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Case report

A rare case of *Actinomyces meyeri* empyema: Still a challenging entity to manage

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ABSTRACT

Actinomyces meyeri is a rare pathogen and an infrequent cause of human actinomycosis. Less than ten cases were reported in the English-literature to date concerning *A. meyeri* empyema. We herein report a case to promote the awareness and adequate management of the disease.

A 44-year-old immunocompetent male with known pulmonary disease was diagnosed with an *A. meyeri* empyema. He underwent chest tube drainage and a short-term treatment with clindamycin for 4 months.

This is the first report of a patient with structural pulmonary disease with an *A. meyeri* empyema treated with 4-month of clindamycin and chest tube drainage. In comparison to previous reports, our case was diagnosed early, empyema was effectively drained with one chest tube and symptoms and radiological findings were rapidly improved. Short-term antibiotic treatment can be well succeeded if an early diagnosis is made, there is no evidence of dissemination and adequate management is promptly instituted.

1. Introduction

Actinomycosis is an unusual chronic infection caused by a group of anaerobic Gram-positive bacilli from the *Actinomyces* genus. *Actinomyces israelii* is the mainly microorganism involved in human diseases, while *Actinomyces meyeri,* in dissimilarity to other species of *Actinomyces*, is a rare cause of human actinomycosis. *A. meyeri* regularly causes pulmonary disease, but instead there are few cases of empyema, displaying a predisposition for dissemination to distant organs. *A. meyeri* respiratory infection grants nonspecific symptoms or radiological characteristic findings. Consequently, microbiological and histological examinations are imperative for diagnosis [1]. Here, we report a one of the few cases of empyema caused by *A. meyeri*.

2. Case report

A 44-year-old immunocompetent male patient with previously known diffuse centrilobular emphysema caused by smoking abuse and saccular form of bronchiectasis in the upper right lobe, probably triggered by a formerly infection. Additionally, the patient had a medical history of hypertensive cardiovascular disease, epilepsy, penicillin and derivatives allergy, and alcohol abuse and was medicated accordingly. He appeared acutely ill with dyspnea and right chest pain for 4 months, without other additional symptoms. The patient's physical chest examination revealed diminished breath sounds in the right side and poor gingival and dental condition. Laboratory analysis showed leukocytosis (16.17 $\times$ 10^9/L) with neutrophilia (78.2%), thrombocytosis (524000/mm^3) and elevated C-reactive protein (20.0 mg/dL). The remainder of the laboratory findings and the arterial blood gas was unremarkable. A large amount of right sided pleural effusion was present on chest radiograph (Fig. 1). Computed tomography (CT) of the chest showed an asymmetrical chest with decreased right lung volume, associated pleural effusion, some saccular bronchiectasis in the upper right pulmonary lobe and diffuse centrilobular emphysema spots (Fig. 2). A thoracic ultrasonography was performed and revealed a loculated pleural effusion. An 18F chest tube was inserted and 1100 ml of purulent pleural fluid was drained. The pleural drainage was removed after 4 days. Pleural fluid was consistent with a polymorphonuclear exudate and gram staining showed numerous filamentous structures morphologically consistent with *Actinomyces*. In anaerobic culture conditions, *A.* meyeri was isolated in the pleural fluid. These bacilli were susceptible to amoxicillin/

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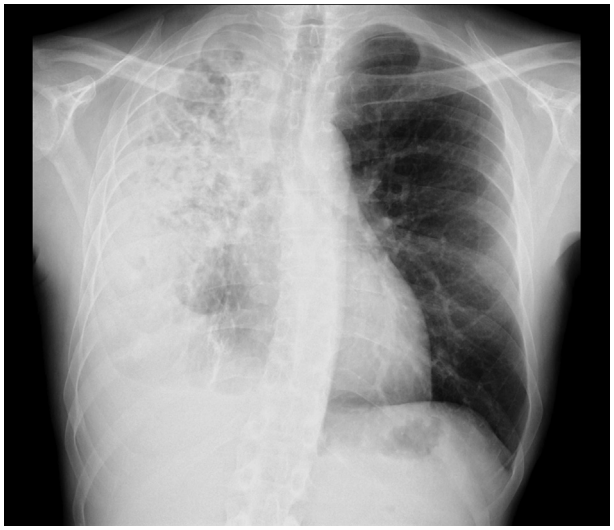

Fig. 1. Initial chest radiograph revealing large loculated pleural effusion in the right hemithorax.

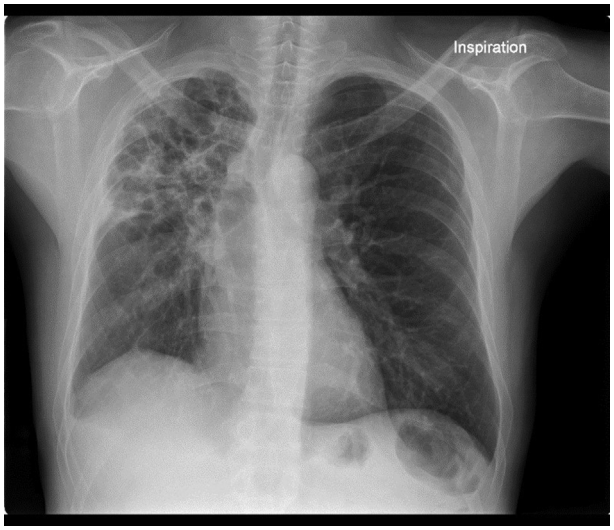

Fig. 3. A chest radiograph showing complete empyema resolution after 4 weeks of clindamycin treatment.

clavulanic acid, penicillin and clindamycin and resistant to metronidazole. He underwent a flexible bronchoscopy with bronchial aspirates and bronchoalveolar lavage that exposed unremarkable findings without any isolated microbiologic agent. From the day of admission, the patient was treated empirically with levofloxacin (750 mg intravenously once a day), without clinical, analytical or imaging improvement. After identification of the pathogenic organism, antibiotics were changed to intravenous clindamycin (2400 mg intravenously twice-daily) with a course of 14 days. Urokinase was not instilled in pleural space. Clinical, analytical and radiograph and CT chest improvement were significant on the follow-up. After 3 weeks of hospitalization, the patient was discharged with the indication to maintain oral clindamycin (450 mg *per os* four times daily). Additionally, the patient successfully completed a respiratory rehabilitation program. A revaluation by chest radiograph after 4 weeks of oral clindamycin treatment showed maintained improvement, with complete empyema resolution (Fig. 3). The patient completed 4 months of clindamycin treatment, without evidence of recurrence during the 12-month follow-up period. Although, a revaluation by chest CT at 8-month showed worsening of the previously known pulmonary disease, with multiple saccular bronchiectasis in the upper right lobe, the largest with 45 mm with important retractable component and a clear retraction of the mediastinum to the right.

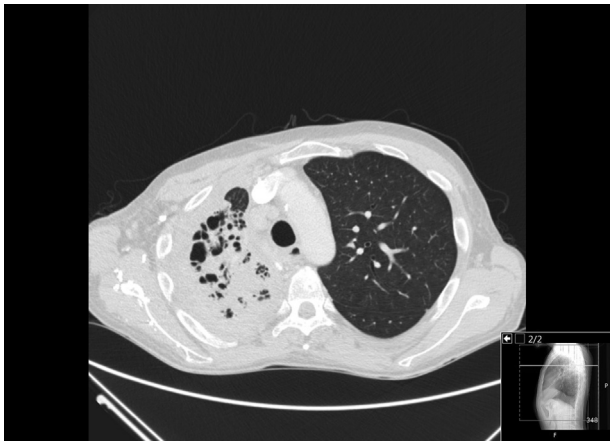

Fig. 2. Computed tomography of the chest showed decreased right lung volume and associated pleural effusion.

3. Discussion

Actinomycosis is caused by anaerobic Gram-positive bacilli commonly present in the gastrointestinal and reproductive systems. Pulmonary actinomycosis accounts for about 15% of cases and may follow aspiration of oropharyngeal or gastrointestinal secretions with *Actinomyces* species into the respiratory tract. Periodontal disease and the aspiration of the organisms from the oral cavity are recognized as main risk factors for pulmonary infection. Infection is generally slowly progressive, and may invade locally tissues or disseminate via the bloodstream [1]. It can occur at any age and is more common in men. Predisposing factors include structural lung disease, HIV infection, corticosteroid use, chemotherapy, organ transplant, and alcoholism [2].

Chest pain, cough, hemoptysis, fever, weight loss, and anorexia are typical symptoms. Imaging is variable, comprising parenchymal infiltrates, consolidation, masses, mediastinal or pleural involvement and sometimes mimicking fungal or mycobacterial disease or cancer, which contributes to the difficulty in making the correct diagnosis. Therefore, microbiology including anaerobic culture of infected material and histological examinations are important for the definitive diagnosis [1].

In particular, *A. meyeri* is a very rare pathogen, cultured from an empyema in 1911 for the first time, with less than ten cases reported in the English-language literature to date [3]. It has the predilection for pulmonary involvement and hematogenous dissemination to distant organs [4]. The pathophysiologic mechanisms are not yet fully understood. Concerning drug treatment, several reports advocate that thoracic actinomycosis can be treated with a short-term antibiotic treatment [5,6]. A review of the English-language literature revealed only one case of *A. meyeri* empyema in a male with no history of medical illness. This patient was treated with a short-term of intravenous penicillin and oral amoxicillin and only a chest tube drainage, with no evidence of dissemination or recurrence [7].

To our knowledge, the present case is a unique report of a male patient with structural pulmonary disease with an *A. meyeri*

empyema treated with a short-term therapy of clindamycin for 4 months and only a chest tube drainage, with no evidence of dissemination or recurrence. In most of previous reports, the patients underwent a surgical procedure, and the duration of antibiotic therapy ranged from 6 to 12 months [3,8,9]. In comparison, the present case was diagnosed early and was effectively drained with only a chest tube, in association with respiratory rehabilitation. Additionally, there was no evidence of dissemination and clinical and radiological findings were rapidly improved. These facts call attention for the success of short-term antibiotic treatment when an early diagnosis is established, without evidence of dissemination, and adequate management is promptly instituted. The usual recommendation of antibiotic therapy for 6–12 months may not be required for all patients.

In conclusion, empyema due to *A. meyeri* is unusual, and anaerobic culture of pleural fluid is crucial in the premature diagnosis of this entity. Prompt diagnosis and successful drainage are important to reduce the treatment duration and potential sequels, even in large loculated pleural effusion as the present case.

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Conflicts of interests

The authors declare to have no conflict of interest directly or indirectly related to the manuscript contents.

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