

## Case Report

# Perforated Ulcer at the Gastrojejunostomy: Laparoscopic Repair after Roux-en-Y Gastric Bypass

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**A 44-year-old woman was admitted from the emergency department with severe acute upper abdominal pain. The patient had undergone a laparoscopic Roux-en-Y gastric bypass (RYGBP) operation 16 months previously. CT scan showed intraabdominal free air. At emergency laparoscopic reoperation, a perforated ulcer at the gastrojejunostomy was found. This late complication of RYGBP can be a rapidly progressing life-threatening situation, and requires prompt treatment. Closure and omental patch were successful laparoscopically.**

*Key words:* Morbid obesity, laparoscopic Roux-en-Y gastric bypass, stomal ulcer, gastric perforation, laparoscopic repair

## Introduction

In recent years, surgical therapy for morbid obesity has increased greatly.<sup>1</sup> However, despite the benefits of bariatric surgery such as longlasting weight loss and significant reduction in co-morbidities, complications may occur.<sup>2</sup> Postoperative early mortality rates range from 0.05% to 2.0%, depending on the selected bariatric operation, and long-term follow-up has found mortality rates up to 4.6%.<sup>3</sup> Complications such as leakage at an anastomosis, bleeding, wound infections, band slippage, and incisional hernias may occur, depending on the operation.<sup>4</sup> After Roux-en-Y gastric bypass (RYGBP), a potential late complication is stomal ulcer.<sup>5</sup> A recent reported study found that 2.8% of 350 patients undergoing a divided

RYGBP developed an ulcer on follow-up.<sup>4</sup> We present a perforated ulcer at the gastrojejunostomy 16 months after laparoscopic RYGBP.

## Case Report

A 44-year-old woman was admitted to our emergency department with severe acute epigastric pain of 3 hours duration. The pain was excruciating and radiated into the lower abdominal quadrants. The patient denied prior abdominal pain, vomiting, hematemesis, bloody stools, or the use of non-steroidal anti-inflammatory drugs (NSAIDs) or chronic alcohol consumption.

Past medical history included a laparoscopic adjustable gastric banding with BMI 42 kg/m<sup>2</sup> in 1999, which was converted in 2003 with BMI 35 kg/m<sup>2</sup> to a laparoscopic RYGBP, because of band slippage and gastro-esophageal reflux. Thereafter, her weight decreased to a BMI of 27 kg/m<sup>2</sup>.

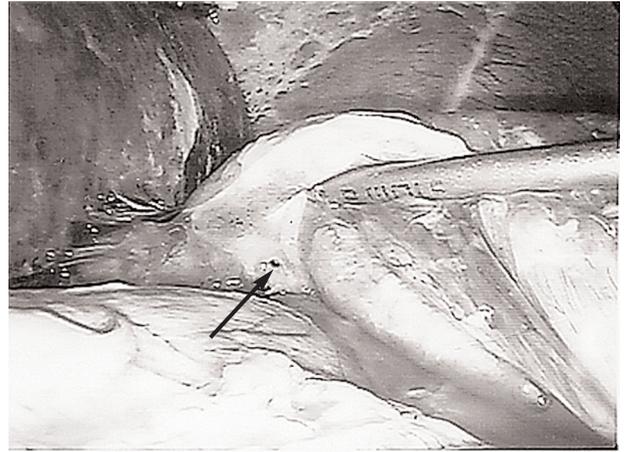
On emergency admission, physical examination revealed abdominal tenderness, rebound, and absent bowel sounds. Blood pressure was 126/58 with heart rate 93. Blood examination showed mild leucocytosis of 11,000/μl (normal 3,000-9,600/μl) and a slight elevation of C-reactive protein to 16 ng/l (normal <5 ng/l). CT scan was performed and showed free air and contrast medium (water-soluble Gastrografin®) in the peritoneal cavity (Figures 1A and B). Therefore, intravenous antibiotics were administered and the patient was immediately transferred to the operating-room.

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Laparoscopic exploration revealed peritonitis with gastric juice in the peritoneal cavity and fibrin clots on the surface of the liver and in the left epigastrium. Further exploration found a small perforation at the gastrojejunostomy (Figure 2), which was verified by methylene blue instillation down a nasogastric tube.

The leak was closed by a single suture transversely so that the jejunum would not be narrowed at the site. In addition, an omental patch was attached. The peritoneal cavity was thoroughly irrigated with saline.

Antibiotics and proton pump inhibitor (PPI) were given. A Gastrografin® swallow 3 days after the intervention demonstrated timely contrast passage with no leak (Figure 3). The postoperative course was uneventful, and the patient was discharged on



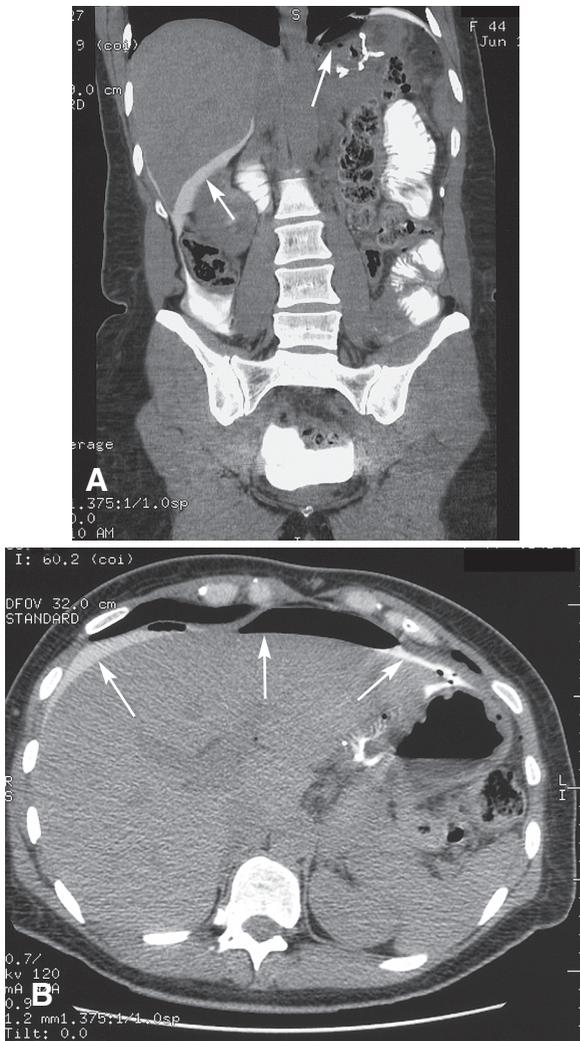
**Figure 2.** Pinhole perforation found on the dorsal aspect of the gastrojejunostomy (arrow).

the 7th postoperative day.

At 24 months after the closure, her BMI is 27.5 kg/m<sup>2</sup> and she is doing well.

## Discussion

Marginal or stomal ulcer, which involves the jejunal side at the gastroenterostomy, is a recognized delayed complication of RYGBP. It has been attributed to a number of causes. NSAIDs have been a



**Figure 1.** A. Free air under diaphragm (arrow) and Gastrografin® below the right lobe of liver (arrow). B. Free contrast and free air in peritoneal cavity (arrows).



**Figure 3.** Gastrografin® swallow at day 3 shows no leak. The drain was removed after the examination.

particular cause, and are to be avoided after RYGBP.<sup>5</sup> Our patient had taken no anti-inflammatory drugs. *Helicobacter pylori* has also been incriminated (although helicobacter was not increased in cases of stomal ulcer in a recent study<sup>6</sup>). We had no evidence of helicobacter in our patient. However, the patient was treated with tazobactam and high doses of omeprazole after the closure procedure, which were considered to be sufficient. Local tissue causes of ulcer formation such as poor blood supply and non-absorbable suture material could also play a role. Pope et al<sup>7</sup> found a five times higher incidence of stomal ulcers when an 8-row rather than a 4-row staple-line was used in undivided RYGBP.

Another cause of stomal ulcer has been attributed to communication between the gastric pouch and the bypassed stomach.<sup>8</sup> In a study by Capella and Capella,<sup>9</sup> the incidence of marginal ulcer decreased from 8.5% to 1.6% after they changed their technique to a divided gastric pouch (with interposition of the jejunal loop). A gastrogastic fistula leads to passage of hydrochloric acid into the pouch and food into the bypassed stomach with gastrin production.<sup>8,10,11</sup> Our RYGBP technique included transection with complete division of the pouch, and GI series does not disclose any communication. Hedberg et al<sup>12</sup> have found that the larger the gastric pouch constructed, the more acid production in the pouch. Sapala et al<sup>13</sup> in a prospective study of 173 RYGBP patients, found only one stomal ulcer (0.6%) at 3 years, and this was in patient with a large gastric pouch. The etiology of the ulcer in our case is unknown.

Reports of perforated marginal ulcer are rare. Lujan et al<sup>4</sup> in their series reported one perforated ulcer, closed laparoscopically. Interestingly, Goitein et al<sup>14</sup> reported 3 perforations at the jejuno-jejunal anastomosis after RYGBP, occurring at about 2 months postoperatively, 2 spontaneous (which were closed laparoscopically with absorbable suture) and one secondary to distal obstruction.

Once the diagnosis of perforated viscus is established, urgent surgical intervention is necessary to minimize the extent of peritonitis. If the inflammation is localized, the treatment can be accomplished laparoscopically. It has been shown that a minimally invasive approach for closing perforated duodenal ulcers results in shorter operating time, less postoperative pain, reduced chest complications, shorter

hospital stay, and earlier return to normal daily activities, compared to open repair.<sup>15</sup> In view of the excellent outcome in our patient, we conclude that laparoscopic repair of a perforated ulcer at the gastrojejunostomy after LRYGBP is feasible.

## References

1. Buchwald H, Williams SE. Bariatric surgery worldwide 2003. *Obes Surg* 2004; 14: 1157-64.
2. Sjostrom L, Lindroos AK, Peltonen M et al. Lifestyle, diabetes, and cardiovascular risk factors 10 years after bariatric surgery. *N Engl J Med* 2004; 351: 2683-93.
3. Flum DR, Salem L, Elrod JA et al. Early mortality among Medicare beneficiaries undergoing bariatric surgical procedures. *JAMA* 2005; 294: 1903-8.
4. Lujan JA, Frutos MD, Hernandez Q et al. Experience with the circular stapler for the gastrojejunostomy in laparoscopic gastric bypass (350 cases). *Obes Surg* 2005; 15: 1096-102.
5. Higa KD, Boone KB, Ho T. Complications of the laparoscopic Roux-en-Y gastric bypass: 1,040 patients – what have we learned? *Obes Surg* 2000; 10: 509-13.
6. Yang C-S, Lee W-J, Wang H-H et al. The influence of *Helicobacter pylori* infection on the development of gastric ulcer in symptomatic patients after bariatric surgery. *Obes Surg* 2006; 16: 735-9.
7. 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.
8. MacLean LD, Rhode BM, Nohr C et al. Stomal ulcer after gastric bypass. *J Am Coll Surg* 1997; 185: 1-7.
9. Capella JF, Capella RF. Gastro-gastric fistulas and marginal ulcers in gastric bypass procedures for weight reduction. *Obes Surg* 1999; 9: 22-7; discussion 28.
10. Mason EE, Munns JR, Kealey GP et al. Effect of gastric bypass on gastric secretion. *Am J Surg* 1976; 131: 162-8.
11. Schrupf E, Giercksky KE, Nygaard K et al. Gastrin secretion before and after gastric bypass surgery for morbid obesity. *Scand J Gastroenterol* 1981; 16: 721-5.
12. Hedberg J, Hedenström H, Nilson S et al. Role of gastric acid in stomal ulcer after gastric bypass. *Obes Surg* 2005; 15: 1375-8.
13. Sapala JA, Wood MH, Sapala MA. Marginal ulcer after gastric bypass: a prospective 3-year study of 173 patients. *Obes Surg* 1998; 8: 505-16.
14. Goitein D, Pappasavvas PK, Gagne DJ et al. Late perforation of the jejuno-jejunal anastomosis after laparoscopic Roux-en-Y gastric bypass. *Obes Surg* 2005; 15: 880-2.
15. Siu WT, Leong HT, Law BK, et al. Laparoscopic repair for perforated peptic ulcer: a randomized controlled trial. *Ann Surg* 2002; 235: 313-9.

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