

Case Report

Endobronchial Stenting: A Novel Intervention for Bronchoscopic Closure of Bronchopleural Fistula

Vikas Marwah¹, Gaurav Bhati¹, C.D.S. Katoch¹, S. Bhattacharjee² and K. Kumar¹

Departments of Respiratory Medicine¹ and Radiodiagnosis², Military Hospital (CTC), Pune (Maharashtra), India

Abstract

We report a case of a 66-year-old male who presented nine years after thoracoplasty with a broncho-pleuro-cutaneous fistula on the left side of the chest, with recurrent pleural infections. He had previously failed surgical attempts at closure of bronchopleural fistula. He was detected to have multiple fistulae in the left upper lobe and closure of air-leak was done by the bronchoscopic implantation of covered self-expandable metallic stent which bridged the left main bronchus to the left lower lobe bronchus, thereby completely occluding the left upper lobe orifice.. [Indian J Chest Dis Allied Sci 2020;62:27-29]

Key words: Bronchopleural fistula, Covered metallic stents, SEMS bronchoscopic intervention

Introduction

Post-operative bronchopleural fistulas (BPFs) carry high morbidity and pose a significant management dilemma. Large central BPF usually require surgical repair but in cases of failed surgical attempts or high risk patients, there is role of bronchoscopic management of these central air-leaks. We report a case of bronchoscopic stenting with covered self-expandable metallic stent (SEMS) for the closure of post-operative BPF. *To the best of our knowledge, such a procedure has not been reported from India so far.*

Case Report

A 66-year-old male underwent thoracoplasty nine years ago for the management of post-left upper lobectomy BPF. He presented with complaints of persistent dragging chest pain and discharge of six months duration from the left lower chest with fever of three months duration. Clinical examination revealed a fistula with persistent purulent foul smelling discharge over the post-operative chest wall defect in the left infra-axillary area (Figure 1). Patient had fever (99.8 °F) and on auscultation reduced breath sounds in the left mammary and axillary areas. The inflammatory markers (white cell count and C-reactive protein), cardiac enzyme levels and electrocardiogram (ECG) were within normal limits. Antibiotic therapy was started on the basis of pus culture sensitivity from the fistula site. Chest radiograph (postero-anterior view) showed left upper zone volume loss with fistulous tract seen in the left lower zone.

Computed tomography (CT) of the chest revealed left upper lobe bronchus communicating with pleural cavity (max diameter of 5.3mm) with pneumothorax (maximum 10mm) with a (21.6mm × 48.5mm) defect in the left lateral chest wall in the left lower lobe region. Thus, CT was used for stent sizing with the left main bronchus of 10mm and

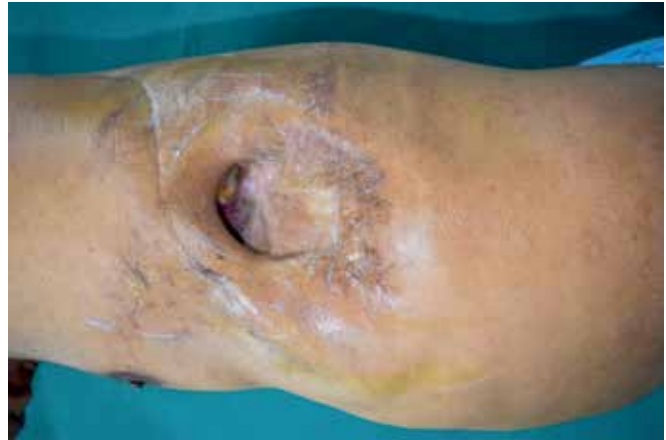


Figure 1. Photograph of the patient showing post-operative broncho-pleuro-cutaneous fistula.

left lower lobe bronchus of 8mm, keeping 20% over sizing a stent of 12mm was used. On fiberoptic bronchoscopy (FOB) examination lingular and the left upper lobe bronchus showed bubbling air-leaks from the multiple segments. The patient did not give consent for a corrective BPF repair surgery, thus FOB intervention procedure was planned. Flexible bronchoscopy under local anesthesia was used to deploy a covered self-expandable metallic stent (OTTOMED, India) (Figure 2). The stent was placed into his left main bronchus (proximal release, length, 40mm; diameter, 12mm) without any complications. A subsequent chest radiograph confirmed stent placement bridging the left main bronchus and the left lower lobe bronchus (Figure 3). Chest radiograph done at 11 weeks after the procedure showed collapse of the left upper lobe (Figure 4). Clinical improvement in terms of gradual decrease of foul smelling discharge along with wound healing was noted.

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Correspondence and reprint requests: Dr (Major) Gaurav Bhati, Graded Specialist (Respiratory Medicine), Department of Respiratory Medicine, Military Hospital (CTC), Pune-411 040 (Maharashtra), India; E-mail: dr.gauravbhati@gmail.com



Figure 2. Photomicrograph showing proximal end of the stent in the left main bronchus and distal end at the lower lobe bronchus.



Figure 3. Pre- and post-stenting chest radiographs.



Figure 4. Chest radiograph (postero-anterior view) after 11 weeks of the procedure showing collapse of the left upper lobe.

Covered stent placement in lieu of surgery to close the affected lobe with multiple leaks has not been tried as a modality of treatment for broncho-pleural-cutaneous fistula.

Discussion

Bronchopleural fistula is an abnormal communication between the pleural space and the bronchial tree. Since it is associated with high morbidity and mortality, thus it poses a management challenge.¹ Incidence of occurrence of BPF as a complication of surgical procedures, such as pneumonectomy, ranges between 3% and 28%.² Various modalities has been used for the closure of BPF, such as Bioglue, Tisseal glue and endobronchial devices like coils.³ The degree of success of various agents depends

upon the underlying disease, size and the proximity of the fistulae, usually larger fistulae have poor closure rates.⁴ Some researchers⁵ have advocated the use of a Dumon stent for the treatment of a post pneumonectomy BPF, however few have found unsatisfactory adherence of the prosthesis to tracheal mucosa, thus its inability in the exclusion of the fistula from the airflow.⁶ In this case silicon stent was not used as customised stent with tapering end (12mm for left main bronchus and 10mm for left lower lobe bronchus was needed for this case) are not readily available). For BPF closure atrial septal occluder device (ASD)⁷ has also been tried, in such a approach the occluder device was inserted directly into the fistula for fistula closure. Fistula closure by using nitinol (PDA) duct occluder device has been successfully tried in a patient of post-lobectomy surgery with air leak from thoracotomy site and fistula opening at stump of the right upper lobe bronchus.⁸ The use of covered endobronchial stenting as a mean to segregate the affected lobe with multiple air leaks has been tried with rigid bronchoscope, using nitinol covered stent with favourable outcome in terms of BPF closure in five post-surgical large BPF patients.⁹ Flexible bronchoscopic deployment of covered metallic stent with aid of fluoroscopy with favourable outcome has also been reported for BPF closure.¹⁰⁻¹² However, such procedures have not been reported from India. In this case report, despite the recognised complications of endobronchial stenting, such as secretion management, frequent infections due to pooling of secretions, granulation tissue formation, stent fracture and rarely stent migration, with limited case reports proving its efficacy, there was no feasible alternative intervention to address the problem apart from using the covered stent in an unorthodox way, *i.e.* to bridge the airway between the left main bronchus and the left lower lobe bronchus using flexible bronchoscope. Patient was subsequently followed up every month and bronchoscopy was done to remove pooled-up secretions and to watch for stent fracture or granulation tissue formation, finally the stent was removed on 3rd month. The patient had radiologically volume loss of left upper zone, clinically significant gradual reduction in the discharge from the chest wound, healing of the skin wound along with improvement in dyspnoea and phonation.

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