Case report

The use of a bone substitute composite in the management of a post-pneumonectomy bronchopleural fistula

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Received 5 January 2009; received in revised form 7 April 2009; accepted 8 April 2009; Available online 23 May 2009

Abstract

Post-pneumonectomy bronchopleural fistulas (BPFs) still represent a formidable therapeutic challenge. Several procedures have been proposed of which the least invasive are gaining distinct recognition and favour. We report the case of small-sized BPF treated by plastering the bronchial stump with a combination of bone substitute composite sprayed on a scaffold made of a Vycril mesh and placed on the mediastinal pleura overlying the right hilum.

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Keywords: Pneumonectomy; Bronchopleural fistula; Sealant

1. Introduction

The management of post-pneumonectomy bronchopleural fistulas (BPFs) still represents a formidable challenge. Recently, the attention of the surgeons was focussed on procedures which can combine safety, least invasiveness and short hospitalisations [1].

2. Case report

A 62-year-old obese and diabetic patient was diagnosed with a sizeable right-sided cT2N0M0 adenocarcinoma requiring surgical resection. A right posterolateral thoracotomy was performed, the right lung was removed and the bronchial stump covered with an intercostal muscle flap. Final pathology showed a T2N2M0 NSCLC.

After two cycles of chemotherapy received in another institution, about 3 months after the original lung resection, the patient developed a bronchopleural fistula (Fig. 1a). The patient’s general condition rapidly deteriorated due to the delayed positioning of a chest drain once the septic symptoms of the pleural empyema had ensued.

The patient was referred back to us and was immediately subjected to an open window thoracostomy (OWT) in order to achieve an ideal drainage and a thorough debridement of the chest cavity. At that time, no attempt was made at closing the fistula due to the patient’s unstable cardio-respiratory condition. After 1 week of daily cavity debridement and changes of dressings, the patient’s condition improved gradually. With the latissimus dorsi divided during the original thoracotomy and the diffuse myocutaneous gangrenous cellulitis around the incision, the idea of chest wall muscle transposition was abandoned. Likewise, fearing the contamination of the abdominal cavity, an omental flap was not considered. We settled for a less-invasive way to close the fistula by plastering over the mediastinal pleura and the bronchus a new sealant called Tricos (Baxter, Vienna, Germany), a re-absorbable bone substitute used in orthopaedics, craniofacial and ENT surgery as a defect-filling compound whenever the integrity of a bony structure is compromised. Tricos is composed of micro-macroporous biphasic calcium phosphate ceramic formulated as granules, which, mixed with fibrin sealant, can act as an effective bone substitute forming well-differentiated lamellar bone [2].

We elected not to apply Tricos directly on the BPF to avoid dislodging the bone fragments into the contralateral bronchial tree. Conversely, after securing with interrupted sutures, a 15 cm × 15 cm Vycril mesh over the hilum, the mixture of Tricos (two 17 cm² kits; Baxter, Vienna, Germany) and Tissucol (two 5 ml kits; Baxter, Vienna, Germany) was spread over this synthetic scaffold and left to solidify for 10 min in order to ‘plaster’ the bronchial stump (Fig. 1b). The OWT was left open with pressure packing for another week and dressings were changed twice daily to check for air leaks.

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leakage. The patient was then returned to the theatre to close the OWT after having filled the cavity with antibiotic solution. More than 3 months after treatment, neither signs nor symptoms of bronchopleural fistula were observed (Fig. 2).

Recently, the emphasis on the use of plugs and sealants to manage post-pneumonectomy BPF has been revamped [3,4]. In the management of late-developing BPFs with the attendant empyemas, the creation of an OWT and the transposition of viable tissue to obliterate the BPF seem to play a major role in determining a successful outcome [5] and should be the preferred method under routine circumstances. If adapted for use within accelerated treatment protocols of post-pneumonectomy BPF [1], the concept of plastering the bronchial stump may prove efficacious and provide an additional solution towards a definitive treatment of this dreadful postoperative complication, thus warranting further clinical study.

References