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CLINICAL SPOTLIGHT

Closure of a Broncho-pleural Fistula Using an Atrial Septal Defect Occluder

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Broncho-pleural fistulae (BPF) are recognised as a rare complication following pneumonectomy. We describe a patient, who after failing conservative treatment, underwent closure of a persistent fistula with an atrial septal defect (ASD) occluder. Additionally we review the literature regarding management of BPF and the emerging role of cardiac defect closure devices as a possible treatment option.

Keywords Broncho-pleural fistula • Atrial septal defect occluder • Empyema • Pneumonectomy • *Clostridium difficile*

Introduction

Broncho-pleural fistulae (BPF) are recognised as a rare complication following pneumonectomy. We describe a patient, who after failing conservative treatment, underwent closure of a persistent fistula with an atrial septal defect (ASD) occluder. Additionally we review the literature regarding management of BPF and the emerging role of cardiac defect closure devices as a possible treatment option.

Case Presentation

An 80 year-old man underwent a right upper lobectomy for bronchioloalveolar carcinoma in 2002, at the age of 69. His only past history was of hypertension. In 2007 a new lesion in his right lower lobe (RLL) was demonstrated on CT scan. Positron emission tomography showed enhanced uptake at this location, consistent with carcinoma, as well as hilar nodes. Biopsy of the RLL lesion was contraindicated due to arterial proximity. At surgery in July 2007, the pretracheal and mediastinal lymph nodes biopsied were negative for malignancy and he proceeded to completion right pneumonectomy with stapling of the bronchus. Histology of the RLL mass confirmed bronchioloalveolar carcinoma.

Six weeks following pneumonectomy he required an open window thoracostomy (Eloesser flap) for a post-pneumonectomy empyema. A large collection of fibrino-purulent fluid was contained in the right pneumonectomy space, without evidence of air leak from the bronchus. Fluid aspirates grew *Clostridium perfringens* and he was commenced on benzyl penicillin. He was readmitted four weeks later, while still on the antibiotic, with fevers and malaise. The pneumonectomy space was again inspected without obvious infection, although wound swabs grew *Serratia marcescens*. The pneumonectomy space was left open, with a large Macfarlane cotton roll inserted and he was discharged on oral ciprofloxacin.

Almost nine months later, due to increasing discharge from the thoracostomy site and associated symptoms of malaise, low grade fevers and weight loss, the pneumonectomy site was re-examined under anaesthesia but no collection or infection was identified. Although a bronchopleural fistula was suspected, it was not confirmed until a repeat CT scan was performed in July 2008. In October 2010 during an elective inspection, a fistula at the bronchial stump,

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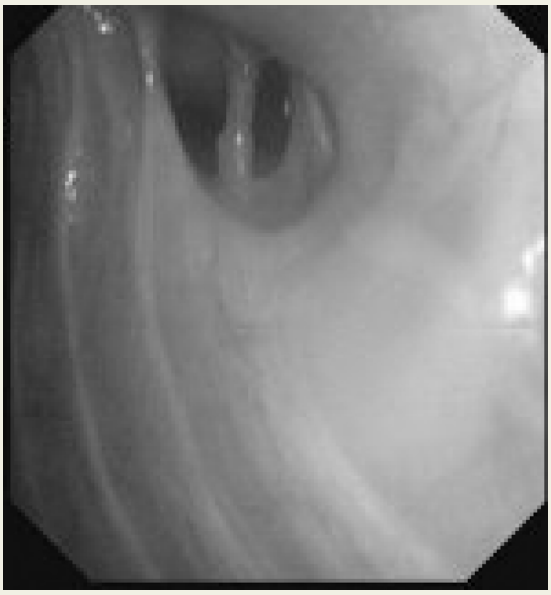

Figure 1 Fistula visualised via bronchoscope.

measuring approximately 4 mm in diameter, was visible from both the endobronchial aspect (via flexible bronchoscopy) and thoracoscopically from the pneumonectomy space. Further inspections under anaesthesia showed a gradually enlarging fistula, which became associated with symptoms of increasing dyspnoea, to the point of breathlessness at rest. Although there was no obvious recurrence of malignancy or infection, the patient declined surgical closure.

In August 2012 because of further decline in exercise capacity, device closure under general anaesthesia (total IV anaesthesia technique and single lumen endotracheal tube) was undertaken. The defect was initially visualised bronchoscopically then thoracoscopically via the pneumonectomy space (Fig. 1). A guide wire was then introduced via the bronchoscope and was passed through the defect into the pneumonectomy space and brought out through the thoracostomy (Fig. 2). A sizing balloon was passed over the wire and the defect diameter was measured at 5.6 mm (Fig. 3). A 6 mm Occlutech^{TM} ASD closure device was then positioned across the defect, via a 6 Fr delivery system advanced over a stiff wire, employing a combination of bronchoscopic, thoracoscopic and fluoroscopic visualisation. The device was deployed in an acceptable and secure position (Fig. 4).

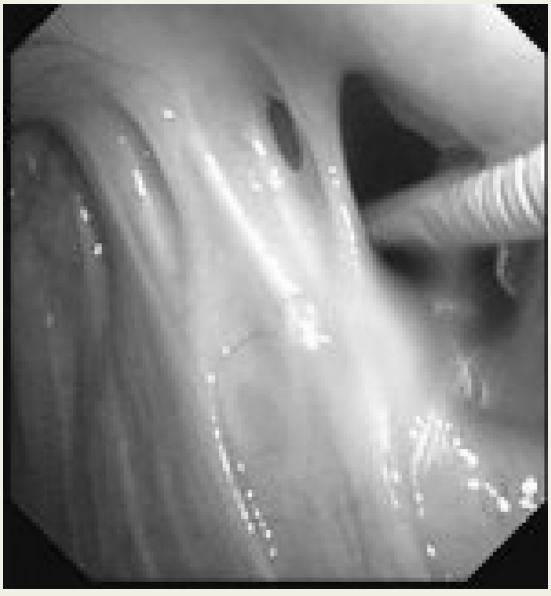

Figure 2 Guide wire introduced through the fistula.

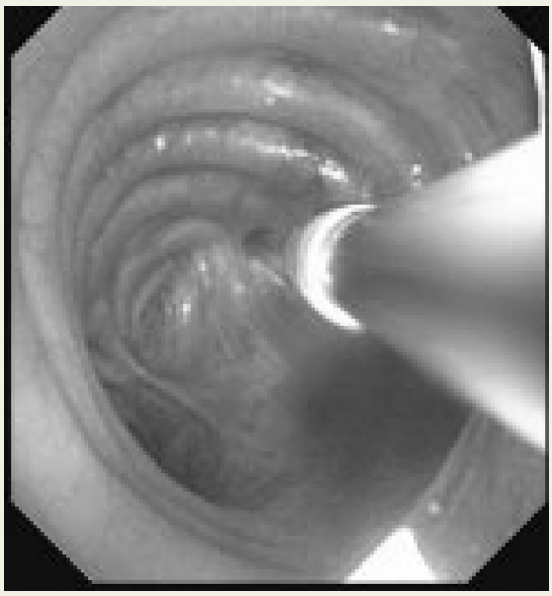

Figure 3 Sizing balloon introduced via catheter.

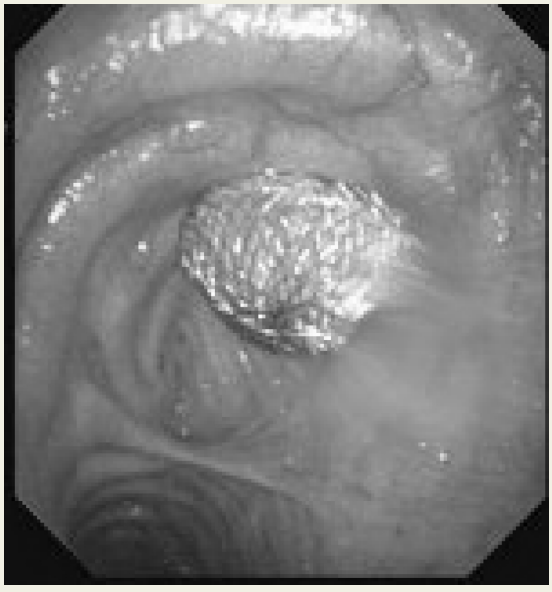

Figure 4 Position of ASD occluder post-deployment.