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LETTER TO THE EDITOR

Gastroduodenal Intussusception of Remnant Stomach After Gastric Bypass: a Case Report

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Introduction

Intestinal intussusception is a rare long-term complication after a Roux-en-Y gastric bypass (RYGBP) surgery that can result in a small-bowel obstruction. The most frequently encountered type involves retrograde intussusception of the common channel into the jejunojejunostomy [1]. In the setting of revisional bypass surgery, an antegrade intussusception of the remnant stomach into the duodenum may occur, of which only two cases have been previously reported in the literature [2, 3].

Case Report

A 65-year-old gentleman was re-referred to his bariatric surgeon for investigation of new iron deficiency anaemia.

He was first referred in 2012 with a BMI of 44 (158 kg) for consideration of surgical management of obesity. He had a background of ischaemic heart disease, hypertension and atrial fibrillation for which he was prescribed aspirin, amiodarone and several antihypertensives. His past surgical history consisted of a partial anterior gastric fundoplication for ulcerative oesophagitis, with good reflux control. The patient underwent a laparoscopic gastric plication in 2013. After an initial weight loss of 19 kg, a weight regain of 26 kg occurred over a 2-year period. A laparoscopic revisional Roux-en-Y gastric bypass was performed in 2015, in which the remnant stomach was not resected. He was switched from aspirin to clopidogrel post-operatively. A successful weight loss of 30 kg occurred, at which point the patient chose ongoing follow-up with their primary care physician.

During this interim period, the patient suffered a life-threatening upper gastrointestinal haemorrhage and underwent urgent gastroscopy by another clinician to reveal several actively bleeding ulcers at the gastrojejunal anastomosis, which were successfully treated endoscopically. These ulcers likely resulted from recommencement of aspirin for his ischaemic heart disease, which was again ceased after his endoscopic intervention.

Three and a half years later, the patient was re-referred for investigation of asymptomatic iron deficiency anaemia despite oral iron supplementation. A CT scan was performed prior to referral, which demonstrated an antegrade intussusception of the remnant stomach reaching the third part of the duodenum (Fig. 1). The patient denied any abdominal pain, and liver function tests were unremarkable. A gastroscopy demonstrated only focal superficial ulceration beyond gastroenterostomy, and colonoscopy revealed a large polyp in the ascending colon, which was shown to be a tubulovillous adenoma with high-grade dysplasia and focal areas of adenocarcinoma.

The patient underwent a laparoscopic reduction of the remnant stomach (Figs. 2 and 3), and after mobilisation by dissection of the lesser omentum, the remnant stomach was resected by dividing the first part of the duodenum by with an Echelon stapler. The patient underwent a concurrent right hemicolectomy. Histological examination of the resected stomach showed moderate chronic gastritis associated with areas of organising fibrosis and ulceration, without evidence of malignancy.

The patient had an uneventful recovery and was discharged 1 week after the operation.

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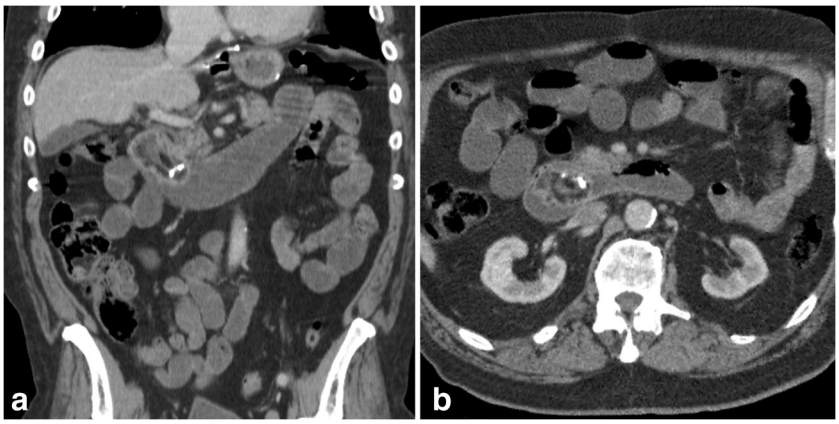

Fig. 1 Multiplanar CT scan with portal venous contrast demonstrating invagination of the remnant stomach into the duodenum. **a** Coronal view; **b** axial view

Discussion

Morbid obesity is an increasingly common chronic condition, and bariatric surgery is being performed in greater numbers to treat this. The sleeve gastrectomy is the most commonly performed primary bariatric operation worldwide; in Australia, over 19,000 sleeve gastrectomies were performed between 2017 and 2018 representing approximately 70.1% of all bariatric surgical procedures nationally [4]. With these growing numbers, there will be an increasing need for revisional surgery in the future. Gastric bypass is commonly performed as a second-stage surgery, especially in the setting of reflux.

We report a rare case of antegrade gastroduodenal intussusception post revisional RYGBP surgery. To our knowledge, only two other cases have been reported in the literature, both of which occurred in the setting of revisional RYGBP [2] or biliopancreatic diversion by Scopinaro [3] after vertical-banded gastroplasty. Division of the gastrosplenic ligament, which normally remains untouched during a primary RYGBP and anchors the remnant stomach, was a common factor in these cases. In our case, the gastrosplenic ligament and greater omentum were divided to mobilise the greater curvature of the stomach during gastric plication. It is important to note that

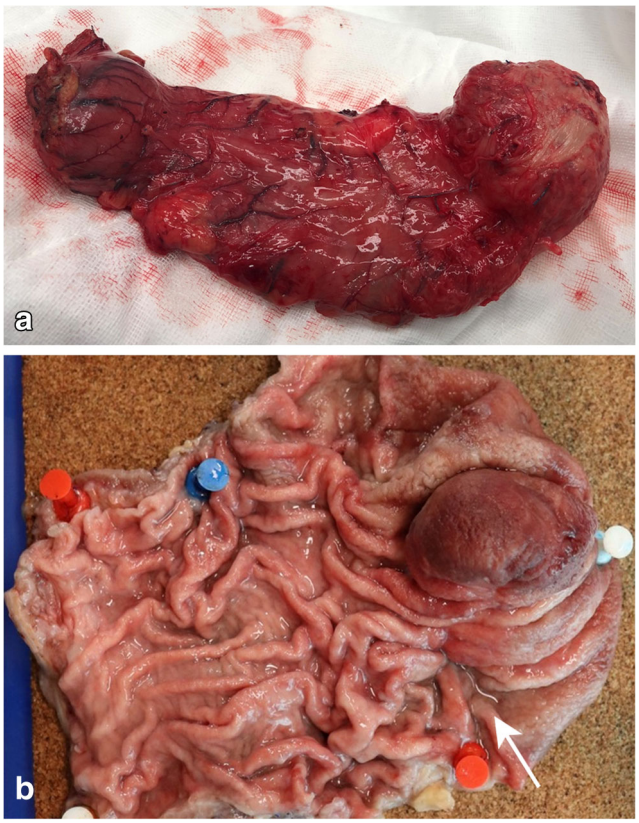

Fig. 2 **a** The resected remnant stomach after reduction of the intussuscepted segment. **b** Opened specimen. Arrow indicates suture material from previous gastric plication, potentially acting as a lead point for intussusception

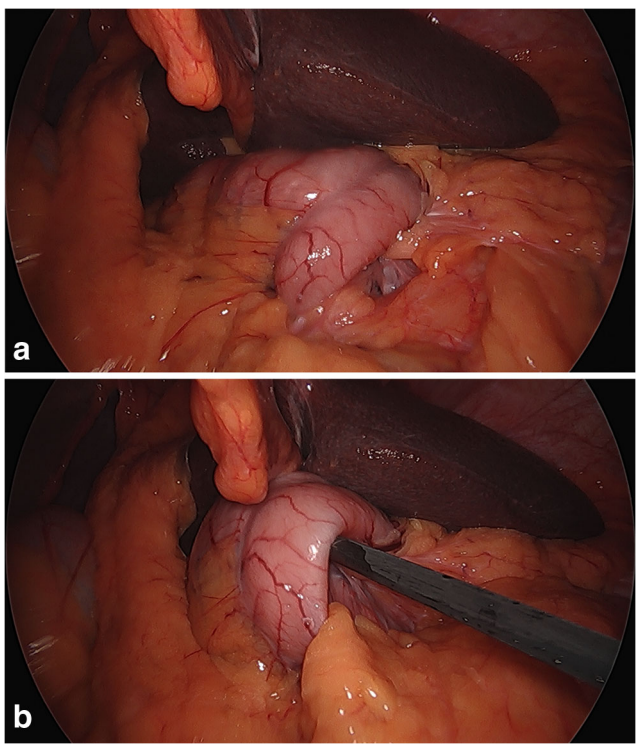

Fig. 3 **a** View at laparoscopy of the gastroduodenal intussusception. **b** Laparoscopic instrument inserted into the intussuscepted remnant stomach

division of the gastrosplenic ligament is also integral to the commonly performed LSG and thus creates the potential for this complication if conversion to a RYGBP was subsequently performed.

Gastroduodenal intussusception itself is a rare phenomenon, and is associated with submucosal lesions such as a gastric lipoma [6] or a gastrointestinal stromal tumour [5], which acts as a lead point. In our case, the initial gastric plication which invaginated the greater curvature of the stomach may have created a lead point which predisposed the stomach to intussusception after it was divided during the revisional RYGBP surgery. A deficiency of adhesions is another postulated predisposing factor for gastroduodenal intussusception; multiple mobilisations of the stomach may cause the tissue to become callous and prevent the formation of adhesions which would anchor it to surrounding structures [2]. Fixation of the remnant stomach to the crura of the diaphragm or to the anterior abdominal wall at the revisional surgery may help prevent this complication [2].

This case of gastroduodenal intussusception was uniquely clinically silent; the other reported cases described symptoms of epigastric or right upper quadrant abdominal pain and nausea. Elevated transaminases and hyperbilirubinaemia resulting from biliary obstruction at the ampulla of Vater were also present [2, 3]. Our case presented with refractory iron deficiency anaemia caused by chronic gastritis and ulceration of the intussuscepted remnant stomach. Similarly, an earlier case also reported anaemia, but was misattributed to marginal ulceration of the gastroenterostomy, and remained refractory to treatment until the intussusception became symptomatic and was surgically treated [3]. As gastroduodenal intussusception has a variable clinical presentation, a high degree of suspicion is required to diagnose this rare complication.

This case presents additional learning points. Firstly, aspirin and other NSAIDs should be avoided in the setting of a gastric bypass due to their known association with marginal ulcers, which in this case resulted in a life-threatening gastrointestinal haemorrhage. Secondly, the danger of the "search satisfying" cognitive bias in clinical medicine is well demonstrated. The patient presented with unexplained iron deficiency anaemia in the setting of known marginal ulcers and a CT demonstrating antegrade intussusception of the remnant stomach. Had the investigation of anaemia ceased when the first plausible explanation was found, the contemporaneous colorectal cancer would have remained undiscovered.

Conclusion

Gastroduodenal intussusception after revisional RYGBP is an exceedingly rare phenomenon. A common predisposing factor is the division of the gastrosplenic ligament during the primary surgery. With the increasing adoption of LSG as the initial surgical treatment for morbid obesity, surgeons should be aware of the potential for this complication if conversion to RYGBP is subsequently required, which may be prevented by resection or fixation of the remnant stomach.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

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