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SCIENTIFIC LETTER

Endoluminal vacuum therapy for the management of acute mediastinitis following esophagogastrectomy: Case report of a patient with esophageal adenocarcinoma

Terapia de vacío endoluminal para el manejo de mediastinitis aguda posterior a esofagogastrectomía: reporte de caso en paciente con adenocarcinoma esofágico

Mediastinitis is defined as the acute or chronic inflammation of the mediastinal structures, and its incidence, in general, is low. The most frequent acute cause is sternotomy, following cardiac revascularization surgery, with an incidence of 0.4-5%. However, due to the increase in endoscopic examinations and surgical instrumentation in the esophagus, esophageal perforation, previously recognized as the second cause of acute mediastinitis, is nearing a similar incidence margin and is rising. Descending necrotizing mediastinitis is the third cause, the origin of which has an odontogenic focus in most cases.[1]

In patients with esophageal adenocarcinoma, the trimodal therapy of neoadjuvant chemotherapy and radiotherapy, followed by esophagogastrectomy, has been associated with a higher survival rate.[2] Nevertheless, its postoperative morbidity burden is high (30-60%) and complications, such as esophagogastric anastomotic dehiscence or leaks secondary to esophageal perforation occur in 3 to 13% of patients.[3] The most dreaded associated complication is mediastinitis, whose mortality rate in such cases is above 40%.[4] Certain predictive factors for this type of complication have been described in the literature, many of which are related to the vascularization of the gastric tube and associated diseases, such as cardiovascular diseases, diabetes, and kidney failure. Other factors are active smoking, corticosteroid use, esophagectomy center volume, intraoperative hypotension episodes, intraoperative blood loss, and anastomosis site (cervical versus thoracic).[5]

The therapeutic management options in mediastinitis differ, depending on the cause.[1] This article's focus is mediastinitis secondary to esophageal perforation. In such cases, conservative treatment through oral diet suspension and antibiotics is only suggested in minimal perforations in the cervical esophagus and when contrast-enhanced imaging shows no fistulous connection to the mediastinum. In the thoracic esophagus, all perforations should be treated surgically, accompanied with drain placement. Endoscopic stents should only substitute surgery in cases of unresectable tumors, as palliative treatment. Those patients have a 20% mortality rate resulting from early surgery (12-24 hours after the perforation) and it reaches 60% in cases of late surgery.[1] For years, control of the infectious focus, through antimicrobials and surgical debridement, has been the cornerstone of management, to prevent the contiguous spread of infection to intrathoracic structures, such as the heart, large blood vessels, airways, and lungs.[6] The use of vacuum systems based on microporous polyurethane sponges is currently increasing. Placed on the wound, the sponge is connected by a tube to a vacuum generator that acts as a suction system, reducing the time between wound debridement and closure, with a high success rate.[1]

Internal devices, such as sponges, used for endoluminal vacuum therapy, known as vacuum therapy or endovac therapy, were first successfully utilized for treating an esophagogastric anastomotic leak in 2008.[7] Since then, this type of procedure, with an endoscopic approach, has been increasingly employed to resolve defects of the upper and lower gastrointestinal tract and their complications. The short-term and long-term clinical results have been favorable, and said procedures have become a new nonsurgical option, with a lower morbidity rate in expert hands.[8,9]

A 51-year-old man had a past history of smoking and a Nissen fundoplication performed 22 years earlier due to Barrett's esophagus. He sought medical attention for dysphagia of 5-month progression. The patient did not know if dysplasia had been documented in the past. Relevantly, his father had presented with Barrett's esophagus and died from esophageal cancer. Gastroscopy identified an ulcerated and partially strictured lesion in the middle third of the esophagus that occupied 75% of the esophageal circumference (Fig. 1A). The histopathologic study reported well-differentiated esophageal adenocarcinoma. The lesion was staged through endosonography, tomography, and histopathology as T3N2M0G1, according to the Eighth Edition Cancer Staging Manual of the American Joint Committee on Cancer.

The patient received neoadjuvant treatment with radiotherapy and chemotherapy, significantly reducing the size of the initial lesion, and so was programmed for Ivor Lewis esophagogastrectomy plus lymphadenectomy with esophagogastric anastomosis. In the postoperative period, 5 days

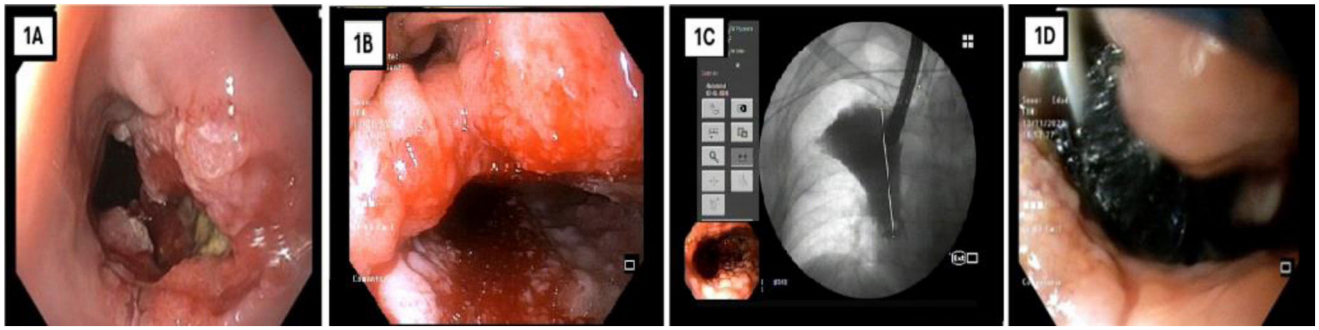

Figure 1 Endoscopic views. A) Ulcerated and partially strictured lesion in the middle third of the esophagus, occupying 75% of the circumference. B) Anastomotic dehiscence of two-thirds of the esophageal circumference. C) Contrast medium leakage into the pleural cavity evaluated through fluoroscopy. D) Vacuum therapy in the cavity with the Eso-Sponge®-B Braun system.

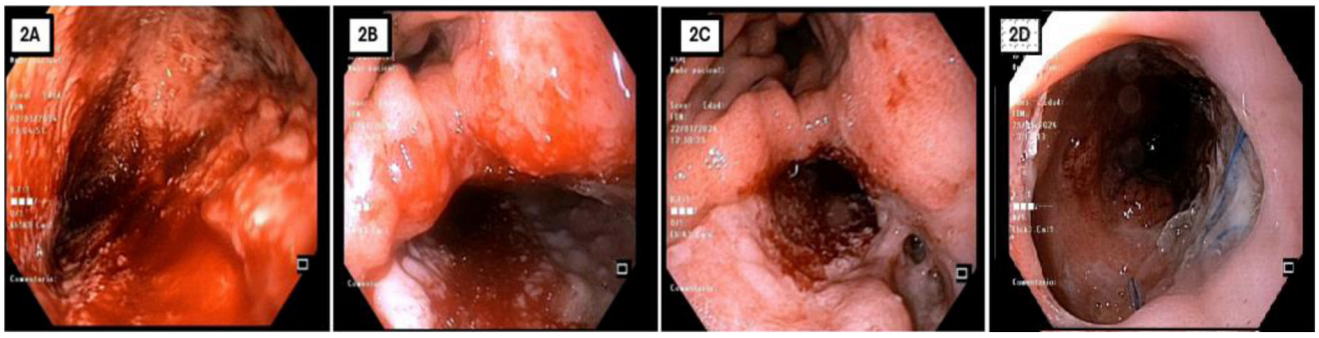

Figure 2 Images A, B, C, and D sequentially correspond to the endoscopic findings during the sponge replacement sessions. They show the progressive healing of the defect, ending in the recovery of the affected area.

after the surgical intervention, the patient presented with septic shock secondary to an anastomotic leak associated with right pleural empyema. Thoracotomy was performed to drain the pleural collection, and a covered metallic stent was intraoperatively placed to manage the leak. Due to the patient's unfavorable progression during the following 2 weeks, stent removal and review of the anastomosis were ordered. Gastroscopy identified anastomotic dehiscence of two-thirds of the esophageal circumference (Fig. 1B), abundant purulent material in the mediastinum, and contrast medium leakage into the pleural cavity evaluated through fluoroscopy (Fig. 1C). Vacuum therapy was endoscopically placed in the cavity, utilizing the Eso-Sponge®-B Braun system, connected to continuous endoluminal vacuum therapy of 125 mmHg (Fig. 1D). The sponge was replaced every 3 or 4 days, while the granulation tissue developed in the pleural cavity. After 9 replacement sessions, successful closure was achieved, with no further evidence of leakage. Fig. 2A-D sequentially shows the patient's favorable recovery. He required no additional intervention, and so an oral diet was started, followed by rehabilitation and discharge. The pathologic report of the resected esophagogastric specimen, after neoadjuvant therapy, was tumor stage: ypT0N2. When the present article was submitted for publication, the patient was undergoing oncologic follow-up at 8 months from the initial intervention and has not presented with stricture or any other complications requiring intervention.

Endovac therapy involves the endoscopic insertion of a polyurethane sponge inside a defect to apply negative pressure for prolonged periods of time. Defect cure is achieved through continuous abscess drainage, reducing bacterial colonization and promoting tissue granulation. Negative pressure also reduces the compression on the microvasculature, increasing microvessel density, blood flow, and tissue perfusion, for the recovery of the affected area.[10]

Several meta-analyses have shown that the use of vacuum endoluminal therapy is a safe and efficacious method for treating leaks and fistulas, with 85% closure rates of transmural defects of the upper gastrointestinal tract, 11% mortality, 10% morbidity, and 14% stricture development rates.[7] The reported statistics are successfully reflected in the outcome of the clinical case presented herein, confirming the validity of said procedures as safe, efficacious, and minimally invasive alternatives for the closure of surgical leaks and fistulas in the gastrointestinal tract. The results of the present case support the idea that this therapy should be used in patients with associated acute mediastinitis, mainly if other available endoscopic or surgical alternatives have already been used unsuccessfully. It is important to standardize the process in clinical guidelines and conduct new studies.

Ethical disclosures

The authors declare that this article contains no personal information that could identify the patient and that they followed the institutional patient anonymity protocol. Informed consent was not requested for the publication of this case because it contains no personal or imaging data

that could identify the patient. This article meets the current bioethical research regulations and no experiments on animals or humans were conducted. The institutional ethics committee of the *Hospital Universitario HM Sanchinarro* in Madrid, Spain, authorized the publication of the present article.

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Conflict of interest

The authors declare that there is no conflict of interest.

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