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Original article

“Candy cane” Roux syndrome—a possible complication after gastric bypass surgery

Ramsey M. Dallal, M.D., F.A.C.S.^{a,*}, Daniel Cottam, M.D.^b

^aAlbert Einstein Healthcare Network, Philadelphia, Pennsylvania

^bSurgical Weight Control Center of Nevada, Las Vegas, Nevada

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Abstract

Background: An excessive length of nonfunctional Roux limb proximal to the gastrojejunostomy can cause abnormal upper gastrointestinal symptoms after gastric bypass surgery. The purpose of this study was to characterize the syndrome and provide the practitioner with diagnosis and management options.

Methods: We performed a retrospective descriptive review of patients who had undergone revisional surgery for “candy cane” Roux syndrome.

Results: From 2004 to 2006, 3 patients underwent revision because of a redundant proximal Roux limb. These 3 revisions were performed at 3, 12, and 36 months after the original Roux-en-Y gastric bypass procedure. The symptoms included regurgitation of food in 2 patients, reflux in 2, significant weight regain in 1, postprandial pain that was relieved after vomiting in 2, persistent nausea in 2, and epigastric fullness in 2 patients. The symptoms were progressive in all 3 patients. The resected length of bowel ranged from 8 to 15 cm. Three different surgeons had performed the initial gastric bypass, and a circular stapler had been used for the construction of the original gastrojejunostomy in all 3 patients. Resection of the excess Roux limb was performed laparoscopically in all cases, and all patients reported complete and immediate resolution of their symptoms.

Conclusion: A long, nonfunctional Roux limb tip may cause persistent nausea, postprandial epigastric pain, and, even, a lack of satiety. Surgeons should attempt to minimize redundancy in the Roux limb during the primary procedure. Additional studies may better characterize this possible complication. (Surg Obes Relat Dis 2007;3:408–410.) © 2007 American Society for Bariatric Surgery. All rights reserved.

Keywords:

Roux-en-Y; Gastric bypass; Revisional surgery; Postoperative complications; “Candy cane” syndrome; Bariatric surgery

With the increasing number of bariatric procedures performed [1], a parallel increase in revisional operations can be expected. Complications that necessitate revision after a standard gastric bypass procedure include gastrogastic fistula, internal herniation, pouch or stomal dilation, and severe ulcer disease. A redundant, nonfunctional Roux limb tip, or “candy cane” Roux (Fig. 1), to our knowledge, has

not been previously described as a complication of gastric bypass surgery.

Methods

A retrospective chart review from 2 bariatric centers was performed of all patients who had undergone revision for symptoms that could be attributed to an excessive, nonfunctioning Roux limb tip. The revisions were all performed laparoscopically by transecting the excess Roux limb after mobilization using a linear stapler close to the gastrojejunostomy. All patients were followed up for ≥ 3 months to monitor their response.

*Reprint requests: Ramsey M. Dallal, M.D., F.A.C.S., Bariatric Surgery Program, Albert Einstein Healthcare Network, 5501 Old York Road, Klein 510, Philadelphia, PA 19141.

E-mail: dallalr@einstein.edu

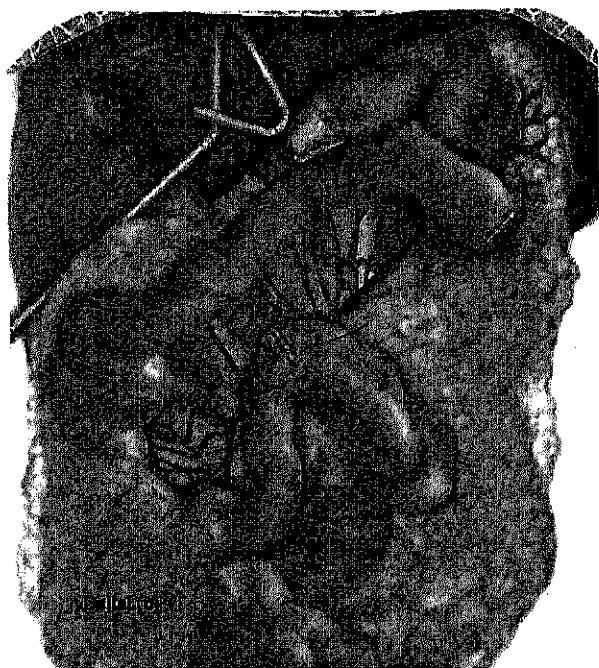


Fig. 1. Depiction of "candy cane" Roux limb. Excess small bowel proximal to gastrojejunostomy causes symptoms of postprandial epigastric discomfort that is relieved by vomiting. Symptoms of reflux, loss of satiety, and nausea are also common.

Case reports

Patient 1

A 52-year-old woman with an initial body mass index of 46 kg/m² presented 3 weeks after undergoing laparoscopic Roux-en-Y gastric bypass by a surgeon who had previously performed 35 laparoscopic gastric bypass procedures. The patient was receiving parenteral nutrition and had been vomiting daily. Radiographic studies clearly demonstrated an obstruction at the jejunojunction, as well as a long Roux limb tip. The original operative report described a retrocolic, retrogastric gastric bypass using a circular stapler for the gastrojejunostomy, with a transorally placed anvil. Laparoscopic revision of the obstructed jejunojunction was performed. Although redundancy in the Roux limb was recognized before the revisional operation, we elected to only address the obvious urgent complication. The patient's obstructive symptoms resolved immediately and she recovered completely. During a period of several months, the patient complained of progressive epigastric pain after eating, daily vomiting of undigested food, and belching. Endoscopy documented the tip of the Roux limb had extended approximately 8 cm beyond the gastrojejunostomy. Laparoscopic revision of the Roux limb was performed 1 year after her original procedure. The operative findings documented a dilated, redundant Roux limb tip 8 cm in length that was resected without complications. The patient's

symptoms immediately resolved and at 4 months of follow-up had not recurred.

Patient 2

A 59-year-old man had undergone open Roux-en-Y gastric bypass 3 years previously. His operation was an antecolic, antegastric procedure with a circular stapled anastomosis using the transgastric technique. He presented to a different surgeon with complaints of weight regain. His initial weight had been 380 lb and during a 2-year period, he had lost 180 lb. However, within the ensuing year, he had gained 83 lb. His only complaint was occasional left upper quadrant pain. An upper gastrointestinal study demonstrated a pouch-like dilation of the proximal Roux limb (Fig. 2). Endoscopy was performed, revealing a very large (on insufflation) 15-cm Roux limb tip. Laparoscopic resection of the blind limb was performed, with a remarkable return of early satiety. The patient had experienced a 20-lb weight loss at 3 months of follow-up.

Patient 3

A 63-year-old woman had undergone an antecolic, antegastric laparoscopic Roux-en-Y gastric bypass procedure with a circular stapler technique by a surgeon who had performed >700 procedures. Her immediate postoperative course was uncomplicated, and she was discharged home on day 1. She presented with extreme nausea 1 month postoperatively and underwent upper endoscopy. A mild gastrojejunal stenosis was endoscopically dilated; however, her symptoms were unchanged. Despite aggressive nonoperative dietary changes, she vomited most of every meal and had nausea 24 h/d at 3 months. Upper endoscopy at that time demonstrated that the gastric pouch emptied into a large "candy cane" limb and not the distal Roux limb. Laparoscopic revision was performed 5 months after her initial gastric bypass and the 8 cm of excess Roux limb was resected. The patient's nausea and vomiting immediately resolved, and, at 4 months of follow-up, her symptoms had not returned.

Discussion

Bariatric patients commonly have complaints of postprandial discomfort, nausea, and vomiting. Common causes of these symptoms include transient food intolerance, overeating, marginal ulceration, and gastrojejunal strictures. We describe a small series of patients whose gastrointestinal symptoms might have been associated with an excessive length of Roux limb proximal to the gastrojejunostomy—the "candy cane" Roux syndrome. A common complaint in this small case series was postprandial epigastric pain, with resolution of pain after vomiting an unexpectedly large volume of food. Other nonspecific symptoms included reflux, nausea, and loss of satiety. These symptoms seemed to progress with time and likely represent a combination of

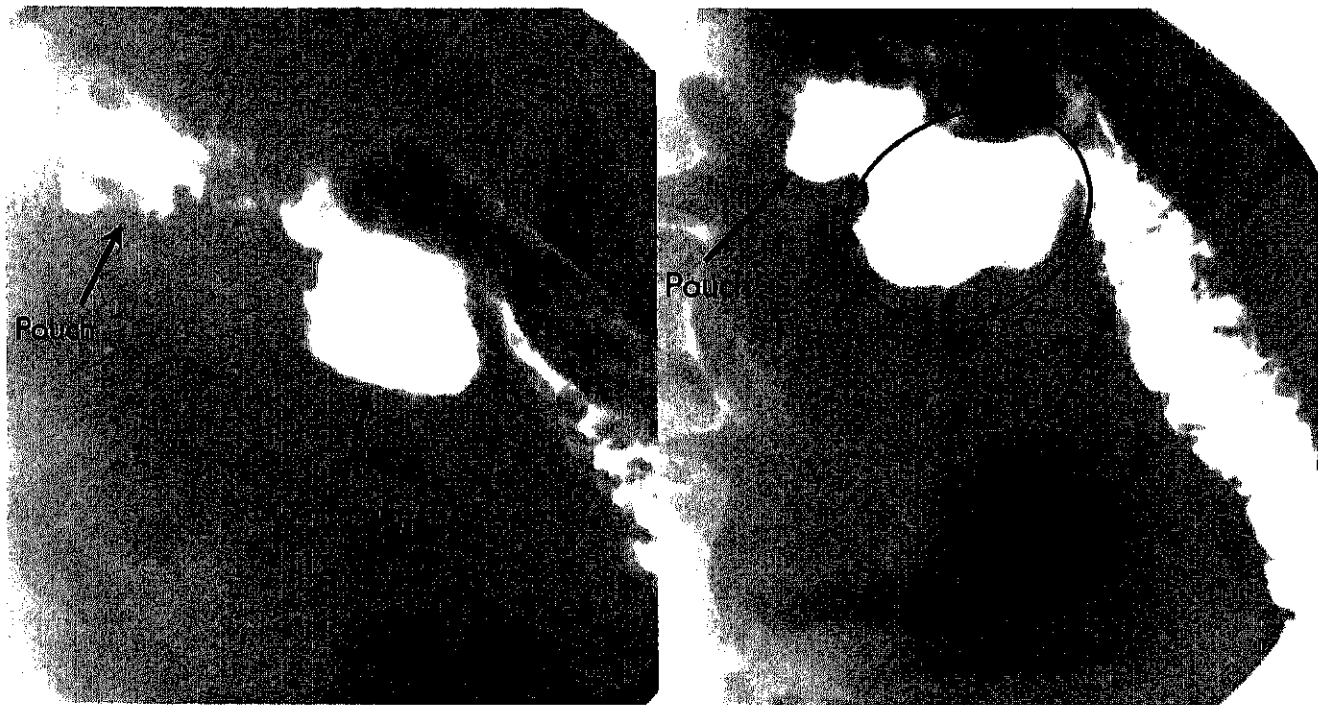


Fig. 2. Upper gastrointestinal series (2 views) of patient 2, who complained of loss of satiety and postprandial epigastric pain 3 years after open Roux-en-Y gastric bypass surgery. Endoscopy documented a 1.2-cm diameter stoma. Capacitance of Roux limb tip was underappreciated on upper gastrointestinal series, because, on gentle insufflation, Roux limb tip distended to 15-cm diameter. Patient had surprising improvement in early satiety after resection of excess Roux limb.

worsening dysmotility and/or increasing dilation of the Roux limb. The diagnosis requires an index of suspicion and endoscopy by a physician familiar with gastric bypass anatomy.

Patients who have undergone a gastrojejunostomy constructed using the circular stapler technique may be more apt to have this anomaly. With this technique, the circular stapler is introduced through the end of the Roux limb, while the anvil is placed in the gastric pouch. After creating the anastomosis, the open end of the Roux limb should be resected close to the anastomosis [2]. All 3 patients had their primary procedure performed using the circular stapler technique.

An additional patient with possible “candy cane” Roux syndrome was excluded from this study. She was found to have a 10-cm redundant Roux limb incidentally during emergent repair of an internal hernia. The patient had longstanding complaints of reflux and vomiting that could have been secondary to redundancy in the Roux limb or to an intermittently obstructing internal hernia.

This small case series certainly had a number of limitations. Without controls, we were unable to determine a critical excess length of the Roux limb at which symptoms would become evident, nor were we able to determine whether all patients, or just a small minority, would develop symptoms, even with seemingly excessive Roux limb redundancy. Our follow-up was limited, and a placebo effect, especially in the 1 patient with complaints of lack of satiety,

could possibly account for the symptom resolution. Regardless, we believe this syndrome could be a more common problem than appreciated and hope that case-controlled studies can characterize this possible complication further. We also conjecture that securing the Roux limb along the gastric pouch (as many surgeons do as a pouch staple line buttress) might prevent gravity-dependent drainage of food into the proximal Roux limb tip, which might worsen bowel dilation and dysmotility.

Future studies may better characterize this possible syndrome; however, until more data are available, we recommend that surgeons minimize the length of Roux limb left proximal to the gastrojejunostomy. In patients who have persistent gastrointestinal symptoms and endoscopic findings of Roux limb redundancy, laparoscopic resection is reasonable in an attempt to ameliorate the symptoms.

Disclosures

The authors have no commercial associations that might be a conflict of interest in relation to this article.

References

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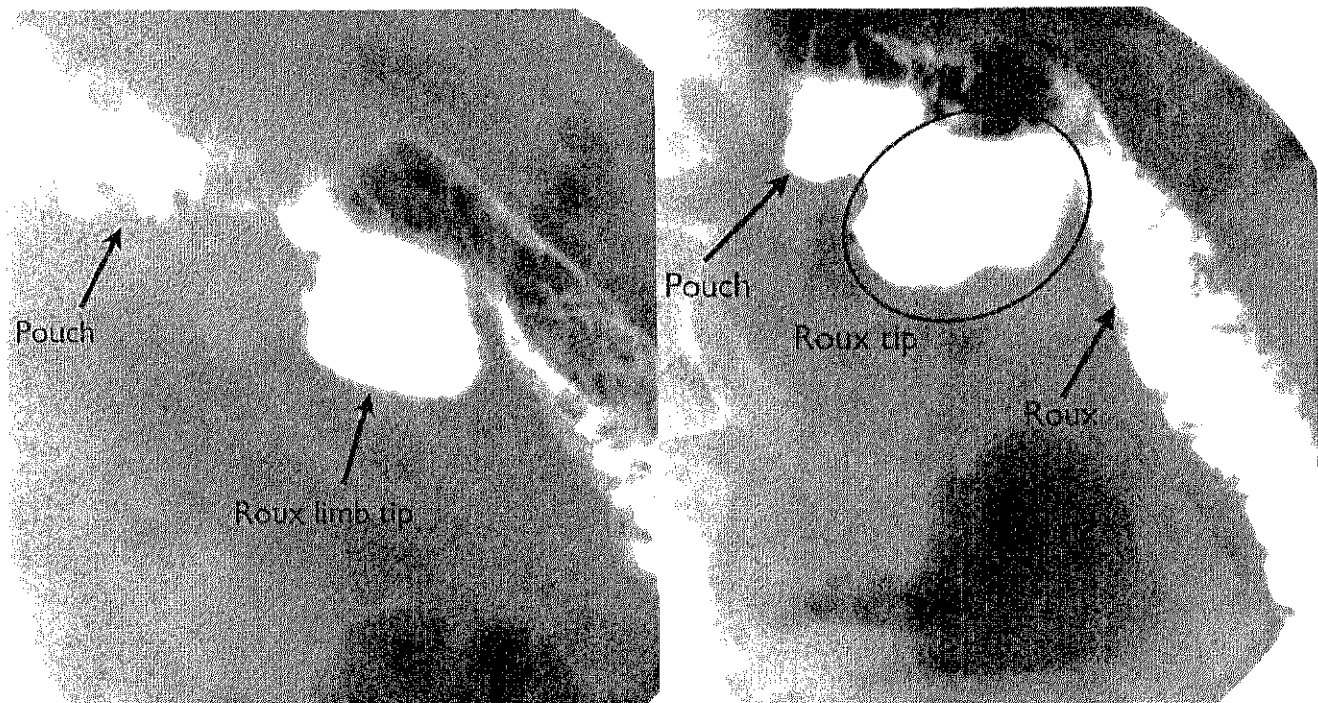


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