Late esophageal fistula complicating early postpneumonectomy empyema

Abstract  Esophageal fistula after pulmonary resection is a rare and severe complication. We report a case of acute postpneumonectomy empyema and bronchopleural fistula treated conservatively and complicated 2 years later by an esophageal fistula. A chest wall window was created to stimulate the granulation tissue and, once a satisfactory result was achieved, a myoplasty was performed to fill the residual space and cover the esophageal fistula. Consecutive endoscopic examinations following surgery showed the complete closure of the esophageal defect and the patient was able to start oral feeding. We conclude that, when esophageal fistula complicates postpneumonectomy empyema, a two-step surgical approach based on rib resections and muscle flaps transposition can be an effective treatment of a dramatic complication.

Introduction

Empyema is an important complication following pneumonectomy and the prognosis is much more severe when associated with an underlying bronchopleural and/or esophageal fistula. Although the initial management of empyema generally consists of drainage, there is not a universally accepted treatment of its further complications. The pedicle muscle flaps are an ideal tissue to fill an infected pleural space because of their excellent blood supply and the possibility to use them in most locations of the residual space.

We describe a case of chronic empyema and bronchopleural fistula, following left pneumonectomy for lung cancer, which was further complicated by a late esophageal fistula.

Case report

A 49-year-old man underwent a pneumonectomy for a lung cancer distally obstructing the left main bronchus (T2N0). The early postoperative course, on the 9th day, was complicated by an infection of the pleural space with bronchopleural fistula which was treated with a closed drain to control the infection in its acute phase.

When clinically stable the patient was treated with infiltrations of fibrin glue (Tissucol, Immuno, Vienna) into the submucosal tissue around the bronchial stump. He had refused any other surgical procedure and therefore an open drain was an acceptable solution which allowed the patient to be discharged and have the washouts at home.

Following multiple applications of fibrin glue the fistula appeared to be closed on endoscopy although the pleural lavage was not completely clear. In addition, there was serologic evidence of persistent decrease in T lymphocyte count and its subtypes (T4, T8). The patient was assessed by specialists, who confirmed the diagnosis but they were not able to identify the cause of this acquired immunodeficiency syndrome and HIV tests on several occasions were negative.

A specific therapeutic course with immunoglobulins was given to the patient for many weeks but, although the T lymphocyte count seemed to reach a normal range, the patient did not make a good re-
Cover from a clinical point of view.

After about 2 years the cavity had reduced in size but the empyema persisted with isolation of *Pseudomonas aeruginosa*. During irrigations at home the patient noticed the presence of food particles discharging from his drain. On emergency admission physical examination revealed dyspnea, cough, dysphagia, fever and weight loss over a 2-week period. Esophagoscopy showed a 5 mm diameter fistula located 30 cm from the incisor teeth. Single-contrast esophagography demonstrated the esophageal defect (Fig. 1). Bronchoscopy, performed to check the bronchial stump, confirmed the complete closure of the previous bronchopleural fistula. Computed tomographic scan of the thorax showed the persistence of a pleural cavity associated with esophageal communication. Oral intake was stopped and parenteral feeding with aggressive broad-spectrum antibiotic therapy was instituted.

Two weeks later surgery was considered. A window was opened into the residual pleural space through resection of the 2nd–5th ribs at the level of the middle and posterior archs with exposure of the esophageal fistula. The cavity was debrided widely and the location of the esophageal defect was identified. An absorbable stitch (Vicryl 2-0) was passed around the borders of the fistula in an attempt to approach the margins, and gauzes imbued with antiseptic solutions (surgical betadine) were left inside and changed daily. To protect the esophagus from the reflux of gastric contents and the draining of saliva in the perioperative period, a gastrostomy and a naso gastric tube in slight suction were placed, the latter positioned above the level of the esophageal communication. A jejunostomy was also made for feeding. After 2 months a good result was achieved with daily dressings and a second-stage operation was performed. The pectoralis major and the superior part of the latissimus dorsi muscles were pedicled and transposed into the cavity to fill the residual pleural space and to protect the esophageal fistula. The wound was closed primarily and three small drains (2 anteriorly and 1 posteriorly) were placed into the filled space. They were put on slight suction for 5 days and were removed 2 days later. The patient was extubated immediately at the end of the operation and the early postoperative course was uneventful. The broad-spectrum antibiotic therapy was continued until the patient’s temperature lowered to 37°C. A chest roentgenogram, after removing the drains, showed a small cavity in the apex that was drained, via the insertion of a pig-tail catheter, under computed tomographic guidance. The endoscopic examinations after the operation showed a complete closure of the fistula.

In the following month the patient was well, apyrexial and oral intake commenced. At the time of writing, 6 months after the operation, he can be considered completely recovered.

### Discussion

Postpneumonectomy empyema has a more severe prognosis when associated with the development of an esophageal fistula. The early fistula is generally a consequence of a surgical trauma and esophageal ischemia; the late fistula is due to the presence of an empyema, a metastatic node or an abscess next to the esophageal wall [10]. Before 1960 this complication was described after resections for tuberculosis and suppurative diseases. Benjamin [2], in 1969, presented three cases of fistula following right pneumonectomy for cancer and Evans [6], in 1972, reported an incidence of esophageal fistulas in 8 of 1,386 patients (0.5%) who underwent pneumonectomy for malignancy. Most fistulas occurred on the right side [2, 6, 9], where the esophagus is next to the mediastinal pleura. In our and other experiences [2, 6, 9] the fistula developed on the left, although the esophagus on that side is separated from the pleura by the aorta through much of its course.

The ideal treatment of an esophageal fistula should consist of control of the infection, adequate feeding of the patient, closure of the communication with reinforcement of the sutures and, finally, obliteration of the empyema space. The reported surgical procedures used to protect the esophagopleural communication are the pleura [2], the intercostal [4] and pectoralis muscle flap [8], the omental pedicled flap [1] and even tissue adhesive in a case of esophagocutaneous fistula [5]. In order to succeed in obliterating the empyema cavity, experiences with thoracoplasty [6, 10], muscle flaps [8] and omental pedicled flap [1] have been advocated. The method we used is a modified tech-
nique described by Clagett and Geraci [3] as a multiple rib resection, antibiotic irrigation and closure of the cavity in 6–8 weeks. Once a good result was achieved, the further surgical step was a muscle flap closure completely obliterating the residual space. In 1984 Miller [7] described a single-stage complete flap closure of postpneumonectomy empyema. To fill the space he recommended the transposition of the omentum, the pectoralis major, the latissimus dorsi, the serratus anterior and sometimes the rectus abdominis. We transposed only the latissimus dorsi and pectoralis major muscles inside a residual cavity reduced in size by the proliferation of granulation tissue, and this can be seen as a considerable advantage when comparing this method with the single-stage closure. Besides, we believe Clagett’s window gives more opportunity to control chronic infection in the pleural space.

In conclusion postpneumonectomy empyema with esophageal fistula is difficult to control. In this case an aggressive surgical approach, based on multiple rib resection and successive well vascularized muscle flap transposition, is justified and can be considered as a possible solution to a life-threatening complication.

References