

Lung abscess by *Actinomyces odontolyticus* and *Parvimonas micra* co-infection presenting as acute respiratory failure

A case report

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Abstract

Rationale: *Actinomyces odontolyticus* and *Parvimonas micra* are very rare causative organisms of lung abscess and acute respiratory failure.

Patient concerns: A 49-year-old male patient visited the emergency room with a complaint of sudden onset of shortness of breath, and he developed acute respiratory failure rapidly.

Diagnosis: An abscess in the left lower lung field was diagnosed on the computed tomography scan of chest.

Interventions: Immediate treatment with intravenous antibiotics was initiated along with a pigtail catheter insertion for pus drainage.

Outcomes: *A odontolyticus* was cultured on the drained pus and *P micra* was identified by a blood culture. The patient was successfully weaned from the mechanical ventilator and the lung abscess was completely resolved.

Lessons: To the best of our knowledge, this is the first case report of mixed infection with *A odontolyticus* and *P micra*, which caused acute respiratory failure in an immune-competent patient. Therefore, physicians should consider the possibility of these organisms as causative pathogens of a fulminant pulmonary infection even in an immune-competent patient.

Keywords: *Actinomyces odontolyticus*, acute respiratory failure, infection, lung abscess, *Parvimonas micra*

1. Introduction

Lung abscess is usually caused by polymicrobial infections with anaerobes including *Peptostreptococcus*, *Prevotella*, and *Bacterioides*, and aerobes including *Streptococcus*, *Staphylococcus*, and *Klebsiella*.^[1] The incidence of actinomycosis is on the decrease and pulmonary actinomycosis accounts for less than 15% of all forms of actinomycosis. Furthermore, the prognosis of actino-

mycosis is good and mortality rate is low.^[2] However, timely diagnosis and proper management of pulmonary actinomycosis are still important because aggressive forms of pulmonary actinomycosis can develop rarely.^[2,3] *Parvimonas micra* is a commensal of the human oral cavity, which rarely causes pulmonary infections. Only a few cases of such pulmonary infections have been identified in pure culture.^[4] In this article, we report a case of lung abscess due to a mixed infection with *Actinomyces odontolyticus* and *P micra*, which initially presented with acute respiratory failure. Patient has provided informed consent for publication of the case.

2. Case report

A 49-year-old male patient visited the emergency room with a complaint of sudden onset of dyspnea developed on the day of the hospital visit. He did not complain of cough or purulent sputum, and did not have fever. He was a current smoker with a 20 pack-year smoking history and had a heavy alcohol drinking habit. His past medical history included hypertension.

On examination, the patient was alert and oriented. He had poor oral hygiene with extensive caries. His body temperature was 36.1°C, blood pressure was 130/70 mm Hg, respiratory rate was 35 breaths per minute, heart rate was 120 beats per minute, and oxygen saturation was 76% on room air. Despite the inhalation of 15 L/min oxygen via facial mask, the patient developed acute respiratory failure and therefore, mechanical ventilation was started.

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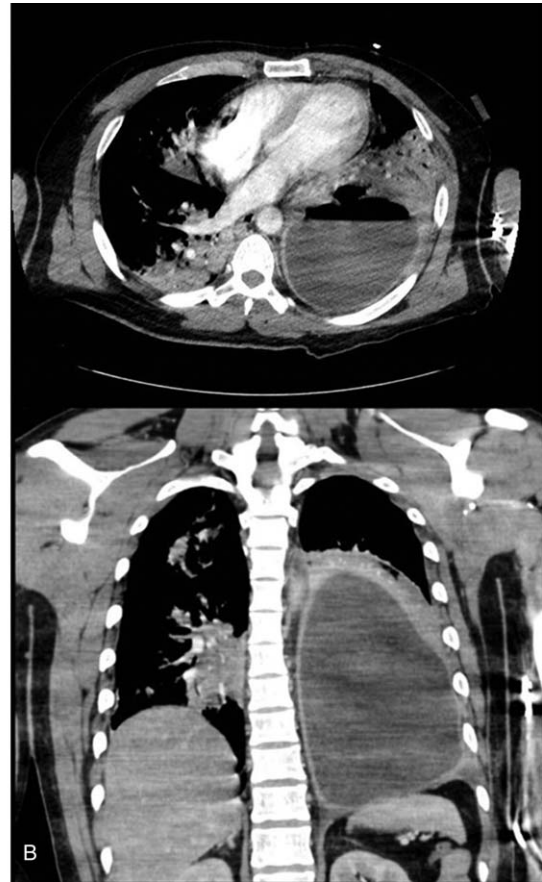
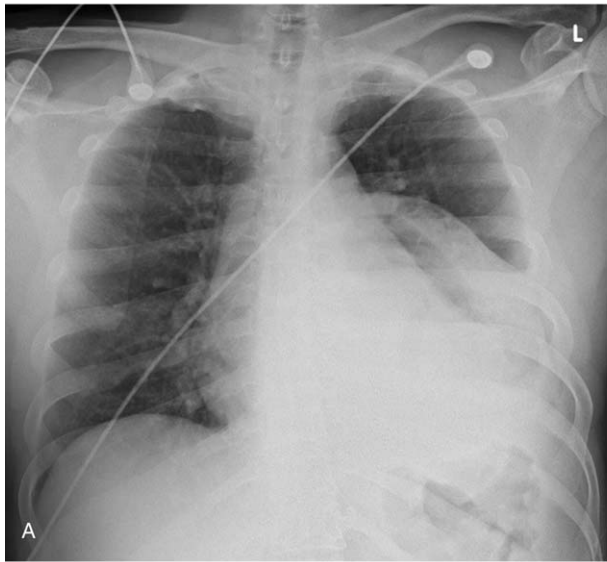


Figure 1. (A) The initial chest x-ray showing infiltration with an air-fluid level in the left lower lung field. (B) The initial chest computed tomography scan before the insertion of a pigtail catheter showing a large lung abscess with internal air and surrounding consolidation in the left thorax.

Initial laboratory test showed a white blood cell count of $17,940/\text{mm}^3$ with 90.1% neutrophils, hemoglobin of 11.1 g/dL, platelet count of $589 \times 10^3/\text{mm}^3$, erythrocyte sedimenta-

tion rate of 105 mm/h, and C-reactive protein of 275.6 mg/L. Liver function test showed total bilirubin of 1.59 mg/dL, alkaline phosphatase of 513 U/L, aspartate transaminase of 43 U/L, alanine transaminase of 42 U/L. In addition, renal function test showed blood urea nitrogen of 24.9 mg/dL, creatinine of 1.86 mg/dL.



Figure 2. The follow-up chest x-ray showing an improvement of the lung abscess in the left lower lung field.

The initial chest radiographs showed a consolidation in the left lower lung field (Fig. 1A). A computed tomography scan of the chest showed a large lung abscess with an air-fluid level in the left lower hemithorax (Fig. 1B). Ceftriaxone and clindamycin were administered promptly and a percutaneous pigtail catheter was inserted to drain the abscess. The drained fluid was purulent in gross appearance. The patient was successfully weaned from the mechanical ventilator on the 6th day of the hospital visit. *A. odontolyticus* was sensitive to penicillin, ampicillin, cephalosporin, tetracycline, clindamycin, and erythromycin. *P. micra* was sensitive to Penicillin, amoxicillin, clindamycin. Therefore, the antibiotics were changed to ampicillin-sulbactam, and the patient recovered faster. The oral examination revealed swelling and redness of gingiva, accumulation of dental calculus, and gingival bleeding on probing. The percutaneous drainage catheter was removed on the 12th day of the hospital visit. The patient was discharged on the 26th day from admission with markedly improved symptoms and general condition. After discharge, oral amoxicillin/clavulanate was prescribed as maintenance therapy for 6 months and the left lung lesion was resolved (Fig. 2).

3. Discussion

Lung abscess due to *A odontolyticus* or *P micra* is very rare, and co-infection with both organisms causing lung abscess and acute respiratory failure had not been reported. The *Actinomyces* species are gram-positive bacteria and are facultative anaerobes.^[2,3] *P micra* is also a facultative, anaerobic, gram-positive bacterium.^[4] These 2 species are often found in the human oropharynx.^[3,4] Pulmonary infection by *A odontolyticus* or *P micra* result from the aspiration of these species into the lungs. In this article, we reported a case of lung abscess and respiratory failure in an immune-competent patient caused by these 2 organisms.

A prompt diagnosis and an adequate treatment of pulmonary actinomycosis are important even though it is a relatively rare disease with a low mortality rate. The computed tomography findings of pulmonary actinomycosis provide limited information; therefore, the confirmative diagnosis of pulmonary actinomycosis is made by a microscopic examination of pus or lung biopsy sample.^[2,5] A case of pulmonary actinomycosis of periodontal origin by *Actinomyces naeslundii* and *Actinomyces viscosus* was reported previously.^[6] A case of periodontal disease-associated septic pulmonary embolism by *Actinomyces* species was also reported, but the specific species was not mentioned.^[7] This case highlights the potential pathogenic role of *A odontolyticus* of periodontal origin as a risk factor for lung infection.

The pulmonary infection by *P micra* is also very rare and *P micra* is rarely identified in pure culture. This organism usually causes periradicular diseases and periodontitis, with other microorganisms.^[4] Poetter et al reported a case of pleural empyema in which *P micra* was cultured from the pleural pus.^[4] In our case, *A odontolyticus* was identified by the pleural fluid culture and *P micra* was identified by the blood culture.

Although pulmonary actinomycosis is rare and difficult to diagnose, prognosis is relatively good if it is properly treated.^[2,8] There are no guidelines for antibiotics treatment for pulmonary actinomycosis and *P micra* infection yet. The recommended therapy for these infections is 4 to 6 weeks of intravenous penicillin followed by a 6 to 12 months oral regimen.^[2,4,9] In this case, the patient was treated with intravenous antibiotics for 15

days along with percutaneous drainage and further treated with oral antibiotics for several months.

This case highlights the potential pathogenic role of *A odontolyticus* and *P micra* in immune-competent patients with lung abscess. Physicians should consider these organisms as causative pathogens of lung abscess and acute respiratory failure, especially when the evidence of periodontitis exists.

Author contributions

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