

# Gastric volvulus after laparoscopic Nissen fundoplication and hiatal closure performed due to giant hiatal hernia: A case report

Heini Savolainen, Tiina Lehtimäki, Tuomo Rantanen

## ABSTRACT

**Introduction:** More fundoplications are done because laparoscopic Nissen fundoplication is less invasive than open surgery. Although recovery after laparoscopic Nissen fundoplication is faster, and complications are fewer, than after open procedures, some potentially life-threatening complications can arise. Acute gastric volvulus is one of these and, because it is not a frequent event, its diagnosis is sometimes difficult. **Case Report:** A 60-year-old female came into the emergency department with severe epigastric pain, and vomiting followed by retching without the ability to vomit. In addition, a nasogastric tube could be passed only with the help of endoscope. Nissen fundoplication had been carried out due to a giant hiatal hernia four months earlier. On CT scan gastric volvulus was suspected with an otherwise intact Nissen fundoplication. The operation was started by laparoscopy, but, when untwisting of the stomach failed, an open laparotomy approach was adopted. During operation no anatomical failures or adhesions were found. Gastropepy with non-absorbable stitches was performed after the release of the volvulus. Two stitches were placed between the fundus and hiatus, and two stitches between the stomach and peritoneum. The patient had a normal postoperative recovery and was discharged home on the sixth post-

operative day. At 24th month of follow-up she was symptomless. **Conclusion:** Gastric volvulus can occur after Nissen fundoplication also with intact fundic wrap and without adhesions, which is now reported for the first time. Fast diagnosis of gastric volvulus is important in the acute form of the disease. Undiagnosed, it can lead to hemorrhage and strangulation, which are potentially fatal complications.

**Keywords:** Abdominal pain, Acute gastric volvulus, Epigastric pain, Gastric volvulus, Laparoscopic Nissen fundoplication, Management

### How to cite this article

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## INTRODUCTION

The introduction of laparoscopic Nissen fundoplication has increased the number of performed anti-reflux operations. Although laparoscopic Nissen fundoplication is thought to be safe, there are also potentially life-threatening complications (esophageal or gastric perforations, para-esophageal herniation), which should be kept in minds, since misdiagnosis can lead to death. We present a case of gastric volvulus four months after Nissen fundoplication carried out due to a giant hiatal hernia.

## CASE REPORT

A 60-year-old woman came into the emergency department with a one day history of vomiting, severe epigastric pain and nausea. Following the acute onset of the above-mentioned symptoms, she could not eat anything. Nissen fundoplication had been performed four months earlier because of giant hiatal hernia. On examination, her abdomen was distended and a mass was palpated.

Biochemistry showed mild leukocytosis (9.7 E9/l), an increased C-reactive protein concentration, at 28 mg/l, and increased serum amylase, at 240U/l (25–120 U/l). The EKG was normal. An abdominal computed tomography (CT) scan with intravenous contrast medium showed massive stomach distension and a suspicion of gastric volvulus (Figures 1–3). Computed tomography scan revealed no signs of gastrointestinal track perforation.

Placement of a nasogastric tube was attempted in the emergency room without success. The patient was taken to the operating theatre, where endoscopy-assisted release of the volvulus was attempted. During the endoscopy, the site of the volvulus could be seen, but the replacement of the volvulus could not be achieved. However, two liters' retention was aspirated and a nasogastric tube was inserted under the endoscope control. Surgery was performed two days later. The operation was started by laparoscopy, but, when untwisting of the stomach failed, an open laparotomy approach was adopted. During laparotomy neither anatomical abnormalities in fundic wrap nor abdominal adhesions were found. Gastropexy with non-absorbable stitches was performed after the release of the volvulus. Two stitches were placed between the fundus and hiatus, and two stitches between the stomach and peritoneum (1 antrum, 1 corpus, both to the greater curvature).



Figure 1: An axial image of the contrast-enhanced computed tomography scan of the abdomen. The stomach (asterisks) is distended. A curvilinear band (arrow), due to the sudden tapering of the antrum is consistent with the twisting point of the gastric volvulus.

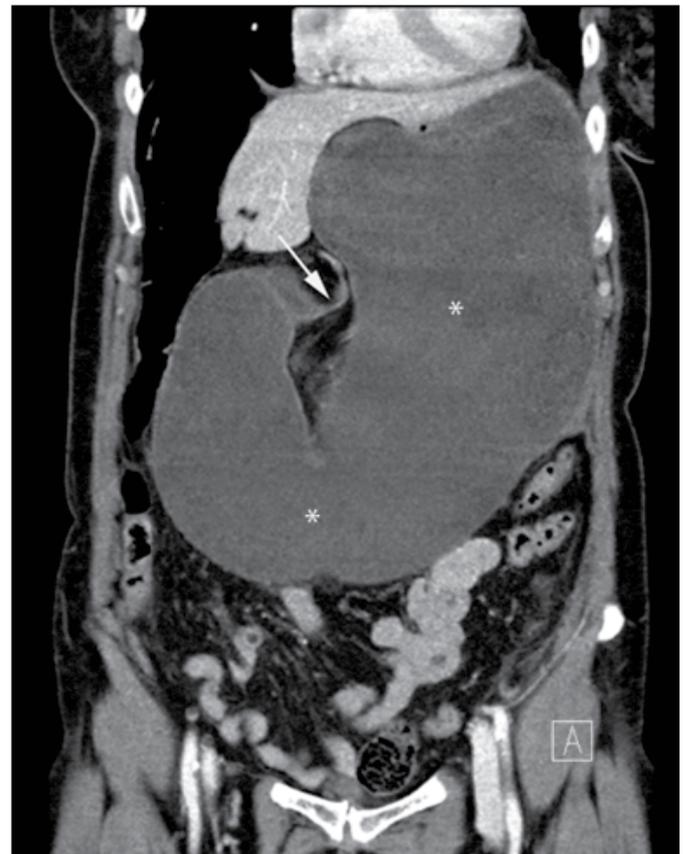


Figure 2: The twisting point of the antrum is seen as a curvilinear band (arrow) in a coronal computed tomography scan. The massive distension of the fluid-filled stomach (asterisks) is clearly visible.

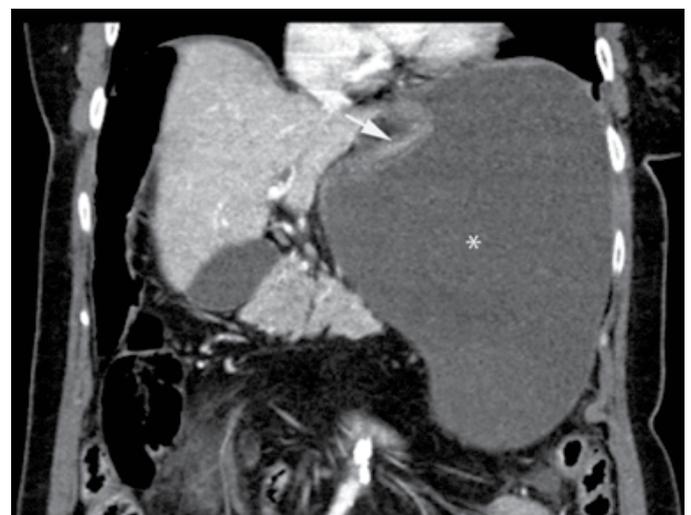


Figure 3: In a coronal computed tomography scan, the site of the fundoplication is seen as a curvilinear band in the fundus (arrow) of the fluid-filled stomach (asterisk).

The patient had a normal postoperative recovery and was discharged home on the sixth post-operative day. At 24 months follow-up she was symptomless.

## DISCUSSION

Gastric volvulus is a potentially life-threatening entity that occurs extremely rarely after Nissen fundoplication. The manifestation of gastric volvulus can range from mild symptoms of abdominal pain and vomiting, to complete strangulation of the stomach, and even death. The triad of intractable retching, severe epigastric pain and difficulty, or inability, to insert a nasogastric tube, is the classical presentation of acute gastric volvulus. This patient fulfilled all of these criteria.

Three types of gastric volvulus have been recognized: organoaxial and mesenteroaxial, and a combination of both [1]. Organoaxial volvulus involves rotation of the stomach along its long axis and it occurs in approximately 59% of the cases [1]. In the present case, as in most cases of strangulation, the volvulus was organoaxial. Fortunately, strangulation reportedly occurs in only 5–28% of cases with gastric volvulus [1]. In our case, C-reactive protein was elevated and bloody serous fluid was found in the fundic region during surgery, suggesting a previous ischemic situation although CT scan revealed no such findings. Serum amylase was also elevated and, without CT scan, pancreatitis could be suspected. If the gastric volvulus diagnosis had been missed, this patient may have died. Therefore, CT scan is important in the diagnosis of gastric volvulus, especially when serum amylase is elevated, which has already been described in one case of gastric volvulus prior to the present case [2].

The treatment of acute gastric volvulus involves reduction of the volvulus and prevention of recurrence. Although endoscopic techniques have been presented [3], laparoscopic or open techniques are mostly used [4–8]. Using endoscopic techniques, reduction can be done, but recurrences can occur easily afterwards. The prevention of recurrences includes gastropexy [9] and the correction of anatomic abnormalities if these exist [4]. We were unable to do the reduction via laparoscopy, mostly due to difficulties in realizing of the situation, because it seemed that twisting had occurred in two places: in the antrum and in the fundus. However, reduction could be performed easily during laparotomy, and no adhesions or anatomic abnormalities could be detected. In fact, when the stomach is strangulated, it is easily damaged during laparoscopic procedures, as seen in our previous study [10] of an acute paraesophageal hernia incarceration. Therefore, it is better to first handle acute incarceration by nasogastric tube or endoscopy, and wait a few days before carrying out the final operation. We were unable to insert the nasogastric tube, but gastroscopy decompression succeeded under general anesthesia, allowing the insertion of the nasogastric tube. The operation could thus be performed after two days.

The etiology of gastric volvulus can be classified as either primary, or secondary to an underlying cause. Primary gastric volvulus commonly occurs due to laxity of the supporting ligaments of the stomach allowing

the stomach to twist along its mesentery [1]. Secondary volvulus can be caused by hiatal hernia, traumatic diaphragmatic rupture, eventration of the diaphragm, abdominal adhesions, intrinsic gastric pathology, or masses outside of the stomach [1, 9]. Only a few cases with gastric volvulus have been presented after Nissen fundoplication, due either to intra-thoracic stomach [4], postoperative adhesions [5], or to the use of a gastrostomy tube [6]. To our knowledge, this is the first case of gastric volvulus occurring after intact Nissen fundoplication performed due to a totally intra-thoracic stomach, and without adhesions or anatomical failure, which have been found previously to be the cause of gastric volvulus. During two years follow-up she has been symptomless, which further support the normality of fundic wrap. Gastropexy was not used during the primary operation, and no adhesions were found during the laparotomy. Mobilization of the stomach during the primary operation was done quite largely to get the stomach to the abdomen. The mechanism of gastric volvulus in our case thus looks like the mechanism of primary volvulus in which laxity of the supporting ligaments allowed the stomach to twist. We, therefore, recommend fixing the stomach to both the hiatus and the peritoneum to prevent volvulus after fundoplication, if the latter is done due to giant hiatal hernia.

## CONCLUSION

Gastric volvulus after Nissen fundoplication without anatomical abnormalities and without abdominal adhesions can occur, which is now reported for the first time. Fast diagnosis of gastric volvulus is important in the acute form of the disease. Undiagnosed, it can lead to hemorrhage and strangulation, which are potentially fatal complications. Computed tomography scan is important in diagnostic workup, especially when serum amylase is elevated.

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### Author Contributions

Heini Savolainen – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Tiina Lehtimäki – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Tuomo Rantanen – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

### Guarantor

The corresponding author is the guarantor of submission.

### Conflict of Interest

Authors declare no conflict of interest.

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