Transgastric drainage of the oesophagus: managing difficult oesophageal injuries

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Abstract

We describe a technique for maintaining patency of the injured or repaired oesophagus while providing vacuum drainage of the oesophageal lumen. A small midline laparotomy is performed. A lubricated 36F soft chest drain (pull-through end) is introduced into the oesophagus using a percutaneous endoscopic gastrostomy (PEG) set, and pulled out through the stomach wall. The drain is brought out through the abdominal wall and the stomach is anchored to the peritoneum. The transgastric drain is positioned across the oesophageal defect. A feeding jejunostomy is placed. Decontamination and drainage of the chest is performed if the patient’s condition allows. The patient takes sterile water by mouth to maintain drain patency, with \( C_0 = 10 \text{ cm H}_2\text{O} \) suction applied. We have used this drainage procedure in seven patients (Boerhaave’s syndrome \((n=4)\), operative injury \((n=3)\)). In five patients with injuries close to the oesophago gastric junction, this method was used as an adjunct to primary repair. There were no deaths; the oesophageal defect healed in all patients without stricture. All patients are swallowing normally at follow-up. This procedure is presented as an option for patients who are unfit for primary repair, or whose primary repair would benefit from efficient drainage and protection.

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1. Introduction

Primary repair is standard management of oesophageal injury, reducing mortality by up to 70% compared with other interventional therapies [1]. Leak rates of 25—50% are reported [1], although with good drainage patients usually recover.

We present this technique as an option for patients who are not candidates for primary repair or salvage resection due to the extent of oesophageal injury or poor general condition of the patient.

2. Method

2.1. Indications

Transgastric drainage of the oesophagus has been instituted:

1. In patients with oesophageal perforation which is too extensive for repair, or patients who are not fit for repair or resection.

2. In patients at the time of oesophageal repair, particularly for injuries in the lower third of the oesophagus, close to the lower oesophageal sphincter.

2.2. Technique

Endoscopy is performed to assess the oesophageal defect and to identify and intubate the distal oesophagus. The endoscope is manoeuvred into the stomach.

Through a small upper midline laparotomy, the anterior wall of the stomach is identified and a suitable position found to comfortably reach the anterior abdominal wall. A purse string is placed in the anterior wall of the stomach, and a 16F cannula is inserted into the stomach, though the purse string, under endoscopic vision (Video 1). A looped wire from a percutaneous gastrostomy set (Corflo-PEG Kit, Corpak MedSystems, Wheeling, IL, 60090, USA) is introduced through the cannula, grasped through the endoscope (Video 1) and withdrawn through the mouth.

A 36F soft silastic chest drain with ‘pull-through end’ (Rocket Medical PLC, Watford, UK) is attached to the looped PEG wire, and the lubricated chest drain is pulled into the stomach. Diathermy incision of the gastric wall allows the chest drain to be delivered through the purse string. The drain is drawn through the stomach wall until it is positioned...
at least 5 cm above the upper end of the defect (Video 1, Fig. 1).

The drain is brought out through the anterior abdominal wall. The gastric serosa is fixed as a gastropexy at this site. A feeding jejunostomy is placed (Video 1).

The oesophageal injury may have already been repaired, and pleural contamination drained by open or minimally invasive approach.

2.3. Postoperative management

The transgastric drain is connected to a closed underwater seal drainage system at −10 cm H2O. The patient drinks sterile water to maintain drain patency. The tubing from drain to collecting system is kept short. Nutrition is provided via the feeding jejunostomy. Any pleural drain is left on dependent drainage and removed when drainage stops.

Serial contrast swallows are obtained to monitor the progress of the oesophageal injury/repair and check the drain position. The drain is removed (in one step) when contrast and endoscopy shows healing of the defect. A small residual pouch is acceptable.

3. Results

We have undertaken this procedure in seven patients. Two patients underwent drainage of a large defect after primary repair of a spontaneous rupture broke down; both were unfit for re-repair or resection.

3.1. Patient 1

A 72-year-old man presented with a spontaneous rupture of the mid oesophagus. He underwent open repair over a T-tube by another service in our institution. On day 16 the repair dehisced, and the patient’s condition deteriorated. Endoscopy showed a 5 cm defect in the mid oesophagus (Video 2). The defect was too large for re-repair and the patient was not fit for oesophagectomy. Transgastric drainage of the oesophagus was instituted laparoscopically, with insertion of a feeding jejunostomy.

The patient’s condition improved. Healing of the defect was followed by contrast swallows (Fig. 2). The drain was removed at day 67 and the patient discharged. He is swallowing normally at 9-month follow-up.

3.2. Patient 2

A 52-year-old man who had undergone repair of a large epiphrenic diverticulum developed a 4 cm defect just above the gastro-oesophageal junction on day 4. The dehiscence was repaired by open surgery but broke down 2 weeks later. The patient was unfit for oesophagectomy so transgastric drainage was instituted via a pre-existing gastrostomy. Healing of the defect was followed by contrast swallow. The transgastric drain was removed on the 32nd day. This patient is swallowing normally at follow-up 3 years later.

Five other patients have had a transgastric drainage tube placed to protect an oesophageal repair close to the lower oesophageal sphincter after spontaneous (n = 3) or operative (n = 2) injury. There were no complications related to the drain. All five patients were discharged alive after drainage ranging 8–33 days; one had a leak on contrast treated conservatively; none have required dilatation.

4. Discussion

Transgastric drainage of the oesophagus delivers vacuum drainage to the oesophageal lumen; the mediastinal boundaries of the defect are encouraged to oppose and heal, while the silastic drain provides a former for the oesophagus to heal around, without stricture formation.

Self-expanding oesophageal stents have been reported for treating oesophageal defects [2,3]. There are disadvantages to their use [1]:

- foreign body in a contaminated field,
- radial force distracts healing surfaces,
- migration,
- gastro-oesophageal reflux,
- absence of vacuum drainage effect.

Transgastric drainage of the oesophagus is a useful option for treating oesophageal injuries in difficult situations.
References


Appendix A. Supplementary data