CASE REPORT

Perforation of the gastric remnant in a patient post-Roux-en-Y gastric bypass

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SUMMARY

With the dramatic increase in obesity surgery and the subsequent increase in ageing post-gastric bypass patients, early recognition of possible and serious complications is of the utmost importance. We present a case of a 33-year-old woman who presented to the emergency room, with progressive epigastric pain. The patient had undergone laparoscopic Roux-en-Y gastric bypass surgery 14 months earlier. Diagnostic laparoscopy was performed and showed a prepyloric perforation of the gastric remnant. The defect was closed and omentoplasty was performed. The patient was put on lifelong proton pump inhibitors.

BACKGROUND

This is a rare but serious complication of Roux-en-Y gastric bypass patients that might get overlooked.

CASE PRESENTATION

A 33-year-old Caucasian woman presented to the emergency room, with increasing pain in the epigastric region for about 2 weeks.

The patient had undergone laparoscopic Roux-en-Y gastric bypass surgery 14 months earlier. At that time, her body weight had been 130 kg (287 lbs) with a body mass index (BMI) of 46 kg/m². The surgery was uncomplicated, but the post-operative admission was prolonged because of diffuse abdominal pain. Clinical and biochemical findings were negative, and 4 days postsurgery, she was discharged. Postsurgery treatment included a 4-week proton pump inhibitor course, a 3-week low-molecular-weight heparin course, and a full year of vitamin D and calcium supplementation. Postoperative follow-up with clinical evaluation and repeated vitamin status was uneventful.

During the 2 days before presentation to the hospital, the epigastric pain had progressed, radiating to the right upper quadrant. There were no symptoms of pyrosis, nausea or vomiting. Recent history was negative for non-steroidal anti-inflammatory drug (NSAID) use, alcohol abuse and smoking.

INVESTIGATIONS

On clinical examination, the patient had lost 50 kg (110 lbs), with a current body weight of 80 kg (177 lbs) and a BMI of 28 kg/m² (excess weight loss of 85%). She was afebrile, and her heart rate was 75 bpm and blood pressure 125/80 mm Hg. Abdominal auscultation was normal. She had right upper quadrant and

epigastric tenderness on palpation, without rebound or percussion tenderness.

Laboratory examination showed (normal values between brackets): C reactive protein <10 mg/L (<10 mg/L), a white cell count of $5.5 \times 10^9/L$ ($4.0-10.0 \times 10^9$) and a haemoglobin level of 7.8 mmol/L (7.5–10.0 mmol/L). Owing to tenderness on palpation, an abdominal ultrasound and CT scan were performed, considering a differential diagnosis that included symptomatic cholecystolithiasis, internal herniation and marginal ulcer/gastric perforation.

Neither the abdominal ultrasound nor the CT scan showed abnormalities aside from a small amount of free fluid around the spleen and, additionally, on the CT scan, in the right paracolic gutter.

The patient was admitted to the hospital ward for observation. On clinical re-evaluation, 14 h after admission, the right upper quadrant pain had increased. Laboratory findings showed an increase of C reactive protein to 105 mg/L, after which a diagnostic laparoscopy was performed.

DIFFERENTIAL DIAGNOSIS

Abdominal pain in the post-gastric bypass patient can be a diagnostic challenge to the clinician. In our patient, even though the CT scan did not show any typical signs of internal herniation (mesenteric swirl sign), this was still in our differential diagnosis. Abdominal contents can intermittently invaginate in the specific herniation ports (Petersen's space, enteroenterostomy), causing a CT scan negative for a mesenteric swirl sign. In addition, isolated free fluid on imaging studies can sometimes be a sign of internal herniation.

Although free air was seen neither on ultrasonography nor on CT scan, a perforation of the excluded stomach or duodenum could not be excluded from the differential diagnosis.

TREATMENT

Peroperatively, the diagnosis of perforation of the gastric remnant was made, with visualisation of a prepyloric perforation on the anterior border of the stomach. The appendix, gall bladder, uterus and ovariae were normal. Cultures were taken and the defect was closed laparoscopically with a non-absorbable barbed suture, followed by an omentoplasty. Peroperative biopsies were not taken. Endoscopic visualisation and biopsies at a later stage were considered a superior diagnostic tool for evaluating ulcer aetiology.

A 3-day course of broad-spectrum antibiotics was given.

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OUTCOME AND FOLLOW-UP

The postoperative course was uneventful and the patient was discharged 3 days postoperatively. The cultures taken peroperatively did not show any pathogens. A *Helicobacter pylori* serology and stool antigen tests were performed, and proved to be negative. The patient was referred to a specialised centre for double balloon enteroscopy to visualise the excluded stomach, but, unfortunately, two consecutive attempts were unsuccessful. A laparoscopic gastroduodenoscopy was slated to be performed.

DISCUSSION

Gastric remnant perforation in the Roux-en-Y gastric bypass patient is very rare, but has been described previously.^{1–5}

Risk factors for gastric remnant perforation are considered to be the same as those for marginal gastro-jejunal ulcers, namely, smoking, NSAID use, alcohol abuse and *H. pylori* infection. The underlying mechanism of both marginal ulcers and gastric remnant ulcers has not been clearly identified.

Recent studies examining the histological changes of the gastric remnant observed changes of the mucosa including chronic gastritis, pangastritis, atrophy and intestinal metaplasia.⁶ These changes could be the result of the reflux of bile and pancreatic secretions. In combination with the absence of the buffering capacities of food in the gastric remnant, this potentially results in detrimental effects to the duodenal and gastric mucosa, hypothetically augmenting the gastric cancer risk.

The role of *H. pylori* is unclear. One study analysing the relationship between *H. pylori* in the functional pouch and gastric remnant, found that all *H. pylori*-positive cases of the excluded stomach were also positive in the functional pouch.⁷ This gives new insights into the diagnostic work up strategies of gastric remnant perforation. Pragmatically, our patient received *H. pylori* eradication therapy, even though serology and faecal testing proved to be negative.

During this diagnostic work up, one must mention that free air in abdominal radiography is only seldom noted, since air in the gastric remnant is absorbed in the postoperative period. Negative radiological findings should never exclude the diagnosis of stomach perforation, as illustrated in our case.

Gastric cancer has not yet been documented as a complication of gastric bypass surgery. However, gastric ulceration is a possible manifestation of gastric malignancy, therefore a diagnostic visualisation and histological confirmation are obligatory.

Different modalities have been described to reach the bypassed stomach, such as retrograde gastroduodenoscopy with a paediatric colonofibroscope, double balloon enteroscopy or laparoscopic gastroduodenoscopy.⁸ In the latter, a gastrostomy is created and a scope is guided laparoscopically in the stomach and the duodenum.⁹ Unfortunately, in our patient, multiple efforts with double balloon enteroscopy in a specialised referral centre were unable to reach the excluded stomach.

To prevent marginal ulcers, proton pump inhibitors (PPIs) are the treatment of choice.¹⁰ Because of its rare incidence, no research has been conducted on the possible prevention against gastric remnant ulcers. Although a different underlying aetiological mechanism is being suggested, PPI's are expected to have a role in the prevention of both conditions. Definitive treatment of perforated gastric remnant ulcers is resection of the bypassed stomach. Some authors even suggest primary resection of the excluded stomach at the time of laparoscopic bypass surgery.¹¹

Our patient will receive lifelong treatment with PPIs. Resection of the bypassed stomach was not considered in our patient, as she was displaying signs of systemic inflammatory response syndrome, and the defect was easy to close using a safe

and short procedure. Resection of the stomach would have entailed more extensive surgery, hence presenting more risk without expected (short term) benefit. In addition, the physician must be aware that the mortality rate of patients with overt peritonitis following bariatric surgery is 0.1–2%.¹²

A laparoscopic gastroduodenoscopy will be proposed to the patient, to obtain direct visualisation of the gastric remnant, and to sort out the aetiology of the perforation.

Patient's perspective

Translated from Dutch correspondence

- In the weeks prior to my admission and surgery, I regularly experienced pain around my stomach. I attributed this pain to maldigestion. But one day, in contrast to the days before, the pain became unendurable and I contacted the emergency department. The ambulance transported me to the hospital.
- At the emergency department, the doctors did several tests but they did not find what was wrong. The pain shifted towards my right lower abdomen, but it was also still present around my stomach. I was admitted to the hospital for observation, and during that first night I experienced a lot of pain that did not react to the pain medication.
- The next day I felt desperate because I was still in pain, and without any diagnosis. I felt relieved when the surgeon told me they would look into my belly to find out what was wrong.
- After the surgery, I was relieved that the doctors found the problem and managed it. I was still in a lot of pain, but the morphine pump made the pain tolerable.
- My body took a big hit. It took a long time to recover from this. Not only physically, but also mentally. I sought help from a psychologist to help me process this difficult time. I was really shocked about the fact that this could have been the end of my life. As a mother of a 6-year-old son, going through this disease was difficult. To this day, I still have the fear that this could happen again. With every little stomach ache, there's this little voice in my head saying 'oh no, not again'. I'm convinced that this will get better over time.
- I will forever be grateful to the surgeon who decided to perform the operation.

Learning points

- Consider perforation of the gastric remnant as a cause of abdominal pain in patients who have undergone laparoscopic Roux-en-Y gastric bypass.
- Abdominal ultrasound and CT can be negative in patients with a perforated gastric remnant.
- Histological changes of the mucosa are suggested to be the result of reflux of bile and pancreatic secretions, in absence of the buffering capacity of food. The role of *Helicobacter pylori* is unclear.
- Lifelong secondary prevention by using proton pump inhibitors and eradication therapy in pouch-positive *H. pylori* patients should be considered after gastric remnant perforation.
- Direct visualisation of the gastric remnant should be obtained to rule out malignancy.

Competing interests None declared.

Patient consent Obtained.

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