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CASE REPORT

Anterograde Intussusception Following Laparoscopic Roux-en-Y Gastric Bypass: A Case Report and Review of the Literature

Darcy Shaw · Stephen Huddleston · Gregory Beilman

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Abstract Intussusception is a rare but worrisome cause of bowel obstruction in patients following Roux-en-Y gastric bypass. When intussusceptions is discovered in the general adult population, most often there is a "lead-point"; however, following bariatric procedures, this may not be true. There appears to be an increased incidence of this condition in open compared to laparoscopic Roux-en-Y gastric bypass procedures. Intussusception is often difficult to diagnose, especially in this population. Symptoms and signs can be very vague, and even computed tomography may not be accurate in diagnosing this condition. A high index of suspicion is required to successfully diagnose intussusception, and treatment often requires exploration and bowel resection. Herein, we report a case that follows several of these trends and suggests other possible contributions to intussusception. We also review other cases of intussusception after laparoscopic gastric bypass reported in the literature.

Keywords Intussusception · Roux-en-Y gastric bypass · Bariatric

Case Report

A 26-year-old female with a history of laparoscopic Roux-en-Y gastric bypass and cholecystectomy 2 years prior presented to the emergency room with a diffusely tender abdomen. In the 2 years since her surgery, she had lost over 100 lb, and her body mass index decreased from 44 to 26.9 kg/m^2. She did have other recent surgeries including a laparoscopic kidney resection for living related kidney transplant donation, followed by the complication of a ventral hernia. An open repair with mesh was performed, with subsequent infection and removal of mesh, along with lysis of adhesions. The patient had developed a chronic wound infection which was treated with drainage and sclerosis.

Aside from pain and nausea, she had no other associated symptoms. She did not have vomiting and was passing flatus on the day of presentation to the emergency department. She was afebrile, and her vital signs were stable. The abdominal exam demonstrated diffuse pain, worst on the left side, with associated guarding, rebound, and rigidity. She had a normal white count at 10.6. A computed tomography (CT) of the abdomen and pelvis with oral and intravenous contrast showed dilated jejunum (Fig. 1) along with intussusception at the jejunojejunostomy (Fig. 2). She was taken to the operating room for exploratory laparotomy. Extensive lysis of adhesions was performed to separate the omentum from the intra-abdominal wall. She was found to have a peristaltic (anterograde) intussusception of the roux limb into the jejunojejunostomy (Fig. 3). All of the involved bowel appeared viable, and manual reduction without resection was deemed appropriate treatment. A lead-point was not found. The Roux limb and biliopancreatic limb were brought together proximal to the jejunojejunostomy with interrupted 3-0 silk sutures to prevent recurrence. The skin was left open, and a negative pressure dressing was placed to control the chronically infected wound. The patient was discharged home on postoperative day9 after she was tolerating a regular diet with pain controlled by oral analgesia, and examination demonstrated a healing wound.

D. Shaw (✉) · S. Huddleston · G. Beilman
Department of Surgery, University of Minnesota Medical School, Minneapolis, MN 55455, USA
e-mail: shawx191@d.umn.edu

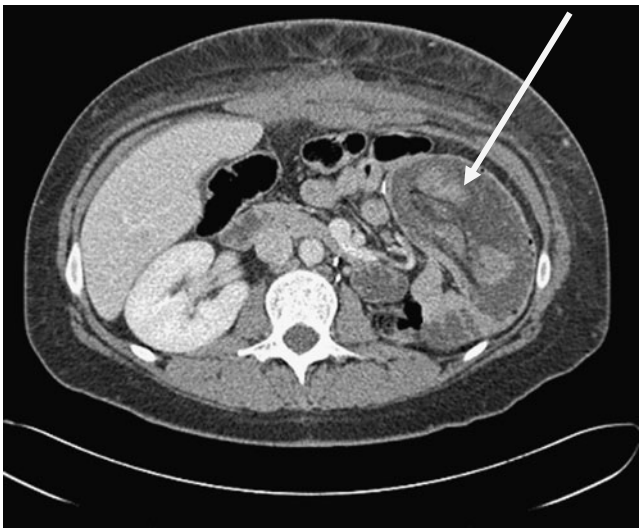

Fig. 1 Axial view of computed tomography scan of abdomen demonstrating fluid in stomach

Discussion

Morbid obesity is a growing epidemic in the USA [1], with increased medical illnesses in this population including cardiovascular disease, diabetes, migraines, venous stasis ulcers, hernias, and degenerative joint disease [2]. Gastric bypass surgeries are becoming an important therapeutic modality for treatment of obesity and obesity-related illnesses [2, 3]. Roux-en-Y gastric bypass has a number of well-documented risks including anastomotic leaks, pulmonary embolism, small bowel obstruction, malnutrition, and anastomotic stricture [4]. There are also specific surgical

Fig. 2 Coronal view of computed tomography of abdomen demonstrating intussusception

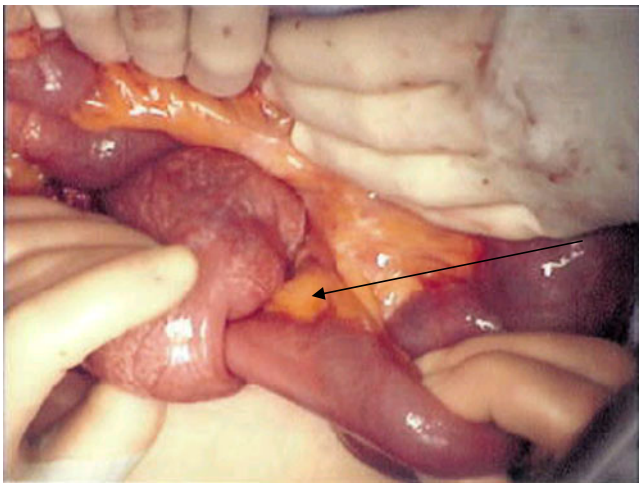

Fig. 3 Intraoperative photograph demonstrating intussusception

risks including internal hernias, which may happen in as many as 3.1% of laparoscopic cases [5]. Intussusception is much less common, and series including both open and laparoscopic Roux-en-Y bypass procedures suggest an incidence of intussusception between 0.07% and 0.15% [6, 7] of patients. In a study by Simper et al., of the 23 cases of intussusception they encountered after 15,000 Roux-en-Y gastric bypass cases, only four occurred in laparoscopic cases. It is critical to note that the majority of our limited information about intussusception following bariatric procedures comes from open procedures.

Furthermore, this can be a difficult condition to diagnose. Our patient did have peritoneal signs and an acute presentation; however, bariatric patients often have more vague complaints heralding an intra-abdominal catastrophe [8], and physical examination may not be as sensitive as in other patients. This problem accentuates the need for a high index of suspicion when approaching this group of patients. Another consideration is that a negative CT of the abdomen does not rule-out this condition. A CT scan may be only 80% sensitive for diagnosis of intussusception [9]. Intussusception in adults without Roux-en-Y bypass usually requires the presence of a lead-point, such as a tumor or other mass [10]. As in our case, with Roux-en-Y bypass, a lead-point may be subtle or even absent [6, 11]. Intussusception following Roux-en-Y often occurs at the jejunojejunostomy site [12, 13] (Table 1).

Our patient had a very large weight loss of over 100 lb. Other studies have shown a relationship between rapid and severe weight loss with intussusception [9].

Zainabadi and Ramanathan [13] have suggested that a thinner mesentery holding the small bowel after weight loss may contribute to intussusception. Another theory more often suggested is that dysmotility disorders following Roux-en-Y gastric bypass [14] may contribute to the development of intussusception [6, 11]. After Roux-en-Y

Table 1 Results of previously published intussusception case reports following laparoscopic Roux-en-Y gastric bypass

	Age (years)	Gender	Time since procedure (months)	Intussusception type	Weight lost	Treatment
Shaw et al.	26	Female	24	Anterograde	45 kg	Reduction
Zainabadi et al. [13]	31	Female	10	Anterograde	47 kg	Reduction
Zainabadi et al. [13]	44	Female	30	Anterograde	71 kg	Reduction
Zainabadi et al. [13]	27	Female	42	Anterograde	70 kg	Reduction
Efthimiou et al. [6]	39	Female	48	Retrograde	Body mass index dropped 24 kg/m^2	Resection
Wax et al. [15]	35	Female	12	Retrograde	NR	Reduction/resection
Mean	34		28		~58	

gastrojejunostomy, there is a motility disorder of the Roux limb. This limb is separated from the endogenous enteric pacemaker originating from the duodenum, causing the Roux stasis syndrome [14].

Another possible factor contributing to our patient's complication could be her other major surgeries, including a kidney resection and ventral hernia repair with infectious complications. Although no definable lead-point was seen at exploration, it is possible that further surgical changes or adhesions surrounding the area incited intussusception in our patient.

In summary, we present a case of intussusception following laparoscopic Roux-en-Y gastric bypass, which has been rarely reported [12, 13, 15]. Our patient's presentation was more alarming than has been found in other case reports of intussusception. Our patient had an acute presentation of pain, and physical exam signs that were alarming for intra-abdominal catastrophe. Often clinical clues are not as ostensible. She did have evidence of intussusception on CT, but in other cases, a negative CT is not sensitive enough to rule-out intussusception. Also worth noting, she had intussusception following a laparoscopic procedure, and we were unable to find a "lead-point" during exploration. Our patient also was able to benefit from simple reduction, instead of resection, as has more often been reported.

Conclusion

This complication of bariatric surgery may become increasingly prevalent as more patients opt for this surgery given the growing problem of obesity [1] and as patients have other procedures after gastric bypass. There have only been a few case reports of intussusception following bariatric procedures, and this data is even more limited following laparoscopic Roux-en-Y procedures [6, 13, 15]. A high index of suspicion is required to diagnose this condition, and even CT is not highly sensitive. In contrast to our case, intussusception often requires bowel resection because of bowel ischemia. *As more reports of this complication arise, additional risk factors for intussusception and characteristics of the clinical presentation may be revealed.*

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