Gastro-oesophageal reflex disease (GORD) is one of the most common gastrointestinal disorders in western countries, and it is frequently treated with laparoscopic anti-reflux surgery (LARS) if medical management is not successful. Laparoscopic 360° Nissen fundoplication has a low mortality and complication rate. Gastroperforation as a late complication is extremely rare, but potentially life-threatening, and underlying mechanisms remain poorly understood. So far, only three cases have been reported in the literature. All of these were managed by explorative laparotomy.

In this case report, we describe successful conservative management of a female patient with late gastric perforation 5 years following laparoscopic fundoplication and discuss potential risks of withdrawing anti-reflux medication after LARS.

Case report
A 55-year-old female patient underwent laparoscopic Nissen fundoplication in a 360° wrap fashion in 2007 for GORD. She was otherwise fit and well; her medications included Lansoprazole. Her postoperative course was uneventful and she recovered well from the surgery.

About 40 months after this surgery, she was diagnosed with microcytic anaemia, for which an upper and lower GI endoscopy was unable to elicit any cause. At the same time, she presented to the local emergency department with left-sided shoulder pain and tightness across the chest, as well as pain below the left ribcage. A cardiac cause was suspected, but was ruled out by appropriate laboratory investigations, and she was discharged with diagnosis of musculoskeletal pain and treatment for the same.

About 10 months following this episode, she presented again—this time to the emergency department of a tertiary centre—with sudden onset of left-sided shoulder pain, heaviness across the chest and pain in the left lower ribcage. Again, a medical cause for her symptoms was suspected (i.e. acute coronary syndrome, pulmonary embolism), but all relevant tests (including electrocardiography, Troponin and D-dimers) were unremarkable.

On direct questioning she admitted that about 4 weeks prior to admission she had stopped taking Lansoprazole, but had taken Ibuprofen up to 1600 mg per day for back pain.

Except for the pain, she was well, with no systemic signs of shock. On examination, she was apyrexial, and her abdomen was soft with mild tenderness in the left upper quadrant. There were no signs of peritonitis.

Blood tests showed a raised C-reactive protein of 65 mg/L and normal white cell count (WCC). The erect chest X-ray showed an extensive pneumoperitoneum (Figure 1). An urgent computed tomography (CT) scan was performed. This revealed a significant amount of free intraperitoneal gas, mostly in the upper abdomen in keeping with visceral organ perforation. Pockets of air at the gastro-oesophageal junction identified this site as the most likely site of perforation (Figure 2), but no leakage of contrast from the gastrointestinal tract was noted.

In view of the patient’s stability and lack of extravasation of oral contrast, she was treated conservatively with intravenous antibiotics and intravenous proton-pump
Mechanisms leading to this complication remain unclear. Suggested causes include ulceration due to ischaemia caused by suture material or pledgets, which are commonly used to secure the fundoplication. In none of the previous cases the perforation occurred at the site where the wrap had been approximated and none of the patients showed evidence of gastric stasis (due to accidental vagotomy during the fundoplication), which might have resulted in ulceration.

In the above case, the surgeon who had initially performed the wrap in 2007 was very experienced and used a standard technique. He did not use pledgets in the operation. None of his other patients ever presented with a similar episode, thus it is very unlikely that the perforation was due to faulty technique.

It is to be noted that the patient had stopped her anti-reflux medication 4 weeks prior to presentation, but nevertheless continued ingesting considerable amounts of nonsteroidal anti-inflammatory drugs (NSAIDs). The possibility of a small perforated gastrointestinal ulcer or perforated actual leakage (Figure 3). Inflammatory markers were found to be normalised over following days. Initially kept nil by mouth, her diet was slowly built up. She fully recovered and was discharged 7 days after her initial presentation.

**Discussion**

Laparoscopic 360° Nissen fundoplication is a common operative procedure to treat GORD. This procedure is associated with low mortality rate (0.2%), and normally only few complications are encountered in the long-term follow-up including dysphagia (27%), gas bloating (20%) and diarrhoea of new onset (12%).

Gastric perforation following laparoscopic fundoplication is an extremely unusual late complication of the procedure and potentially life-threatening. So far, only three patients have been reported in the literature with similar symptoms and presentation as the above case. However, they were managed operatively by explorative laparotomy and by oversewing the perforation if a site of perforation was identified.

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diverticular disease needs to be mentioned for completeness; however; presentation was not typical; recent upper GI endoscopy was normal and the CT scan was not suggestive of any perforated diverticulum.

This raises the question, how safe it is to withdraw anti-reflux medication from patients following LARS? How safe is NSAID medication in this group of patients? As reported previously, it is the aim of LARS to achieve long-term symptom control without the use of anti-reflux medication. This has been studied extensively by various randomised controlled trials that investigated LARS versus medical treatment. These studies have proved LARS to be effective, however, mainly focussed on short-term follow-up. There are very few studies investigating long-term symptom control and the use of anti-reflux medication following LARS. A retrospective study by Oelschlager et al. published in 2008 reports that 27% of patients were taking anti-reflux medication for GORD symptoms at long-term follow-up after (median 69 months) LARS. About 69% of patients complained of hoarseness and cough, and 22% of patients with recurrent heartburn actually had abnormal results on pH study.

A Cochrane review published in 2010 comparing surgical and medical treatment similarly concluded that it remains unclear if benefits from LARS are sustained in the long-term.\(^4\)

**Conclusion**

Gastric perforation following laparoscopic fundoplication is an extremely unusual late complication of the procedure. Underlying mechanisms are still poorly understood. LARS is widely used to treat GORD. Studies on long-term follow-up suggest that acid reflux recurs in a significant number of patients, which may well contribute to late gastric perforation following LARS. Previously described cases were managed by exploratory laparotomy.

We report successful conservative management of late gastric perforation following laparoscopic fundoplication. If systemically stable, patients with similar presentation should undergo a trial of conservative management. Long-term prevention should be sought by adequate prescription of anti-reflux medication.

**Abbreviations list**

CT, computed tomography; GORD, Gastro-oesophageal reflux disease; LARS, laparoscopic anti-reflux surgery; NSAIDs, nonsteroidal anti-inflammatory drugs.

**Consent**

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

**References**