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A successfully closed postpneumonectomy fistula with an hourglass-shaped stent: one year follow-up

Pnömonektomi sonrası oluşan fistülün kum-saati stent ile başarılı kapatılması: Bir yıllık takip

Çağatay Tezel, Oral Akın, Cemal Asım Kutlu

Department of Thoracic Surgery, Süreyyapaşa Chest Diseases and Thoracic Surgery Teaching Hospital, İstanbul, Turkey

Successful management of bronchopleural fistulas (BPF) after pulmonary resection remains a challenge in thoracic surgical practice. Several techniques have been developed for the closure of bronchopleural fistulas after pneumonectomy. In this article, we present a 57-years-old female case of treatment of post-pneumonectomy BPF using a stent supported by polyglactin mesh through open window thoracostomy with the aid of bronchoscopy.

Key words: Bronchoscopy; complication; fistula; postpneumonectomy; stent.

Göğüs cerrahisi uygulamasında pulmoner rezeksiyon sonrası gelişen bronkoplevral fistüller (BPF) tedavisi oldukça güçtür. Pnömonektomi sonrası gelişen fistüllerin kapatılması için pek çok teknik geliştirilmiştir. Bu yazıda, bronkoskopi eşliğinde açık pencere torakostomi yardımıyla poliglaktin örgü ile desteklenen stent kullanılarak pnömonektomi sonrasında BPF tedavisi uygulanan 57 yaşında bir kadın olgu sunuldu.

Anahtar sözcükler: Bronkoskopi; komplikasyon; fistül; pnömonektomi sonrası; stent.

A bronchopleural fistula (BPF) is a life threatening complication of major lung resections. The incidence of BPF ranges from 1.5-28% after major pulmonary resection.[1] Several management possibilities, including the closure of the BPF by stenting, have been described. We herein report a complicated case in which the patient eventually underwent a completion pneumonectomy that resulted in a BPF for which she was treated with a technique described as an "hourglass-shaped stent".[2]

CASE REPORT

A 57-year-old female with a two-year history of BPF presented for evaluation at our clinic. She had undergone a right upper lobectomy due to aspergilloma 15 years ago. Soon after that operation, empyema was detected that was resistant to medical treatment. Thoracomyoplasty was then performed. Ten years after the initial operation, a severe functional defect was confirmed with radiological and nuclear imaging tests. In order to reduce the shunt and diminish the chronic infection in the right chest cavity, a completion pneumonectomy was performed 12 years after the first operation. However, empyema recurred with the more severe complication of esophageal-pleural fistulas, and these were treated with an esophageal stent. The patient tolerated the procedure well and began eating and drinking. Eventually, she was referred to our clinic with chronic empyema. Her chest X-ray showed the postoperative findings of the right thoracomyoplasty with an esophageal stent, and a rigid bronchoscopy detected a 5 mm BPF on the bronchial stump at the point where it was 2 cm long. An open-window thoracostomy (OWT) was performed in the same operative setting, and the patient showed an improved clinical status with conventional therapy that included nutritional support and antibiotics.

The patient was scheduled for the closure of the fistula via a bronchoscopic approach using stenting due to the considerable length of the stump. A covered 14x40 mm, distal release, self-expanding, tracheobronchial stent (Tracheobronxane® Silmet®, Novatech SA, La Ciotat Cedex, France) was inserted

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Correspondence: Çağatay Tezel, M.D. Süreyyapaşa Göğüs Hastalıkları ve Göğüs Cerrahisi Eğitim ve Araştırma Hastanesi Göğüs Cerrahisi Kliniği, 34844 Maltepe, İstanbul, Turkey.
Tel: +90 216 - 464 79 57 e-mail: mdcagatay@hotmail.com

in the bronchial stump, and the tip of the stent was withdrawn from the OWT. In addition to the previously described technique,[2] the partially released stent was wrapped with a piece of polyglactin woven mesh (Figure 1) that was tied with a heavy silk suture (No: 0) to the partially released stent (half of its length) in order to give an hourglass shape. Then the stent was withdrawn through the fistula until the released part was close to the fistula. After the appropriate localization was ensured with direct vision from both sides, the stent was completely released. Clinically, after the procedure, a marked reduction of air leak was observed. In addition, a chest X-ray detected the location of the stent (Figure 2).

The patient was discharged after a week with dressing over the OWT, and three months later, the wound was completely healed. One year after the stent placement, there was no recurrence of her symptoms, and a bronchoscopy revealed a closed fistula with entirely fibrous tissue.

DISCUSSION

A bronchopleural fistula is a devastating complication of thoracic surgery. Even though the rate of occurrence is rare, BPFs are associated with high mortality and morbidity. According to different series, the overall incidence after a lobectomy or pneumonectomy is 0.5% and 4.5-20%, respectively.[3] The management of BPFs varies, and no consensus or guidelines have been established.

Early chest drainage is required to control any life-threatening situation. When the BPF occurs in the early postoperative period, surgical closure of the bronchial stump is the treatment of choice. However, mediastinal fibrosis, to some degree, precludes late surgical reclosure, necessitating a sternotomy or contralateral thoracotomy.

In 1977 Ratliff et al.[4] reported the first successful endoscopic closure of a BPF. Since then, a conservative approach involving the bronchoscopic closure of the fistulas has been widely accepted after numerous of reports of using glue, coils, sealants, and stents.

Regarding the diameter of the fistula, glues or sealants have a potential risk of expectoration in fistulas greater than 2-3 mm. Hence, for patients with larger fistulas who are poor surgical candidates, stent placement might be the best choice. The present case was contaminated after the initial operation, and the patient ended up with a post-pneumonectomy bronchopleural fistula with empyema that required an OWT. The presence of the OWT gave us the idea of inserting a covered tracheobronchial stent in the new fashion that we described. Wrapping the stent with a piece of polyglactin woven mesh activated more fibroblasts, resulting in granulation tissue via a foreign body reaction. Following the resolution of the acute and chronic inflammatory responses created by the foreign body reaction, the granulation tissue was identified by the presence of macrophages and the infiltration of fibroblasts.

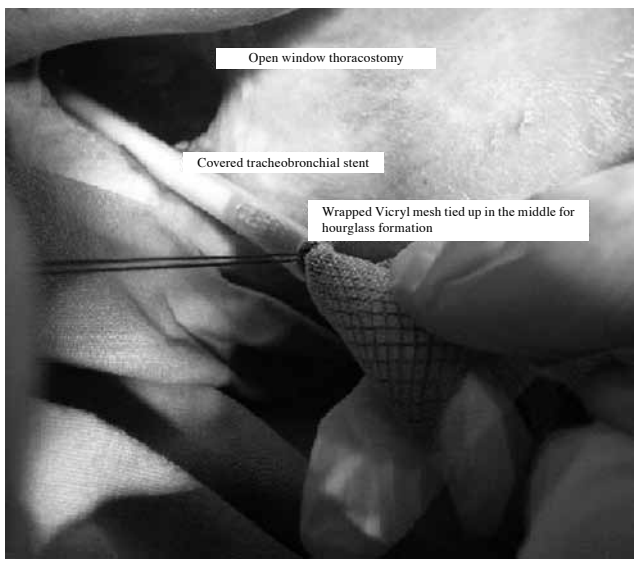

Figure 1. The technical details of the hour-glass formation supported by polyglactin woven mesh. Outside of the chest cavity, the partially released stent was wrapped with a piece of mesh and closed tightly with a suture in order to give the hourglass formation.

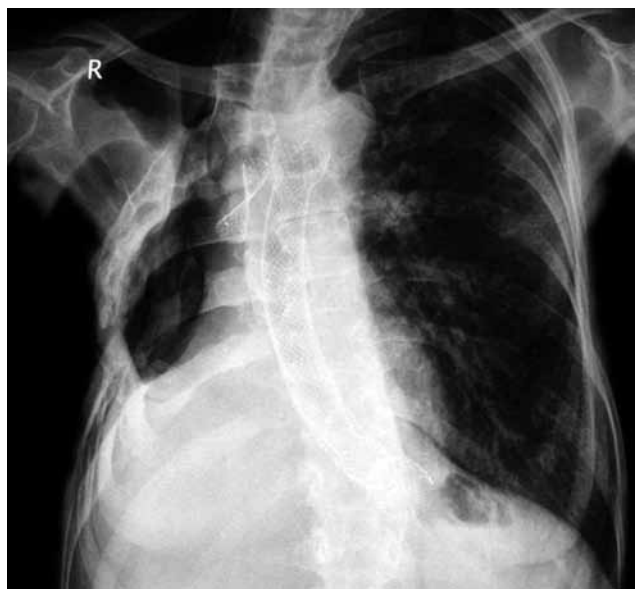

Figure 2. A chest X-ray shows two stents. One was for the closure of the bronchial fistula "hour-glass stent, and the other was for the esophageal fistula that had been previously performed.

A bronchopleural fistula still remains a serious complication after pulmonary resection. Patients who are extremely poor surgical and anesthesia risks fail to heal after surgical re-resection because their unstable status and negative metabolic balance does not allow for the healing of the stump. As an addition to the traditional first-line therapy, stent placement that serves as a double barrier via the hourglass configuration might be a promising option for patients in poor condition. However, further experience is needed with this technique before it can be considered as another choice for endobronchial treatment in fistula closure.

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