

# Managing anastomotic leaks with EndoVAC: Case report

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## Abstract

**Background:** Successful EndoVAC Management of Oesophago-jejunal Anastomotic Leak After Gastrectomy and Oesophageal Resection for Carcinoma. This case report highlights the effectiveness and safety of EndoVAC treatment for postoperative oesophago-jejunal anastomotic leaks. Anastomosis leaks following oesophageal cancer surgery are serious complications that often result in prolonged hospital stays and increased mortality rates. Despite advancements in surgical techniques and perioperative care, managing these leaks remains a challenge. Traditional treatment methods, such as surgical reoperation and stent placement, may not always be appropriate. Endoscopic vacuum-assisted closure (EndoVAC) therapy has demonstrated promising results in this context. The advantages of vacuum therapy, as reported in the literature, include removing exudates, reducing bacterial invasion, and promoting tissue granulation. The presented case report discusses the mechanisms of action, clinical outcomes, and benefits of EndoVAC therapy, emphasising the importance of a multidisciplinary approach involving surgeons, radiologists, gastroenterologists, and intensive care specialists.

**Aims:** Clinical case report and literature review.

**Materials and method:** A 59-year-old male patient presented with gastric adenocarcinoma involving the cardia (Siewert Type 3). He underwent a gastrectomy with Y (Roux loop) oesophago-jejunal anastomosis. Oesophago-pleural fistula due to anastomotic insufficiency of the anastomosis occurred on 8th postoperative day. Video-assisted thoracoscopic surgery (VATS) was performed for the placement of para-oesophageal drains with local debridement and lavage of the pleural cavity and mediastinum on the 9th postoperative day. EndoVAC system was placed endoscopically. PEJ also was placed. After 12 days with four sponge changes a significant improvement was observed and the patient started oral feeding. He was discharged on 29 post-op day. Three months later a check endoscopy was performed that showed full closure of the defect.

**Results and discussion:** This serious complication after surgery can be treated successfully with vacuum therapy with satisfying results. A multidisciplinary approach greatly enhances the chances for a successful outcome.

## Keywords

EndoVAC, gastric cancer surgical complications, anastomosis leak, vacuum-assisted closure, multidisciplinary approach

## Introduction

Anastomotic insufficiency after oesophageal surgery is one of the most challenging complications. Anastomotic leakage following esophagectomy for cancer occurs in

5% to 30% of cases and accounts for approximately 40% (range=3.3-67%) of all postoperative fatalities<sup>[1]</sup>. The cause for the leak may vary from a minor defect to complete dehiscence. It can be associated with high morbidity and

mortality of up to 25% [2, 3, 4]. In the context of total gastrectomy, the incidence can range from 0% to 17% [7, 8, 9, 10]. Leakage-related mortality has been reported to be between 19% and 64%, with higher mortality observed following surgical intervention compared to conservative or endoscopic treatment approaches [10, 11].

The outcomes of revision and resuture of the anastomosis often are not satisfying [10, 12], with a high risk of recurrent insufficiency [10, 16]. Additionally, surgical re-intervention for leakage following esophagectomy and gastrectomy carries a significant risk of morbidity and mortality, with higher mortality rates compared to conservative or endoscopic approaches [10, 13, 17, 15]. Furthermore, surgical revision has been associated with worse long-term survival outcomes [7]. However, the poorer outcomes following surgical re-intervention may be influenced by selection bias, as this approach is typically employed in patients with more severe disease, sepsis, or in cases where conservative treatment has failed [16].

Endoscopic clipping, efficient for early oesophageal perforations is unfeasible, especially in the case of fibrotizing, scarred fistulas and a severely inflamed environment [24].

Endoscopic vacuum therapy (EVT) is required in these cases. The procedure may be challenging to execute, limiting its application in routine clinical practice and denying critically ill patients access to a potentially life-saving treatment.

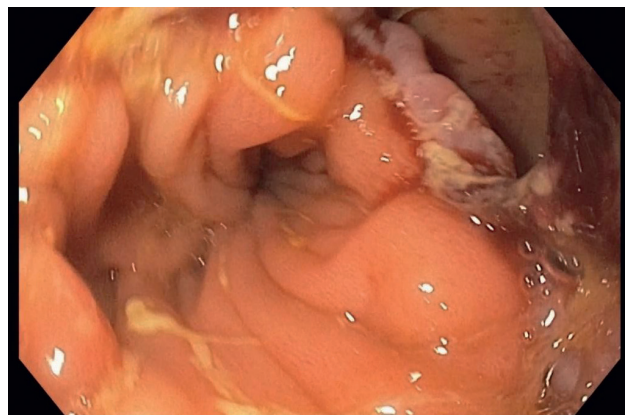
The EndoVAC technique was first used by Weidenhagen to treat anastomotic leaks after rectal surgery in 2007 [5]. The wound VAC sponge is cut to a size that matches the defect and is attached to a nasogastric tube before being placed. The EndoVAC sponge is replaced frequently and facilitates healing over 2 weeks depending on the size of the perforation [16].

## Clinical case and results

We present a case of a 59-year-old male patient, who underwent a gastrectomy with distal esophagectomy and intestinal transposition (Roux anastomosis) for an adenocarcinoma of the cardia Stage pT1N0M0. He underwent 4 courses of neoadjuvant chemotherapy with Docetaxel, Oxaliplatin, and Calcium folinate a month before the operation that was open with anastomosis made by staplers DST 25 mm EEA25. In the early postoperative period, he developed an anastomotic leak. The defect appeared in the lateral wall of the anastomosis around 20 mm. After a good initial recovery, he developed nausea, vomiting and fever. Endoscopy and a CT Scan showed a likely leak in the anastomosis of the oesophagus. (Figure 1, 2) Initial stenting was attempted with a fully covered metal prosthesis (fc



**Figure 1.** CT demonstrates a leak of the oesophago-jejunal anastomosis.



**Figure 2.** Endoscopy findings after CT, demonstrates insufficiency of 1/3 of the anastomosis with oesophago-pleural fistula.



**Figure 3.** CT after VATS procedure and placement of two local drainages.



**Figure 4.** Endoscopy after last EndoVAC system removal.

Taewoong 120mm). However, a contrast study showed a leak at the distal end of the stent. An endoscopy was performed. The stent was removed, and lavage was performed. A right VATS was carried out. Pleural and mediastinal debridement with lavage was undertaken. Two wide bore drains were placed and a percutaneous nutritional jejunostomy was performed at the end of the procedure. (Figure 3) Another stenting was attempted, but once again failed to control the leak. Following the removal of the second stent, an Endo-VAC was placed at the level of insufficiency. A total of 4 Endo-VAC sponges were replaced every week with significant clinical and inflammatory marker improvement. First we used commercially available ready-to-use system then the last two times we made ourself. CRP levels during the performing of this treatment were 86.9 mg/L, 46.7 mg/L, 24.7 and then 12.1 and after one week was 4.9 mg/L, not significant leucocytosis was exposed- in the biging of the treatment 14.7 and during the changes of the Endo-VAC 7.7 10.9/L, until 5.87 10<sup>9</sup>/l. No leak was demonstrated in the subsequent contrast study. The patient was discharged in good condition on 29 post-op day. (Figure 4, 5)

Three months later a new endoscopy was performed, showing satisfying results and no defect on the oesophagus. (Figure 6) The patient doesn't have any symptoms, subjectively feeling good, BMI 18.5. He haven't made any chemotherapy yet, no dysphagia.

## Discussion

While VAC has been used for chronic open wounds in daily medical practice, EndoVAC is similarly transforming the management of gastrointestinal defects, a trend that our case report supports. Healing occurs when the site of leakage is sealed and the wound cavity collapses, facilitated by the rapid and continuous removal of necrotic debris, infected tissue, and gastric conduit exudate (often seen with delayed gastric emptying after Ivor-Lewis esophagectomy). At the same time promotion of blood flow and tissue granulation occurs [18].

Mennigen et al. found that EndoVac therapy had a success rate of 86.4 %, compared to 60.9% of stent therapy. The

average duration of hospital stay following stenting was 36 days and that of EndoVac therapy was 26.5 days.

EndoVAC therapy has become the standard of care for anastomotic leaks in esophagus, stomach and colorectal region in Western world and also is inveneted Esophagectomy Complications Consensus Group (ECCG) defining the leakage of anastomosis that is transmural dehiscence. There are three types depending on their need of intervention and seriousness. First type requires conservative treatment, broad-spectrum antibiotics, antifungals, and close monitoring. Type II needs invasive therapy and type III is for surgical revision [23].

The EndoVAC therapy with its negative pressure reduce the wound surface. The macrodeformation makes wound contraction, while microdeformation induces cellular proliferation and differentiation, that forces through the extracellular matrix. With this mechanism is creating the optimization of the wound microenvironment and more concretely tissue perfusion, enhancing the circulation in microvasculature, clearing contamination as exudate, toxins, and microorganisms, and increasing the lymphatic drainage from the wound [23].

As of 2018, no standardized recommendations exist for the management of upper gastrointestinal defects, including anastomotic leaks and perforations, and no formal guidelines on EVAC use have been established. While there is consensus on the conservative treatment for asymptomatic, small, and well-contained leaks, controversies remain regarding the management of larger, symptomatic fistulas, particularly when complicated by mediastinal involvement, sepsis, or hemodynamic instability. Endoscopic interventions, such as fibrin glue injection, clipping, and stenting (SEMS and SEPS), are considered viable options for managing leaks, though they carry significant risks of complications. Some authors recommend fibrin glue injection for small less than 30% defects [1], though it may require repeated applications into both the lumen and tissue. There is a potential risk of infection since fibrin glue is derived from human blood. Due to the small diameter of the esophagus and the larger size of the devices used, clips can be misplaced, potentially obstructing the lumen while leaving the fistula open.



Figure 5. CT Scan on the day before discharge.



Figure 6. The endoscopy test showed that the defect had fully recovered three months later.

Additionally, removing clips may cause bleeding [20].

For leaks with a divergence between 30-70%, stenting can be an option, though it is not without complications [5]. In particular, dislocation rates for SEPS can reach 40%, and non-sealing rates can be as high as 22% [1]. SEMs also carries the risk of stent failure due to granulation tissue in-growth or secondary strictures. For these reasons, the use of SEMs in managing AL after esophagogastric cancer surgery is not recommended [35]. Both SEMs and SEPS also interfere with direct inspection of the AL site and wound cavity, making it difficult to determine the optimal timing for their removal [21].

## Conclusion

Anastomotic leaks after upper and lower gastrointestinal surgery have an important impact on surgical outcomes. Endo-VAC therapy is proven to be safe, and easy with long-term effect procedures in treating gastric and jejunal oesophageal anastomosis fistulas as an alternative to the initial management with stents or clips. With its minimally invasive approach, it represents a significant breakthrough in the treatment of this most feared and serious complication. The advantages are reducing the need for reoperation, improving healing times, shortening hospital stays, with long-term efficacy.

## Additional information

### Conflict of interest

The authors have declared that no competing interests exist.

### Ethical statements

The authors declared that no clinical trials were used in the present study.

The authors declared that no experiments on humans or human tissues were performed for the present study.

The authors declared that no informed consent was obtained from the humans, donors or donors' representatives participating in the study.

The authors declared that no experiments on animals were performed for the present study.

The authors declared that no commercially available immortalised human and animal cell lines were used in the present study.

### Use of AI

No use of AI was reported.

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### Author contributions

All authors have contributed equally.

### Data availability

All of the data that support the findings of this study are available in the main text or Supplementary Information.

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