Case report - Pulmonary

Novel management of a large chronic bronchocutaneous fistula after lobectomy

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Abstract

We describe the successful use of silicone stent for the treatment of chronic bronchocutaneous fistula in a patient with a large stump opening of 20 mm in diameter. A literature review of bronchoscopic treatment of bronchopleural fistula (BPF) is also discussed here.

Keywords: Bronchoscopy; Bronchus; Pleura; Fistula; Stents

1. Case

A 47-year-old male patient with a past history of pulmonary tuberculosis and right upper lobectomy for massive haemoptysis 20 years ago, presented to our hospital with persistent BPF for which multiple attempts at resuturing the stump, thoracoplasties and 3 repairs using muscle flaps were unsuccessful over a 17-year period. This had resulted in him being unemployed and totally financially dependent on his sibling.

In January 2001, the patient complained of 3 months duration of cough and purulent discharge from the right chest wound. Bronchoscopy revealed the right upper lobe (RUL) stump to be inflamed with 2 fistulae and purulent secretions. Loose debris over the stump suture was seen. The suture could be removed partially with Nd-YAG laser and forceps. A 6-week course of antimicrobial therapy was initiated. Repeat bronchoscopy 7 months later showed closure of the fistulae with exposed suture on the RUL stump.

In September 2002, he presented with one week duration of fever, haemoptysis, breathlessness and purulent discharge from the right chest wound. Chest radiography findings were consistent with a large bronchopleural cutaneous fistula (Fig. 1). Bronchoscopy revealed RUL stump leading to a large 20 mm cavity lined with plaque. The biopsy of the plaque revealed fungal elements with septate hyphae at acute angle and spores characteristic of aspergillus. Bronchial washings grew Aspergillus Fumigatus. For the treatment of the fungal empyema, he underwent creation of a pleural window and was concurrently treated with Amphotericin B (total 1 g) followed by 2 weeks of Itraconazole. Repeat bronchoscopy one month later revealed healthy mucosal tissue lining the cavity and repeat bronchial washings did not isolate any fungus nor bacteria.

Rigid bronchoscopy with stenting of the right mainstem bronchus using a 16×30 mm Dumon stent (Novatec, France) was performed together with omental patch repair of the stump in October 2002. This resulted in complete...
chest wound healing and closure of the BPF. The stent was removed 4 months later. He remains well on follow-up 20 months later with much improved quality of life.

2. Discussion

Bronchopleural fistula after pneumonectomy or lobectomy is a most dreaded complication of thoracic surgery. Early fistulae occurring between 1 and 7 days after surgery are mainly due to technical errors, whereas intermediate (8 to 30 days) and late (after 30 days) seem mostly due to impaired healing of the bronchial stump [1]. Its incidence and the development of postpneumonectomy empyema have been reported to be as high as 13% in one series with overall mortality of 29% [2]. Incidence of BPF was increased especially in patients with sequelae of tuberculosis and this was associated with higher morbidity and mortality [3].

Treatment of BPF includes immediate pleural drainage, adequate antimicrobial therapy and closure of the fistula either bronchoscopically or surgically. Bronchoscopic treatment includes the use of albumin-glutaraldehyde tissue adhesive, metallic coils and absolute ethanol to seal the fistula [1,4–6]. Hollaus has one of the largest series of patients with BPF treated endoscopically [5]. In his series of 29 patients, fistulas <3 mm were treated with fibrin sealant and fistulae >3 mm were treated with fibrin and spongycalf bone. The overall rate of fistula closure was 35.6% in his series. Fistulas >8 mm were deemed not suitable for endoscopic therapy by experience [5]. Sclerants and metallic coils have been used in other reports [1,6]. However, only fistulas of <8 mm are thought to respond well to bronchoscopic treatment [5] and we are unaware of any reports using bronchoscopic methods for fistula size of >10 mm.

As the presence of an empyema usually does not permit healing of the BPF, we treated the infection with pleural window drainage and 1 month of antifungal therapy before proceeding to a definitive BPF closure procedure. We chose to use a stent as an adjuvant therapy to seal off the large (20 mm) stump opening from the airway while allowing the stump to heal after omental patch. Stenting prevents the potential detrimental effect of coughing on the large BPF. It provides a stable support for the omental flap to re-epithelize across the large defect leading to permanent complete closure of the BPF.

This is the third case report in the English literature describing the use of silicone stent for the treatment of BPF [7,8]. Watanabe reported the successful use of Dumon stent together with intercostal muscle flap for a bronchial stump dehiscence which occurred 25 days after RUL lobectomy for carcinoma of the lung was performed [7]. In another report, Dumon stent was inserted for a 3 mm BPF which persisted despite multiple endoscopic injections of polidocanol, thoracoplasty and repair of the fistula using muscle flap [8]. This patient had undergone chemotherapy for adenocarcinoma of the lung prior to the pneumonectomy and had been mechanically ventilated since the development of the recurrent empyema and BPF. The rationale for using a stent was to prevent the continuous positive pressure delivered by the ventilator from impeding stump healing [8].

This is a novel way of managing persistent BPF and should be considered in patients for which surgical repair of the BPF is planned as the stent could be deployed concurrently.

3. Conclusion

We describe a novel therapeutic approach for the treatment of a large chronic BPF. A staged procedure of sterilisation using open drainage and a course of antimicrobial therapy followed by definitive closure of the fistula using thoracoplasty with omental patch and airway stenting was performed. This method resulted in the closure of the fistula where previously 3 attempts had failed.

References