an important preoperative role in bariatric surgery. Obes Surg 2004; 14: 1367-72.
9. Shirmer B, Erenoglu C, Miller A. Flexible endoscopy in the management of patients undergoing Roux-en-Y gastric bypass. Obes Surg 2002; 12: 634-8.
10. Champion JK, Hunt T, DeLisle N. Role of intraoperative endoscopy in laparoscopic bariatric surgery. Surg Endosc 2002; 16: 1663-5.
11. Shin RB. Intraoperative endoscopic testing resulting in no postoperative leaks from the gastric pouch and gastrojejunal anastomosis in 366 laparoscopic Roux-en-Y gastric bypasses. Obes Surg 2004; 14: 1067-9.
12. Mehran A, Szomstein S, Zundel N et al. Management of acute bleeding after laparoscopic Roux-en-Y gastric bypass. Obes Surg 2003; 13: 842-7.
13. Ahmad J, Martin J, Ikramuddin S et al. Endoscopic balloon dilation of gastroenteric anastomotic stricture after laparoscopic gastric bypass. Endosc 2003; 35: 725-8.
14. Go MR, Muscarella P, Needleman BJ et al. Endoscopic management of stomal stenosis after Roux-en-Y gastric bypass. Surg Endosc 2004; 18: 56-9.
15. Huang CS, Forse RA, Jacobson BC et al. Endoscopic findings and their clinical correlations in patients with symptoms after gastric bypass surgery. Gastrointest Endosc 2003; 58: 859-66.
16. Marano BJ Jr. Endoscopy after Roux-en-Y gastric bypass: a community hospital experience. Obes Surg 2005; 15: 342-5.
17. Madan AK, Frantzides CT. Triple staple technique of jejunojejunostomy for laparoscopic gastric bypass. Arch Surg 2003; 138: 1029-32.
18. Ghassemian AJ, MacDonald KG, Cunningham PG et al. The workup for bariatric surgery does not require a routine upper gastrointestinal series. Obes Surg 1997; 7: 16-8.
19. Sharaf RN, Weinshel EH, Bini EJ et al. Radiologic assessment of the upper gastrointestinal tract: Does it play an important preoperative role in bariatric surgery? Obes Surg 2004; 14: 313-7.
20. Sanchez BR, Morton JM, Curet MJ et al. Incidental finding of gastrointestinal stromal tumors (GISTs) during laparoscopic gastric bypass. Obes Surg 2005; 15: 1384-8.
21. Escalona A, Guzman S, Ibanez L et al. Gastric cancer after Roux-en-Y gastric bypass. Obes Surg 2005; 15: 423-7.
22. Printen KJ, Scott D, Mason EE. Stomal ulcers after gastric bypass. Arch Surg 1980; 115: 525-7.
23. Renshaw AA, Rabaza JR, Gonzalez AM et al. Helicobacter pylori infection in patients undergoing gastric bypass surgery for morbid obesity. Obes Surg 2001; 11: 281-3.
24. Mason EE, Munns JR, Kealey GP et al. Effect of gastric bypass on gastric secretion. Am J Surg 1977; 131: 162-8.
25. Pope GD, Goodney PP, Burchard KW et al. Peptic ulcer/stricture after gastric bypass: a comparison of technique and acid suppression variables. Obes Surg 2002; 12: 30-3.

(Received September 27, 2005; accepted November 18, 2005)