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Retrograde Jejunojejunal Intussusception With Perforation After Sleeve-to-Roux-en-Y Gastric Bypass (RYGB) Conversion: A Case Report

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Abstract

Jejunojejunal (JJ) intussusception is a rare late complication of Roux-en-Y gastric bypass (RYGB). Most cases are retrograde, meaning the common channel telescopes backward into the JJ anastomosis. The best surgical treatment is still debated: simple reduction, reduction with fixation, or resection with a new anastomosis.

We report a 69-year-old woman who had a sleeve gastrectomy 10 years earlier, converted to RYGB about two years later because of reflux. She presented with abdominal pain that woke her from sleep and radiated to the back, with recent diarrhea and no vomiting or fever. She had leukocytosis (14.5 x 10^3/µL) with normal C-reactive protein (CRP) and a lactate of 2.2 mmol/L. An abdominal radiograph showed air-fluid levels, and a nasogastric tube drained coffee-ground content. Computed tomography (CT) then showed dilated proximal small bowel and a suspected intussusception at the JJ anastomosis, without free air.

Laparoscopy was converted to laparotomy because the intussusception could not be reduced laparoscopically. About 90 cm of the common channel had telescoped retrogradely into the JJ anastomosis. The bowel was congested but viable. A 1 cm perforation was found in the common channel, 10 cm distal to the anastomosis. The Petersen space and the JJ mesenteric defect were both open. We reduced the intussusception, repaired the perforation primarily, closed both mesenteric defects, and fixed the common channel to the biliopancreatic limb and the mesenteric root. We chose not to resect because the bowel was viable, the involved segment was long (about 90 cm), and the biliopancreatic and alimentary limbs were markedly dilated close to the ligament of Treitz. Recovery was uneventful, and the patient was discharged on postoperative day 6. At two months, she was well, with no recurrence or complaints.

This case shows that intussusception after RYGB can present with few signs of perforation, even when the bowel is perforated. In selected patients with viable bowel, reduction with fixation and primary repair is a reasonable alternative to resection.

Categories: General Surgery, Endocrinology/Diabetes/Metabolism
Keywords: bariatric surgery complications, jejunojejunal intussusception, revisional bariatric surgery, roux-en-y gastric bypass (rygb), small bowel obstruction (sbo)

Introduction

Intussusception is uncommon in adults. In most adults, it is caused by a lead point, such as a tumor or polyp [1]. In Roux-en-Y gastric bypass (RYGB), a small gastric pouch is joined to a loop of jejunum called the alimentary (Roux) limb, which carries food. The bypassed stomach, the duodenum, and the proximal jejunum form the biliopancreatic limb, which carries bile and pancreatic juice. The two limbs join at the jejunojejunal (JJ) anastomosis, and the bowel beyond it, where food and digestive juices mix, is called the common channel. After RYGB, intussusception behaves differently. There is usually no lead point, and most cases are retrograde [2-4]. This means that the distal bowel telescopes into the proximal bowel, against the normal direction of peristalsis and food flow. After RYGB, the common channel telescopes into the JJ anastomosis. In the usual (antegrade) form, proximal bowel telescopes into distal bowel.

The condition is rarely reported in the literature. One center found 23 cases among more than 15,000 gastric bypass patients over about 12 years [3]. Typical patients are young women who have lost a lot of weight, and the median time from bypass to diagnosis is about four years [3,5]. The cause is not fully understood. The leading theories are abnormal motility in the divided small bowel, with ectopic pacemakers that create retrograde waves, and thinning of the mesentery after weight loss [2,6].

The presentation is often vague, and computed tomography (CT) is the main diagnostic test [2]. If diagnosis is delayed, the bowel can become ischemic, necrotic, or perforated [2,3]. Surgery is the standard treatment, but there is no agreement on the best operation. Options range from simple reduction to reduction with fixation (enteropexy), to resection with a new JJ anastomosis [5,7].

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We present a retrograde JJ intussusception with perforation of the common channel in a 69-year-old woman whose RYGB was a conversion from a previous sleeve gastrectomy. The value of this case lies in the combination of its features: older age, a sleeve-to-RYGB conversion, a long blind segment of the biliopancreatic limb with open mesenteric defects, and a perforation that was present before surgery despite no peritoneal signs, a normal C-reactive protein (CRP), and no free air on CT. We also describe our reasons for choosing reduction with fixation instead of resection, and the favorable short-term outcome.

Case Presentation

A 69-year-old woman presented to the Emergency Department of Rambam Health Care Campus with abdominal pain that woke her from sleep and radiated to her back. She had no vomiting and no fever. She reported recent diarrhea.

Her medical history included breast cancer more than 10 years earlier and familial Mediterranean fever (FMF) treated with colchicine. Her surgical history included a hysterectomy for uterine fibroids 15 years earlier and a laparoscopic sleeve gastrectomy 10 years earlier, when her body mass index (BMI) was 42 kg/m². She lost 20 kg after the sleeve. About two years later, she developed reflux symptoms, and the sleeve was converted laparoscopically to an RYGB. The operative report of the conversion was available and stated that the mesenteric defects had been closed. An upper endoscopy one year before this admission was normal.

On arrival, her vital signs were normal: temperature normal, heart rate 78 beats per minute, and blood pressure 132/87 mmHg. Her abdomen was diffusely tender, without guarding, rigidity, or signs of peritonitis. Blood tests showed a white blood cell count of 14.5 × 10³/μL (reference range 4.0-11.0 × 10³/μL), hemoglobin 13.3 g/dL (reference range 12.0-16.0 g/dL), lactate 2.2 mmol/L (reference range 0.5-2.0 mmol/L), and CRP 0 mg/dL (reference range 0-0.5 mg/dL).

A plain abdominal radiograph showed air-fluid levels. A nasogastric tube was inserted and drained coffee-ground content. Rectal examination showed an empty ampulla, with no melena and no fresh blood.

CT of the abdomen with intravenous and oral contrast was then performed. It showed dilated proximal small bowel loops, up to 5 cm in diameter, with air-fluid levels. The excluded (remnant) stomach was dilated, and contrast flowed back into it. Because the remnant was small after the previous sleeve gastrectomy, it was difficult to identify on CT. There was a suspected intussusception in the left upper abdomen, which appeared to include the JJ anastomosis. The telescoped complex, from its entry point to its tip, measured about 23 cm. CT could not show with certainty which limb was involved. No contrast passed beyond the intussusception, and the small bowel distal to it was collapsed. There was no free intraperitoneal air (Figure *1*).

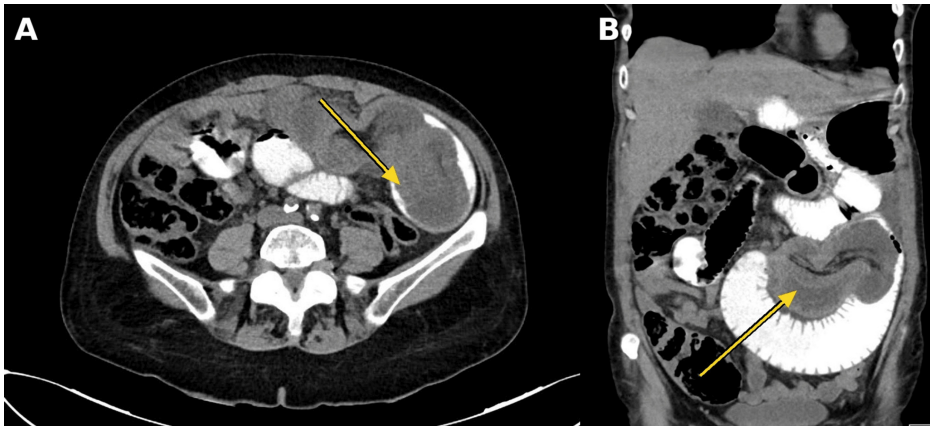


FIGURE 1: Contrast-enhanced computed tomography of the abdomen.

(A) Axial view showing a markedly dilated small bowel loop in the left abdomen with a bowel-within-bowel appearance and a thin crescent of oral contrast around the intussuscepted segment (arrow). (B) Coronal view showing the intussuscepted segment (arrow) inside a markedly dilated, contrast-filled small bowel loop in the left mid-abdomen.

Based on the clinical picture and the CT findings, we started with diagnostic laparoscopy. At the initial laparoscopic inspection, before any manipulation of the bowel, a 1 cm perforation of the common channel was seen outside the intussuscepted segment. Its edges were edematous, without fibrin, and there was no leakage of enteric content or peritoneal contamination. The intussuscepted loop could not be released laparoscopically, so we converted to an exploratory laparotomy.

At laparotomy, each limb was measured from fixed landmarks. The biliopancreatic limb measured about 50 cm from the ligament of Treitz to the JJ anastomosis and was dilated. Beyond the anastomosis, it continued as a blind segment of about 30 cm, measured from the anastomosis to its tip. The tip was adherent to the liver. The total length from the ligament of Treitz to the tip of the blind segment was therefore about 80 cm. The alimentary (Roux) limb measured about 80 cm from the gastrojejunostomy to the JJ anastomosis and was dilated at its distal end. The JJ anastomosis was a stapled side-to-side anastomosis. The common channel had telescoped retrogradely, against the direction of flow, through the JJ anastomosis into the blind segment (Figure 2). The intussuscepted bowel was hyperemic but not ischemic. The JJ mesenteric defect was open, and the Petersen space was very wide, although both had been closed at the conversion. No bowel had herniated through either defect. No lead point was found on inspection or palpation. The adhesion of the blind segment to the liver did not cause angulation or tethering of the bowel.

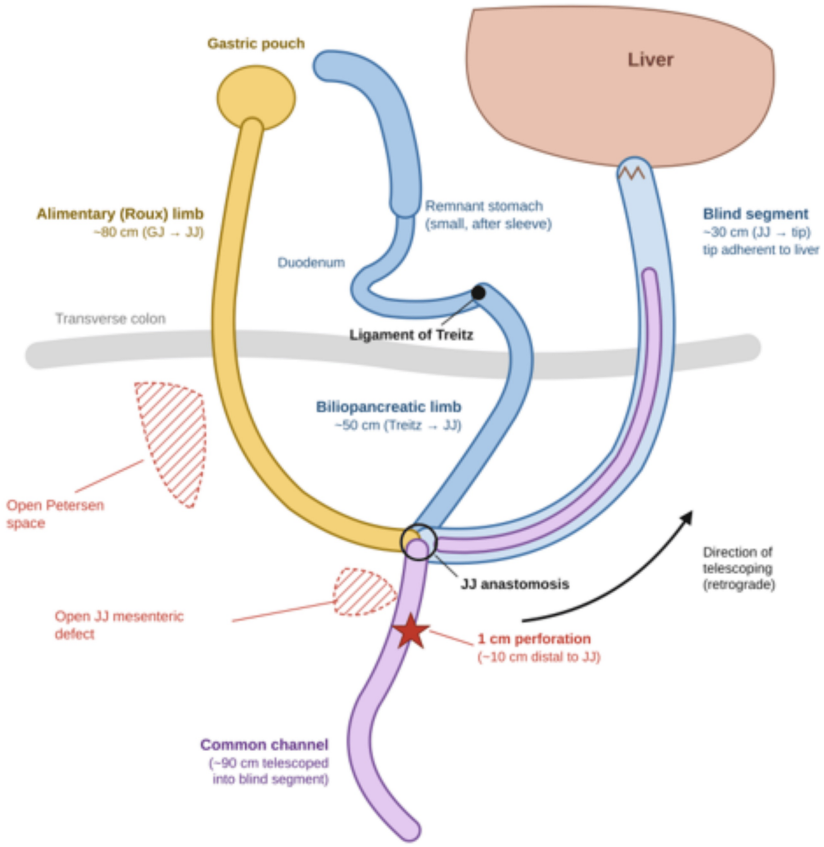


FIGURE 2: Schematic of the operative findings.

The gastric pouch is joined to the alimentary (Roux) limb (about 80 cm). The biliopancreatic limb (about 50 cm from the ligament of Treitz) joins the JJ anastomosis and continues as a blind segment (about 30 cm) whose tip is adherent to the liver. The common channel telescoped retrogradely through the JJ anastomosis into the blind segment (arrow). The perforation (star) is in the common channel, about 10 cm distal to the anastomosis. The open Petersen space and JJ mesenteric defect are also shown.

This image is a schematic drawing created with Claude (Anthropic, San Francisco, CA, USA).

Once the bowel was exposed, the intussuscepted loop was easily milked out of the blind segment, and the reduction was complete. After complete reduction, the involved common channel measured about 90 cm, and the perforation was about 10 cm distal to the JJ anastomosis. The bowel was warmed with warm saline. Its color improved, and peristalsis returned, which supported the surgeon's clinical assessment that the bowel was viable. Viability was judged clinically, without other tests such as fluorescence angiography. This assessment cannot exclude earlier reversible ischemia or a focal injury at the site of the perforation.

The perforation was closed transversely with a continuous single-layer 3-0 Vicryl suture, without debridement. No formal leak test was performed, and the repair was checked visually. The Petersen space and the JJ mesenteric defect were closed with a continuous barbed suture (V-Loc). To prevent recurrence, the common channel was fixed to the biliopancreatic limb and to the root of the mesentery with about three interrupted Vicryl sutures. Peritoneal lavage was not performed because there was no leakage or contamination. A drain was left in place.

Because the bowel was judged viable and the perforation was small and clean, we did not consider resection or revision of the JJ anastomosis necessary. The mesentery and its vessels appeared normal, and the area was not difficult to mobilize. We also did not resect the blind segment, because the obstruction was caused by the intussusception and not by the blind segment itself. The patient remained hemodynamically stable throughout the operation, which lasted about two hours.

Postoperative course and follow-up

The postoperative course was uneventful. She received intravenous ceftriaxone and metronidazole for three days. Oral intake was advanced gradually after guidance from a dietitian. She passed gas and stool, voided spontaneously, and had normal vital signs. Her blood tests showed no signs of inflammation and no other abnormal values. She was discharged home on postoperative day 6 in good general condition.

We recommended yearly follow-up in the bariatric clinic and an upper endoscopy one year after discharge. At her clinic visit two months after discharge, she felt well, reported no new symptoms, and had no signs of recurrence.

Discussion

Most reported patients with intussusception after RYGB are young women. In the series by Simper et al., all 23 patients were women, with a median age of 32 years [3]. Our patient was 69 years old. She did share a known risk factor, weight loss: her BMI before the sleeve was 42 kg/m², and she lost 20 kg after it [5]. Her bypass was also a conversion from a sleeve gastrectomy, not a primary bypass. Intussusception after sleeve-to-RYGB conversion has rarely been reported [8]. Revisional anatomy may add risk factors of its own. In our patient, these included a long blind end of the biliopancreatic limb, an open JJ mesenteric defect, and a very wide Petersen space. Both defects had been closed at the conversion, so they had reopened over time. The open defects may have allowed the bowel to move more freely around the anastomosis. We found no lead point, and the adhesion of the blind segment to the liver did not cause angulation.

The cause of intussusception after RYGB is not fully known. Dividing the jejunum separates the distal bowel from the natural pacemaker in the duodenum. Ectopic pacemakers may then form in the divided bowel and send waves in both directions, which can push the common channel backward into the anastomosis [2,6,9]. Thinning of the mesentery after weight loss, and the staple line acting as a lead point, are other possible factors [6,10]. In our patient, the common channel telescoped toward the blind end of the biliopancreatic limb, which fits this retrograde pattern.

Our patient had a perforated common channel, yet she had no fever, no peritoneal signs, a normal CRP, only a mildly raised lactate, and no free air on CT. The perforation was seen at laparoscopy before any bowel manipulation, so it was present before surgery. There was no leakage of enteric contents or contamination, which may explain the absence of free air, peritoneal signs, and CRP rise. This is a key teaching point. In the series by Simper et al., 35% of patients already had gangrene, perforation, or obstruction that could not be reduced when they reached surgery [3]. A recent report of intussusception after sleeve-to-RYGB conversion also described perforations, but that patient had free air and lactic acidosis [8]. Our case shows that a mild picture does not exclude advanced injury. Intussusception after RYGB can also be an incidental CT finding without obstruction. In a study of 35 CT scans after RYGB, an intussusception longer than 10 cm and dilation of the proximal bowel were associated with obstruction [11]. Our patient's CT showed both, and no contrast passed beyond the intussusception. CT findings should be read together with the clinical picture. In a patient after RYGB with acute abdominal pain and CT signs of obstruction, early surgery should be considered even when the clinical signs are mild.

The coffee-ground nasogastric output came from the gastric pouch and may reflect stasis in the obstructed proximal bowel. The contrast reflux into the excluded stomach suggests back-pressure in the biliopancreatic limb. A nasogastric tube cannot decompress the excluded stomach, so its dilation on CT is an important warning sign. After a previous sleeve gastrectomy, the remnant is small and can be hard to identify, as in our patient, so this sign may be easy to miss.

The intussusception measured about 23 cm on CT, while about 90 cm of common channel was involved at surgery. These numbers measure different things. CT showed the length of the telescoped complex, in which the bowel is folded on itself. At surgery, we measured the length of bowel involved after reduction. The intussusception may also have progressed between CT and surgery, but we cannot confirm this. A single case cannot show whether CT routinely underestimates the length of bowel involved.

Reduction or resection?

The best operation for intussusception after RYGB is still debated. Older reviews favored resection because it seemed to lower recurrence [2,3]. In the series by Simper et al., recurrence was 100% after simple reduction (two patients), 40% after plication, and 12.5% after resection [3]. A meta-analysis also found that resection with a new JJ anastomosis had the lowest recurrence risk [7]. Recurrence after simple reduction can happen within 24 hours [10].

Other data support a less aggressive approach. Varban et al. reported 28 patients, of whom 54% had reduction with or without enteropexy. Only one recurrence occurred at a median follow-up of 9 months. Resection led to a longer hospital stay without fewer complications [5]. These authors recommend resection when the bowel is ischemic or cannot be reduced, and reduction with or without enteropexy in more stable patients [5]. Others have reported good results with laparoscopic enteropexy alone [12]. Sandhovel et al. repaired three perforations primarily after reduction and placed a fixation stitch between the common channel and the biliopancreatic limb. Their patient developed postoperative septic shock that required intensive care, but recovered fully [8].

To contextualize our surgical decision-making, we compared our findings with major published series and relevant revisional case reports (Table *1*). While historical data from Simper et al. [3] and the meta-analysis by Oor et al. [7] emphasized higher recurrence rates following simple reduction (up to 100%), more recent data, including the series by Varban et al. [5] and the case report by Sandhovel et al. [8], suggest that reduction with fixation and primary repair of localized perforations can be safe in carefully selected patients.

Author	Study Type & Patients	Presentation & Perforation	Surgical Strategy	Outcome & Recurrence
Present case	Case report; 69-year-old woman; laparoscopic sleeve converted to laparoscopic RYGB	Abdominal pain radiating to the back, coffee-ground NG output; 1 cm common channel perforation with normal CRP and no free air on CT	Laparoscopy converted to laparotomy; reduction, primary repair, fixation of common channel to BP limb and mesenteric root, closure of Petersen and JJ defects; no resection	Uneventful recovery, discharged POD 6; no recurrence at 2 months
Simper et al. [3]	Single-center series (n=23); all women, median age 32; 22 after RYGB	Median 51 months after bypass; 35% had gangrene, perforation, or non-reducible obstruction	Resection (70%), plication (22%), simple reduction (9%)	Recurrence: 100% after simple reduction, 40% after plication, 12.5% after resection
Varban et al. [5]	Single-center retrospective series (n=28); after RYGB	Occurred late, usually after major weight loss	Reduction ± enteropexy (54%); resection and JJ revision (46%)	1 recurrence overall (median follow-up 9 months); resection meant longer stay with similar complication rates
Sandhovel et al. [8]	Case report; 46-year-old woman, 15 months after sleeve-to-RYGB conversion	Free air and lactic acidosis; 3 perforations with feculent contamination	Laparoscopic reduction, two-layer primary repair, Brolin fixation stitch, Petersen defect closure	Postoperative septic shock requiring ICU; full recovery with bowel length preserved
Oor et al. [7]	Systematic review and meta-analysis	Pooled data from published reports	Resection vs. reduction with or without fixation	Resection with JJ revision had the lowest recurrence risk

TABLE 1: Summary of key literature on jejunojejunal intussusception after RYGB compared with the present case.

RYGB: Roux-en-Y gastric bypass; NG: nasogastric; CRP: C-reactive protein; CT: computed tomography; BP: biliopancreatic; JJ: jejunojejunal; POD: postoperative day; ICU: intensive care unit

In our patient, the reduction was easy and complete; the bowel was judged viable, and the perforation was small and clean. These findings favored non-resective management (Table *1*). This approach avoided a new anastomosis and preserved the existing anatomy.

We chose reduction with fixation because revision did not appear necessary. The intussuscepted loop was easily milked out of the blind segment, the bowel was judged viable after reduction and warming, and the mesentery and its vessels appeared normal. The perforation was small, clean, and without contamination, so it could be closed primarily. A limited revision would have required removing only the anastomosis and the short perforated segment, not the whole intussuscepted length, but we did not judge it to be needed. To lower the risk of recurrence, we fixed the common channel to the biliopancreatic limb and the mesenteric root, and closed both mesenteric defects. We left the blind segment in place because it was not the cause of the obstruction.

The main limitation of this approach is the risk of recurrence, which is higher after reduction than after

resection in some series [3,7]. Long-term follow-up is needed. We recommend yearly review in the bariatric clinic, and patients should be told to seek care early if similar pain returns.

Conclusions

Retrograde JJ intussusception is a rare late complication that can occur in any patient after RYGB, including after sleeve-to-RYGB conversion and in older patients. It may cause bowel perforation with few clinical, laboratory, or CT signs. Surgeons should keep this diagnosis in mind in any patient after RYGB with acute abdominal pain and signs of obstruction, and should not delay surgery because the picture seems mild. When the bowel is viable after reduction, reduction with fixation, primary repair of small perforations, and closure of mesenteric defects is a reasonable alternative to resection, especially when the reduction is easy and complete, the bowel is judged viable, and the perforation is small and clean. Long-term follow-up is needed to watch for recurrence. In our patient, reduction of the intussusception, primary repair of the perforation, fixation of the common channel, and closure of the mesenteric defects led to an uneventful recovery without bowel resection. She was discharged on postoperative day 6 and was well, with no recurrence, at two months of follow-up.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Yosor Fiesal, Mohammad Radwan, Assaf Harbi

Acquisition, analysis, or interpretation of data: Yosor Fiesal, Mohammad Radwan, Assaf Harbi

Drafting of the manuscript: Yosor Fiesal, Mohammad Radwan

Critical review of the manuscript for important intellectual content: Yosor Fiesal, Mohammad Radwan, Assaf Harbi

Supervision: Yosor Fiesal, Assaf Harbi

Disclosures

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