

How to treat right post-pneumonectomy fistula with carinal sleeve resection

Despite the presence of some treatment methods for the closure of a right post-pneumonectomy bronchopleural fistula (BPF), unsuccessful outcomes still pose a major risk.

Three male patients aged 32, 33 and 59 had undergone right pneumonectomy with posterolateral thoracotomy (two bronchial carcinoma and one destroyed lung caused by bronchiectasis). In all cases, bronchial closure was done with stapler and reinforcement of the bronchial stump was not performed. The patients presented to our department at postoperative day 11, 26 and 57 complaining about shortness of breath, cough, purulent phlegm, abundant sero-haemorrhagic expectoration and fever. Chest X-rays showed decreased fluid levels in right hemithorax and thorax tomographies revealed fistula. The purulent fluid was aspirated with thoracentesis, the patients underwent tube thoracostomy and broad-spectrum antibiotic therapy was started. All patients underwent fiberoptic bronchoscopy to calculate the length of the main bronchus and determine the width of fistula. A pleural lavage was performed with isotonic solution through tube thoracostomy (average 2 weeks, once a day) until the direct microscopic examination and culture became negative. Then, patients were operated rethoracotomy. After removal of all debris, the lower end of the trachea and the left main bronchus were freed with dissection and extending up to 2 cm away from carina. The carinal region and the bronchial stump where the fistula was located were resected. At the same time, ventilation was continued by way of left main bronchus intubation from sterile area. Then, end-to-end anastomoses were performed at distal trachea and proximal left main bronchus with the continuous suture

technique using 3.0 polyglactin (Vicryl; Ethicon, Somerville, NJ, USA) (Fig. 1). The patients were discharged within 6–9 days without complications and they were still asymptomatic at the end of their follow-up periods of 20 months on the average.

Occurring mostly after lung surgery, BPF is a frightening complication and is among the most common causes of morbidity and mortality.¹ A post-pneumonectomy BPF is seen more often after right pneumonectomy, and a clinically more severe form than that seen after a lobectomy with a mortality rate ranging from 25 to 71%.^{2,3} The widely used treatment methods include tube thoracostomy, open window thoracostomy, thoracomyoplasty, closure of the fistula with rethoracotomy and reinforcing the stump with live autologous flaps, and transpericardial closure of the fistula with sternotomy.^{1–4}

The incidence of BPF in carinal sleeve resections is generally within the range of 3.8–21.6% in the literature.^{1,5} The carinal sleeve resection performed through rethoracotomy has lower probability of fistula recurrence as compared to other interventions. Since the bronchial system tends, by its nature, to remain open, the outward force along the suture line in the closed bronchi increases the probability of fistula formation. In fact, all sleeve resections have less BPF rates as they eliminate this tendency in the bronchi. We think here that since it has to be performed much closer to the carina region, a direct primary repair of the stump will increase the probability of fistula recurrence by causing greater tensile strength as compared to the initial operation. Conversely, the distal trachea and the left main bronchial lumens are brought facing each other and the cylindrical aspect of the bronchial structure is

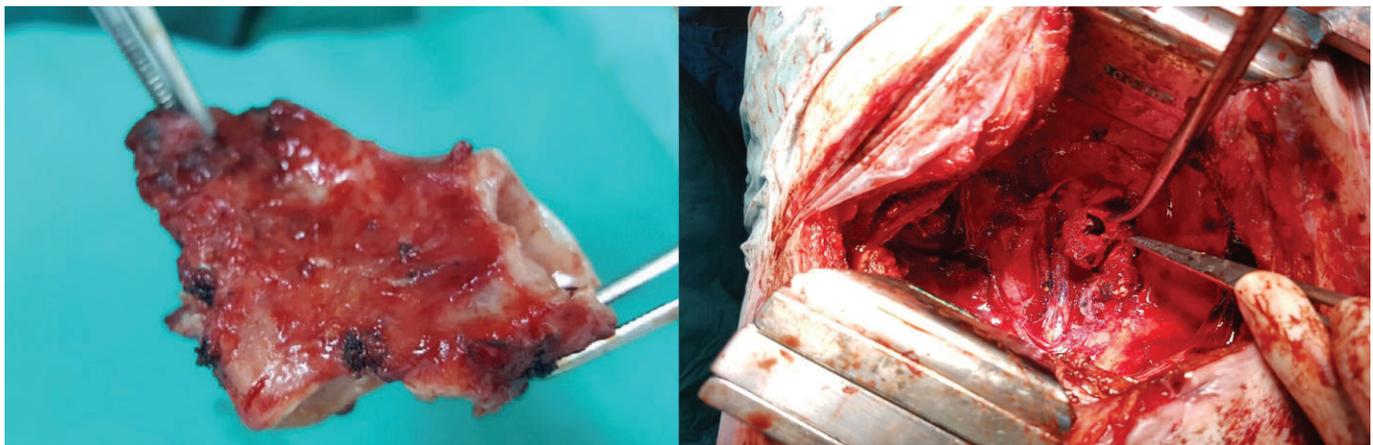


Fig. 1. Macroscopic image of the resected carinal region and fistula (left) and image showing distal trachea and left main bronchus well freed (right).

maintained in a carinal sleeve resection. Since the distal trachea and the left main bronchus are well freed and brought opposite to each other before suturing, there is little tension along the suture line. Because of all these, we think that this surgical procedure will involve less fistula recurrence.

In conclusion, carinal sleeve resection (Video S1) through rethoracotomy can be a safe and effective alternative in the treatment of BPFs occurring after a right pneumonectomy.

References

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Supporting information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

Video S1. Video demonstrating the carinal sleeve resection technique in right post-pneumonectomy fistula.

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