Endoscopic vacuum-assisted closure therapy for the treatment of oesophageal anastomotic leaks

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Abstract

Persisting suture dehiscence with oesophageal anastomotic leaks after thoracic surgery is a difficult complication, especially when a surgical repair fails. We report here endoscopic vacuum-assisted closure therapy as a novel endoscopic treatment for the management of oesophageal anastomotic leaks. Endoscopic vacuum-assisted closure therapy is a minimally invasive method to treat anastomotic leakage by positioning an open-pored polyurethane sponge and a suction tube connected to a wound drainage system into the opening of the wound cavity. This multidisciplinary endoscopic and surgical approach is a successful therapy for the management of suture dehiscence with oesophageal anastomotic leaks after thoracic surgery or oesophageal perforations. (Acta gastroenterol. belg., **2019**, 82, **529-531**).

Keywords : oesophagus, anastomotic leak, perforation, endoluminal vacuum therapy, endoscopic vacuum-assisted closure therapy

Abbreviations : EVAC, endoscopic vacuum-assisted closure – CT, computed tomography

Introduction

Persisting suture dehiscence with oesophageal anastomotic leaks after thoracic surgery is a difficult complication, especially when a surgical repair fails (1-3). We report in this article endoscopic vacuum-assisted closure (EVAC) therapy or endoluminal vacuum therapy as a novel combined endoscopic and surgical treatment for oesophageal anastomotic leaks in a patient with a persisting suture dehiscence after a left thoraco-phreno-laparotomy with partial oesophagectomy and partial gastrectomy with an intrathoracic anastomosis because of an adenocarcinoma of the distal oesophagus (1-3).

Case history

A 65-year-old patient had undergone a left thoraco-phreno-laparotomy with partial oesophagectomy and partial gastrectomy with an intrathoracic anastomosis because of an adenocarcinoma of the distal oesophagus. One month after the index operation, the patient was admitted in the hospital complaining about shortness of breath with observed desaturation and an extreme cough. Blood analysis showed a highly elevated C-reactive protein of 153 mg/dl (normal < 5). Computed tomography (CT) scan of the chest and abdomen showed an oesophageal anastomotic leak due to a suture dehiscence at the level of the oesophagogastric anastomosis with leakage into the right posterior mediastinal space with extension to a collection into the right basal subpleural space (Figure 1). X-ray oesophagogram with an iodium-based contrast agent confirmed the presence of an important oesophagogastric anastomotic leak with opacification of a supradiaphragmatic space (Figure 1). These findings where confirmed on the oesophagogastroduodenoscopy (Figure 2). The patient was treated with nothing by mouth, intravenous administration of antibiotics and intravenous rehydration. A surgical repair of the anastomosis was performed, but unfortunately it failed. We therefore treated the patient with EVAC therapy (endo-sponge). Two open-pored polyurethane sponges of 13mm and

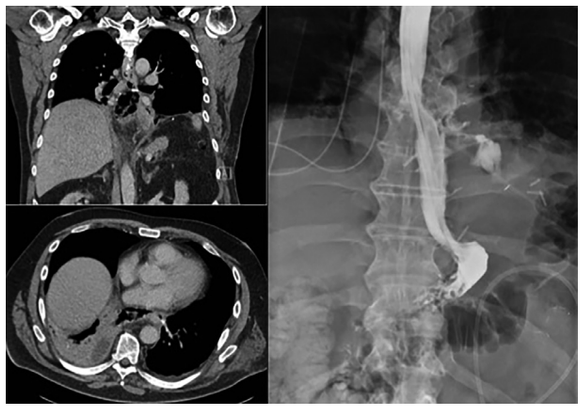

Figure 1. — Computed tomography scan of the chest and abdomen showing the oesophageal anastomotic leak due to a suture dehiscence at the level of the oesophagogastric anastomosis with leakage into the right posterior mediastinal space with extension to a collection into the right basal subpleural space. X-ray oesophagogram with an iodium-based contrast agent showing the presence of an important oesophageal anastomotic leak with opacification of a supradiaphragmatic space.

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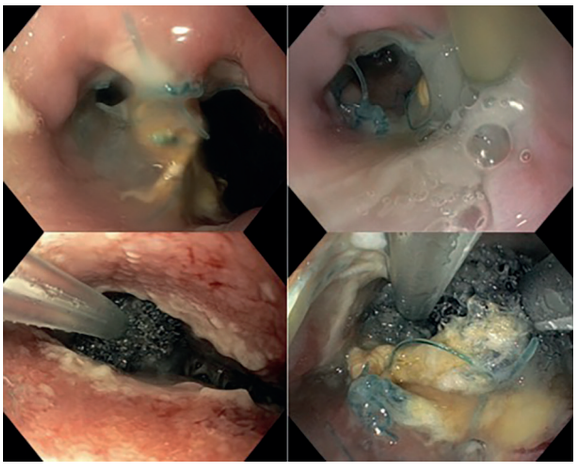

Figure 2. — Endoscopic view showing the oesophageal anastomotic leak before and after the insertion of the endo-sponges used for endoluminal vacuum therapy. Endoscopic view through the oesophageal anastomotic leak into the mediastinal and subpleural space showing the position of the sponge in the mediastinal and subpleural space before correct positioning of the sponge at the level of the anastomotic leak.

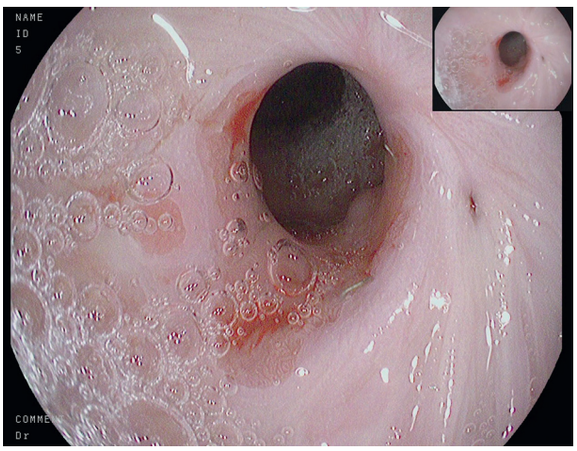

Figure 3. — Endoscopic view of the anastomosis at the end of the endoscopic vacuum-assisted closure therapy. The closure resulted in a mild anastomotic stenosis, which was dilated once with a through-the-scope (TTS) balloon with good result.

15mm were endoscopically positioned in the wound cavity and continuous suction (-75 mmHg) was applied by drainage tubes fixed to the sponges (Figure 2). An endoscopic replacement of the sponges was performed every 48 to 72 hours where we managed to reduce the amount and the volume of the polyurethane sponges. This EVAC therapy was stopped at the moment we achieved a significant reduction of the wound cavity and a narrowing of the anastomotic leak where the anastomotic defect was too small for the further placement of a sponge. Successful closure of the anastomotic leak was achieved after 5 weeks and 15 replacement sessions in total. During the EVAC treatment period, nutrition was provided by enteral nutrition with a jejunostomy, which was placed during the index surgery. The closure resulted in a mild anastomotic stenosis, which was dilated once with a through-the-scope (TTS) balloon with good result (Figure 3).

Discussion

EVAC therapy or endoluminal vacuum therapy is a minimally invasive method to treat anastomotic leakage or oesophageal perforations. This therapeutic system consists of an open-pored polyurethane sponge and a suction tube connected to a wound drainage system and is placed into the wound cavity (1). The size and the format of the sponge can be individually adapted to the size of the anastomotic suture dehiscence and the wound cavity. One or several sponges can be used during one session, depending on the size and the depth of the wound cavity. Manual adaptation of the sponge is possible to allow a perfect fitting of the sponge in the wound cavity. The sponge allows a gentle, continuous suction to be transferred evenly over all tissues in contact with the sponge surface and provides appropriate drainage with a gradual reduction in the size of the wound cavity. The vacuum technique is based on application of a negative pressure to the wound via a vacuum-sealed sponge tissue. This technique leads to the formation of healthy granulation tissue, the removal of wound secretions and infected fluids out of the wound cavity, reduction of oedema and local improvement of the blood flows. This results in a clean wound base, a gradual reduction in the size of the wound cavity, collaps of the wound cavity, improvement of wound closure and a better control of the septic focus (2). The endoscopic procedure consists in general out of four steps. First, the introduction of the endoscope for inspection of the anastomotic suture dehiscence and the wound cavity and positioning of the overtube into the wound cavity. Secondly, the positioning of the endo-sponge into the wound cavity by using the pusher in the overtube. The next step is the mobilisation of the suction tube of the endo-sponge on a nasogastric tube for correct transnasal placement. And finally, activation of the vacuumpump (settings : - 75 to - 100 mmHg) to start the endoluminal vacuum therapy. Altough this technique seems to be an important improvement in the management of oesophageal leaks, there are a few disadvantages and limitations associated with EVAC therapy which should be kept in mind. First of all, there is the necessity for performing repeated endoscopic procedures every 48 to 72 houres to replace the endo-sponge to prevent ingrowth and retraction of the endo-sponge into the wound cavity. The nasal tube attached to the sponge can also lead to notable discomfort. There is a deleayed oral feeding with EVAC therapy compared with the placement of metallic oesophageal stents where early oral feeding is possible. The transoral endoscopic placement of vacuum sponges into the leak is also technically demanding in contrast to metallic oesophageal stent positioning, though due to improvement of the material, this has

more and more become easier with newer techniques where we use nowadays an overtube and a pusher in stead of using graspers. Because the vacuum sponges are placed transluminally into the necrotic wound cavity, this approach is limited to endoscopically accessible leaks. Percutaneous drainage and antibiotics are always indicated if radiologic investigation shows fluid collection or the formation of empyema in the mediastinum or pleural cavity. It is important to know that not all anastomotic leaks are suitable for endoscopic treatment. A suture dehiscence of more than 50 % of the anastomotic suture or anastomosis with an ischemic and avital anastomotic line are not suitable for EVAC treatment and should be referred for surgical treatment (3).

In conclusion, the spectrum of manifestations of oesophageal anastomotic leakage ranges from clinically sillent to (early) fulminant leaks. Appropriate treatment must therefore be matched to the individual patient. During the past decade, the principles of management of oesophageal leaks have shifted increasingly towards a more conservative approach including therapeutic endoscopic procedures. Endoscopists can successfully treat traumatic non-malignant oesophageal perforations or thoracic anastomotic leaks smaller than 50 % of the circumference. Through-the-scope clips (TTS), over-the-scope clips (OTSC), metallic stents and now also EVAC can be used as a endoscopic therapeutic strategy for closing oesophageal (anastomotic) perforations (4). A key issue is that there are no uniform methods for treating patients with symptomatic intrathoracic leakage. The appropriate management of patients with oesophageal anastomotic leaks requires cooperation between the gastroenterologist, the surgeon and the radiologist.

Conflict of interest

None declared.

Mathieu Struyve : No disclosures. First author of this article and endoscopist in this case. Charlotte De Vloo : No disclosures. Combined first author of this article. Hans Van Veer : No disclosures. Thoracic surgeon in this case. Philip Roelandt : No disclosures. Endoscopist in this case.

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