CASE REPORT

First UK experience of endoscopic vacuum therapy for the management of oesophageal perforations and postoperative leaks

Alaa Alakkari,¹ Ruchit Sood,¹ Simon M Everett,¹ Bjorn J Rembacken,¹ Jeremy Hayden,² Abeezar Sarela,² Noor Mohammed¹

¹Gastroenterology Department, St James's University Hospital, Leeds, UK

²Department of Upper Gastrointestinal Surgery, St James's University Hospital, Leeds, UK

Correspondence to

Dr Alaa Alakkari, Gastroenterology Department, St James's University Hospital, Leeds LS9 7TF, UK; alaa.alakkari@nhs.net

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ABSTRACT

Oesophageal perforations and anastomotic leaks are associated with high morbidity and mortality. Endoscopic vacuum therapy (EVT) is a promising novel treatment that promotes healing and avoids sepsis. There are no data reporting its use in the UK. We report the first British experience of EVT in two elderly frail patients. Two patients were treated in our institution with EVT using Eso-SPONGE®. One patient had spontaneous oesophageal perforation and the other had anastomotic leakage post-Merendino oesophageal reconstruction (oesophagogastric continuity with jejunal interposition anastomosis). Both patients were over 65 years of age. One patient had 13 endoscopic Eso-SPONGE® exchanges over 8 weeks, while the other one had 6 exchanges over 4 weeks. Complete resolution of oesophageal leakage was achieved in both cases. EVT should be considered in the management of patients with oesophageal perforations and postoperative leaks. This novel therapeutic intervention has the potential to significantly reduce morbidity and mortality in these patients.

INTRODUCTION

Oesophageal perforations and anastomotic leaks remain a therapeutic challenge. They are associated with significant morbidity and mortality. The reported mortality of intrathoracic anastomotic leakage ranges from 20% to 64% depending on factors including the severity of the leakage, fitness of the patient and surgical or conservative management options.^{1 2} Non-surgical treatment includes endoscopic oesophageal stenting to seal the leak and exclude the cavity from oesophageal contents. However, this does not drain the sepsis, which commonly requires lengthy or

repeated percutaneous or surgical drainage, with associated significant discomfort and morbidity. Furthermore, stents often provide an imperfect seal and can migrate so their use in this situation is of uncertain benefit.³

Vacuum therapy to seal and facilitate healing of open abdominal wounds is well established and has also been utilised infrequently as an endoscopic therapy in the lower gastrointestinal (GI) tract.^{4 5} Endoscopic vacuum therapy (EVT) (Eso-Sponge) has recently been introduced in Europe to facilitate drainage and secondary healing of upper gastro-oesophageal leaks, most commonly postoperatively. Here we report the first two cases of EVT in the UK to successfully seal oesophageal perforations and related complex sepsis.

METHODS

EVT consists of the endoscopic insertion of a polyurethane sponge into the cavity induced by leakage or perforation (figure 1). Once the cavity is assessed endoscopically, an overtube is introduced under visual control. The sponge is pushed into position through the overtube using a pusher. Once the sponge is in place, the overtube and pusher are pulled out. Sponge position is confirmed endoscopically and adjusted if necessary using grasping forceps. The sponge is then connected to continuous negative pressure at 125 mm Hg via a transnasal tube. Sponge exchange is performed endoscopically under conscious sedation every 3–5 days. Each exchange takes 15–30 min to complete.

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Figure 1 Eso-Sponge tool kit.

Case 1

A 69-year-old woman with a background history of severe chronic obstructive airways disease was transferred to Leeds Teaching Hospitals NHS Trust (LTHT) with acute spontaneous oesophageal perforation. Imaging showed right midoesophageal perforation extending 2.7 cm in length with extensive subcutaneous emphysema and pneumomediastinum and food debris within the mediastinum. There was a large right pleural effusion with continuity between the right pleural space and the oesophageal perforation.

She underwent emergency thoracotomy and thoracic debridement with the insertion of a T tube. Despite this, she remained septic with a persistent mediastinal cavity communicating with her oesophagus ([figure 2](#)). She was referred for EVT using Eso-Sponge ([figure 3](#)), which was started 28 days after presentation. At this

Figure 2 Endoscopic upper oesophageal view, with oesophageal lumen on the left and defect on the right.

Figure 3 Endoscopic oesophageal view with nasogastric feeding tube in the oesophageal lumen and Eso-Sponge in the cavity.

stage, she was quite unwell with albumin 17 g/L, haemoglobin 89 g/L and C reactive protein (CRP) 53 mg/L.

The sponge was exchanged 13 times over 8 weeks with increasing intervals between exchanges; initially every 3 days, then every 5 days and finally every 7 days. The patient was treated with continuous antibiotics and received parenteral nutrition for the first 6 weeks followed by enteral feeding via a transgastric jejunal feeding tube with gastric secretions cleared through a venting gastrostomy tube.

Follow-up water-soluble contrast study performed 14 weeks after therapy was commenced revealed no leakage of contrast into the mediastinum ([figure 4](#)) and repeat oesophago-gastroduodenoscopy (OGD) at this stage showed complete healing of the oesophageal defect ([figure 5](#)).

Case 2

A 65-year-old woman was referred to LTHT for oesophageal reconstruction surgery. One year previously, she had a perforated gastro-oesophageal junction during hiatus hernia repair. Following complex

Figure 4 Contrast swallow showing leakage of contrast into cavity compared with follow-up contrast swallow showing resolution of the cavity.

Figure 5 Endoscopic view showing complete healing of the oesophageal defect following treatment.

repair attempts, she underwent separation and stapling of her oesophagus and stomach with the placement of a feeding jejunostomy. She underwent Merendino oesophageal reconstruction (oesophagogastric continuity with jejunal interposition anastomosis) but developed a postoperative anastomotic leak with a complex multiloculated right pleural effusion (figure 6).

Initial treatment was with intravenous antibiotics and CT-guided chest drain insertion but as her condition failed to improve, she was referred for EVT, which was started on day 10 postoperatively. Following Eso-Sponge insertion, the chest drain was removed and the sponge was exchanged every 3 to 4 days. The sponge had to be trimmed down as the cavity rapidly reduced in size to avoid it becoming adherent to the lining of the cavity. By day 7, following initiation

Figure 6 Endoscopic view of large cavity lateral to the oesophagojejunal anastomosis.

Figure 7 Contrast swallow showing initial large leak from the oesophagojejunal anastomosis compared with a follow-up study showing complete resolution of the leak.

of EVT, the patient had improved significantly with normalisation of white cell count, reduction in CRP from 237 to 47 mg/L, and increase in albumin from 14 to 20 g/L. Antibiotics were discontinued and following 6 exchanges over 28 days, the cavity healed and EVT was discontinued. Water-soluble contrast study confirmed complete resolution of the previously demonstrated oesophagojejunal anastomotic leak (figure 7).

DISCUSSION

This is the first UK experience of EVT in two frail patients with complex oesophageal perforations. In both cases, despite the patients' significant established sepsis, there was successful healing of the cavities to the point of discharge from the hospital.

Initiation of treatment was delayed in the first case, which is probably why she required more prolonged therapy for over 8 weeks. The final result was excellent with complete resolution of her spontaneous oesophageal perforation and return to an oral diet. Treatment was initiated earlier in the second case and healing occurred more rapidly with complete resolution of the leakage within 4 weeks. In both cases, EVT accelerated healing of the oesophageal leakage and promoted patient recovery leading to improved outcomes and reduced hospital stay.

EVT is well tolerated even in sick frail patients with other comorbidities. It has a potential role in the management of patients with complex upper GI injuries due to a variety of causes including spontaneous and iatrogenic perforations and postoperative leaks. Early EVT is likely to achieve faster healing and shorter duration of treatment. It should be considered in a multidisciplinary setting with joint decision-making between upper GI surgery and gastroenterology.

CONCLUSION

EVT should be considered in the management of patients with oesophageal perforations and postoperative leaks. This novel therapeutic intervention has the potential to significantly reduce morbidity and mortality in these patients.

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