Gastric tube volvulus following an Ivor–Lewis esophagectomy

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ABSTRACT

Gastric tube conduit is the method of choice for restoring continuity of the digestive track after a partial or total esophagectomy. Redundant gastric conduit (i.e. an elongated, floppy conduit) is a rare cause of dysphagia in patients with long survival. Gastric tube volvulus is exceedingly rare with only three cases described in the literature. We present the diagnostic and therapeutic course of a 57-year-old man who presented to our department with gastric tube volvulus 32 months after an Ivor–Lewis esophagectomy. Diagnosis was made with computed tomography and volvulus was reduced endoscopically. To the best of our knowledge, this is only the fourth case of gastric tube volvulus described in the English literature. This rare situation might be a consequence of a redundant gastric tube. Endoscopic volvulus decompression was successful in our case.

KEYWORDS

Tube – Volvulus – Esophagectomy

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Introduction

Gastric tube volvulus is an exceedingly rare condition with only three cases described in the literature.^{1–3} A 57-year-old man who had previously undergone Ivor–Lewis esophagectomy due to adenocarcinoma of the gastroesophageal junction presented with sudden onset of dysphagia, epigastric pain and nonbilious vomiting, 32 months after the initial surgery. Imaging revealed a possible gastric tube volvulus. An upper gastrointestinal endoscopy confirmed the diagnosis and reduction was achieved endoscopically. Gastric tube volvulus might be a consequence of a redundant gastric tube, a rare situation occurring in patients after esophagectomy.⁴ Pathophysiology of redundant gastric tube is not well investigated; neither are proper imaging criteria or treatment. We present the diagnostic and therapeutic course of this patient together with previous experience in the literature.

Case history

A 57-year-old man with a history of a transthoracic Ivor–Lewis oesophagectomy was admitted to our department

with sudden epigastric pain that reflected to his back, sudden onset of dysphagia and nonbilious vomiting. He had undergone surgery 32 months previously for a Siewert I adenocarcinoma of the gastroesophageal junction. The oesophagus was resected to the level of the confluence of the azygos vein with the inferior vena cava. An oesophago-gastric anastomosis was performed with a narrow (4 cm) gastric tube. The gastric tube was constructed with an endoscopic linear stapler, with the stapler line starting from the incisura angularis and extending parallel to the greater curvature until the distal resection margin. A gastric tube was placed in orthotopic position (i.e. in the posterior mediastinum) and was fixed to the lateral pleura. The middle and lower mediastinal lymph nodes were dissected, including the para-oesophageal, subcarinal, tracheobronchial and supradiaphragmatic lymph nodes. In the abdomen, a D2 lymph node dissection was performed.

The pathology report showed a pT3N3M0 adenocarcinoma of the gastroesophageal junction, with nine positive lymph nodes from the 43 dissected. The patient was thereafter submitted to adjuvant chemotherapy. Patient followed a regular follow-up with endoscopy and computed tomography (CT) every six months for the first two years. During

the follow-up period, no dysphagia or vomiting ever presented. Endoscopy was always normal. CT of the gastric tube was normal except for the final follow-up, one month prior to admission, which revealed a somewhat dilated and redundant but otherwise normal gastric tube (Fig 1).

On admission, the patient was investigated with CT, which revealed a huge, dilated gastric tube occupying the left lower mediastinum (Fig 2). No signs were found of tumour recurrence in the upper abdomen to justify the

Figure 1 Last follow-up of the patient showing a dilated but otherwise normal gastric tube.

Figure 2 Computed tomography of the patient indicates gastric tube volvulus; the gastric tube is huge and dilated, and the staple line is rotated.

gastric outlet obstruction and gastric tube dilatation. He then had an upper endoscopy. The gastric tube lumen was obliterated and gastric folds resembled a spiral (Fig 3). ‘Stenosis’ was soft and the endoscope passed easily with only a few attempts. During withdrawal, no volvulus recurrence was noted. No dilation was needed. The rest of the examination was unremarkable. Endoscopy and CT were highly suggestive of a gastric tube volvulus that was reduced endoscopically. Repeat endoscopy of the patient after few days was normal. Repeat CT showed the gastric tube in its usual position and shape (Fig 4). The patient returned to his normal diet and remains asymptomatic to date.

Discussion

To the best of our knowledge, only three cases of gastric tube volvulus have been described in the literature. Casson *et al.*¹ were the first to report a patient who had undergone transthoracic total oesophagectomy, with the entire stomach used as a gastric conduit, and immediately postoperative presented with signs and symptoms of gastric outlet obstruction. The patient was reoperated and a gastric tube volvulus was found that was fixed with gastropexy. However this ‘volvulus’ could be a result of a principally malpositioned gastric conduit rather than a true postoperative event. Donkervoort *et al.*² also described a case of gastric tube volvulus after a trans-hiatal total oesophagectomy that was reduced endoscopically with the use of a stent. Notably, stent displacement two years later did not lead to a recurrence of the volvulus. Finally, Letamendia *et al.*³ also described a case of postoperative gastric tube volvulus after a minimally invasive total oesophagectomy that was treated with endoscopic means.

Gastric tube volvulus might not represent a separate entity but rather an extreme case of a redundant gastric tube, a poorly investigated complication after oesophagectomy in patients with prolonged survival. Kent *et al.*⁴ have addressed this rare situation of redundant gastric tubes in

Figure 3 Endoscopy of the patient; the gastric folds resemble a spiral.

a relatively small case series. Common symptoms of a redundant gastric tube are those of gastric tube dysfunction: dysphagia, vomiting, regurgitation and aspiration. In their series, symptoms were dysphagia (43%), regurgitation (30%), reflux (26%), vomiting (22%) and early satiety (9%). Proposed mechanisms are excess conduit, gastric tube outlet obstruction, twisted conduit and sigmoid-shaped dilated conduit, probably due to denervation. Anatomical details of the gastric tube construction during the initial operation such as excess conduit, a low anastomosis above the diaphragm, no pyloroplasty or narrow hiatus alongside with tube denervation due to disruption of vagus nerves might be predisposing factors.

Treatment of a redundant gastric tube is difficult and implies extensive use of conservative measures such as diet modifications, vigorous use of anti-reflux medication and repeated endoscopic dilatations. Proposed operative treatment includes reduction of excess tube, tube plication, stomach retubularisation and improvement in gastric drainage, such as a new pyloroplasty or even Roux-en-Y reconstruction. Symptom improvement was achieved in 85%, with a morbidity rate of 19%. Shindel *et al.*⁵ reported two patients with gastric tube dysfunction, refractory to conservative treatment. In both cases, the cause was a redundant gastric conduit that caused food stasis and severe reflux. One patient who underwent removal of proximal excess conduit with revision of oesophagogastric anastomosis and another underwent excision of the remaining proximal oesophagus and conversion of Ivor-Lewis to total oesophagectomy. The object in both cases was to restore a non-refluxing anatomy. The authors also propose that, if repair of the conduit is not possible, revision to total oesophagectomy should be undertaken, using a small or large bowel conduit.

In conclusion, all cases described to date are total oesophagectomies with longer conduits, more amenable to

Figure 4 Computed tomography of the patient post-reduction.

postoperative torsion. We believe that our patient's volvulus occurred as a consequence of chronic redundancy of his conduit. Any further connection with specific operative details is difficult because of the rarity of these cases and the lack of available studies. We agree with Kent *et al.*⁴ that diagnosis of redundant gastric tube and/or gastric volvulus should not be based on strict imaging criteria but should equally consider the patient's symptoms and quality of life. Furthermore, and considering that patients with oesophageal cancer often have limited life expectancy and many comorbidities, treatment decisions should be personalised and tailored to conservative treatment and symptoms relief rather than aggressive surgical correction.

Table 1 Previous cases of gastric tube volvulus in the literature.

Author	Patient	Tumour	Surgery	Interval between operation and symptoms	Treatment	Outcome
Casson <i>et al.</i> (1990) ¹	Male, 64 years	Squamous cell carcinoma, middle oesophagus	Transthoracic total oesophagectomy	Perioperatively	Reoperation	Gastric tube necrosis
Donkervoort <i>et al.</i> (2004) ²	Female, 78 years	not amenable	Trans-hiatal oesophagectomy	n/a	Endoscopic stent	Asymptomatic after 2 years
Letamendia <i>et al.</i> (2016) ³	Female, 63 years	Squamous cell carcinoma, middle oesophagus	Minimally invasive total oesophagectomy	Perioperatively	Endoscopic stent	Asymptomatic after 5 months
Our case	Male, 57 years	Adenocarcinoma, gastroesophageal junction	Ivor–Lewis esophagectomy	28 months	Endoscopy	Asymptomatic after 3 months

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