

Gastrogastroic Fistula: a Possible Complication of Roux-En-Y Gastric Bypass

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ABSTRACT

Background: Gastrogastroic fistula is a communication between the proximal gastric pouch and the distal gastric remnant, rarely described in the realm of bariatric procedures. The aim of this study was to review the existing literature about this topic and to demonstrate its laparoscopic treatment.

Methods: An extensive literature review found several articles reporting this complication. However, no citation was found describing the steps of the laparoscopic management of this situation.

Results: Gastrogastroic fistula occurs in up to 6% of Roux-en-Y gastric bypasses. Two theories exist for fistula formation: (1) it is a technical complication derived from the incomplete division of the stomach during the creation of the pouch, and (2) it occurs after a staple-line failure, developing a leak with an abscess, which then drains into the distal stomach forming the fistula. Early symptoms include fever, tachycardia, and abdominal pain. Failure in weight loss is a late clinical sign observed in these patients. Diagnosis is based on radiologic study, upper endoscopy and computed tomography. When identified in the acute postoperative course, laparoscopic treatment is easy. Chronic fistulas are difficult to manage, and the laparoscopic approach is an alternative to open surgery.

Conclusions: Gastrogastroic fistula is a possible complication of Roux-en-Y gastric bypass and its laparoscopic treatment is feasible.

Key Words: Bariatric surgery, Complications, Gastric bypass, Fistula.

INTRODUCTION

Adult obesity has become a disease of epidemic proportions,¹ and it is well known as a root cause of multiple medical comorbidities. Conservative treatment options for the obese, such as low-calorie diets, behavior modifications, and exercise, are still the mainstay of therapy. Unfortunately, the results of these measures remain disappointing, with most patients either losing an inadequate amount of weight or, for those able to lose a significant amount of weight, experiencing total weight regain within a few years.²

Currently, surgical intervention offers the best means to achieve significant and durable weight loss in the morbidly obese.³ The widely accepted indications for bariatric surgery today are severe obesity with a body mass index (BMI) greater than 40 or greater than 35 in the presence of weight-related comorbid disease.⁴

Many bariatric surgical procedures have been tried with a wide spectrum of success and complications. Among them, laparoscopic Roux-en-Y gastric bypass has become the most often performed bariatric operation in the United States.⁵ Easier recovery, lower morbidity, shorter hospital stay, less pain, less disability, and superior cosmetic results have made minimally invasive surgery the preferred surgical approach for the treatment of morbid obesity.⁶ However, the procedure is not risk-free, especially during the learning curve. Major complications include bowel obstructions, anastomotic leaks and strictures, gastrogastroic and gastro-cutaneous fistulas.⁷⁻¹⁰

Gastrogastroic fistula is a communication between the proximal gastric pouch and the distal gastric remnant. Fistula formation, although a commonly described phenomenon in various gastric operations and disease process, rarely has been described in the realm of bariatric procedures.¹¹ We have performed an extensive literature review using the Pubmed database, and we did not find any article reporting the surgical technique for the repair of this condition. The aim of this article is to review the current literature about gastrogastroic fistula and to describe the surgical steps of its laparoscopic management.

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Incidence

In 1995, the Greenville group¹¹ documented an 11.8% rate of staple-line dehiscence after staple partition of the stomach in Roux-en-Y gastric bypass procedures. These staple-line breakdowns resulted in failure of the procedure because the restrictive quality of the proximal pouch was no longer present. Because the patient could eat again without discomfort, and regained weight, revision of the failed operation remained the only option.¹² To avoid this high incidence of staple-line dehiscence, Cucchi et al¹¹ recommended the division of the stomach instead of staple partitioning it. They postulated that resultant separation of gastric pouches would free them of the dependence on staple lines and avoid this cause of failure. Nevertheless, the new operation also has introduced a new complication, the gastrogastic fistula, which was documented in 6% of the 100 patients evaluated in this series.

In 2000, Schauer et al¹⁰ observed 2 cases of gastrogastic fistula in their series of 275 laparoscopic Roux-en-Y gastric bypass. Two years later, Blachar et al⁷ analyzed 463 patients who underwent the same procedure, and they found one case of gastrogastic fistula.

Recently, Gould et al⁹ studied their first 100 cases in a new minimally invasive bariatric surgery program, observing a gastrogastic fistula in 2 patients, and Dresel et al⁸ reported one patient with a fistula from her gastric pouch to the gastric remnant among 120 patients who underwent laparoscopic Roux-en-Y gastric bypass.

Fistula Formation

Even after transection of the stomach during gastric bypass, late staple-line failure can occur developing fistulous communication between the proximal pouch and the distal stomach¹¹ if the pouch remains close to the bypassed stomach.¹³ Because the 2 portions of the stomach are completely separate, these are probably caused by a leak with abscess formation adjacent to the distal staple line, which then drained into the distal stomach, forming the gastrogastic fistula.^{14,15} A gastric leak usually is a catastrophic complication, leading to sepsis and necessitating reoperation for drainage. By developing a fistula via the divided edge of the distal stomach, these patients probably internally drain their leaks or abscess, which explains their delayed presentation and absence of systemic sepsis.¹¹ Analyzing 6 patients with gastrogastic fistulas, Cucchi et al¹¹ identified a leak or an abscess before the discovery of the gastrogastic fistula in all patients but one.

On the other hand, according to Gould et al's⁹ observa-

tions, gastrogastic fistula is a purely technical complication that occurred on 2 occasions early in their experience. These fistulas resulted from the incomplete division of the stomach during the creation of the pouch. The angle of His is sometimes very difficult to clearly visualize during laparoscopic Roux-en-Y gastric bypass. Posterior stomach in this area can easily hide behind intraabdominal fat. Clear and definitive visualization of the completely divided stomach is essential to avoid this complication.

Signs and Symptoms

Cucchi et al¹¹ observed 6 patients with gastrogastic fistulas, and they had similar postoperative symptoms. All patients had symptoms of fever, tachycardia, and abdominal pain. Less frequent symptoms included nausea, vomiting, fatigue, and diarrhea. Shoulder pain, tachypnea, and anorexia were each noted in one patient.

Failure in weight loss is a late clinical sign observed in patients with gastrogastic fistula because they can eat again without discomfort. We highlight this situation, which must be considered in those patients regaining weight after a Roux-en-Y gastric bypass.

Diagnosis

Following open Roux-en-Y gastric bypass at most bariatric centers, postoperative upper gastrointestinal contrast studies (UGI) are routinely performed to detect a leak or early obstruction, because the subtle early clinical signs of these complications after open procedures are obscured by incisional pain and narcotic administration.^{16–20} Laparoscopic surgeons have adopted the practice of routine postoperative radiological contrast studies, perhaps because of this custom following open bariatric surgery.^{5,21}

Gould et al⁹ perform a limited upper gastrointestinal dilute-barium radiographic examination routinely on the morning of postoperative Day 1 after laparoscopic Roux-en-Y gastric bypass. The diet is initiated after a normal gastrointestinal examination in patients without clinical indicators of potential leak (ie, tachycardia, low urine output, fever). In their series, a gastrogastic fistula was identified on the postoperative barium leak study in 2 patients. In both cases, the stomach was incompletely divided superiorly near the diaphragm.

Lyass et al⁶ analyzed the efficacy of selective use of radiological studies after laparoscopic Roux-en-Y gastric bypass instead of routine postoperative upper gastrointestinal contrast studies, and they concluded that the selective approach is safe (**Figure 1**). They studied 368 patients,

and 41 patients (11%) developed symptoms and signs in the early postoperative period suggestive of complications. Most of the symptomatic patients had abdominal pain, tachycardia, nausea or vomiting, and elevated white cell count. Two patients had 5 clinical signs and symptoms. Both of these patients had postoperative complications. Of 4 patients with 4 clinical signs, 2 had complications. Of 10 patients with 3 clinical signs, 4 (40%) had complications. With 1 or 2 signs, the chance of having postoperative complications was low. Radiological contrast studies in the early postoperative period were performed in 39 of the 41 symptomatic patients. Computed tomography was performed in 34 (87%), upper gastrointestinal contrast studies in addition to computed tomography in 6 (15%), and upper gastrointestinal contrast study alone in 5 (13%). Gastrogastric fistula was diagnosed in one patient by computed tomography and confirmed by upper gastrointestinal contrast study.

Huang et al¹³ studied all adult patients referred for endo-

scopic evaluation of upper gastrointestinal symptoms at any time after Roux-en-Y gastric bypass. Barium contrast upper gastrointestinal radiography was useful in the evaluation of patients with symptoms after surgery when performed in conjunction with upper endoscopy (**Figure 2**). They state that it provides important anatomic information, which may be particularly helpful to endoscopists with limited experience with this patient population. Barium contrast radiography is particularly useful and is the preferred initial study for the detection of staple-line dehiscence, which may be small and overlooked during endoscopy. All 8 cases of staple-line dehiscence were correctly diagnosed by upper gastrointestinal radiography, and one case of gastrogastric fistula was identified.

In 1995, Cucchi et al¹¹ studied 6 patients with gastrogastric fistula. In all cases, patients had either fever or tachycardia in the early postoperative course, although routine postoperative day 3 meglumine diatrizoate swallows were negative in each case. For them, this fact emphasizes the insensitivity of contrast studies in detecting leaks, and additional evaluation or treatment of suspected leaks in these patients often must be guided by their clinical presentations.

Surgical Treatment

Once identified, gastrogastric fistulas may be treated surgically, by laparoscopy or open surgery, when diagnosed in the early postoperative setting and when patients fail to

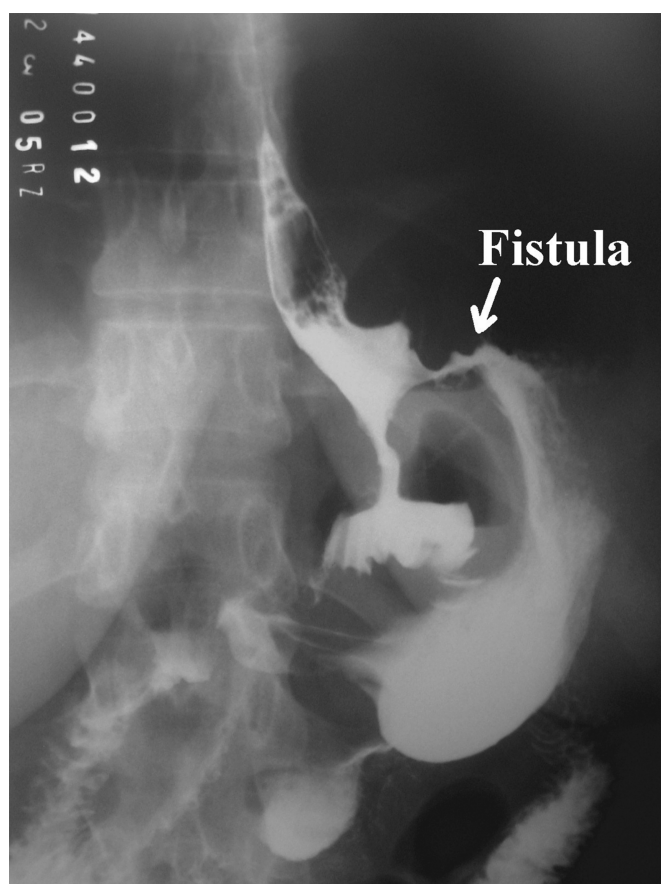


Figure 1. Upper gastrointestinal contrast study showing a gastrogastric fistula.



Figure 2. Gastrogastric fistula demonstrated by upper endoscopy.

loose weight or experience late regain of weight in their postoperative follow-up.

In the era of minimally invasive surgery, laparoscopy seems to be the preferred approach for experienced laparoscopist surgeons. As demonstrated by other laparoscopic operations, minimally invasive approaches offer significant advantages compared with open surgery, such as reduced postoperative pain and complications, decreased length of hospital stay, and earlier return to normal activity.^{22–25} Even revisional bariatric surgeries can be approached laparoscopically with acceptable morbidity compared with patients whose revision is approached in an open manner.²⁶

When diagnosed in the acute postoperative setting, as demonstrated by Gould et al,⁹ these fistulas can easily be addressed laparoscopically. They elected to laparoscopically divide the fistula on the first postoperative day in their 2 cases. Mean operating time for these 2 reoperative cases was 30 minutes.

When the fistula is identified late in the postoperative course, as a cause of poor weight loss, surgical approach is more difficult. We did not find any report in the literature describing the laparoscopic approach for these cases and herein we describe it, step-by-step.

The patient is placed in a supine position with the surgeon on the right and the assistant on the left, and 2 monitors above the patient's shoulders. After creation of carbon dioxide pneumoperitoneum (14 mm Hg) using the Veress needle technique, trocars are placed: 10-mm supraumbilical (for the 30-degree laparoscope), 5-mm subxiphoid, 10-mm in the left subcostal region, 5-mm in the right subcostal region, and 12-mm in the right flank.

Adhesions from the previous surgery are released using blunt dissection, electrocautery and Ultracision Harmonic scalpel (or Ligasure vessel sealing system). Dissection is performed to identify the gastric pouch, the gastrojejunal anastomosis, and the gastric remnant. After exposure of these structures, a fibrous area can be visualized between the gastric reservoir and the gastric remnant.

An intraoperative upper endoscopic examination is helpful in determining the gastrogastic fistula. It is best demonstrated by turning off the laparoscope light and keeping the endoscope light on (**Figure 3A**).

The fistula is dissected and isolated using a penrose drain (**Figure 3B**). After complete identification, the gastrogastic fistula is transected with an Endo GIA stapler (**Figure 4A**). The closure of the fistula can be observed under

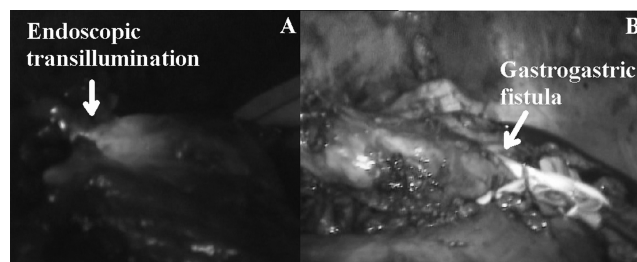


Figure 3. An intraoperative upper endoscopic examination is performed. The endoscope light is guided to the gastrogastic fistula and when the laparoscope light is turned off, the fistula can be observed (A). The gastrogastic fistula is isolated using a Penrose drain (B).

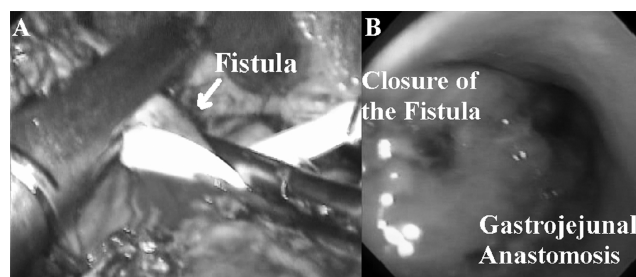


Figure 4. Transection of the fistula using Endo GIA stapler (A). Demonstration of the closure of the fistula by intraoperative endoscopy (B).

direct view by flexible endoscopy (**Figure 4B**).

The staple line is subsequently reinforced with continuous 3–0 polypropylene sutures, and the integrity of the gastric pouch staple line is determined intraoperatively by 2 methods. First, the pouch is endoscopically inspected and tested for leakage after insufflation and submerging it in irrigation fluid. Second, the methylene blue is introduced through the nasogastric tube, and the anastomosis is examined once again for leaks of the dye.

A tubulo-laminar drain is placed next to the gastric pouch and brought out through the left subcostal port site. The final aspect of the surgery can be observed in **Figure 5**.

Recommendations

Surgical technique is an important cause of gastric leak and subsequent fistula formation. The following recommendations are established to minimize this complication:

- Oversewing of the long divided staple lines of the proximal pouch and distal stomach with closely spaced sutures at 2mm between stitches¹¹;

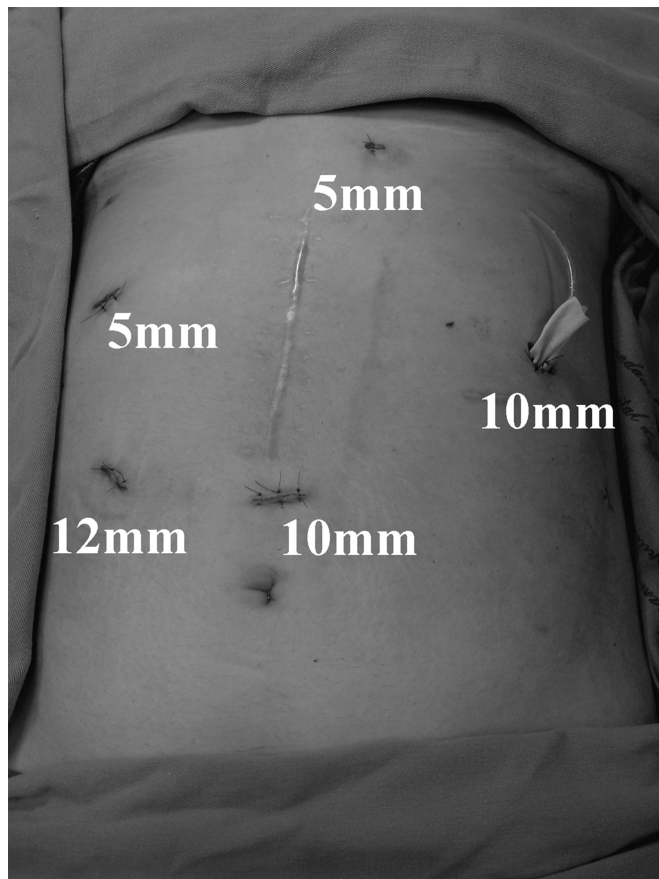


Figure 5. Final aspect of the surgery.

- Construction of an 8-mm to 10-mm anastomosis, taking care to include strong bites of both gastric and jejunal mucosa with every suture¹¹;
- Avoidance of possible obstruction of the efferent jejunal limb by ensuring that the limb lies without tension and without kinks during its course for the transverse mesocolon to the gastric pouch¹¹;
- Intraoperative tests of pouch and anastomosis integrity with air and methylene blue; from our results with these 6 patients, this obviously will not prevent all leaks, but hopefully will reduce the incidence¹¹;
- Interposition of omentum or a limb of jejunum between the gastric segments.¹³

CONCLUSION

In this article, we reviewed the scarce literature regarding gastrogastric fistula, and we described the surgical steps of its laparoscopic management. We believe that in the mod-

ern era of laparoscopy, patients need and want to be treated in the most possible minimally invasive manner. In the hands of the skilled and gifted laparoscopists, laparoscopic correction of the gastrogastric fistula can be performed with no additional harm to the patient. In this report, we focused on the surgical technique, and we do think a larger study must be carried out to confirm the feasibility and safety of the described technique.

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