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Treatment Experience with Percutaneous Drainage for Infected Pulmonary Bulla Complicated after Severe Pneumonia: A Case Report

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1. Abstract

A 52-year-old man visited a local doctor for fever, but his symptoms worsened despite antibiotic chemotherapy. He was referred to our hospital with a diagnosis of severe pneumonia. Antibiotic plus immunosuppressive treatment were started immediately. After that, bilateral pneumothorax occurred, then, bullectomy and pulmonary suture under thoracoscopy were performed. After surgical treatment for pneumothorax, an infected pulmonary bulla was found on the left side. Percutaneous drainage was chosen to control infection, because the antibiotic therapy alone was not able to improve the infected bulla and the patient's general condition was poor. As a result, the infected pulmonary bulla was successfully treated without surgery.

2. Introduction

It has been reported that pulmonary bullae are complicated by infection in 9-27% of patients1). Although it is a common occurrence, the background of each case is different, and the treatment for infected bulla is often difficult. We report a case of a MRSA-infected pulmonary bulla cured by percutaneous drainage complicated after severe pneumonia.

3. Case Report

A 52-year-old man visited a nearby hospital with fever and was treated with antibiotics for approximately 2 weeks. At the time of admission, her body temperature was 38.3°C, SpO2 was 90% (O2 1 L nasal), and auscultation revealed rales in both lungs. Strepto anginosus group (1+) was detected in sputum, WBC 13100/μL, CRP 7.5 mg/dL in blood test and LDH 344 U/mL, BNP 29.2 pg/mL, KL-6 621 U in biochemical test were observed. A chest CT scan revealed bilateral severe emphysema, a mixture of infiltrative shadows and ground-glass opacities in the right lower lobe, left tongue segment, and left lower lobe, and bilateral pleural effusion (Figure 1a), so treatment was started on the same day. However, as the symptoms and imaging findings worsened, ventilator management was performed, and LVFX 500 mg/day was added, steroid pulse therapy (mPSL 1 g/day for 3 days, then tapered from 500 mg → 120 mg → 80 mg → 40 mg) + endoxan pulse therapy (CPA 1 g) were performed. Left pneumothorax was confirmed on the 12th hospital day, so a trocar was inserted. Later, right pneumothorax and right bulla infection developed concurrently, so SBT/ABPC 6 g/day + CLDM 1.2 g/day were started. On the 43rd hospital day, pulmonary bullectomy and pulmonary fistula closure were performed for bilateral pneumothorax. On the 47th day, the right pneumothorax recurred ,so pleurodesis was performed to stop the air leakage of the lung. The patient developed intermittent fever on the 85th day of illness, and a chest X-ray showed fluid retention in the left cyst. He was diagnosed with a left infected bulla, and was started on DRPM 1.5 g/day + CLDM 1.2 g/day (Figure 1b). The infection in the left bulla did not improve with antibiotics alone, and his general condition was bad, Performance status (PS) was 3-4. Therefore, an 8Fr catheter was inserted into the cyst on the 99th hospital day to drain the cyst fluid percutaneously instead of surgically resecting the infected bulla . However, it became impossible to drain the fluid soon due to its high viscosity, so

finally a 24Fr drainage tube was placed into the cyst (Figure 1c). Since an additional anti-MRSA drug for the retained fluid detected MRSA was administered, cystic infection showed a tendency to improve due to a synergistic effect with drainage. When removing the drainage tube, that catheter diameter was gradually reduced (24 Fr→16 Fr→12 Fr→8 Fr), and no lung collapse was confirmed by a clamp test, so the drain was removed on the 158th hospital day. A subsequent chest radiograph showed contraction of the left pulmonary cyst, and the patient was discharged from the hospital on the 169th hospital day (Table 1).

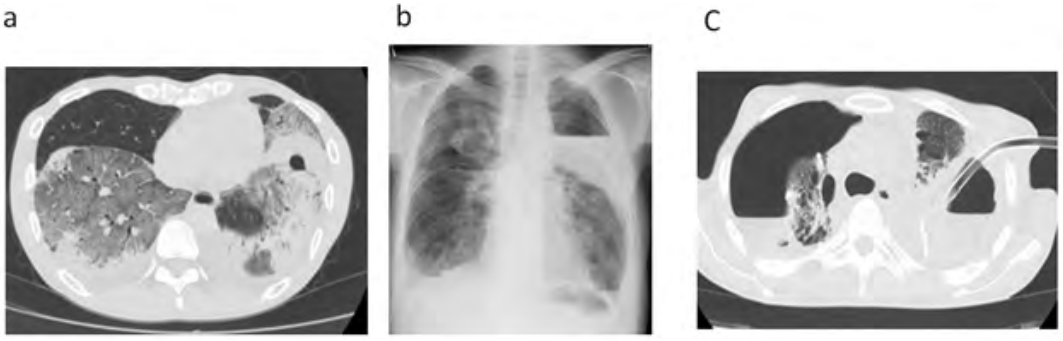
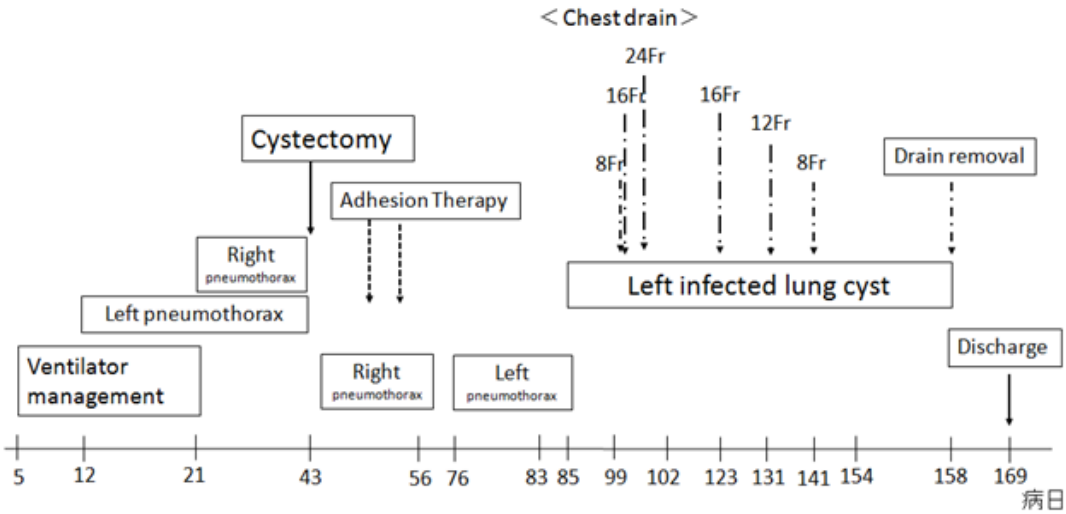


Figure 1A: In addition to bilateral emphysema, infiltrative shadows and ground-glass opacities were observed in the right lower lobe, left tongue segment, and left lower lobe, and bilateral pleural effusions were confirmed. **1B:** There was mild collapse of the right upper lobe and decreased lung volume due to the previous surgery. Fluid accumulation was observed in the left pulmonary cyst. **1C:** Fluid retention and thickening of the cyst wall were found in the left cyst cavity, and a 24 Fr tube was inserted to eliminate fluid collection.

Table 1: The clinical course is written, and as shown in the figure, the diameter of the catheter was reduced and it was removed.



4. Discussion

In this case, bullectomy was performed for the first time for an infected pulmonary bulla complicated with severe pneumonia due to severe emphysema. Because of his poor general condition, we tried percutaneous drainage instead of surgery. Infected lung cysts are first treated with antibiotics, and if ineffective, surgical treatments such as bullectomy are considered [2]. If surgical treatment is difficult due to poor general condition, however, transbronchial drainage or percutaneous cyst drainage are effective [3]. In this case, when considering the second operation, the patient's general condition was bad, so we thought the reoperation to be invasive for the patient. Considering the possibility of third recurrence, it was necessary to choose a treatment that puts the least burden on the patient. The indications for percutaneous drainage are [1] no improvement with antibiotics, [2] difficulty in trans-airway drainage, and [3] the presence of pleurodesis at the puncture site [4]. In this case, regarding [3], CT showed that the cyst wall and chest wall were in wide contact, and we judged that there was inflammatory adhesion at the site. The success rate of percutaneous drainage is 83.9%, and complications associated with drain obstruction are 16.1% [3,5,6]. In this case, the first 8Fr tube was obstructed in a short period of time, and finally replaced with a 24Fr tube, which reduced the cystic fluid. Insertion of a larger-diameter drain into the pulmonary cyst was expected to lead to aggravation of pneumothorax, lung injury, and progression to empyema [6], but it is highly likely that such a situation could have been prevented by adhesion. When removing the tube, we were concerned about recommunication between the bulla and the airway, and aggravation of pneumothorax due to the improvement of the infection, so we gradually replaced it with a thinner catheter. An air fistula, which was thought to be caused by recommunication between the bulla and the airway, was actually observed after switching to 12Fr

tube. When the drain was removed in this situation, it was thought that air might flow into the thoracic cavity via the chest wall [7]. Therefore, a clamp test was performed for several days before the drain was removed, and we were able to remove the tube without collapsing the lung and shrinking the bulla due to strong adhesion between the lung and the parietal pleura. Regarding the shrinkage of the bulla, the fibrosis of the bulla wall probably caused the wall to stiffen and shrink [7]. Other complications associated with percutaneous drainage have been reported, including pneumothorax associated with puncture, concurrent empyema due to leakage of cystic fluid, and the possibility of rapid deterioration of respiratory status [1]. If successful, it can be a relatively minimally invasive procedure for patients with poor general condition, but it is necessary to be prepared to deal with possible complications immediately.

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