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Case report

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Treatment of Esophageal-Pleural Fistula After Diverticulectomy Using Transluminal Vacuum Therapy in a Patient with HIV Infection

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ABSTRACT A clinical observation of the successful treatment of an HIV-infected patient with esophageal-pleural fistula and pleural empyema after diverticulectomy is presented, where the key tactical decision was the use of transluminal vacuum therapy together with adequate drainage of the pleural cavity and correct drug therapy. When analyzing the available literature, no publications concerning the treatment of HIV-infected patients with the discussed esophageal pathology were found.

AIM OF STUDY To discuss the results of treatment of postoperative esophageal-pleural fistula using transluminal vacuum therapy in a patient with HIV infection.

Keywords: esophageal diverticulum, diverticulectomy, esophageal-pleural fistula, transluminal vacuum therapy, HIV infection

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HAART – highly active antiretroviral therapy

FGDS – fibrogastroduodenoscopy

INTRODUCTION

Defects of the esophageal walls, including postoperative suture failure, are associated with high mortality [1, 2], the rates of which range from 3 to 67% and average 19.7% [3].

In recent years, intraesophageal vacuum therapy has become an alternative strategy for the treatment of esophageal fistulas [1, 4–7]. The method provides sanation and continuous drainage of the wound and

promotes the formation of granulations, reducing the healing time of the defect [8].

The term "vaccum-assisted closure" (*VAC*) was first published in 1995 in the materials of *Kinetis Concepts* (USA), which pioneered the creation of professional equipment for negative pressure treatment. By the end of the 20th century, vacuum therapy was a widespread method of treating infected wounds [9]. In the State Budgetary Institution of Clinical Hospital in Irkutsk, obturation-aspiration structures have been used in the treatment of unformed digestive fistulas and purulent wounds since the 1980s. Continuous vacuuming through a porous sponge (foam rubber) cleans the wound without injuring the surrounding tissues, reduces swelling, stimulates microcirculation and the growth of granulations [10, 11].

There are currently no domestic clinical recommendations for the treatment of esophageal fistulas using *VAC systems, and the number of institutions that publish the results of using this method is small.*

A clinical observation of successful treatment of postoperative esophageal-pleural fistula using a transluminal vacuum system in a patient with HIV infection is presented.

Clinical observation

Patient M, 46 years old, was admitted for surgical treatment of epiphrenic diverticulum of the esophagus (Fig. 1) with complaints of difficulty passing solid food and discomfort behind the sternum while eating. Chronic viral hepatitis *C*, as well as HIV infection for 10 years. He is taking HAART (highly active antiretroviral therapy) and is not receiving treatment for hepatitis *C*.

Satisfactory condition. The tongue is clean and moist. The abdomen is of normal shape and size. The anterior abdominal wall is involved in breathing. On palpation it is soft, painless in all parts, there are no symptoms of peritoneal irritation. Stool is daily, stool is formed, brown in color. Laboratory data are within reference values. A control fibrogastroduodenoscopy (FGDS) confirmed a diverticulum with a wide neck (6 cm) and signs of diverticulitis.

Diagnosis: "Epiphrenic diverticulum of the esophagus. Diverticulitis. Dysphagia 1st degree. HIV infection stage 4A, CD4-0.302 $\times 10^9$, remission phase on HAART. Chronic viral hepatitis C without enzymatic activity."

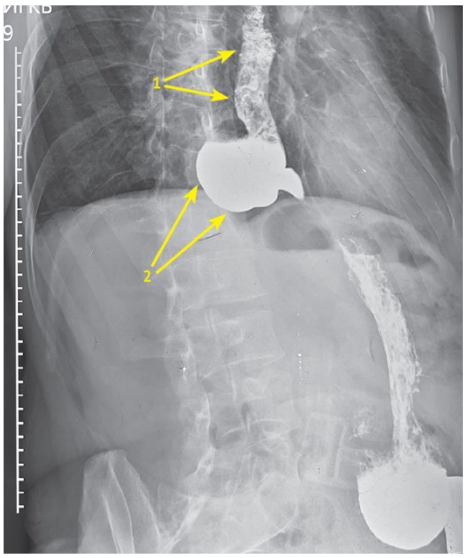

Fig. 1. X-ray of the esophagus with barium. 1 - lower thoracic esophagus; 2 - epiphrenic diverticulum

Planned surgical treatment was performed: laparotomy from the xiphoid process to the umbilical ring. The abdominal segment of the esophagus is mobilized. Sagittal diaphragmotomy. Lower thoracic esophagolysis: multiple dense adhesions of the esophagus with mediastinal tissue and the diaphragm are dissected. The diverticulum is tightly fixed to the right mediastinal pleura. Its neck, up to 6 cm wide, is mobilized, exposing the mucous membrane. The diverticulum was removed after suturing the neck with an *Echelon* 60 *mm* (*ETHICON*) device, 2 cassettes. The stump is sealed with a muscle wrapping suture using *PDS* 3/0 suture. The esophageal opening of the diaphragm has been restored. Drainage into the subhepatic space and to the esophageal opening of the diaphragm. The laparotomy wound is sutured.

Protocol for pathological and anatomical examination of the material: Diverticulum 5×7 cm with a hardware suture along the edge. Morphological signs of chronic ulcerative diverticulitis.

On the 3rd day after surgery, complaints of pain in the chest on the right, difficulty breathing, increased body temperature to 38°C. The general condition is moderate. Conscious, accessible to contact, active within the ward. The tongue is covered with a white coating and is rather dry. The abdomen is soft, moderately painful in the area of the postoperative suture. There are no symptoms of peritoneal irritation. In the lungs, breathing is vesicular, weakened on the

right, there are no wheezes. During percussion, the sound is shortened at the level of the angle of the scapula on the right. Plain X-ray of the chest in a direct projection: Limited hydropneumothorax on the right, hypoventilation of the lower lobe of the right lung.

Fluoroscopy of the esophagus revealed leakage of water-soluble contrast beyond the esophagus into the right pleural cavity—esophageal-pleural fistula (Fig. 2).

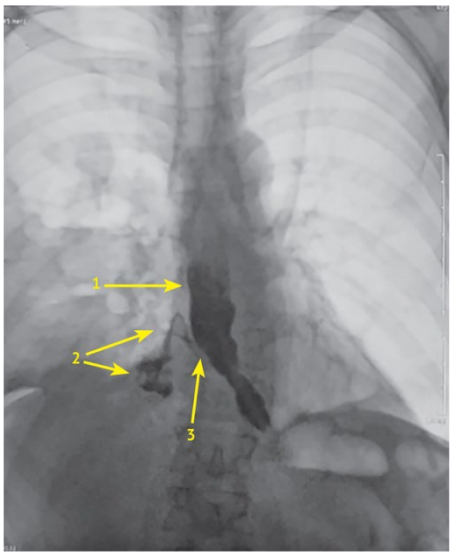

Fig. 2. X-ray scan of the esophagus with water-soluble contrast, front view. 1 — lower thoracic esophagus; 2 — contrast flowed beyond the contrast esophagus into the mediastinum and the right pleural cavity; 3 — esophageal-pleural fistula

Repeated laparotomy. The sutures were removed from the diaphragm, the abdominal and lower thoracic sections of the esophagus were released. Fibrin layers were removed. In the upper third of the mechanical suture, a defect in the wall of up to 0.5 cm was found, it was sutured with *PDS* 3/0 thread with fixation of the greater omentum with two sutures. Sanation of the mediastinum and abdominal cavity, drainage into the posterior mediastinum. Drainage of the right pleural cavity into the 7th intercostal space along the posterior axillary line on the right and into the 8th intercostal space along the anterior axillary line on the right. 150.0 ml of serous fluid was evacuated, and a day later 1,200 ml of turbid fluid with fibrin and an unpleasant odor were evacuated. At the control FGDS, carried out on the 2nd day after repeated surgical treatment, a recurrence of esophageal suture failure of up to 1 cm was diagnosed.

To treat recurrent fistula, a device for vacuum aspiration was formed (Fig. 3).

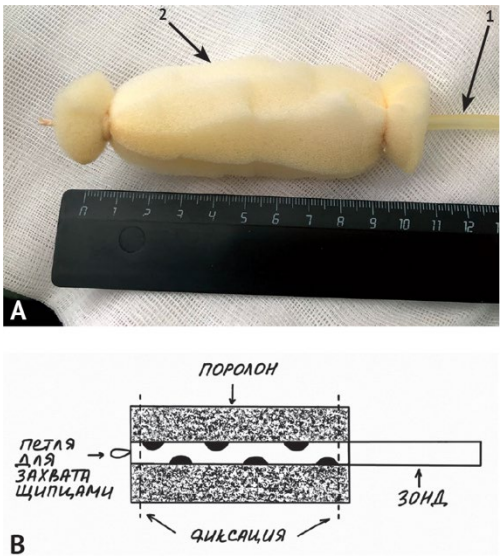

Fig. 3. Improvised VAC system design. 1 — nasogastric tube 6.7 mm — 20 Fr; 2 – foam sleeve; 3 – diagram

A structure congruent with the size of the esophagus was brought to the wall defect using the gripping forceps of a fibrogastroduodenoscope. After installation of the *VAC* system, a constant negative pressure of 100 mmHg was created with *DVP L* 105 device (France). The structure was changed every 3–4 days.

The right pleural cavity was sanitized for 90 days with a solution of 0.02% chlorhexidine bigluconate twice a day, 500 ml, through drainage tubes alternately. Particular attention was paid to nutritional, infusion, antiretroviral and antibacterial therapy, selected in sensitivity to the existing microorganism association (*Klebsiella pneumoniae* 10^5, *Pseudomonas aeruginosa* 10^6, *Methir Stapidermidis* 10^4, *Acin Etobacter Baumannii* 10^6, *Candida Glabrata* 10^4). Venous thrombosis was prevented with elastic compression of the lower extremities and low molecular weight heparins in therapeutic doses. The esophageal wound cleared of fibrin deposits within 3 days (Fig. 4), the fistula closed after 3 months.

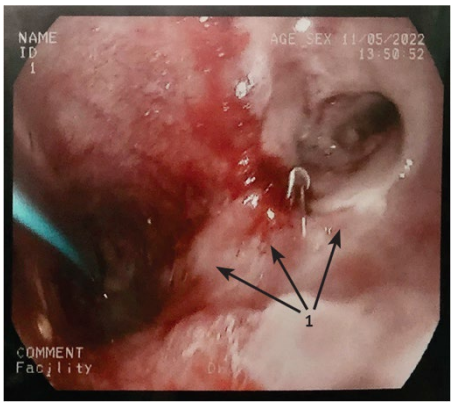

Fig. 4. Endoscopic photo. Esophagus on the 3rd day of treatment with transluminal vacuum therapy. 1 — the wound defect is cleared of fibrin and pus, granulations appear

Enteral nutrition was provided through a nasoduodenal tube. Natural food intake began after a control X-ray examination of the esophagus - no leakage of water-soluble contrast agent was detected 91 days after the formation of the fistula (Fig. 5).

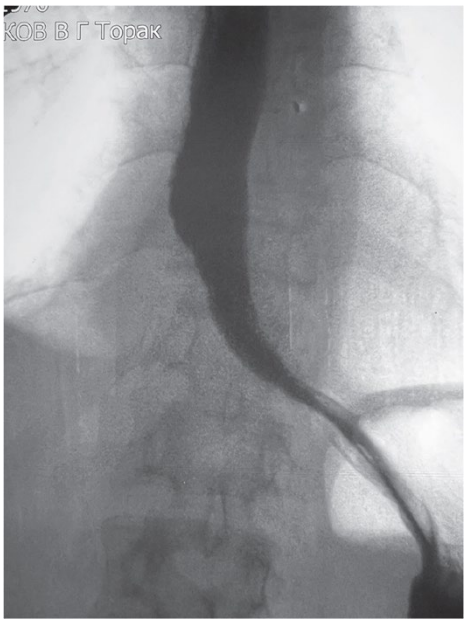

Fig. 5. Control radiograph of the esophagus with barium 91 days after the formation of the fistula. Deformation of the wall of the lower third of the esophagus without obstruction of patency and evasion of the contrast agent

The patient was discharged 109 days after diverticulectomy. Follow-up examination 1 month later: satisfactory condition, no dysphagia, diet without restrictions (Fig. 6).

Fig. 6. Endoscopic photo 1 month after discharge. No mucosal defect

DISCUSSION

Considering the gigantic size of the diverticulum, pronounced adhesive lower thoracic mediastinitis, periesophagitis, as well as a long history of HIV infection, a traction mechanism of its formation due to an inflammatory process in the posterior lower mediastinum cannot be ruled out. One of the possible reasons for the failure of esophageal sutures may be a disruption of regeneration processes against the background of HIV infection.

In the treatment of esophageal-pleural fistula, regardless of its cause, widely available interventions prevail, including suturing, resection, extirpation of the esophagus, etc. An alternative to traditional surgery has become vacuum-assisted closure of a postoperative wound defect.

In the clinical observation discussed, the intraluminal obturation-aspiration design after ineffective suturing of the fistula made it possible to effectively sanitize the local infectious process, stimulate the growth of tissue granulations and stop the esophageal-pleural communication, which ultimately led to restoration of the esophageal wall.

CONCLUSION

This observation shows the effectiveness of transluminal vacuum therapy for postoperative esophageal-pleural fistula in a patient with immunodeficiency in the course of correctly selected drug therapy, adequate drainage and sanitation of the pleural cavity.

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