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Case Report

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Endoscopic Vacuum Therapy (EVT) in the Management of Postoperative Leaks Following Upper Gastrointestinal Surgery: Case series

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ABSTRACT

Anastomotic leaks and staple line disruptions are among the most serious complications following upper gastrointestinal (GI) surgery, contributing significantly to postoperative morbidity and mortality. This case series describes the clinical application, outcomes, and technical aspects of EVT in patients with postoperative leaks after partial pharyngectomy, gastrectomy, and esophageal diverticulectomy. We retrospectively reviewed three consecutive patients treated with EVT for postoperative leaks between January 2023 and March 2025 at Intermed Hospital. EVT was performed using a polyurethane sponge attached to a nasogastric or nasoesophageal tube, applying continuous negative pressure (−115-125 mmHg) via an external suction device. The patients (2 males, 1 female; mean age 53.4 years) developed leaks after various upper GI procedures, including esophageal diverticulectomy, partial pharyngectomy, and remnant total gastrectomy. EVT duration ranged from 10 to 28 days, with 3 to 8 sponge changes per patient. EVT is an effective and safe treatment for anastomotic leaks after upper GI surgery. It promotes healing, reduces the need for surgical reintervention, and can be successfully applied across a range of postoperative leak scenarios. Early diagnosis, proper sponge positioning, and multidisciplinary care are key to achieving optimal outcomes.

Keywords: GI- Gastrointestinal, EVT – Endoscopic Vacuum Therapy, EVAC – Endoluminal Vacuum Therapy

Introduction

Anastomotic leaks and staple line disruptions represent some of the most severe complications after gastrointestinal (GI) surgery, significantly increasing postoperative morbidity and mortality. Endoscopic Vacuum Therapy (EVT) has become a minimally invasive and effective method for treating these leaks, especially when applied early. This case series outlines the clinical use, outcomes, and technical considerations of EVT in patients experiencing postoperative leaks following partial pharyngectomy, gastrectomy, and esophageal diverticulectomy.

Traditionally, such cases have been managed with surgical intervention. However, the development of alternative treatments like endoscopic stent placement now offers a less invasive option for management.

Negative pressure wound therapy has long been used to treat complex external wounds [1]. With the growing need for effective control of GI leaks, this technique has been adapted for internal use, resulting in the advent of endoluminal vacuum therapy (EVAC/EVT). This approach can help avoid additional surgical procedures and reduce patient morbidity and mortality. While EVAC/EVT is still relatively new, its adoption is increasing globally.

The endosponge, a key component of EVT, is capable of collapsing the leak cavity and creating a seal to achieve source control. It is placed endoscopically at the site of the leak using one of two methods: Intracavitary placement, in which the endosponge is situated within the leak cavity outside the mucosa-lined space, maximizes contact with surrounding tissue, aids in debriding necrotic tissue, collapses residual spaces, and promotes granulation, thereby enhancing negative pressure therapy. Intraluminal placement involves positioning

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the endosponge within the GI tract directly on the mucosa to completely cover and seal the leak by adhering to the adjacent mucosal tissue [2].

Materials and Methods

We retrospectively reviewed three consecutive patients treated with EVT for postoperative leaks between January 2023 and March 2025 at Intermed Hospital. The patients (2 males, 1 female; mean age 53.4 years) developed leaks after various upper GI procedures, including esophageal diverticulectomy, partial pharyngectomy, and remnant total gastrectomy. We chose the patient with the following indications:

- The general condition of the patient is stable.
- Ongoing leak in the GI tract.
- The leak site is accessible by an endoscope.

We used a polyurethane sponge attached to the nasogastric tube, using permanent surgical sutures for all cases.

Case presentation 1

A 71-year-old female patient presented with a chest burn. In 2022, she was diagnosed with poorly cohesive carcinoma of the stomach, and Laparoscopic near-total Gastrectomy D2 lymph node dissection and Roux-en-Y reconstruction surgery was done. After surgery, XELOX -80% 3 courses of chemotherapy and FOLFOX 80% 5 courses of chemotherapy were completed in September 2022 in Mongolia. Follow-up examination, she was diagnosed with a malignant neoplasm of the cardio-esophageal junction on the 20th of March 2024.

Completion of total gastrectomy, Esophago-Jejunostomy Roux-en-Y, Ileo- transversostomy side-to-side surgery was done on the 10th of April. During the operation, there was no sign of peritoneal seeding. The operation duration was 360 minutes, with an estimated blood loss of 300ml.

On the 12th day after surgery, UGI and endoscopy were performed, and a postoperative complication, which is anastomosis leak was diagnosed (Figure1).

Figure 1: A.UGI, B. Computer tomography

Endoscopic vacuum-assisted negative pressure treatment was performed. EVT was performed using a polyurethane sponge attached to a nasogastric or nasoesophageal tube, applying continuous negative pressure (−115 mmHg) via an external suction device. EVT duration ranged from 28 days, with 8 sponge changes overall. EVT was performed using a polyurethane sponge attached to a nasogastric or nasoesophageal tube, applying continuous negative pressure (−115mmHg) via an external suction device. The sponge was replaced every 3–5 days until defect closure. The initial anastomosis leak was completely cured (Figure 2). The patient was discharged on postoperative day 45.

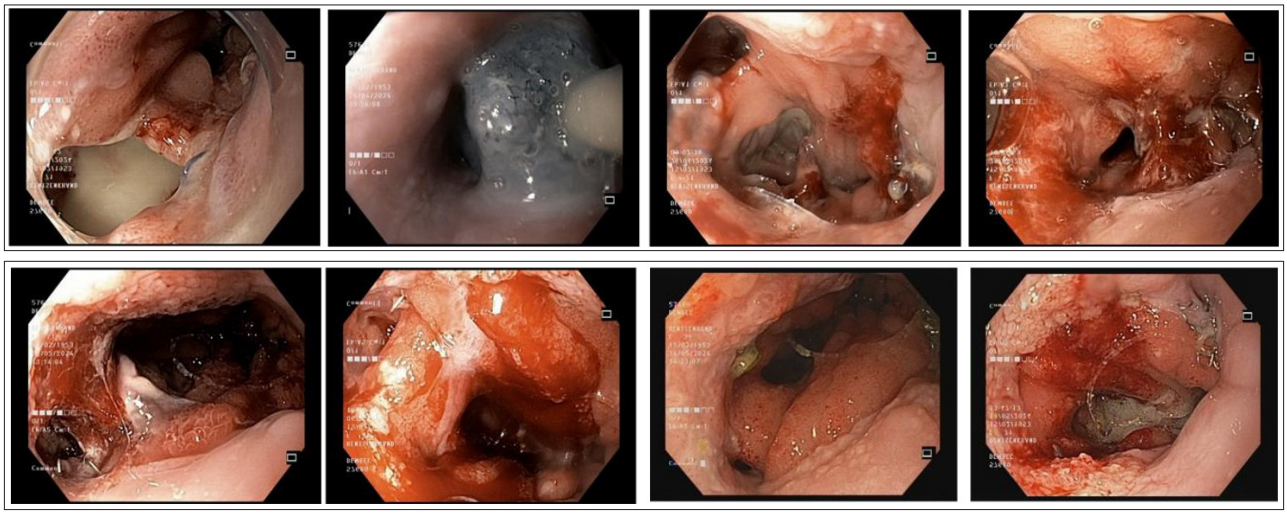

Figure 2: Result of nine times EVAC treatment

Case presentation 2

A 51-year-old man presented to our hospital with a diagnosis of malignant oropharyngeal cancer. Regarding his past medical history, in 2012 he underwent a total laryngectomy for advanced laryngeal cancer, followed by radiotherapy with a total dose of 66 Gy and six cycles of chemotherapy.

During post-treatment follow-up, he remained free of disease recurrence for more than 10 years. However, around October 2024, a large squamous cell carcinoma located at the base of the tongue was diagnosed.

The tumor was treated surgically with resection of the base of the tongue and part of the pharynx. The resulting defect was reconstructed using a radial forearm free flap on December 4, 2024. The operation time was 550 minutes, with an estimated blood loss of 200 mL.

On postoperative day 9, a postoperative leak was observed, and endoscopic evaluation was performed to confirm the leakage (Figure 3). Endoscopic vacuum therapy (EVT) was initiated immediately using a polyurethane sponge connected to an external suction device with continuous negative pressure

of −125 mmHg. EVT was maintained for 10 days, with sponge changes performed every 3 days (three changes in total). On postoperative day 19, the sponge was removed after endoscopic examination confirmed complete resolution of the leakage. The patient was discharged on postoperative day 21.

Figure 3: POD#9 Postoperative leak was diagnosed on EGD and sponge placement.

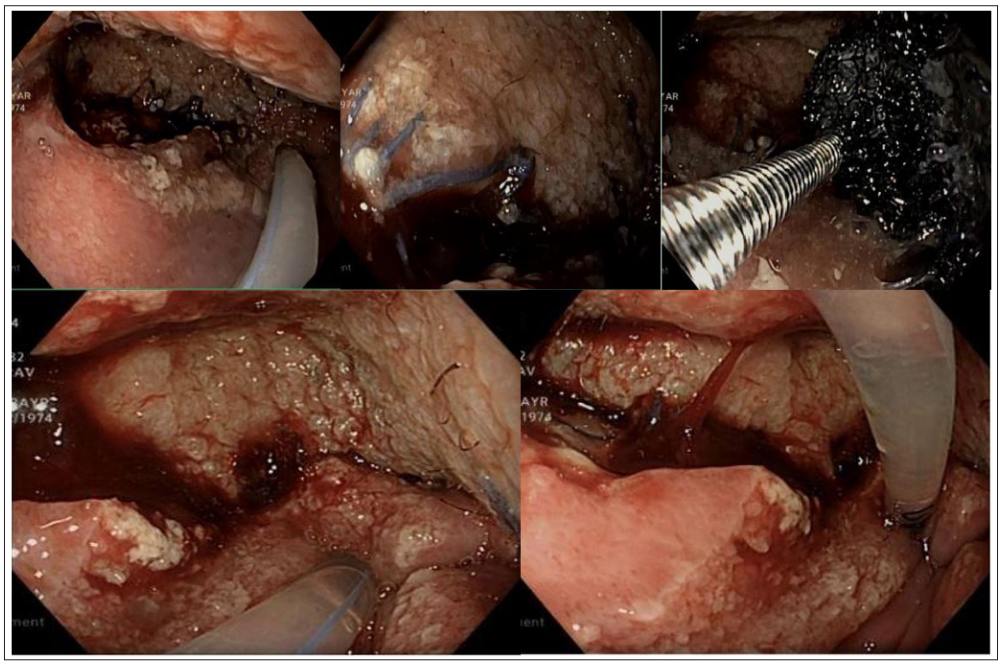

Figure 4: POD#19 and POD#23, process of EVT treatment.

Case presentation 3

A 40-year-old male patient presented with difficulty in swallowing, dysphagia and weight loss. He was diagnosed with distal esophageal diverticulum and on 15th of January, 2024. The stapled esophageal diverticulectomy surgery was done. The operation duration was 160 minutes, with an estimated blood loss of 10ml. On the 9th day after surgery, endoscopy was performed, and a postoperative leak was diagnosed (Figure 5). EVT treatment was performed, duration was 15 days, with 3 days interval of 5 sponge changes, and on post operative day 29, we took the sponge after an endoscopy examination revealed the defect closure using endoscopic clips. The patient was discharged on postoperative day 36.

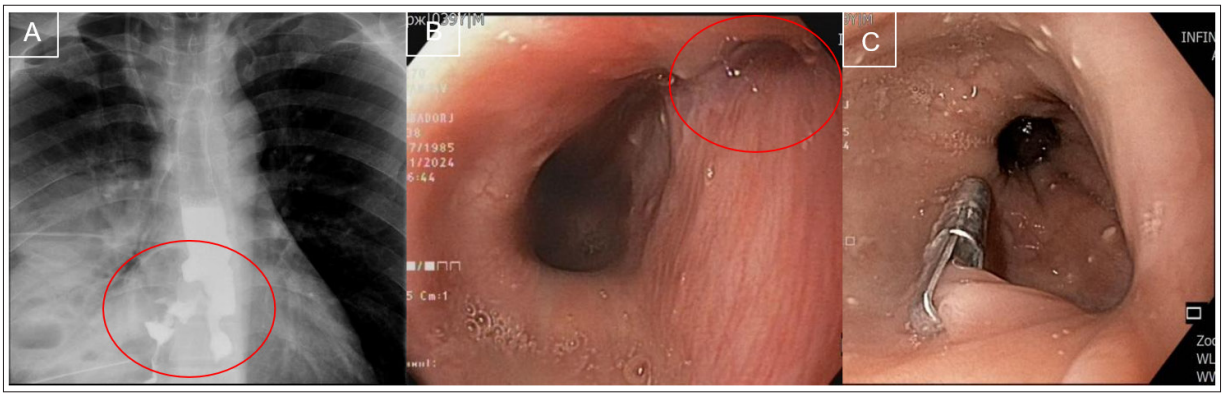

Figure 5: A. Postoperative leak diagnosed by UGI and B. by an EGD. C. Defect closure.

Result

All patients achieved successful leak closure without the need for reoperation. No major complications related to EVT were observed. One patient had a delayed oral intake, and another had a chronic fistula that resolved completely with extended therapy. All patients had regular follow-up examinations with the surgeon and endoscopists, and 1 to 2 year follow-up examinations showed no complications or complaints.

Discussion

Esophagogastric leaks — The earliest assessments of mortality and effectiveness in foregut leaks using EVAC/EVT date back to its early use. In a 2013 study comparing EVAC/EVT therapy with stent placement for intrathoracic esophageal leaks, the mortality rate was much lower with EVAC/EVT than with stent placement (15 versus 25 percent) [3]. In the same study, stricture rate was also lower with EVAC/EVT therapy (9 versus 28 percent).

In another 2013 study comparing EVAC/EVT with conservative management, stent placement, and surgical diversion in patients with anastomotic leaks after esophagectomy, the severity of disease was assessed with Acute Physiology and Chronic Health Evaluation (APACHE) II scores, and the most severe patients either underwent surgical diversion or EVAC/EVT therapy.

Once again, mortality of EVAC/EVT was lower compared with surgery (12 versus 50 percent) [4]. Stent placement was done in a less-acute cohort, and its mortality rate was 42 percent.

More recent systematic reviews and meta-analyses that compared EVAC/EVT with other endoscopic modalities for foregut leaks include: A 2021 systematic review and meta-analysis of esophagectomy and gastrectomy leak patients showed that the overall complication rate favors EVAC/EVT over SEMS (self-expanding metal stents; 9 versus 31 percent) [5]. Mortality also favored EVAC/EVT (9 versus 20 percent).

Another 2020 meta-analysis of esophageal leaks showed that short-term complications, long-term complications, and mortality rates (11 versus 22 percent) all favored EVAC/EVT over SEMS [6].

In another 2021 meta-analysis of esophageal leaks, adverse events were equal with EVAC/EVT and SEMS at 17 percent [7]. Stricture development remained lower in the EVAC/EVT group when the subset analysis was done, which is consistent with other studies.

Findings

Although in theory EVAC/EVT can be performed for any gastrointestinal (GI) leak that can be reached endoscopically barring a few technical limitations, in practice several clinical factors, as well as the experience of the provider, will determine its suitability.

EVT is a new option in the management of GI transmural defects. EVT use has been increasing and appears to be effective in the treatment of this condition as a first-line therapy, as well as a salvage procedure when other options have failed.

Some studies indicated that procedures can be done in the operating room or the endoscopy suite, but the endoscopy suite cost was much lower. However, with critically ill patients, the operating venue should be chosen based on optimal patient care and safety rather than cost.

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