

# Options in the treatment of totally intrathoracic stomach with volvulus

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## Abstract

Gastric volvulus is a rare life-threatening condition resulting from rotation of the stomach by 180°. We describe two patients with unusual chronic totally intrathoracic gastric volvulus that were treated by different laparoscopic techniques. Preoperatively, upper gastrointestinal contrast studies are diagnostic and, gastroscopy is helpful. Rapid progress in laparoscopy has shifted treatment away from traditional and complex open surgery. Reduction of the intrathoracic stomach, hernia sac excision and closure of the hiatal defect is now possible laparoscopically. Surgeon preference guides the addition of a fundoplication, gastropexy or gastrostomy to maintain gastric reduction. Advances in minimal access techniques mean a variety of options are now available, enabling the surgeon to successfully modify treatment for individual patients with intrathoracic gastric volvulus.

## Introduction

Gastric volvulus (GV), first described by Berti in 1866<sup>1</sup>, is a rare, life-threatening condition which results from rotation of the stomach by more than 180°. Primary volvulus, which occurs in a third of cases, results from laxity of the gastro-splenic and gastro-colic ligaments. Gastric volvulus secondary to other conditions is more common and usually occurs along the organoaxial axis which extends from the cardia to the pylorus. Less commonly the volvulus can be mesentero-axial with the axis extending transversely from the mid greater curve to the porta hepatis. Even rarer is the combined type.<sup>3</sup> We report two patients with the unusual intrathoracic form of organoaxial volvulus and the rationale for utilising two different minimal access techniques.

### Case-1

A 58 year old male attended a surgical clinic with heartburn, regurgitation, nausea and postprandial sensations of excessive wind and bloating. A gastroscopy thirteen years ago had revealed a large hiatus hernia and oesophagitis; the latter having resolved endoscopically with H<sub>2</sub>-antagonists and sucralfate. A barium study on this occasion showed an intrathoracic stomach with organoaxial rotation (Figure 1).

A 3-port laparoscopy was performed. After division of gastric adhesions, the stomach was reduced intra-abdominally and the hiatal defect closed. A short floppy Nissen

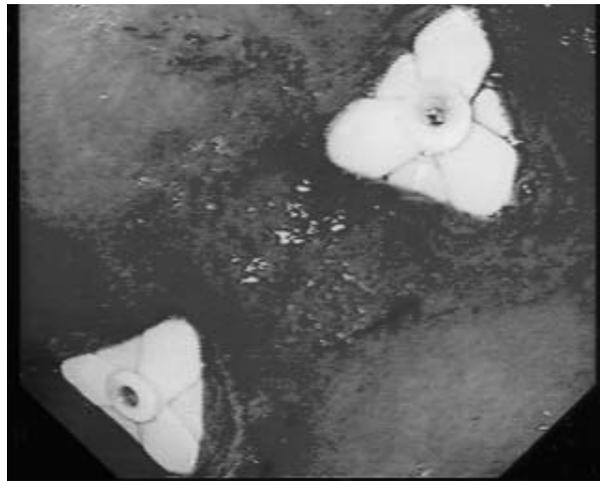


Figure 1. Upper gastrointestinal contrast study demonstrating gastric volvulus with hold-up of contrast.

fundoplication was performed with fixation of the wrap to the right crus. Postoperatively a nasogastric tube was left in for 24 hours followed by resumption of oral intake and an uneventful recovery. The patient remained symptom-free at one year follow-up.

### Case-2

An 82 year old male presented with a three day history of coffee-ground vomiting and a dull epigastric ache. Fourteen years ago he was investigated for upper GI symptoms and a haemoglobin of 6.2g/dL, and gastroscopy showed a large fixed hiatus hernia. This time he was haemodynamically stable, without jaundice but had epigastric tenderness and guarding, a succussion splash and melanotic stools per rectum.

During the next three days his haematemesis continued and haemoglobin dropped from 15g/dL to 11g/dL. Gastroscopy revealed copious gastric residue with inability of the scope to progress beyond the antrum. A Gastrografin meal demonstrated a fixed intrathoracic organoaxial GV.

Laparoscopy confirmed a totally intrathoracic stomach with omentum adherent to the anterior abdominal wall. Adhesionlysis had to be performed in order to mobilise the omentum downwards, thereby allowing the stomach to be reduced into the abdomen. Dual percutaneous gastrostomy (PEG) tubes were placed (Figure 2) along the body and antrum. The patient was discharged on resumption of normal diet. He underwent removal of PEG tubes six months later and was symptom-free at one year follow-up.



Figure 2. Endoscopic view of stomach showing dual PEG tubes in place for fixation.

## Discussion

GV is primarily a disease of adults in the fifth decade of life and beyond.<sup>3</sup> It can present acutely with Borchardt's classic triad of epigastric pain, unproductive vomiting and difficulty inserting a nasogastric tube.<sup>4</sup> Our first patient had chronic volvulus which can present more insidiously with unexplained iron-deficiency anaemia, chest pains, dyspnoea, dysphagia, vomiting, waterbrash or heartburn and varying degrees of obstruction. Ulceration, perforation with or without mediastinitis and frank strangulation of the stomach are serious potential complications. The second patient demonstrated more acute symptomatology, compared with the first, in the form of major continuing haemorrhage due to gastric erosions.

While there are many investigational options available not all are beneficial. An upper gastrointestinal contrast study is the best initial test in that it demonstrates the presence and type of volvulus, classically showing an "upside down stomach".<sup>5</sup> Gastroscopy is diagnostic if the scope is unable to proceed beyond the mid-stomach<sup>6</sup> and has the additional benefit of excluding tumours and a short oesophagus.<sup>2</sup> The latter in particular limits the possibility of full gastric reduction into the abdomen and may increase the likelihood of intrathoracic migration of the repair post-operatively.

Classically, open surgery was the mainstay of treatment with options ranging from simple reduction and repair of the hiatal defect to complex bowel anastomoses.<sup>3,6</sup> Endoscopic derotation is described<sup>7</sup> but may be difficult with a chronic intra-thoracic volvulus. Open procedures have been largely supplanted by minimal access approaches, which represent a sound and effective treatment option for most patients - with the rare exception of gastric perforation.<sup>2,5,8</sup>

ration.<sup>2,5,8</sup>

The principles of definitive treatment include reduction of the intrathoracic stomach by gentle traction during laparoscopy. This is followed by hernia sac excision and closure of the hiatal defect with retrogastric crural closure using non-absorbable sutures.

For wide gaps with difficult closure, a mesh can be utilised. This was not required in the two presented cases. A meta-analysis of hiatal repair concluded that mesh use prevented recurrences and was safe in the short term.<sup>9</sup> However the absence of long term results make it difficult to comment on the probability of infrequent but serious, delayed complications such as mesh-bowel adhesion, erosion and perforation. Meanwhile tissue separating mesh systems, such as the Proceed Surgical Mesh® (Ethicon Inc, NJ, USA), are becoming available for large hiatal defects when tension-free primary closure is a challenge. This has a hydrophilic bioresorbable cellulose layer which separates the polypropylene from visceral contact. Prospective, randomised studies are needed to confirm whether these approaches will reduce long term complications.

Lastly, either a fundoplication, gastric fixation intra-abdominally (gastropexy) or gastrostomy may be performed depending on surgeon preference.<sup>8</sup> After hiatal closure, some surgeons may perform a fundoplication routinely in order to reduce fundal mobility and decrease the risk of re-herniation. Gastropexy entails suturing the anterior gastric wall to either the posterior left rectus sheath, the ligamentum teres, the free edge of the left hepatic lobe, or more bravely to the colon itself.<sup>3,6</sup> The alternative fixation is by PEG tube insertion for a variable period.<sup>7,10</sup> Interestingly, a Japanese centre has described the use of an endoscopic balloon for repositioning/reduction of an intrathoracic GV followed by PEG fixation.<sup>11</sup>

Individual patient characteristics determine the specific fixation technique to be utilised. Our second patient presented a management dilemma in view of his age and frailty with continuing haemorrhage. Compared to fundoplication, placement of dual PEG tubes represented a smaller surgical insult and allowed maintenance of intra-abdominal stomach reduction. The skills needed for a successful outcome should not be underestimated - upto 400 prior laparoscopic fundoplications may be required.<sup>5</sup>

In summary, although intrathoracic GV is a rare condition, it may present with life threatening complications. In experienced hands, minimal access techniques are now the mainstay of treatment, offering tailor made management for patients presenting with gastric volvulus.

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