

The Management of Delayed Post-Pneumonectomy Broncho-Pleural Fistula and Esophago-Pleural Fistula

Dongsub Noh, M.D., Chang-Kwon Park, M.D., Ph.D.

Broncho-pleural fistula (BPF) and esophago-pleural fistula (EPF) after pulmonary resection are challenging to manage. BPF is controlled by irrigation and sterilization, but such therapy is not sufficient to promote closure of EPF, which usually requires surgical management. However, it is generally difficult to select an appropriate surgical method for closure of BPF and EPF. Here, we report a case of concomitant BPF and EPF after left completion pneumonectomy, in which both fistulas were closed through a right thoracotomy.

Key words: 1. Empyema
2. Broncho-pleural fistula
3. Esophago-pleural fistula

CASE REPORT

A 69 year-old man, who had undergone left completion pneumonectomy for recurrent lung cancer four years previously, presented with new-onset sputum production and fever. He had undergone left lower lobectomy for lung cancer eight years ago. His chest X-ray showed air-fluid level in the left pneumonectomy space. A fistula between the left bronchial stump and the pneumonectomy space was found on chest computed tomography (CT), and contrast leakage into the pneumonectomy space was found on esophagogram (Fig. 1). Subsequent bronchoscopy and esophagoscopy could not identify either the broncho-pleural fistula (BPF) or esophago-pleural fistula (EPF). An Eloesser flap was created for daily active irrigation, with gastrostomy for hyperalimentation. There were food materials and purulent fluid in the pneumonectomy space, and the BPF was located at the left bronchial stump. Spontaneous closure of the BPF and EPF was not obtained

despite conservative therapy with daily irrigation and antibiotics for two months.

Surgical closure of the BPF and EPF was planned. We predicted that an approach through the left pleural space would be extremely difficult, and that a trans-sternal approach would not provide adequate exposure of both the EPF and BPF. Therefore, we planned a closure of the BPF and EPF across the right pleural space. A right posterolateral thoracotomy was performed, with intermittent ventilatory pause by the anesthesiologist. There was a BPF at the left bronchial stump and an esophageal diverticulum communicating with the pneumonectomy space. We could not assess the exact length of the left main bronchial stump and the sizes of BPF and EPF due to thick pleural adhesions. We estimated the length of the left main bronchial stump to be 2 cm, and the two fistulas were separated by approximately 0.5 to 1.0 cm. Both fistulas were closed with staplers (Echelon Flex 45 Endopath Stapler, Green cartridge, Ethicon; Johnson &

Department of Thoracic and Cardiovascular Surgery, Keimyung University Dongsan Medical Center, Keimyung University School of Medicine
Received: July 16, 2015, Revised: September 20, 2015, Accepted: September 23, 2015, Published online: April 5, 2016

Corresponding author: Chang-Kwon Park, Department of Thoracic and Cardiovascular Surgery, Keimyung University Dongsan Medical Center, Keimyung University School of Medicine, 56 Dalseong-ro, Jung-gu, Daegu 41931, Korea
(Tel) 82-53-250-7342 (Fax) 82-53-250-7307 (E-mail) ckpark80@dsmc.or.kr

© The Korean Society for Thoracic and Cardiovascular Surgery. 2016. All right reserved.

© This is an open access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

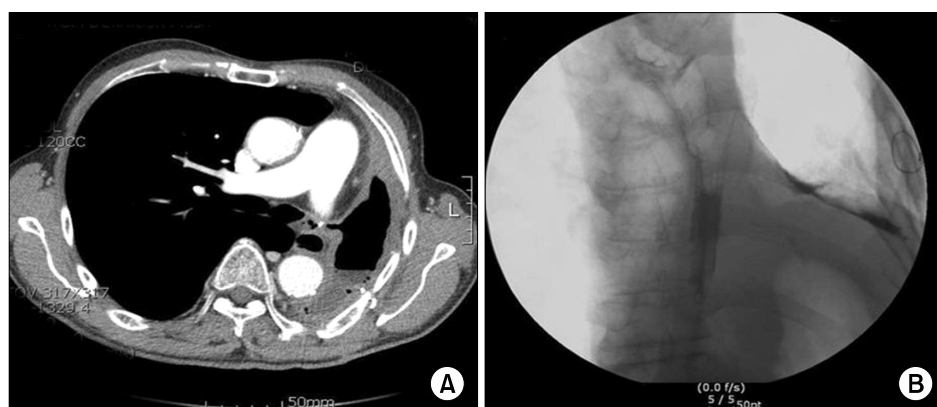


Fig. 1. (A, B) Broncho-pleural fistula and esophago-pleural fistula were identified with chest computed tomography and esophagogram.

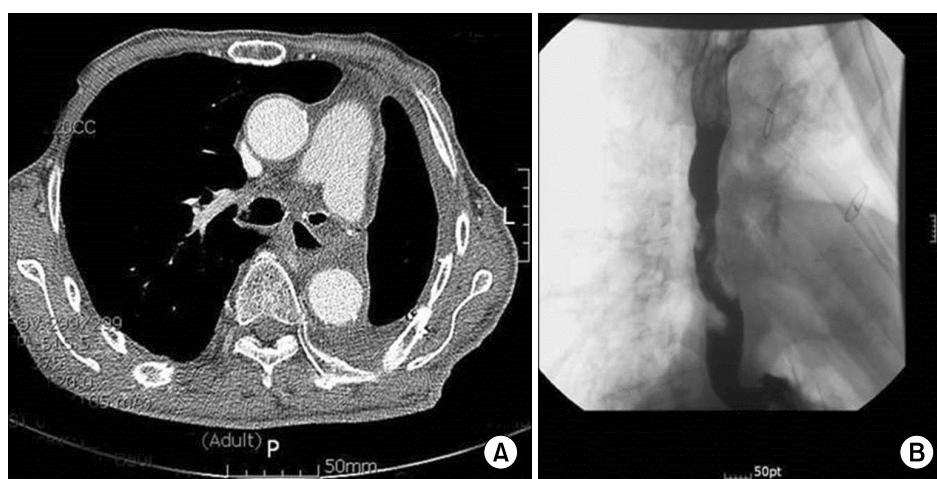


Fig. 2. (A, B) Postoperative esophagography showed no contrast leakage and postoperative chest computed tomography revealed the closure of both fistulas.

Johnson, Cincinnati, OH, USA). The stapled sites were reinforced with pericardial fat pads. The postoperative course was uneventful. Postoperative esophagography showed no contrast leakage, and postoperative CT revealed closure of the BPF (Fig. 2). The patient was discharged home without any complications.

The left pleural space was obliterated gradually, and the Eloesser flap was closed spontaneously at six months postoperatively. There was no evidence of fistula recurrence.

DISCUSSION

Post-pneumonectomy BPF and EPF are difficult to treat and usually require surgical management. The incidence of BPF ranges from 2% to 4% after pulmonary resection, which has decreased with novel pulmonary resection techniques including the use of staples. BPF is the sole cause of post-

pneumonectomy empyema, and there are many causes of BPF. In the immediate postoperative period, the main cause of BPF is the failure to obliterate the bronchial stump, whereas delayed BPF is usually due to infection or tumor recurrence at the stump.

EPF is a rare catastrophic complication after pneumonectomy. Most EPFs are located at or near the carina, which has a poor blood supply and is the site of most thoracic surgical procedures. The major cause of early EPF is operative injury, whereas that of late non-malignant EPF is chronic inflammation or infection [1]. We assumed that in this case, the causes of the BPF were recurrent carcinoma, repeated mediastinal manipulations, and radiation therapy, and that the cause of the EPF was inflammation related to the BPF and in the local space of the left pleural cavity.

The standard treatments for BPF and empyema due to BPF are pleural drainage, irrigation, and surgical repair. Surgical

repair of BPF includes not only direct simple repair but also BPF coverage using vascularized pedicle flaps. However, the main treatment has been operative management, achieved through the trans-sternum or the ipsilateral pleural space, or the contralateral pleural space for left-sided fistulas [2].

Once an EPF is identified, it is managed by drainage of empyema, irrigation of the pleural space, and distal parenteral nutrition through gastrostomy or jejunostomy. Ultimately, reconstruction of the esophageal wall is needed. The approach to surgical treatment for EPF or BPF varies. EPF or BPF is most often approached ipsilaterally. However, certain cases use trans-sternal closure for BPF [2] or approach via the contralateral pleural space for EPF [3].

It is very rare that a patient presents with concomitant BPF and EPF, and the outcome of this scenario has been reported to be very poor [4], although Trigui et al. [5] have reported simultaneous closure of BPF and EPF. We thought that an approach through the ipsilateral pleural space would not provide aseptic surgical access, and that trans-sternal approach would not enable closure of both fistulas. As such, we conducted the closure of the BPF and EPF through the contralateral pleural space, with satisfactory outcomes.

In summary, we report a case of concomitant BPF and

EPF after left completion pneumonectomy, in which both fistulas were closed through a right thoracotomy.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

1. Pache G, Thuerl C, Bley T, Kotter E, Ghanem N. *Asymptomatic esophago-pleural fistula presenting 35 years after pneumonectomy for tuberculosis*. J Thorac Imaging 2005;20:223-5.
2. De la Riviere AB, Defauw JJ, Knaepen PJ, van Swieten HA, Vanderschueren RC, van den Bosch JM. *Transsternal closure of bronchopleural fistula after pneumonectomy*. Ann Thorac Surg 1997;64:954-7.
3. Yekeler E, Altuntas B, Ulutas H. *Role of prolene mesh in late postpneumonectomy empyema: esophageal pleural fistula*. Ann Thorac Surg 2012;93:e43.
4. Evans JP. *Post-pneumonectomy oesophageal fistula*. Thorax 1972;27:674-7.
5. Trigui W, Le Pimpec-Barthes F, Shaker W, Lang-Lazdunski L, Riquet M. *Simultaneous bronchopleural and esophagopleural fistulas after pneumonectomy*. Ann Thorac Surg 2002;74:923-4.