Retrograde intussusception post-total gastrectomy and small bowel resection with Roux-en-Y gastric bypass reconstruction

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ABSTRACT

Intussusception is a rare cause of intestinal obstruction, especially in adult populations. Adult intussusception was traditionally thought to occur secondary to a pathological lead point such as a malignancy, inflammatory bowel disease, or anatomic abnormality; for example, a Meckel’s diverticulum. Intussusception is a rare surgical complication post Roux-en-Y gastric bypass. An increase in incidence is found with increasing demand of bariatric surgeries. The exact cause of intussusception is unclear. We present a 86-year-old female with retrograde small bowel intussusception post-total gastrectomy and small bowel resection with Roux-en-Y reconstruction.

Keywords: Gastrectomy, Retrograde intussusception, Roux-en-Y gastric bypass

INTRODUCTION

Intussusception occurs when a part of the bowel telescopes into itself, leading to obstruction. The telescoping segment often pulls the mesenteric vessels with it causing ischemic pain and effacement of the draining veins. Sequelae of intussusception can include bowel obstruction or bowel ischaemia. Intussusception is a rare complication after Roux-en-Y gastric bypass (RYGB) and extremely rare after total gastrectomy [1]. We present a case report of 86-year-old female with retrograde small bowel intussusception post-total gastrectomy and small bowel resection with Roux-en-Y reconstruction.

CASE REPORT

A 86-year-old lady presented to emergency department with three weeks history of worsening generalised abdominal pain, increasing frequency of bowel motions and nausea. She denied signs of upper gastrointestinal bleeding, such as melena and haematemesis. Her past medical history included
total gastrectomy and small bowel resection with Roux and Y bypass reconstruction for a bleeding foveolar gastric adenoma, a rare form of Gastro-Intestinal Stromal Tumour (GIST) 6 years ago. Her other medical history included previous transient ischaemic accident, ischemic heart disease, dyslipidaemia, hypertension, knee replacements and pelvic organ prolapse requiring a pessary. On presentation, her vital signs were all within normal range. Her abdomen was soft and tender over the central area. She had no rebound tenderness or signs of peritonism or distension. Her biochemical tests were unremarkable with normal white cell count, haemoglobin, kidney function, and liver function tests. Computed tomography scan (CT) of the abdomen and pelvis revealed small bowel intussusception around the anastomosis site from previous surgery at the level of the umbilicus; however could not identify any obvious leading mass. There was no significant distension above or below the intussusception and no significant distension of a Roux loop was found (Figure 1).

She was admitted under a general surgical team with appropriate fluid resuscitation, strict fluid balance, nasogastric tube insertion, pain relief, and in dwelling urinary catheter insertion. Emergency surgery was conducted the next day. Intra-operatively, laparoscopy was performed, and a retrograde intussusception of the common channel of Roux-En-Y was identified. The decision was made to convert to open surgery with an upper midline laparotomy. Approximately 15 centimetres of distal small bowel had telescoped in a retrograde fashion toward the anastomosis (Figure 2). No lead point or retrograde peristalsis could be identified. Her anatomy of Roux-En-Y reconstruction was unusual compared to other total gastrectomies with Roux-En-Y reconstruction because she also had small bowel resection at the proximal jejunum for the bleeding of small bowel lesion (Figure 3). Manual reduction of the intussusception was not attempted in the patient.

The resection was conducted at all three limbs; from proximal alimentary limb, biliopancreatic limb, and the common channel distal to the intussusception, as illustrated in Figure 3. The resections were conducted using a COVIDEN Endo GIA 80 mm x 3.8 mm linear stapler. The stapler was also used to make a side-to-side isoperistaltic jejuno-jejunal anastomosis between the proximal (oesophageal) limb and previous common channel. The side-to-side anastomosis between the bilio-pancreatic limb and the common channel was also conducted using staplers. The mesenteric window was closed using 3'0 PDS. Her histopathological result showed ischemic necrosis of small bowel without any sign of recurrence of GIST. Post operatively, she was admitted to intensive care for two days. Her nasogastric tube output was minimal and was removed on fourth day. She recovered well post-operatively and began tolerating a free fluid diet on seven day.

**DISCUSSION**

Adult intussusception is uncommon, making up only 5% of total cases of intussusception and accounting for 1-5% of adult intestinal bowel obstructions [2]. Tumours cause the majority of adult intussusception (benign 25% and malignant 27.3%) [3]. Other causes include inflammatory bowel disease and anatomic abnormalities, such as a Meckel's diverticulum or a mobile caecum [4]. Intussusception after RYGB is a rare cause of intussusception, with increasing incidence [3, 5, 6].
A prompt diagnosis of intussusception is essential as it may lead to obstruction and bowel necrosis [7]. Intussusception is often difficult to diagnose because of its variable gastrointestinal symptoms and presentation. Common symptoms include non-specific abdominal pain, nausea and vomiting and occasionally symptoms of bowel obstruction, such as constipation or altered bowel habits [8]. Symptoms may vary in acuity and severity [5]. Stephenson et al. (2014) conducted a retrospective review of laparoscopic RYGB patients, finding that 91.7% of intussuscepted patients presented with upper quadrant abdominal pain as a chief complaint and 8.3% presented with persistent nausea and vomiting [7]. The abdominal examination may be non-specific. Only about 10% of patients in the study presented with a palpable mass [9].

Imaging is the tool of choice in diagnosing intussusception. Radiological studies which have been found to be useful include abdominal ultrasound, plain abdominal films, upper gastrointestinal contrast series, barium enema or CT abdomen/pelvis. Abdominal CT is considered the most sensitive, reliable and useful way of diagnosing intussusception with a reported accuracy of 58–100% [10]. MRI abdomen/pelvis is recommended in pregnant women to limit radiation exposure [11, 12].

Roux-En-Y bypass is performed for a variety of indications and increasing commonly as part of bariatric surgery. Dr. Edward E Mason and Dr. Chikashi Ito were the first to report using RYGB for weight loss surgery in 1965 [9]. It was noted that approximately 20% of complications occurred after RYGB [9]. Intussusception is certainly a rare complication. The incidence of retrograde intussusception has been reported as 0.07 to 0.6% in RYGBs [5]. Jejunal intussusception after gastrectomy was first reported by Bozzi et. al (1914) [9]. It is an uncommon complication affecting approximately 0.07-2.1% of patients who undergo gastrectomy [1].

Some authors have estimated intussusception to be a cause of 10.8% of small bowel obstructions post RYGB [8]. Given the rapid increase in the rate of bariatric surgery, intussusception is becoming an increasingly prevalent post-op complication, despite its rare incidence post-RYGB [4].

Singla et al. (2012) reports that females make up the overwhelming majority (92-98.6%) of patients to suffer from intussusception after laparoscopic gastric bypass surgery [5, 9, 13]. Singla et. al (2012) also found the median patient age to be around 35 [5, 9, 13]. The identified risk factors for developing intussusception include female gender [5], younger age, and significant weight loss after surgery [9].

Adult intussusception is usually treated by resection, as it is normally caused by a known lead point. However, in intussusception post- RYGB there is not usually a lead point. Currently, there is no consensus on definitive treatment for intussusception post-RYGB. Manual reduction with or without plication/pexy procedure has been described in many previous studies [4, 5, 8]. It was recommended that resection should be conducted when there are signs of bowel necrosis. It was also found that resection has statistically lower recurrence rates compared to manual reduction (7.7% versus 31.5%) [9].

Kitasato et al. (2016) conducted a literature review on intussusception post gastrectomy with RYGB reconstruction [1]. It found 18 cases of intussusception after total gastrectomy with Roux-en-Y reconstruction. Most patients were aged 60-70 years old. Only four cases were antegrade intussusception and rest were retrograde intussusception. There were six cases from the early post-operative period, with the rest occurring between 1-22 years. Out of 18 cases, 12 had manual reduction and 6 had bowel resection. It was found that recurrence was more likely when only manual reduction was performed. Kitasato believed Y leg side-to-side anastomosis in the case of gastrectomy may prevent retrograde intussusception [1].

In our case, the initial gastrectomy for this patient six years earlier was performed as part of emergency surgery for gastrointestinal bleeding and gastric cancer. A separate bleeding exophytic lesion was found in the proximal jejunum intra-operatively and was resected separately. The proximal jejunum was resected to fashion a retrocolic roux loop with a 5 cm pouch at the proximal end which was stapled to the oesophageal stump; the opposite end...
was stapled side-to-side with the distal jejunum (common channel) forming a jejunjejunostomy. The duodenal stump was oversewn and attached side-to-side with the common channel. The unique anatomy sets this case apart from the 20 other reported cases of intussusception after total gastrectomy with roux-en-y reconstruction [1, 14, 15]. Our case demonstrates retrograde intussusception in a Roux-en-y reconstruction despite a side-to-side Y leg anastomosis.

Most intussusceptions occur in antegrade fashion, however, with RYGB, the intussusception is more often retrograde in nature [1, 4, 11, 12]. All three limbs of the Roux-en-Y anastomosis can be affected by intussusception, however, in most cases published so far it has been the common channel that has invaginated through the jejuno-jejunalostomy [5]. The exact mechanism/cause of intussusception post RYGB remains unclear [4]. The most accepted theory is called the ‘Roux Stasis syndrome’ hypothesis [4, 5]. It purports that ectopic pacemakers are developed in the Roux limb to generate motor complexes that migrate both proximally and distally after bowel resection from the natural duodenal pacemakers [9]. This may explain the high incidence of retrograde intussusception in post-REYGB (69.8%) compared to virgin abdomens (2.3%) [1].

Kitasato et al. divided the other causes into two groups; namely, mechanical and functional. Mechanical group causes include iatrogenic lead point created by suture or staple line at the anastomosis, ptosis of the gastrojejunal anastomosis, post-operative adhesions, and focal nodular hyperplasia. Functional causes include dysmotility, peristaltic abnormality, autonomic nervous system abnormality, enteral nutrition, and a decrease in gastric wall tension [1].

It has been noted there is a higher incidence of intussusception in cases of RYGB for weight loss compared to cases of RYGB with gastrectomy [8, 9]. This may be contributed to by thinning of the mesentery associated with weight loss, which increases the mobility and instability of bowel, leading to a higher chance of intussusception [5, 9, 12]. Furthermore, the Roux limb in RYGB for obesity is much longer than in cases with gastrectomy, which possibly increases the risk of developing an intussusception [8].

CONCLUSION

An increase in incidence of intussusception secondary to Roux-and-Y gastric bypass anastomosis is noted; likely secondary to a rapid increase in bariatric surgeries over the past 30 years. A prompt diagnosis of intussusception is essential as it may lead to obstruction and bowel necrosis. Small bowel intussusception should be considered as a differential diagnosis for abdominal pain and gastrointestinal abnormalities in a patient with a history of gastrectomy.

REFERENCES

Author Contributions
Tzu-Yi (Arron) Chuang – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved
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Guarantor of Submission
The corresponding author is the guarantor of submission.

Source of Support
None.

Consent Statement
Written informed consent was obtained from the patient for publication of this article.

Conflict of Interest
Authors declare no conflict of interest.

Data Availability
All relevant data are within the paper and its Supporting Information files.

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