Case Report

Percutaneous gastrostomy tube placement of the excluded gastric remnant after laparoscopic bariatric surgery in three patients

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A B S T R A C T

Roux-en-Y gastric bypass (RYGB) is the most common bariatric surgery in the United States. RYGB is a successful and safe procedure that promotes weight loss, improves medical comorbidities and overall quality of life. Following RYGB, endoscopic access to the biliopancreatic limb and the excluded stomach is limited due to altered anatomy. Access to the excluded stomach maybe needed for management of complications following RYGB as gastric remnant decompression duo to biliopancreatic limb obstruction or nutritional support due to postoperative malnutrition. We report three cases of RYGB complications that necessitated percutaneous gastrostomy.

Keywords: Enteral nutrition; Gastric bypass; Gastric stump

Introduction

Roux-en-Y gastric bypass (RYGB) is the most performed bariatric surgery in the United States.1 The stomach is divided at the cardia with gastrojejunal anastomosis in the upper pouch and jejunojejunal anastomosis between Roux-en-Y and pancreatico-biliary limbs (Fig. 1). This results in the creation of an excluded stomach with limited endoscopic access. Multiple complications can arise such as bleeding, distention, leaks and perforation.2,3 When oral intake is poor or not possible after RYGB due to ulceration or stenosis at the gastrojejunostomy, access to the gastric remnant is important to provide adequate nutritional support.2,3 We report three cases with post RYGB complications that required percutaneous placement of gastric tube (Table 1).

Case Report

Case 1

A 48-year-old female underwent RYGB 6 years ago. Her starting body mass index (BMI) was 51.8 kg/m², now presented with significant malnutrition and BMI of 18 kg/m². No ulcer or stricture was found on endoscopy. Feeding through percutaneous gastrostomy was needed. Computed tomography (CT) scan of the abdomen was performed without contrast media. A small window to the excluded portion of the stomach, between the left lobe of the liver and the splenic flexure colon was identified (Fig. 2A). Under fluoroscopic guidance a 21-gauge needle was inserted along the left lobe of the liver 50 mL of normal saline was injected in order to hydro-dissect the left lobe of the liver and the splenic flexure colon from the anterior margin of the excluded stomach (Fig. 2B). Air was then inflated into the stomach via the 21-gauge needle. Next, 3T-fasteners (Halyard Health, Alpharetta, GA, USA) were deployed in the anterior portion of the stomach and retracted. Under careful fluoroscopic guidance, a puncture was made into the stomach between the T-fasteners and the gastric position was confirmed with injection of air and contrast. A guidewire was inserted, and the tract carefully dilated to 16 French, followed by the placement of a 16 French MIC gastrostomy tube (Halyard Health) (Fig. 2C). Feeding was initiated two days after the tube placement. The patient gained up to 59.8 kg (from 51.2 kg) after initiating tube feeds. The patient’s oral intake improved, and she was able to maintain body weight with oral intake. She also experienced some pain at the tube site, so gastric tube was removed after 4 months.
A 58-year-old female with history of RYGB presented with gastrointestinal bleeding from a chronic ulcer at the gastrojejunostomy anastomotic site. Enteral feeding by percutaneous gastrostomy was needed. The patient had a complex surgical history including multiple exploratory laparotomies and a right colectomy with ileostomy creation. Recent computed tomography angiogram demonstrates superficial position of the excluded stomach with a branch of the gastroduodenal artery looping superficial to the gastric remnant that appears in a strange anatomic location due to multiple surgeries (Fig. 3A). A 21-gauge Chiba needle (Cook medical, Bloomington, IN, USA) was used to access the excluded stomach with color ultrasound guidance to provide a safe access to the stomach and avoid the artery (Fig. 3B). Air was then inflated followed by contrast to confirm positioning un-
der CT (Fig. 3C). Under CT guidance a needle was advanced into the gastric lumen and 3T-tack fasteners deployed. The needle was then advanced between the T-tacks into the gastric lumen. A wire was placed through the needle and then the needle was removed. After serial dilation of the tract, a 15 French MIC gastrostomy tube was placed. Tube feeds were initiated afterwards. Gastric tube
was used for feeds for approximately 12 months and the patient continued to need tube feeds due to persistent marginal ulcers at the anastomosis. Multiple abdominal CTs were done due to abdominal pain, showing adequate position of gastric tube (Fig. 3D). The Tube was pulled out and replaced twice after that.

Case 3

An 84-year-old female with history of RYGB 3 years ago presented with protein calorie malnutrition and non-intentional weight loss. Percutaneous feeding tube was needed for proper nutrition and the patient was transferred to our hospital for G tube placement in the excluded gastric remnant. Under ultrasound guidance a 21-gauge Chiba needle was advanced into the gastric remnant then it was subsequently distended with normal saline (Fig. 4A). 3T fasteners were placed under ultrasound guidance with the final placement confirmed with CT fluoroscopy (Fig. 4B). An 18-gauge needle was inserted adjacent to the T-fasteners, directed from left to right. A guidewire was then placed. The tract was sequentially dilated followed by insertion of a 16 French MIC gastric tube (Fig. 4C). The balloon was inflated, and contrast injected confirming the location of the gastric tube in the gastric remnant. There was filling of the gastric antrum and emptying into the duodenum (Fig. 4D). The Tube feeds were initiated the next day after tube placement. The tube remained in place for 30 days, then was replaced by another tube due to tube leakage. The replacement tube was used for 3 months then was accidently dislodged and replaced by another one.

Discussion

We report the successful placement of percutaneous gastrostomy tubes in excluded stomach of post-RYGB patients. No complications were encountered in the three patients.

The gastric remnant is small measuring about 15 to 20 mL with difficult endoscopic access; therefore, percutaneous gastrostomy could be the only option to avoid laparoscopy or laparotomy. Gastric remnant is a blind pouch formed after RYGB that is difficult to access due to its location away from the abdominal wall, position under the liver, close relation with bowel or body habitus.

Imaging guided percutaneous gastrostomy tubes can help avoid surgical risks and general anesthesia. Placement of percutaneous gastrostomy tube in a patient with normal anatomy has a lower major complication rate of 5.9% with percutaneous gastrostomy versus 9.4% with percutaneous endoscopic gastrostomy.4 RYGB anatomy is a lot more technically challenging, however no significant increase in overall rate of major complications was evident in the few reported studies.5 Few data is available in interventional radiology literature about the techniques for the access of the excluded stomach.7 The type of imaging guidance utilized depends on pre-procedural imaging, anatomy and operator comfort. In cases of delayed gastric remnant emptying/biliopancreatic limb obstruction, pre-procedural imaging typically demonstrates a dilated gastric remnant, which may allow simple access using fluoroscopy alone. Identification of the decompressed stomach and providing access can be a lot harder.8 A study by Majumdar et al9, used a combination of fluoroscopy and ultrasound guidance to access the excluded stomach. Fluoroscopy was used to identify the air-filled stomach and ultrasound was used to avoid injury of nearby structures. The use of fluoroscopy and ultrasound, helps in reducing radiation does with CT. Inappropriate visualization of under distended stomach by ultrasound and fluoroscopy mandates the use of CT guidance to allow safe access of the stomach.7

Delayed gastric remnant emptying and biliopancreatic limb obstruction may develop in the early or late postsurgical period. In the early postsurgical period, this may result from mechanical obstruction or ileus caused by internal hernia, adhesions, hemorrhage or edema at the entero-enterostomy. If this is left untreated, the resultant high intraluminal pressures may result in ischemia, anastomotic disruption with leak, or perforation.10-12 Findings of delayed gastric remnant emptying and biliopancreatic limb obstruction on CT scans include dilatation of the remnant stomach and biliopancreatic limb with occasional air fluid levels.10,11

RYGB-related malnutrition is a late postsurgical complication (developing after months to years) and may be a result of chronic abdominal pain that causes chronic vomiting, stomal stenosis or ulceration. Stomal stenosis usually occurs at the gastrojejunal surgical anastomosis with an estimated incidence up to 27%, while marginal anastomotic ulcers can occur in up to 16% of patients.12 Enteral feeding through the excluded remnant is the preferred route for treating protein-calorie and vitamin deficiencies until oral intake is tolerated.

Percutaneous CT-guided gastrostomy tube placement should not be performed if an internal hernia, port site hernia, or ischemic bowel. Diagnostic laparoscopy should be performed emergently in such cases. Also, patients with worsening clinical examination findings or no improvement after percutaneous gastrosy tube placement should undergo operative treatment.5,13

In conclusion, percutaneous gastrostomy tube placement of the excluded gastric remnant in a post RYGB patient is a convenient and safe route for enteral nutrition. As the population of patients with RYGB grows and ages, an increase in requests for gastrostomy tube placement in those patients is anticipated.

Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

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References

1. Nguyen NT, Varela JE. Bariatric surgery for obesity and metabolic disorders: state of the art. Nat Rev Gastroenterol Hepatol. 2017;14:160-9.
2. Nosher JL, Bodner LJ, Gigles WS, Brilin R, Siegel RI, Gribbin C. Percutaneous gastrostomy for treating dilatation of the bypassed stomach after bariatric surgery for morbid obesity. AJR Am J Roentgenol. 2004;183:1431-5.
3. Stein EG, Cynamon J, Katzman MJ, Goodman E, Rozenblit A, Wolf EL, et al. Percutaneous gastrostomy of the excluded gastric segment after Roux-en-Y gastric bypass surgery. J Vasc Interv Radiol. 2007;18:914-9.
4. Wollman B, D’Agostino HB, Walus-Wigle JR, Easter DW, Beale A. Radiologic, endoscopic, and surgical gastrostomy: an institutional evaluation and meta-analysis of the literature. Radiology. 1995;197:699-704.
5. Shaikh SH, Stenz JJ, McVinnie DW, Moorison JJ, Getzen T, Carlin AM, et al. Percutaneous gastric remnant gastrostomy following Roux-en-Y gastric bypass surgery: a single tertiary center’s 13-year experience. Abdom Radiol (NY). 2018;43:1464-71.
6. Majumdar S, Tiwari T, Akhwaland O, Ramaswamy RS. Percutaneous gastrostomy placement for decompression of the excluded gastric remnant following Roux-en-Y gastric bypass surgery. J Clin Interv Radiol ISVIR. 2018;2:144-8.
7. Griffith PS, Birch DW, Sharma AM, Karmali S. Managing complications associated with laparoscopic Roux-en-Y gastric bypass for morbid obesity. Can J Surg. 2012;55:329-36.
8. Papasavas PK, Causaj PF, McCormick JT, Quinlin RF, Hayetian FD, Maurer J, et al. Laparoscopic management of complications following laparoscopic Roux-en-Y gastric bypass for morbid obesity. Surg Endosc. 2003;17:610-4.
9. Ballesta C, Berindoague R, Cabrera M, Palau M, Gonzales M. Management of anastomotic leaks after laparoscopic Roux-en-Y gastric bypass. Obes Surg. 2008;18:623-30.
10. Scheirey CD, Scholz FJ, Shah PC, Brams DM, Wong BB, Pedrosa M. Radiology of the laparoscopic Roux-en-Y gastric bypass procedure: conceptualization and precise interpretation of results. Radiographics. 2006;26:1355-71.
11. Merkle EM, Hallowell PT, Crouse C, Nakamoto DA, Stellato TA. Roux-en-Y gastric bypass for clinically severe obesity: normal appearance and spectrum of complications at imaging. Radiology. 2005;234:674-83.
12. Hermández J, Boza C. Novel treatments for complications after bariatric surgery. Ann Surg Innov Res. 2016;10:3.
13. Acquafresca PA, Palermo M, Rogula T, Duza GE, Serra E. Early surgical complications after gastric by-pass: a literature review. Arq Bras Cir Dig. 2015;28:74-80.