CASE REPORT

Perforated gastric remnant ulcer after laparoscopic gastric bypass

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SUMMARY

Ulcer perforation in the excluded stomach and duodenum is a rare complication after Roux-en-Y gastric bypass (RYGB). Pathogenesis of these ulcers are multifactorial. We report a case of perforated gastric remnant ulcer in a 54-year-old woman who had undergone a laparoscopic RYGB 5 years previously. The perforation was successfully repaired with an omental patch. We also present a review of the literature of similar cases.

BACKGROUND

The estimated number of bariatric surgery performed in the USA has increased from 100,014 in 2011 to 175,608 in 2016, with Roux-en-Y gastric bypass (RYGB) being one of the most performed procedures.¹ Perforation of ulcers in the excluded segment of the stomach or duodenum is a rare complication of RYGB, with 29 cases reported in the literature.^{2–4} Early diagnosis and treatment of perforated ulcer is crucial. We hereby present a case of a perforated gastric remnant ulcer following RYGB, as well as a review of the literature.

CASE PRESENTATION

A 54-year-old woman presented to an outside emergency department with worsening abdominal pain. Abdominal computed tomography (CT) revealed foci of free air at the hilum of the liver, right upper quadrant and hepatic flexure with no contrast extravasation and no fluid collection. Due to her history of RYGB 5 years ago, attempts to find a local surgeon willing to operate were unsuccessful. The patient was eventually transferred to our tertiary care centre 24 hours later.

INVESTIGATIONS

On physical examination, the patient was afebrile. Other vital signs were all within normal limits. She had diffuse abdominal tenderness without rebound but endorsed guarding on percussion and deep palpation. Her body mass index at that time was 24 kg/m². Laboratory findings showed mild leucocytosis (12.0 k/uL). Her CT scan from outside hospital was reviewed.

TREATMENT

The patient was taken to the operating theatre immediately. An upper midline incision was created. On exploration, a perforated remnant gastric antral ulcer was identified. We encountered significant inflammation during the surgery, clearly

related to her symptom onset 24 hours previously. The site of perforation was biopsied circumferentially to exclude malignancy. The defect was closed in an interrupted fashion with 2–0 polydioxanone (PDS) sutures. A tongue of omentum was sutured in place over the repair to buttress the repair. Due to concern about the possibility of significant post-operative ileus due to peritonitis, a gastrostomy tube was placed in the gastric remnant proximal to the site of perforation. This would help decompress the stomach and also help gain access to the gastric remnant if further studies were required. An upper endoscopy was performed intraoperatively and revealed an intact gastrojejunostomy with 20% marginal ulceration.

The final pathology revealed a benign perforated gastric ulcer with reactive epithelial changes and evidence of ischaemic-type injury in the smooth muscle. Her stool was also found to be negative for *Helicobacter pylori* antigen and antibody.

OUTCOME AND FOLLOW-UP

The patient recovered well and was discharged with a proton pump inhibitor on postoperative day 7 with her gastrostomy tube clamped. She continued to do well after discharge, and her gastrostomy tube was removed 4 weeks postoperatively. Most recent follow-up was in 2017.

DISCUSSION

Perforation of ulcers in the gastric remnant and the excluded segment of duodenum after RYGB is rare. There has only been 29 other cases reported in the literature, with reported perforation prevalence ranging from 0.12% to 0.84%.^{2–4} Of these cases, 21 (72%) patients had perforation of a duodenal ulcer, 7 (24%) had perforation of a gastric ulcer and 1 (3.4%) had simultaneous perforation of a duodenal and gastric ulcer (table 1).

Several mechanisms have been proposed to explain the pathogenesis of ulcers in the excluded stomach and small bowel. *H. pylori* infection may play an important role in ulcerogenesis. It has a high prevalence of 20%–53% among bariatric patients,^{5 6} prompting some authors to endorse routine preoperative oesophagogastrroduodenoscopy with concurrent *H. pylori* screening during the workup for bariatric surgery. Ingestion of non-steroidal anti-inflammatory drugs or excessive alcohol consumption can also contribute to ulcerogenesis by causing mucosal injury. Bjorkman proposed that since the excluded stomach and duodenum is deprived of the buffering effect of

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Table 1 Summary of all reported cases with their radiological findings

First author, year published	Number of patients	Location of perforation	Findings on plain film	Findings on CT
Moore, 1979 ⁹	2	Duodenal (n=2)	–	–
Andersen, 1982 ¹⁰	1	Gastric (n=1)	Unremarkable	–
Charuzi, 1986 ¹¹	2	Duodenal (n=2)	Pneumoperitoneum noted in one patient Not reported for the other patient	–
Bjorkman, 1989 ⁴	1	Duodenal	–	–
Macgregor, 1999 ¹²	11	Duodenal (n=9) Gastric (n=1) Both (n=1)	–	–
Papasavas, 2003 ¹³	1	Gastric	Pneumoperitoneum	–
Mittermair, 2007 ¹⁴	1	Duodenal	Unremarkable	Pneumoperitoneum
Snyder, 2007 ³	4	Duodenal (n=3) Gastric (n=1)	–	–
Sasse, 2008 ²	2	Gastric (n=2)	Pneumoperitoneum noted in one patient Not reported for the other patient	–
Gypen, 2008 ¹⁵	1	Duodenal	No pneumoperitoneum	–
Iskandar, 2015 ⁷	2	Duodenal (n=2)	No pneumoperitoneum noted in both patients	Pneumoperitoneum and free fluid in right paracolic gutter noted for the first patient. No pneumoperitoneum, but oedematous excluded stomach, duodenum, jejunum and transverse colon for the second patient
Ovaere, 2016 ¹⁶	1	Gastric	–	Free fluid around the spleen and in the right paracolic gutter

ingested food, acid produced in the gastric remnant may remain unneutralised.⁴ Since the normal stimulus to pancreatic secretion is bypassed after RYGB, the delay in bicarbonate secretion further prolongs the duration of acid exposure. Moreover, refluxed bile may augment the effect of unbuffered acid and contribute to further mucosal injury.

Immediate exploration is warranted in unstable patients with an acute abdomen. However, imaging may provide valuable information in treatment planning for stable patients. Of the reported cases, pneumoperitoneum was observed on plain films in only 38% of the patients (table 1). Two of these patients subsequently underwent a CT scan that demonstrated pneumoperitoneum. CT scan could also help identify free peritoneal fluid, inflammatory processes in the abdomen,⁷ as well as other possible causes of the surgical abdomen. Hence, it is reasonable to obtain a contrast enhanced CT scan with oral contrast as a first-line diagnostic tool when a perforated ulcer is suspected in a stable patient after RYGB.

Delay in treatment, as seen in our case, should be avoided as the perforation to operation time interval is an important predictor for morbidity and mortality in peptic ulcer perforation.⁸ Since bariatric procedures are done at an increasing number each year, general surgeons should be aware of common bariatric techniques and be able to repair the perforation, even if bariatric surgery is not performed at their institution.

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Learning points

- Ulcer perforation in the excluded segment after a Roux-en-Y gastric bypass (RYGB) is rare.
- Ulcers in the excluded segment after a RYGB could be attributable to *Helicobacter pylori* infection, non-steroidal anti-inflammatory drug use, excessive alcohol consumption, acidic gastric environment and bile reflux.
- Immediate exploration is warranted for unstable patients with an acute abdomen.
- Bariatric procedures are being performed at an increasing rate each year. General surgeons should be aware of the different techniques and be able to surgically manage perforation. A delay in treatment of a perforated ulcer endangers patient safety and should be avoided.

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