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CASE REPORT

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A case of attempted transbronchial spigot insertion for fistulous pyothorax in the residual pleural airspace after pleurectomy/decortication for malignant pleural mesothelioma

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Abstract

Pleurectomy/decortication for malignant pleural mesothelioma is a relatively recent surgical approach for which there is a dearth of information on complications, especially in the late postoperative period. A 70-year-old man was diagnosed with right epithelioid malignant pleural mesothelioma and underwent pleurectomy/decortication. Computed tomography at 6 months after surgery revealed nodules on the surface of the right lung. These nodules gradually increased in size and were diagnosed as recurrent disease. Immunotherapy was started, but treatment was discontinued a few days after the first course due to pneumonitis. Subsequent oral prednisolone therapy for about 2 months ameliorated pneumonitis, but fistulous pyothorax developed. During attempted transbronchial occlusion of the responsible bronchus, some spigots penetrated the empyema cavity. Open window thoracotomy was performed on the following day. This case suggests that if there is no change in diameter between the proximal and distal parts of the responsible bronchus, transbronchial occlusion should not be chosen.

KEYWORDS
fistulous pyothorax, malignant pleural mesothelioma, penetration, pleurectomy/decortication, residual thoracic airspace

INTRODUCTION

Malignant pleural mesothelioma (MPM) is an uncommon, mesothelial-derived solid malignancy that mostly results from exposure to asbestos. Treatment of MPM has commonly involved surgery of extrapleural pneumonectomy (EPP) followed by chemoradiotherapy.[1] In a multimodal setting, the role of surgery is to obtain macroscopic complete resection (MCR), while perioperative therapy is used to control micrometastasis.[2] Pleurectomy/decortication (P/D) for MPM is a relatively recent surgical approach that can also achieve MCR.[1] Furthermore, accumulated data show that P/D preserves more of the lung and results in at least similar overall survival with decreased postoperative morbidity and mortality, compared to EPP.[1]

A major complication unique to P/D is postoperative air leak, which can result in empyema or pneumonitis. Broncho- or pulmonary-pleural fistula from decorticated lung allows residual airspace without pleural effusion to persist for an extended period.[3] The incident rate of residual thoracic airspace (RTS) after P/D is reported to be 34%, but this mostly disappears spontaneously during the follow-up period.[3] Prolonged air leakage is correlated with RTS and postoperative empyema.[3]

Herein, we report a case of attempted transbronchial spigot insertion for fistulous pyothorax in RTS after P/D for MPM. During attempted transbronchial occlusion of the responsible bronchus, some spigots penetrated the empyema cavity, and open window thoracotomy was performed on the following day.

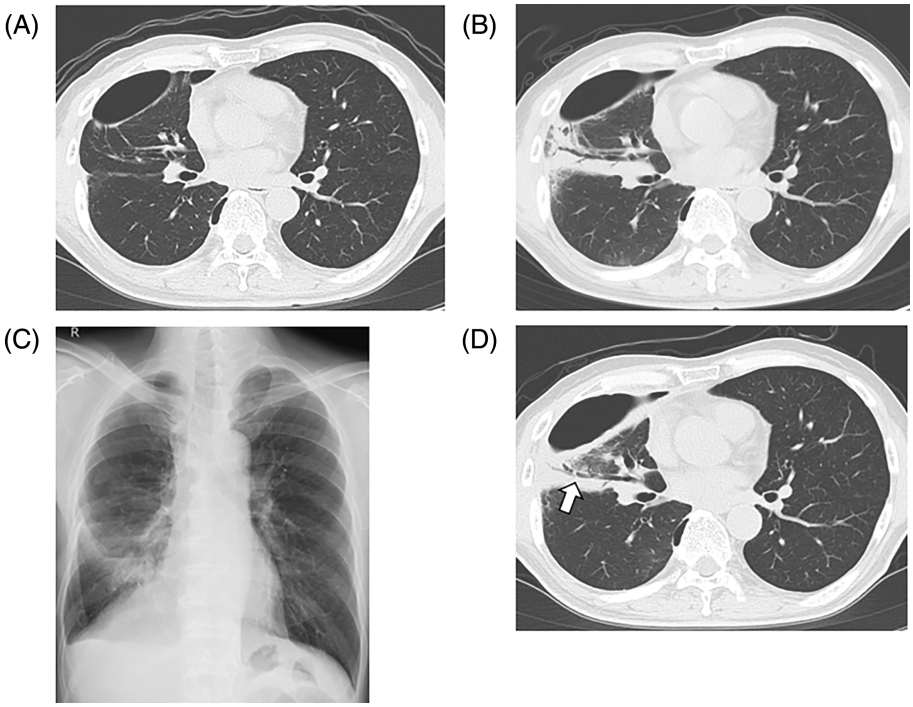

FIGURE 1 Imaging findings. (A) Residual thoracic airspace (RTS) in the right chest cavity on computed tomography. (B) Enlarged RTS at 12 months after surgery. (C) An air-fluid level was apparent on a chest roentgenogram at 13 months after surgery. (D) The responsible bronchus (arrow) of fistulous pyothorax in the right middle lobe.

CASE REPORT

A 70-year-old man was diagnosed with right epithelioid MPM. The patient underwent 2 courses of cisplatin and pemetrexed therapy followed by right P/D. Postoperative air leakage was prolonged, but did not require pleurodesis. The chest tube was removed on postoperative day 16. Two additional courses of pemetrexed in combination with cisplatin was administered. In chest computed tomography (CT), RTS persisted in the right chest cavity throughout the postoperative follow-up period (Figure 1A). On CT at 6 months after surgery, nodules were noted on the surface of the right lung. These gradually increased in size and were diagnosed as recurrence of mesothelioma. Nivolumab in combination with ipilimumab was started at 10 months after surgery, but treatment was discontinued a few days after the first course due to grade 2 pneumonitis, and 30 mg/day oral prednisolone was administered. Soon after the start of corticosteroids, pneumonitis was ameliorated and prednisolone was reduced to 5 mg/day.

Twelve months after surgery, CT showed an enlarged RTS and a small amount of fluid retention in the airspace without lung consolidation (Figure 1B), but the patient was asymptomatic and was followed up. About 3 weeks later, coughing appeared and a chest roentgenogram indicated an air-fluid level (Figure 1C), suggesting accumulation of fluid in the RTS. The patient underwent thoracic drainage, after which air leakage and purulent fluid were observed, leading to a diagnosis of fistulous pyothorax. The responsible bronchus in the right middle lobe was identified on chest CT (Figure 1D) and bronchial embolization was performed using an endobronchial spigot (EWS). During filling of the responsible bronchus, an EWS penetrated into the empyema cavity and it was determined that transbronchial occlusion was not possible. Thus, open window thoracotomy was performed on the following day. The postoperative course was uneventful and the patient was discharged on postoperative day 24.

DISCUSSION

Control of pyothorax is critical in management of fistulous empyema. The first step is to attempt to close the bronchopleural fistula (BPF) after treatment of the active infection. BPFs can be closed with endoscopic or surgical procedures, including decortication, direct closure, thoracoplasty, or omental or muscle transposition.[4,5] If closure of the BPF cannot be achieved, open window thoracotomy is considered to evacuate the retained pus.

Bronchial embolization with an EWS is a first-line option in conservative management of BPF when the target bronchus is well defined, and its success rate has been reported as 40%–86%.[4] An EWS is a silicone bronchial plug that can be placed in the target bronchus. It is available in three sizes: small, medium and large, with diameters of 5, 6, and 7 mm, respectively, allowing for adaptation to different bronchial diameters.[4] There is a dearth of data on the appropriate duration of EWS insertion, including temporary versus permanent EWS insertion. In a study of the clinical efficacy of endobronchial embolization with an EWS for managing prolonged pulmonary air leaks, Sasada et al. found no severe infections in follow-up of 20 patients in whom a permanent EWS was used.[5]

In this case, CT findings showed that tractional bronchiectasis is in the right middle lobe connected to the RTS (Figure 1D). The diameter of the responsible bronchus was 3.5 mm both proximally and distally before bronchial embolization, and a 7-mm diameter EWS could be inserted during the procedure. The EWS allowed the bronchi with tractional bronchiectasis to dilate further because there is no cartilage lining the bronchial wall in the endobronchial bronchi to accommodate the 7-mm diameter of the EWS. From these findings, we hypothesised that a prior inserted peripheral EWS might have been pushed to the distal bronchus and the pleural cavity by an additional EWS insertion.

In conclusion, if there is no tapering in diameter between the proximal and distal parts of the relevant responsible bronchus, transbronchial occlusion with spigots should be avoided.

AUTHOR CONTRIBUTIONS

RM: Writing-Original Draft. KU: Writing-Review & Editing. All authors performed surgery, and read and approved the final manuscript.

CONFLICT OF INTEREST STATEMENT

None declared.

DATA AVAILABILITY STATEMENT

The data underlying this article will be shared on reasonable request to the corresponding author.

ETHICS STATEMENT

The authors declare that appropriate written informed consent was obtained for publication of this manuscript and accompanying images.

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