

Seven Cases of Gastric Perforation in Roux-en-Y Gastric Bypass Patients: What Lessons Can We Learn?

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Received: 14 September 2007 / Accepted: 23 October 2007 / Published online: 7 March 2008
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Abstract

Background Patients undergoing Roux-en-Y gastric bypass for the resolution of morbid obesity have significant medical sequelae related to their weight. One of the most common comorbid conditions is joint pain requiring the use of non-steroidal anti-inflammatory medications (NSAIDs). In addition to NSAIDs, patients may engage in behaviors such as smoking and alcohol misuse that increase the risk of long-term postoperative complications to include gastric perforation.

Methods Data on 1,690 patients undergoing gastric bypass surgery were collected prospectively and reviewed retrospectively.

Results We identified seven patients who presented to an emergency room and subsequently required emergent surgical intervention for repair of gastric perforation. Six of the seven cases involved use or abuse of NSAIDs.

Conclusion Important characteristics were identified including the use of NSAIDs, alcohol use, and non-compliance with routine long-term postoperative follow-up. Identifying those patients at high risk may decrease the incidence of this potentially life-threatening complication.

Keywords Marginal ulcer (MU) · Roux-en-Y gastric bypass (RYGB) · Gastrointestinal anastomosis · *Helicobacter pylori* (*H. pylori*) · Proton pump inhibitors (PPI) · Bariatric surgery

Introduction

Roux-en-Y gastric bypass (RYGB) has emerged as the most commonly performed bariatric surgical procedure in the USA. The number of patients undergoing RYGB surgery is expected to exceed 150,000 cases in 2007. Numerous studies outline the efficacy of bariatric surgery and the dramatic health improvements and gains in longevity that patients experience after undergoing RYGB surgery [1].

However, recent findings indicate that marginal ulcer (MU) can occur after RYGB [2]. MU is defined as a gastric ulcer of the jejunal mucosa near the site of a gastrojejunostomy [2]. Proposed theories of MU etiology include ischemia, foreign body reactions, fistula, acid production, inflammation, and *Helicobacter pylori* (*H. pylori*) [3–7]. As with any gastrointestinal anastomosis, incidence of MU is expected to be in the range of 1.8–3.1% [8] Sacks et al. [9] in 2006 conclude that the use of non-absorbable suture material increases incidence of MU. Gastric ulcer perforation in patients who have undergone RYGB surgery can occur in two separate and distinct anatomic places:

1. The stomach remnant, which includes the antral-duodenal region as well as the large stomach body. Evidence exists that the bypassed gastric segment continues to have gastric secreting capabilities. Bjorkman et al. [8] in 1989 contributed an interesting case study demonstrating acid-related gastroduodenal disease in a bypassed gastrointestinal tract. Access and evaluation of the bypassed stomach is challenging and can delay treatment [10, 11].
2. The small stomach pouch and the gastrojejunal region, which would include MU. It has been suggested that the smaller pouch would reduce acid exposure at the anastomosis and adjacent jejunum [4] (Table 1).

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Table 1 Proposed risk factors for development of gastric perforation

Risk factors
<i>Helicobacter pylori</i> infection
Non-steroidal anti-inflammatory medication (NASIDs) use
Alcohol
Tobacco
Corticosteroid use
Critical illness, burns, and shock
Local factors, pouch size, staple dehiscence, antecolic position

There are many variables to consider in the prevention of MU. The extent to which risk factors of MU are sought, identified, avoided, or mitigated varies with each provider. Currently, there is not uniform consensus on prophylaxis against development of ulcer disease. Recent studies, however, indicate that empiric proton pump inhibitor (PPI) therapy in the first 8 weeks after RYGB may decrease the incidence of MU development [4]. Gumbs et al. [12] in 2006 reported on 16 documented cases of MU after RYGB. It is felt by these investigators that MU is underreported and can successfully be treated with short-term use of PPI therapy.

There are no studies to date which confirm a relationship between *H. pylori*, gastric bypass, and MU formation. However, a correlation has been suggested by several studies [13]. Madan et al. [14] in 2004 documented a 20% incidence of *H. pylori* preoperatively among patients undergoing gastric bypass. Schirmer et al. [7] in 2002 investigated 206 patients preoperatively. The results on endoscopic exam identified and treated 62 patients positive for *H. pylori* and decreased the MU rate from 6.8 to 2.4% in this group. Further studies would be of value to determine standards of care with regard to *H. pylori* and MU prevention.

Materials and Methods (Case Presentations)

Prospective data are collected on all patients undergoing RYGB surgery. Records of 1,690 patients were reviewed to identify the seven cases presented herein. In each case, the abdomen was thoroughly irrigated at time of surgical repair and a drain placed. No cases of gastro-gastric fistula have been identified in the series. The incidence of gastric ulcer perforation in this series is 0.4%, with average length of time to perforation 32.6 months (Tables 2 and 3).

Case number 1 is a 58-year-old female who underwent laparoscopic retrocolic RYGB surgery in Los Angeles in 2002, approximately 3 1/2 years before presentation at our institution. Although she had experienced resolution of many comorbid conditions, she continued to have severe

degenerative joint disease and pain in her spine, hips, and weight-bearing joints. She was receiving monthly corticosteroid injections for the spine and joint disease. She was intermittently taking Prilosec, a proton pump inhibitor, but was non-compliant with daily treatment. On rare occasions, the patient took aspirin orally. She denied the use of alcohol or non-steroidal anti-inflammatory medications (NSAIDs). This patient developed severe epigastric pain with radiation to the shoulders and back. She presented to the emergency room where she was found to have pneumoperitoneum. She was taken urgently to surgery and was found to have free fluid in the abdomen and a perforation on the anterior aspect of the gastrojejunal anastomosis at the site of a marginal ulcer. The perforation was treated with an oversewing technique and omental patch. She recovered after a 6-day hospital course and was discharged home in stable condition. Discharge medications include: Carafate slurry, 1 g p.o. four times daily and Prilosec, 20 mg p.o. twice daily.

Case number 2 is a 55-year-old female with a history of morbid obesity, diabetes mellitus, degenerative joint disease. She underwent laparoscopic retrocolic RYGB in 2002. Postoperatively, she used NSAIDs extensively for treatment of her degenerative spine and joint pain. She presented to the emergency room in 2003 with an acute abdomen. Abdominal films demonstrated pneumoperitoneum. With surgical exploration, she was found to have a perforation of a prepyloric gastric ulcer. This was treated with oversewing and omental patch. After a difficult hospital course, she recovered to her previous level of functioning. She improved and did well for approximately 2 years until she needed spinal surgery. She later developed complications including osteomyelitis of the thoracic spine. After multiple hospitalizations, she died in 2005 from recurrent sepsis unrelated to abdominal surgery or peptic ulcer disease.

Case number 3 is a 27-year-old female with a history of mild depression, morbid obesity, chronic back pain, headaches, and irregular menses. She had a successful laparoscopic retrocolic RYGB in 2003. After the death of a sibling, she was diagnosed with bipolar affective disorder. In 2005, she began abusing alcohol and also started

Table 2 Initial data of the seven RYGB cases

Case no. (<i>n</i> =1690)	Age	Female	BMI
1	58	Y	n/a
2	55	Y	44
3	27	Y	44
4	22	Y	44
5	46	Y	46
6	52	Y	46
7	47	N	57
Avg.	44	86%	47

Table 3 Initial comorbidities of each patient (case no. 1 through case no. 7)

Initial comorbidities	Case no. 1	Case no. 2	Case no. 3	Case no. 4	Case no. 5	Case no. 6	Case no. 7
Arthritis			X		X	X	
Asthma	X			X		X	
Back pain	X	X	X	X			X
Degenerative joint disease	X				X	X	X
Diabetes mellitus		X					
GERD						X	X
Headaches			X		X		
Hypertension		X				X	
Irregular menses			X	X			
Morbid obesity	X	X	X	X	X	X	X
Sleep apnea							X
Short of breath		X	X	X	X	X	X
Urinary stress incontinence		X		X			X
Varicose veins				X			

smoking. Resulting chronic abdominal pain was self-treated with NSAIDs, taking “handfuls” of ibuprofen on a daily basis. She presented to a local emergency room with severe abdominal pain where was found to have peritoneal signs and pneumoperitoneum. Upon exploration, she was found to have a perforated marginal ulcer at the gastrojejunal anastomosis. This was treated with oversewing and omental patch. This patient was referred for alcohol dependency treatment and was advised about absolute contraindication of NSAIDs and alcohol. She recovered uneventfully.

Case number 4 is a 22-year-old female who had a history of asthma, chronic back pain, and morbid obesity. She underwent a laparoscopic antecolic RYGB procedure in 2003. She began experiencing headaches in late 2005 and was taking 800 to 1,000 mg of ibuprofen every 6 h. She presented to the emergency room with a 6-h history of increasing abdominal pain and she was found to have pneumoperitoneum. She was taken to surgery and the abdomen was explored with an open laparotomy. She was found to have a perforated ulcer at the gastrojejunal anastomosis. This was treated with oversewing and omental patch. She recovered rapidly with no long-term effects.

Case number 5 is a 46-year-old female with history of morbid obesity and medical sequelae of hypertension and degenerative joint disease. She underwent a successful retrocolic RYGB in 2002. She used NSAIDs for management of persistent bone and joint pain. She presented in 2004 with abdominal pain and was found to have pneumoperitoneum. Upon exploration, she was found to have a perforated ulcer at the gastrojejunal anastomotic region. She was surgically treated with oversewing and omental patch. Two weeks postoperatively, she was admitted with a small bowel obstruction and an internal hernia. A Baker tube was placed at this time. After a brief hospital stay, she was discharged home and maintained on proton pump inhibitor

therapy. She has not complained of any further or residual complications.

Case number 6 is a 52-year-old female with history of morbid obesity and medical sequelae of hypertension and degenerative joint disease. She underwent a successful retrocolic laparoscopic RYGB in 2002. Postoperatively, she used NSAIDs for treatment of bone and joint pain. She presented in 2005 with abdominal pain and was found to have pneumoperitoneum. Upon exploration, she was found to have a perforated ulcer at the gastrojejunal anastomotic region. She was treated with oversewing and omental patch. After repair, the patient recovered and was discharged home with instructions for long-term care. Discharge management included Carafate and PPI therapy.

Case number 7 is a 47-year-old male with history of morbid obesity and medical sequelae of obstructive sleep apnea and degenerative joint disease. He underwent a laparoscopic antecolic RYGB in 2002. He lost in excess of 120 lbs and reported a remarkable improvement in his quality of life and health. However, NSAIDs were used for control of spine and joint pain. He presented in 2006 to a small hospital in another state with abdominal and chest

Table 4 Patient data at time of ulcer perforation

Case no.	Surgery year	Time to perf (months)	NSAID use	Anti/Retrocol
1	2002	42	N	Retro
2	2001	24	Y	Retro
3	2002	24	Y	Retro
4	2003	24	Y	Anti
5	2001	36	Y	Retro
6	2002	36	Y	Retro
7	2002	42	Y	Anti

pain. Despite reporting previous gastric bypass surgery and repeated documentation of this history, he was treated with Toradol and corticosteroids and then sent home. He returned to the same emergency department the following day in extremis. Upon exploration, he was found to have a perforated gastric ulcer and died of multiorgan failure (Table 4).

Discussion

This report describes seven cases of gastric ulcer perforation in patients who had previously undergone RYGB surgery. These cases represent all those identified in a review of 7,200 patient-years of follow-up in gastric bypass patients at our center. An incidence of 0.4% with 36 months of follow-up is reported. Authors have postulated that larger pouch size, antecolic position, or other anatomic factors increase risk of marginal ulceration [4, 15–18]. Most of our cases have occurred in patients with retrocolic position. Many studies document a positive correlation with the use of irrigation and the placement of drains and resolution of abscess [8, 11, 13]. Some studies have shown an association between gastro-gastric fistula and marginal ulcer [2, 4, 18]. However, this was not evident in the seven cases presented. Pouch size is small but difficult to quantify in this series. Six of the seven cases involved use or abuse of NSAIDs; one case involved alcohol abuse. A particularly troubling case involved a patient who presented twice to an outside hospital where care rendered was provided by health professionals unfamiliar with the complexities of long-term management of gastric bypass.

Gastric ulcer perforation is a serious and relatively frequent event among patients who have undergone RYGB. Identification of risk factors in all these patients suggests that this problem may be preventable with improved patient education. *H. pylori* presence is not routinely screened preoperatively at most centers, although an increasing number of centers are beginning to do so. Efficacy and safety of eradication of *H. pylori* in treatment of perforated ulcers is still being examined [19]. Each of the patients discussed in previous case studies was treated empirically against *H. pylori* after development of ulcer perforation. To our knowledge, at time of submission, none has recurred. Rabeprazole has been noted to be as effective as omeprazole and lansoprazole as part of a triple therapy regimen to treat *H. pylori* [20]. Selection of PPI at our institution has recently become limited by patient formulary.

What lessons can be learned? MU complication requires increased knowledge and awareness. Long-term patient follow-up appears important in tracking outcomes as well as promoting patient education. Patients who resume care with a health care provider unfamiliar with bariatric

medicine may put themselves at increased risk of being prescribed NSAIDs and corticosteroids. These medications appear to increase the risk of ulcer formation and perforation. We believe that the incidence of MU may be reduced with *H. pylori* investigation, empiric proton pump inhibitor therapy, as well as avoidance of NSAIDs. Our practice has focused on the latter two and in the future will incorporate *H. pylori* testing and treatment preoperatively. Beginning in 2004, patients were treated with empiric proton pump inhibitors postoperatively. Before 2004, patients were treated with PPI therapy on a case-by-case basis. At this time, no cases have occurred since adopting a two-phased approach to ulcer prevention:

1. Empiric 12-week treatment with proton pump inhibitors immediately after surgery and
2. Zero-tolerance policy toward NSAIDs in gastric bypass patients.

Future studies will need to guide us with respect to *H. pylori* and anatomic factors which may or may not affect the incidence of this serious problem.

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