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Non-Surgical Management of a Large Pulmonary Abscess in a Pediatric Patient: A Case Report

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Abstract

Background: Lung abscess is a complication of pneumonia that represents a cavity filled with purulent content in the lung parenchyma, resulting from its destruction. Not infrequently, this condition is complicated by persistent air leak (PAL), which further complicates the course of the disease.

Case Description: We present a clinical case of a two-year-old child with a lung abscess with minimal pleural reaction. Targeted drainage of the cavity was performed, which achieved adequate sanitation. After drainage, bronchoscopic obstruction of the left lower lung lobe was performed due to PAL. The obturation was performed with a pre-molded bronchial blocker for a period of 30 days. Its placement and extraction were performed via rigid bronchoscopy. The air leak ceased during the intervention itself, which was verified by monitoring the underwater drainage system.

Conclusions: The combination of these two methods allows for complete lung healing without the need of resection surgery. Targeted drainage of the abscess cavity facilitates evacuation of the purulent collection, while bronchoscopic occlusion addresses the persistent air leak and allows for prolonged pleural lavage.

Keywords: Persistent Air Leak (PAL), Alveolo-Pleural Fistula, Bulgaria

Introduction

Lung Abscess is the formation of a confined cavity or multiple cavities in the lung, resulting from its destruction, filled with liquid or thick purulent material. The surrounding lung parenchyma exhibits pronounced inflammatory infiltration [1].

Persistent Air Leak (PAL) is the flow of air into the pleural cavity from a fistulous channel, which may originate from the periphery of the lung (alveolo-pleural fistula) or from centrally located airways (broncho-pleural fistula). Persistent air leak is defined as the flow of air into the pleural cavity from a fistulous channel lasting more than 5-7 days [2]. According to other authors, the leak is defined as persistent when present for more than 48 hours [3]. Causes of its formation include surgical interventions in the thoracic cavity, infections, lung biopsies, chest trauma, and prolonged mechanical ventilation. Persistent air leak is a frequent complication in necrotizing pneumonia in childhood. The incidence varies between 5 and 15%, with series of up to 55% even being described [4-7].

The presence of this condition is a serious complication that leads to prolonged hospital stay, and despite advances in medicine, its diagnosis and treatment remain a major challenge for physicians.

Conservative treatment with intravenous antibiotics is the first method of choice in the presence of lung abscess without or with minimal pleural reaction. Surgical intervention is necessary when there is no response to the provided treatment or in cases of abscesses with very large size >6cm [8].

Case Presentation

A two-year-old girl with an unremarkable premorbid history. For 10 days with catarrhal symptoms and fever up to 39 degrees Celsius. Received inpatient treatment in a pediatric ward for 4 days. Due to evidence of increasing left-sided pleural effusion, she was referred to the Pediatric Surgery Clinic. Upon hospitalization, she was in severely compromised general condition, intoxicated with signs of respiratory failure - nasal flaring, epigastric retraction, respiratory rate 30-35/min. On auscultation, bronchovesicular breathing on the left, markedly diminished to absent at the base. Imaging studies showed pleural effusion with a width of 26mm. Thoracic ultrasound indicated stage 2a. A thoracic chest drain was placed with evacuation of 100ml of serosanguineous exudate. (Fig 1).

Fig 1: Chest X-ray on admission (left) and after chest tube insertion (right)

During the course of ongoing antibiotic therapy, the general condition improved and body temperature normalized. Due to absence of secretion from the thoracic chest drain (TCD), it was removed on the third day after placement. Follow-up imaging studies showed evidence of an abscess cavity in the left lower lobe. (Fig 2 and 3).

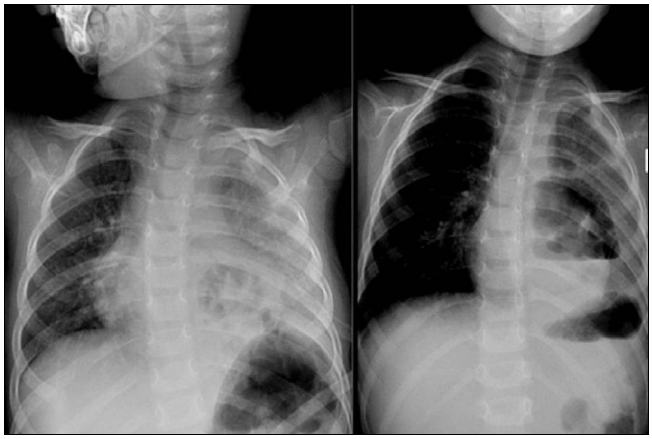

Fig 2: Chest X-rays on the 2nd (left) and 6th (right) day of hospitalization

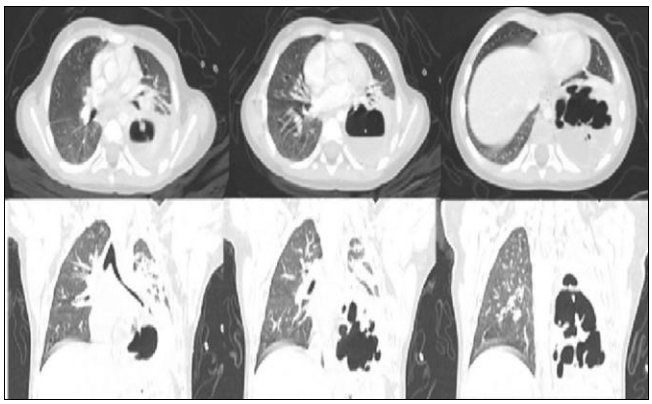

Fig 3: CT scan performed on day 7 of hospitalization

Due to minimal amount of pleural effusion - 7.5mm, a decision was made to perform Monaldi drainage of the abscess cavity under fluoroscopic and ultrasound guidance. A 9F pigtail catheter was inserted, evacuating a large amount of air and thick brownish pus approximately 40ml. (Fig 4).

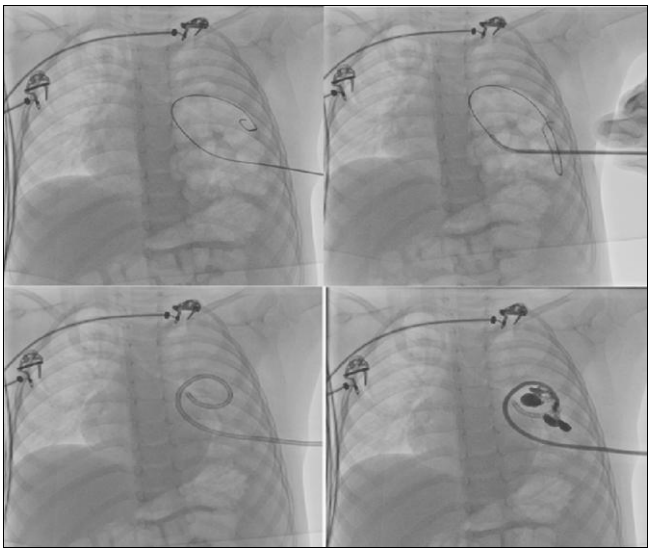

Fig 4: Percutaneous drainage of the abscess cavity

After drainage of the abscess cavity, on the fifth day from drainage placement, bronchoscopic obturation of the left lower lobe bronchus was performed, using two pre-molded endobronchial blockers. (Fig 5).

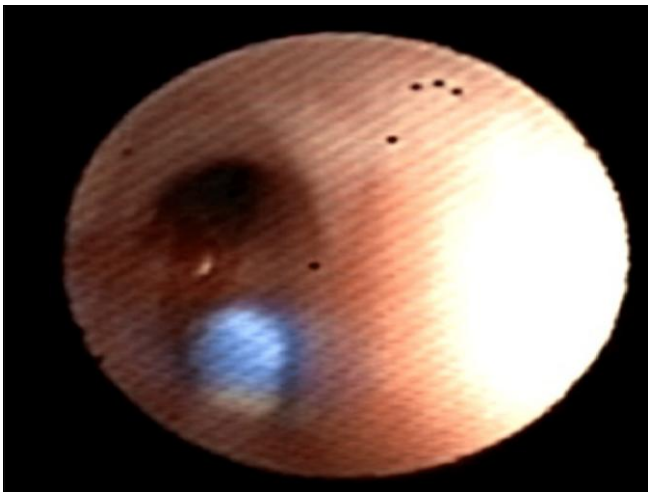

Fig 5: Bronchoscopy demonstrated the left lower lobe bronchus occluded by a previously molded obturator

The child remained persistently afebrile, gradual improvement in pulmonary status was registered, and a decrease in inflammatory activity was documented from the paraclinical investigations. The drain was removed on the 7th day from abscess drainage. (Fig 6).

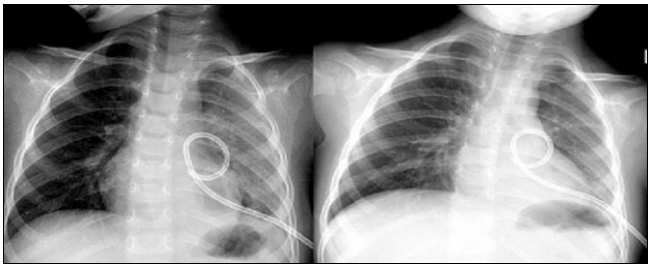

Fig 6: Follow-up chest X-rays during ongoing conservative management

The child was discharged after 17 days of treatment. Bronchoscopy with extraction of the blockers was performed 30 days after obturation. At follow-up within 2 months after completion of treatment, the child was asymptomatic with normal physical status. (Fig 7).

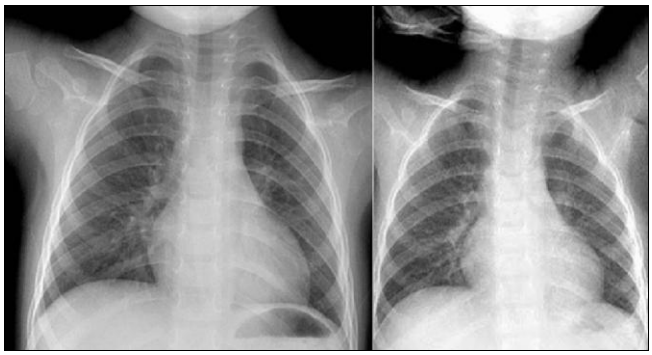

Fig 7: Chest X-rays at obturator removal (left) and two months later (right)

Discussion

In the presented clinical case, we demonstrate a patient with a large lung abscess and subsequent PAL, in whom complete restoration of the lung parenchyma was achieved without the need for resection surgery. Through targeted drainage of the abscess cavity, adequate sanitation was achieved, and bronchoscopic obstruction limited the air leak. The simultaneous use of these two methods led to complete lung healing. The clinical case is rare because in the majority of cases, lung abscesses in childhood present with pleural empyema rather than in isolation with minimal pleural reaction.

Conclusions

Compared to resection surgery methods, bronchoscopic interventional techniques lead to elimination of the air leak with minimal trauma to the patient without increasing morbidity. Despite the need for at least one additional anesthesia for blocker extraction, the interventions have a duration of 15 to 30 minutes, in contrast to the time required to perform resection surgery. Additionally, there is no pain associated with performing extensive surgical interventions, and the absence of need for intensive care treatment allows for earlier mobilization and rehabilitation of patients.

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