

# Gastric necrosis complicating lately a Nissen fundoplication

## Report of a case

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Received: 4 April 2007 / Accepted: 16 July 2007 / Published online: 10 August 2007  
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### Abstract

**Background** Gastric necrosis after Nissen fundoplication is a rare and life-threatening complication described in paediatric surgery and in some experimental models. Prompt diagnosis and appropriate therapy of acute gastric dilatation is mandatory to avoid potentially fatal gastric necrosis.

**Case report** This case report is the first one to describe a gastric necrosis in an adult as a late and very severe complication after Nissen fundoplication. Gastric dilatation and subsequent necrosis occurred 14 years after Nissen fundoplication because of small bowel obstruction based on adhesions.

**Conclusion** Early diagnosis and treatment of gastric dilatation after Nissen fundoplication are essential to prevent from severe secondary complications but can be difficult to establish because of atypical symptoms.

**Keywords** Fundoplication · Gas bloat · Gastric necrosis

### Introduction

An 85-year-old woman presented with a history of epigastric pain, nausea, fever and abdominal distension. Fourteen years ago, she underwent a Nissen fundoplication for a hiatal hernia with reflux disease. Since then, she suffered from a chronic sensation of satiety and bloated

abdomen with flatulence and difficulties to belch and to vomit. Furthermore, a hysterectomy with adjuvant radiotherapy for uterine carcinoma was carried out 50 years ago.

On clinical examination, the abdomen was distended with peritonitis in all four quadrants. Bowel sounds indicated a bowel obstruction. On rectal exam, the ampulla was empty. Blood tests showed an elevated level of the acute phase proteins (C-reactive protein) and an increased white blood cell count. Abdominal plain X-ray revealed a massive gastric dilatation and a small bowel obstruction (Fig. 1).

The insertion of a nasogastric tube for gastric decompression was unsuccessful.

Based on the clinical and radiological findings, an emergency laparotomy was performed. Intra-operatively, an obstructing adhesion at the distal jejunum was found and removed. The small bowel was dilated, and the stomach was massively distended with several serosal lesions on the ventral part. Needle puncture of the stomach relieved the gas-related distension. Thereafter, a nasogastric tube for further decompression and drainage could be inserted. The stomach was mobilized, and a large necrotic area on the posterior wall of the stomach was identified (Fig. 2). Based on the extent of the necrotic area from the antrum up to the cardia, a total gastrectomy with a Roux-en-Y oesophago-jejunostomy was performed. The post-operative recovery was uneventful, and the patient could be discharged 10 days later.

### Discussion

This case report is the first in the literature to describe a gastric necrosis with perforation related to a Nissen fundoplication in an adult. Our patient suffered from a chronic gas bloat syndrome, a well-known problem after Nissen fundoplication. The acute small bowel obstruction

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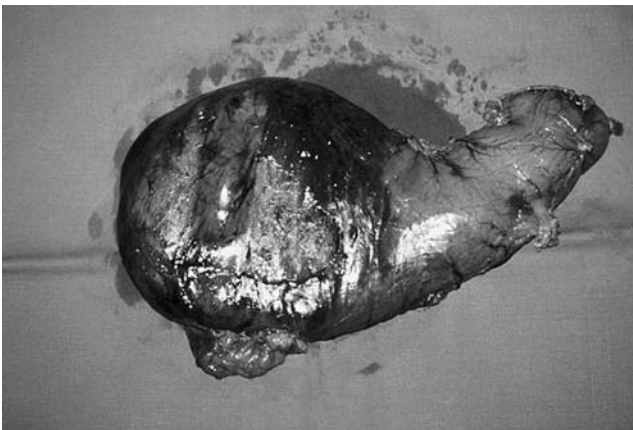


**Fig. 1** Preoperative plain abdominal X-ray

based on adhesions led to an acute gastric dilatation. The increasing intra-gastric pressure tightened the competent fundoplication wrap. Subsequently, the progressive gastric dilatation compromised the gastric blood supply inducing a massive gastric necrosis.

#### Technique and effect of Nissen fundoplication

The Nissen fundoplication is an effective procedure in the treatment of the gastro-oesophageal reflux disease (GERD) [1]. Its importance has diminished since the introduction of proton-pump inhibitors in the 1980s. The Nissen fundoplication underwent several modifications, and many eponyms are used to describe the anti-reflux surgery (Nissen, Rosetti, Toupet, Lind, Hill, Guarner).



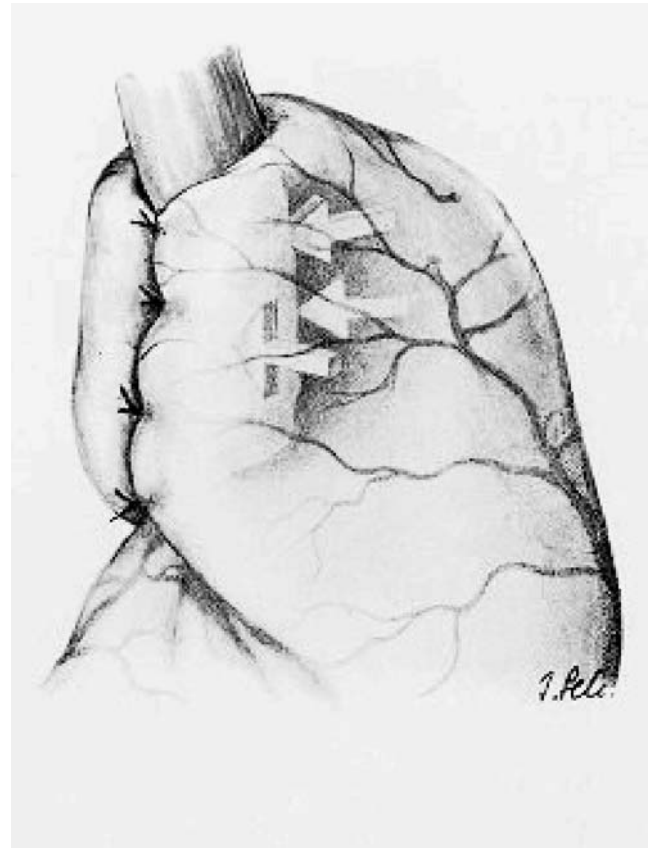
**Fig. 2** Resected stomach with gastric necrosis

The indication for a Nissen fundoplication is GERD, refractory to medical therapy, or with secondary complications (e.g., chronic aspiration or asthma, oesophageal stricture not amenable to medical therapy and dilatation, deep ulceration, oesophageal shortening, bleeding) [2].

In Nissen fundoplication, the fundus is wrapped around the distal oesophagus. The anti-reflux mechanism is based on a compression of the cardia and the distal oesophagus by the wrap (Fig. 3). This compression prevents a reflux of gastric content into the oesophagus resulting in a one-way valve mechanism. Its efficiency depends on the quality of the wrap, such as its tightness, as well as on the extent of gastric pressure that increases the pressure in the wrap [3]. Common acute post-operative complications include dysphagia in 25%, acute gas bloat and heartburn in 10%. Gas bloat can persist in about 20% of the patients [2].

#### Gas bloat

The gas bloat syndrome, also known as post-Nissen syndrome, occurs as a consequence of a tight fundoplication wrap with a chronic accumulation of ingested air in the distended stomach and intestine. Patients suffer from difficulties to belch or to vomit, post-prandial fullness, bloating, secondary weight loss because of early satiety,



**Fig. 3** Anti-reflux mechanism in Nissen fundoplication. With permission of Novartis

and excessive flatulence. Some technical modifications of the Nissen fundoplication were shown to decrease the incidence of the gas bloat syndrome but were less effective in preventing from GERD [1, 4]. A tight fundoplication can also induce a gastric dilatation and infarction because of the inability to vomit, as shown in experimental models [5].

#### Acute gastric dilatation

Acute gastric dilatation is a well-known surgical post-operative complication. Other aetiologies include anorexia nervosa, bulimia, trauma, volvulus, medications, electrolyte abnormalities, debilitating chronic illness, diabetes mellitus, acute infections, diaphragmatic herniation, psychogenic polyphagia, emotional stress, the ‘cast syndrome’ and spinal deformities [6]. Patients usually present with vomiting in more than 90% of the cases, progressive abdominal distension and pain. Plain abdominal X-rays demonstrate a combination of fluid and gas in the left upper quadrant within a distended stomach. The initial therapy consists of a decompression of the stomach by a nasogastric tube [6–8].

#### Gastric necrosis

The most dramatic consequence of an acute gastric dilatation is a gastric necrosis, which represents a rare and life-threatening complication with a mortality of 73%. Urgent surgical therapy is mandatory, and a delay of diagnosis may be fatal [6]. Reported aetiologies include intra-thoracic herniation, volvulus, acute necrotizing gastritis, ingestion of caustic material, vascular compromise and, as in this case, acute gastric dilatation [8]. The rich collateral blood supply of the stomach and its extensive intramural anastomoses normally protects from ischaemia [8]. A ligation of all four major arteries and 80% of its small vessels would not result in gastric necrosis, as shown in animal models. The critical factor consists of a secondary vascular insufficiency because of an increased intra-gastric pressure exceeding the venous intramural flow. Therefore, an intra-gastric pressure of 20 to 30 mmHg will result in ischaemia and rupture [6, 9].

#### Conclusions

Our patient suffered from a small bowel obstruction in combination with a gas bloat syndrome after Nissen fundoplication. The subsequent gastric dilatation induced a gastric necrosis with perforation. Early recognition and treatment of gastric dilatation after Nissen fundoplication are essential to prevent from secondary complications but might be difficult to establish because of atypical clinical signs.

We encountered one similar case in an infant in the literature [4]. To our knowledge, this case report is the first description of a gastric necrosis as a late complication after a Nissen fundoplication in an adult.

**Acknowledgments** We thank Novartis, Basel, Switzerland, for providing us the illustration in Fig. 3. No conflicts of interest. No financial interests to disclose.

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