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(CASE REPORT)

Pulmonary abscess due to *Rothia mucilaginosa*: A rare case in an immunocompetent patient

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Abstract

Rothia mucilaginosa is a germ rarely involved in pulmonary abscesses, especially in immunocompetent patients. We report the case of a 69-year-old man, a former smoker, admitted for fever, productive cough, and purulent sputum for the past 15 days. Clinical examination revealed moderate fever, tachycardia, and tachypnea, along with abnormal auscultatory findings in the right lower lung. Blood tests showed leukocytosis with a predominance of neutrophils. Imaging studies revealed an 8 cm hydro-aerial collection, suggesting a pulmonary abscess.

Despite antimicrobial treatment including third-generation cephalosporins, ciprofloxacin, and metronidazole, the patient continued to exhibit symptoms. Blood gas analysis revealed severe hypoxia and hypercapnia. A thoracic ultrasound identified a cystic formation, leading to chest drainage on the sixth day of hospitalization, resulting in the extraction of 1.5 liters of purulent fluid.

The cytobacteriological examination of the fluid confirmed the presence of *Rothia mucilaginosa*, with no signs of malignancy or fungal infection. Following drainage, both clinical and radiological improvement was observed, highlighting the importance of early diagnosis and therapeutic intervention in the management of pulmonary abscesses, particularly in at-risk patients.

Keywords: Pulmonary abscess; *Rothia mucilaginosa*; Immunocompetence; Chest drainage

1. Introduction

Rothia mucilaginosa (*R. mucilaginosa*) is a Gram-positive coccus and a facultative anaerobic bacterium, part of the normal flora of the oral cavity and upper respiratory tract [1]. As an important opportunistic pathogen, it can cause severe infections in patients with immunosuppression due to conditions such as malignancies, acquired immunodeficiency syndrome, liver transplantation, etc [2-3]. However, few cases of pulmonary abscesses caused by this bacterium have been reported in immunocompetent individuals [3-4].

Cases of bacteremia, endocarditis, central nervous system infections, urinary infections, osteomyelitis, peritonitis, and, very occasionally, lower respiratory tract infections have been reported [5]. We describe here a case of a pulmonary abscess due to *R. mucilaginosa* in an immunocompetent patient.

2. Case Report

A 69-year-old male smoker, with a history of valve replacement surgery, was admitted with complaints of fever and cough with purulent sputum for the past 15 days. On examination, he was febrile (38.2°C), tachycardic (121 beats per

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minute), and tachypneic (22 breaths per minute). Examination of the lungs revealed decreased vesicular breath sounds in the lower two-thirds of the right lung field. The rest of the physical examination was unremarkable. No dental or periodontal infection was found. Laboratory tests showed a white blood cell count ranging from 17.7 to 10.9 thousand/mm^3, with a predominance of neutrophils (80%). Furthermore, hemoglobin levels, blood glucose, and electrolyte levels; platelet count; as well as renal and liver function tests were all determined, with results falling within the reference range; The tests for viral infections, such as HIV, were negative. The tests included assessments of blood glucose and hemoglobin A1c (HbA1c), both of which were normal. A chest X-ray (Figure 1A) revealed a round opacity of water density occupying the right lower lung, topped by a clear area without vascular markings, creating the appearance of a hydro-aerial level.

Computed tomography (CT; Figure 2) showed a well-defined round hydro-aerial collection measuring 8 cm in diameter, potentially related to a pulmonary abscess in the right lower lobe. A pulmonary abscess was diagnosed based on clinical and radiological findings. A triple therapy regimen consisting of third-generation cephalosporins, ciprofloxacin, and metronidazole was initiated, along with treatment for his heart condition, and respiratory physiotherapy. No pathogens were found in the sputum and blood cultures collected during hospitalization. Fever and right pleuritic chest pain persisted despite antimicrobial treatment. Arterial blood gas analysis (on room air) showed a pH of 7.44, a partial arterial oxygen pressure (PaO2) of 54.5 mm Hg, and a partial arterial carbon dioxide pressure (PaCO2) of 53.2 mm Hg. Thoracic ultrasound detected a cystic parenchymal formation in the right lung, characterized by a thick-walled, multi-loculated anechoic content, located 3.6 cm from the overlying skin wall. The patient then underwent right posterior chest drainage on the sixth day of hospitalization. Approximately 1.5 liters of purulent fluid were drained. The cytobacteriological examination of the abscess fluid was positive for ***Rothia mucilaginosa***. No signs of malignancy or fungal elements were observed. Post-drainage chest X-ray (figure 1B,1C) indicated early radiological clearance, along with clinical and biological improvement in the patient.

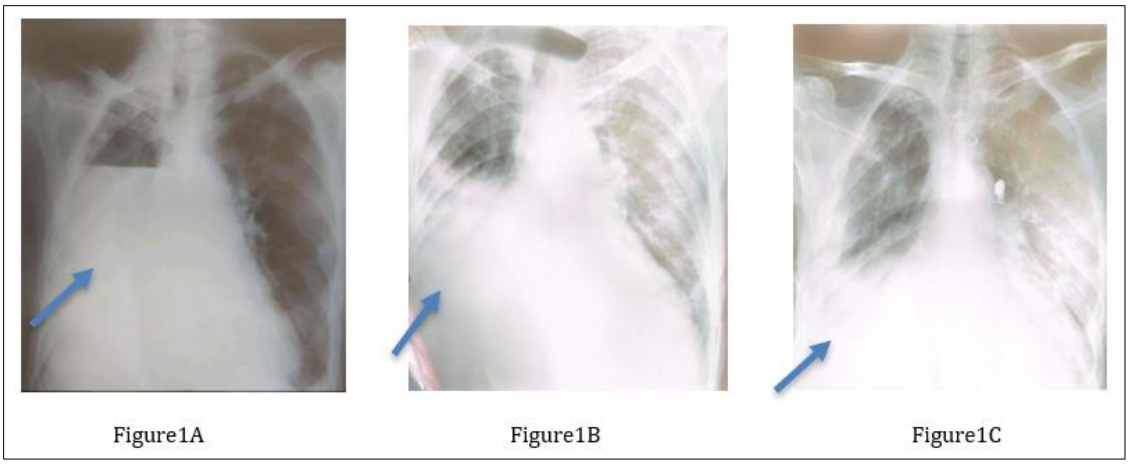

Figure 1A Chest X-rays taken during hospitalization show significant evolution following the drainage of the pulmonary abscess. Before drainage, the imaging revealed a round opacity with a characteristic hydro-aerial level indicative of a purulent collection in the right lower lung. After chest drainage, the post-intervention X-rays (figure: 1B, 1C) showed early signs of radiological clearance, indicating a reduction in opacity and improvement in pulmonary aeration

Chest X-rays taken during hospitalization show significant evolution following the drainage of the pulmonary abscess. Before drainage (Figure:1A), the imaging revealed a round opacity with a characteristic hydro-aerial level indicative of a purulent collection in the right lower lung. After chest drainage, the post-intervention X-rays (Figure:1B, 1C) showed early signs of radiological clearance, indicating a reduction in opacity and improvement in pulmonary aeration.

The thoracic computed tomography (CT) scan (Figure 2) performed during hospitalization accurately characterized the pulmonary abscess in the right lower lobe. The examination revealed a well-defined hydro-aerial collection measuring approximately 8 cm in diameter, with regular contours. This presentation is typical of a pulmonary abscess, indicating an accumulation of pus within the pulmonary parenchyma.

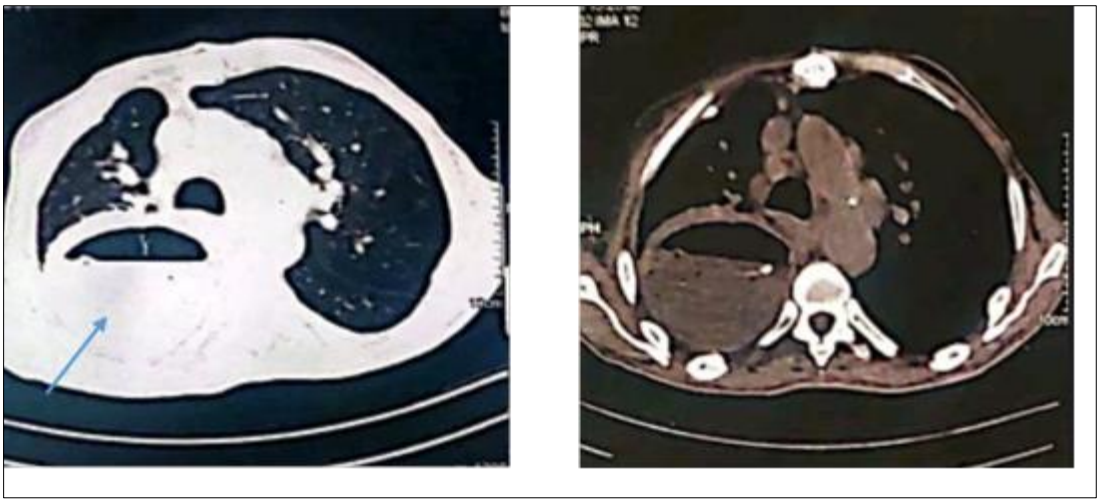

Figure 2 The thoracic computed tomography (CT) scan performed during hospitalization accurately characterized the pulmonary abscess in the right lower lobe. The examination revealed a well-defined hydro-aerial collection measuring approximately 8 cm in diameter, with regular contours. This presentation is typical of a pulmonary abscess, indicating an accumulation of pus within the pulmonary parenchyma

3. Discussion

We report a case of a pulmonary abscess in which *R. mucilaginosa* was the sole agent isolated from purulent pleural fluid samples in an immunocompetent patient. This microbe is rarely identified as the causal agent of lower respiratory tract infections. A pulmonary abscess is a necrotic cavity lesion of the pulmonary parenchyma, usually secondary to the inhalation of anaerobic bacteria or mixed flora [6]. Primary abscesses in healthy individuals account for 80% of cases; secondary abscesses are observed in cases of bronchial obstruction, underlying pulmonary conditions, or as a result of hematogenous spread. The pulmonary parenchyma can be affected via bronchogenic, hematogenous, or contiguous pathways [7]. Among the risk factors, poor oral hygiene, neurological disorders, gastroesophageal reflux, bronchial obstructions, and immunosuppression are noted [8]. Ninety percent of pulmonary abscesses are polymicrobial, with anaerobic bacteria being predominant. *Rothia mucilaginosa* is a Gram-positive facultative anaerobic coccus, oxidase-negative, and with variable catalase activity; in smears, the bacteria appear in pairs or clusters. It grows on most non-selective media and in standard blood culture systems. This bacterium is usually sensitive to β-lactams, with natural resistance to ciprofloxacin and aminoglycosides, and acquired resistance to macrolides (30% of strains). Only about 50% of abscesses are associated with purulent sputum [9]. Chest X-rays allow for diagnosis and monitoring of the therapeutic response. Before initiating any antibiotic therapy, microbiological samples are systematically collected (sputum, blood cultures, bronchial samples, and possibly pleural fluid or abscess puncture fluid). CT scans are crucial for localizing the abscess, particularly for small abscesses, and for aiding in differential and etiological diagnosis [10-11]. Thoracic ultrasound is useful if the abscess is peripheral. Importantly, bronchoscopy allows for bacteriological study and helps determine the presence of any potential neoplasia. Among the main differential diagnoses, bronchogenic carcinoma, necrotizing pneumonia, systemic diseases, tuberculosis, hydatid cysts, nocardiosis, and actinomycosis should be considered. Before tailoring treatment based on the pathogen and antibiogram, the antibiotics most commonly used as first-line treatments are clindamycin, beta-lactams with beta-lactamase inhibitors, and metronidazole. Initially, the intravenous route is often employed. The duration of treatment is at least 6 to 8 weeks. In cases of medical treatment failure, percutaneous drainage is the preferred treatment; it leads to complications in nearly one in five cases. If the hydro-aerial level of the abscess stagnates or worsens, endoscopic drainage is another option. Percutaneous drainage is the most commonly used invasive technique as a first-line approach. Its effectiveness, estimated at 83%, has been demonstrated in several studies, and it has the advantage of resulting in lower morbidity and mortality compared to surgical treatment [12].

However, this treatment carries risks, especially when the catheter path through healthy parenchyma is long, and complications such as hemorrhages, bronchopleural fistulas, pneumothorax, or dissemination of the abscess contents into the pleural space should be carefully monitored.

4. Conclusion

The identification of *Rothia mucilaginosa* in the drainage fluid of a pulmonary abscess underscores the importance of a thorough evaluation of opportunistic infections, particularly in at-risk patients. A better understanding of the clinical characteristics and treatment options for this bacterium could improve outcomes for affected patients.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of ethical approval

Ethical approval was done.

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