



Closure of late bronchopleural fistula with atrial septal occluder

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Abstract: Bronchopleural fistula (BPF) is a severe and often challenging complication after lung resection. A 74-year-old woman with a history of breast and bowel cancer underwent right lower lobectomy for a lung cancer. She developed a late bronchopleural fistula. After several unsuccessful attempts to solve it, we definitively closed it using an atrial septal occluder.

Keywords: Bronchopleural fistula (BPF); lobectomy; atrial septal occlude

Received: 02 August 2019; Accepted: 28 August 2019; Published: 17 September 2019.

doi: 10.21037/ccts.2019.08.05

View this article at: <http://dx.doi.org/10.21037/ccts.2019.08.05>

Introduction

Bronchopleural fistula (BPF) is a severe and often dramatic complication after lung resection. Although the incidence is dropped over the last years reaching near to 4%, it remains a challenging situation for thoracic surgeons (1). The treatment can include several strategies, ranging from “wait and see” policy, medical therapy, redo surgery and endobronchial devices deployment. Recently, devices designed for closure of cardiac defects have been successfully used to repair BPF (2). We report a case of a patient with a late BPF successfully treated with atrial septal occluder after several failed attempts with conventional techniques.

Case presentation

A 74-year-old woman with a history of breast and bowel cancer underwent right lower lobectomy for a lung cancer. Previous cancers were treated with surgery and adjuvant radiotherapy (breast) and chemotherapy (bowel); after radiotherapy she developed a large right fibrothorax (*Figure 1A* white arrows) and consequently to chemotherapy her body mass index (BMI) decreased. At preoperative computed tomography (CT) scan diffuse bronchial calcifications (*Figure 1B* white arrows) were also detected and at surgery the closure of bronchial stump resulted very hard and it was distally performed; however at the

end of operation no air leakage from bronchial stump was observed. The postoperative course was characterized by prolonged parenchymal air leaks and not complete re-expansion of lung; however, bronchoscopy didn't show any signs of BPF and patient was discharged after 15 days with Heimlich valve and the drainage was removed in 26th postoperative day. After one year the patient presented low degrees of fever, metallic taste and muco-purulent expectoration. A CT scan showed a purulent encapsulated pleural effusion and bronchoscopy showed a minimal fistula in a subsegment of right lower bronchial stump. Under CT vision a pleural drainage was inserted to clean the cavity and, through fiber bronchoscopy, fibrin glue was placed to occlude the BPF, with success. The patient remained asymptomatic for another one year and half when she presented again signs of infection. At bronchoscopy the BPF was larger (*Figure 1C*) and the cavity in the pleural space full of purulent fluid. She newly underwent drainage of cavity and bronchoscopic insertion of fibrin glue; however the dimension and the rigidity of fistula due to calcifications didn't allow its closure. We tried to insert a one-way valve in the fistula (*Figure 1D*), but the patient expectorated it after 12 hours. According to recent publications about BPF closure with atrial septal occluder we decided to try this strategy. Under deep sedation, the patient underwent rigid bronchoscopy and, under direct and fluoroscopic view, the device (Figulla Flex II, Occlutech) was correctly delivered and placed. At bronchoscopy and CT scan control

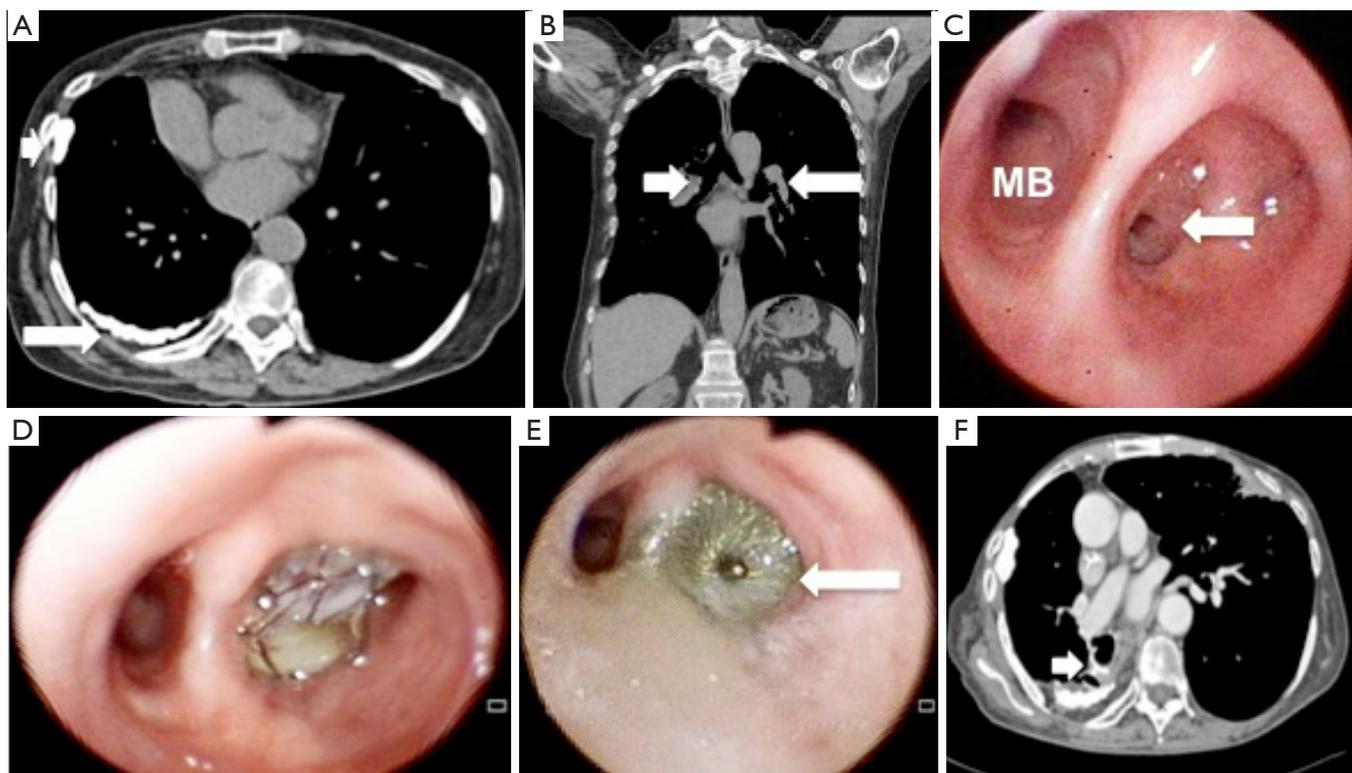


Figure 1 Preoperative imaging, endoscopic view of BPF, unsuccessful attempts with endobronchial valve, endoscopic view of Atrial Septal Occluder, post procedure imaging. (A) Axial view of CT scan showing large fibrothorax (white arrows). (B) Coronal view of CT scan showing diffuse bronchial calcifications (white arrows). (C) Endoscopic view of bronchopleural fistula (white arrow). (D) Endobronchial unidirectional valve inserted in the bronchopleural fistula. (E) Endoscopic view of Atrial Septal Occluder inserted in the bronchopleural fistula (white arrow). (F) Axial view of CT scan showing the correct placement of Atrial Septal Occluder in the bronchopleural fistula (white arrow). MB, middle bronchus.

(Figure 1E,F, white arrows) performed the day after, BPF was completely closed and the patient was successfully discharged. She remained asymptomatic for two years when she died because of recurrence of breast cancer.

Discussion

BPF is a rare but often severe complication after major pulmonary resections. Several risk factors have been reported to increase the risk of BPF as administration of induction and adjuvant chemo-radiotherapy, diabetes, impaired BMI, infections, postoperative mechanical ventilation (3). Surgery remains the gold standard treatment in case of massive early BPF and to treat the infective complications in late presentation. Also several endoscopic techniques as administration of fibrin glues, sealants, silver nitrate and albumin, staminal cells and placement

of covered stents and endobronchial valves have been proposed with different degree of success (4). Recently, it has been implemented the use of devices designed to treat atrial septal defects to occlude BPF (5) but, differently from our case, in particular after pneumonectomy and in early postoperative period.

Acknowledgments

Funding: None.

Footnote

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/ccts.2019.08.05>). FV serves as an unpaid editorial board member of *Current Challenges in Thoracic*

Surgery from Mar 2019 to Mar 2021. The authors have no conflicts of interest to declare.

Ethical Statement: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committees and with the Helsinki Declaration (as revised in 2013). The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

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doi: 10.21037/ccts.2019.08.05

Cite this article as: Poggi C, Diso D, Tanzilli G, Venuta F, Anile M. Closure of late bronchopleural fistula with atrial septal occluder. *Curr Chall Thorac Surg* 2019;1:12.

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