

Pulmonary actinomycosis associated with poor oral hygiene: A case report

Kötü ağız hijyeni ile ilişkili pulmoner aktinomikoz: Olgu sunumu

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ABSTRACT

Pulmonary actinomycosis, a rare and chronic infection caused by Actinomyces species, involves anaerobic gram-positive bacteria that are part of the oral cavity's normal flora. Thoracic involvement, accounting for approximately 15% of all actinomycosis cases, typically results from aspiration of oropharyngeal secretions. We report the case of a 36-year-old man with poor oral hygiene and severe dental decay who presented with a month-long history of chronic cough, hemoptysis, malodorous sputum, weight loss, and pleuritic chest pain. Imaging identified a cavitory lesion in the left upper lobe, initially raising concern for infectious or malignant etiologies. Bronchoscopic sampling confirmed pulmonary actinomycosis through histological identification of sulfur granules. The patient responded favorably to high-dose intravenous penicillin followed by oral antibiotics. This case underscores the diagnostic challenges of pulmonary actinomycosis, the importance of oral hygiene as a modifiable risk factor, and the need for a multidisciplinary management approach.

Key Words: Pulmonary actinomycosis, cavitory lung disease, sulfur granules, oral hygiene, thoracic infections, penicillin therapy

Öz

Pulmoner aktinomikoz, Actinomyces türlerinin neden olduğu nadir ve kronik bir enfeksiyon olup, ağız boşluğunun normal florasında bulunan anaerobik gram-pozitif bakterilerden kaynaklanır. Tüm aktinomikoz vakalarının yaklaşık %15'ini oluşturan torasik tutulum, genellikle orofaringeal sekresyonların aspirasyonu sonucu meydana gelir. Bu yazıda, kötü ağız hijyenine ve ciddi diş çürümesine sahip 36 yaşındaki bir erkek hastanın bir aydır devam eden kronik öksürük, hemoptizi, kötü kokulu balgam, kilo kaybı ve plöretik göğüs ağrısı şikayetleri ile başvurduğu bir vaka sunulmaktadır. Görüntülemeye sol üst lobda kaviteli bir lezyon saptanmış ve bu durum başlangıçta enfeksiyöz veya malign etiyolojiler açısından endişe yaratmıştır. Bronkoskopik örnekleme sonucunda histolojik olarak sülfür granüllerinin tespitiyle pulmoner aktinomikoz tanısı doğrulanmıştır. Hasta, yüksek doz intravenöz penisilin tedavisi ve ardından oral antibiyotiklerle olumlu yanıt vermiştir. Bu vaka, pulmoner aktinomikozun tanılmasını zorluklarını, modifiye edilebilir bir risk faktörü olarak ağız hijyeninin önemini ve multidisipliner bir yönetim yaklaşımının gerekliliğini vurgulamaktadır.

Anahtar Kelimeler: Pulmoner aktinomikoz, kaviter akciğer hastalığı, sülfür granülleri, ağız hijyeni, torasik enfeksiyon, penisilin tedavisi

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Introduction

Cavitary lung diseases encompass a broad spectrum of infectious, inflammatory, and neoplastic conditions. Diagnostic insights often rely on evaluating lesion characteristics such as wall thickness, contents, location, and multiplicity (1). Among infectious causes, actinomycosis represents a rare but clinically significant entity. It is a chronic suppurative infection caused by *Actinomyces* species, anaerobic gram-positive filamentous bacteria found in the oral cavity, gastrointestinal tract, and female genital tract. Pulmonary actinomycosis is uncommon and usually arises from aspiration or contiguous spread, particularly in individuals with risk factors such as poor oral hygiene, dental infections, or recent invasive dental procedures (2).

The clinical presentation of pulmonary actinomycosis frequently mimics conditions such as tuberculosis, malignancy, or fungal infections, creating diagnostic challenges (3). The disease's indolent course and capacity to form fistulae or cavitary lesions further obscure its diagnosis (4). Awareness of risk factors, including oral health, is crucial for accurate identification and prompt management (5). Here, we describe an unusual presentation of pulmonary actinomycosis in a patient with significant dental decay and poor oral hygiene, highlighting the need to recognize oral health as a determinant of pulmonary pathology.

Case Presentation

A 36-year-old man presented with a one-month history of shortness of breath, productive cough with foul-smelling sputum, unintentional weight loss of 10 kg, anorexia, fever, and stabbing chest pain. A marketer by profession, he reported a 20-pack-year smoking history and was a current smoker. His medical history was unremarkable for chronic or systemic illnesses.

On examination, the patient had a temperature of 38.9°C, blood pressure of 90/60 mm Hg, a respiratory rate of 19 breaths per minute, and oxygen saturation within normal limits on room air. Auscultation revealed crackles over the left anterior chest. A chest radiograph showed a cavitary lesion in the left upper lobe (Figure 1). Laboratory findings included leukocytosis (25,150/ μ L; 81% neutrophils), an elevated erythrocyte sedimentation rate (57 mm/h), C-reactive protein (312 mg/L), and procalcitonin (0.578 ng/mL). Arterial blood gas analysis indicated respiratory alkalosis with hypocarbia. Sputum for acid-fast bacilli was negative, and both sputum and blood cultures showed no growth.

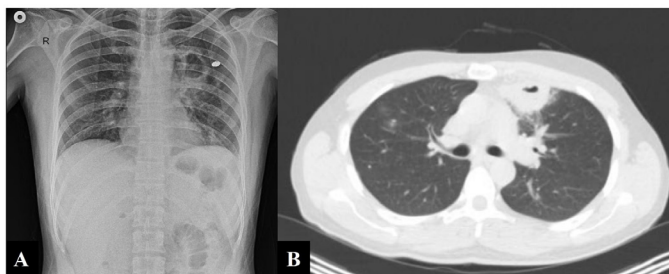


Figure 1. (A) Cavitary lesion on chest X-ray and (B) CT scan.

Positron emission tomography/computed tomography (PET/CT) revealed a pleural-based lesion in the anterior segment of the left upper lobe (27 × 37 × 53 mm), with irregular borders and increased FDG uptake (SUVmax, 17.5) (Figure 2). Flexible bronchoscopy demonstrated thick purulent discharge within the left bronchial system (Figure 3). Cytologic and histopathologic analysis of specimens confirmed actinomycosis, revealing neutrophilic inflammation and sulfur granules.

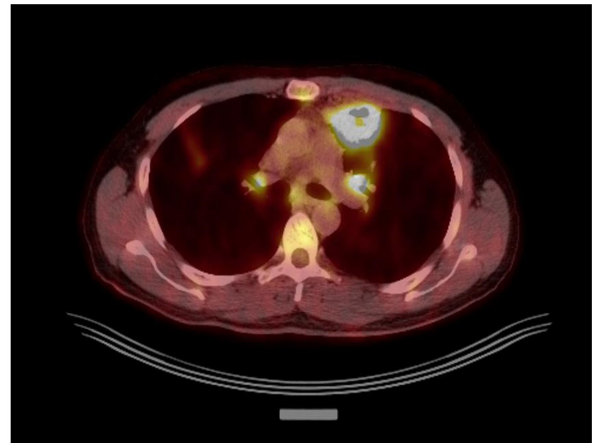


Figure 2. Prominent cavitary lesion on PET-CT with increased metabolic activity.

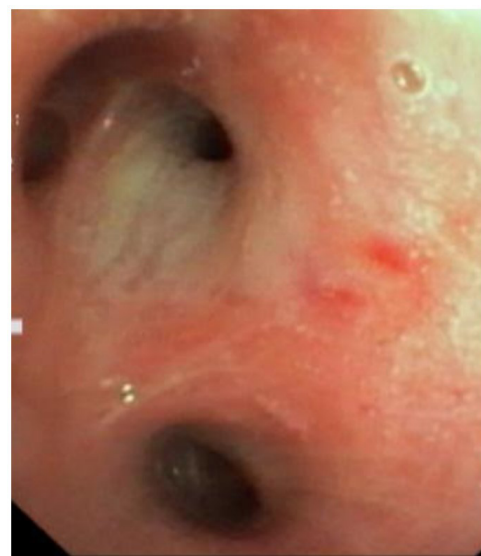


Figure 3. Thick purulent discharge from the left upper lobe.

The patient was treated with intravenous crystalline penicillin (6 × 4 million units daily), which led to clinical and radiological improvement (Figure 4), followed by oral antibiotic therapy. Given his poor oral hygiene (Figure 5), he was referred for dental evaluation and management of extensive dental decay.



Figure 4. Improvement on chest X-ray after treatment.

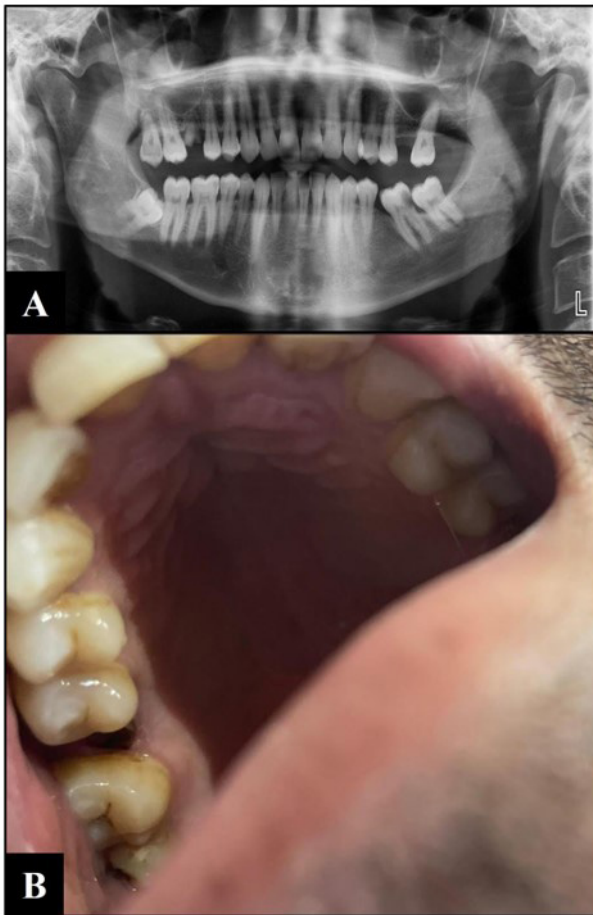


Figure 5. (A) Dental caries on X-ray and (B) Clinical examination.

Discussion

Pulmonary actinomycosis, caused by *Actinomyces* species, represents a rare thoracic infection resulting from aspiration of oropharyngeal secretions. In this case, poor oral hygiene and severe dental decay were likely predisposing factors. Established risk factors include dental infections, invasive dental procedures, oropharyngeal trauma, and conditions that increase aspiration risk, such as alcoholism and chronic debilitating illnesses (6).

Poor oral hygiene has broader implications for respiratory health. It increases the risk of aspiration-related infections and alters the oral microbiome, which can serve as a reservoir for pathogens implicated in respiratory diseases. Studies have demonstrated associations between oral microbiota and respiratory conditions such as bacterial pneumonia, chronic obstructive pulmonary disease exacerbations, and ventilator-associated pneumonia (6). The anaerobic environment created by dental caries and periodontal disease fosters *Actinomyces* proliferation, facilitating migration into the lower respiratory tract during aspiration episodes.

Preventive dental care and awareness of systemic implications of oral health could reduce respiratory infection burdens. This case underscores the value of multidisciplinary approaches combining dental and medical expertise. Routine dental evaluations for high-risk populations, including individuals with chronic illnesses or substance use disorders, may enhance prevention strategies for pulmonary infections.

Radiological findings in pulmonary actinomycosis, including cavitary lesions, mass-like consolidations, nodules, or pleural thickening, often mimic tuberculosis, malignancy, or fungal

infections, contributing to diagnostic delays (8, 9). In this case, PET/CT findings of increased FDG uptake (SUVmax, 17.5) necessitated histopathologic confirmation to rule out malignancy (11).

Laboratory findings, such as leukocytosis with neutrophil predominance and elevated inflammatory markers, supported an infectious etiology. Cultures often fail to isolate *Actinomyces* species due to their fastidious nature. Histopathologic identification of sulfur granules remains the diagnostic gold standard (2). The cornerstone of pulmonary actinomycosis treatment is prolonged antibiotic therapy (12). Our patient's symptoms resolved following high-dose intravenous penicillin, with alternatives available for penicillin-allergic patients, including tetracycline, erythromycin, and clindamycin (13).

Conclusion

This case highlights the importance of addressing underlying risk factors, such as poor oral hygiene, in the management of pulmonary actinomycosis. Multidisciplinary care, including dental intervention, is critical to prevent recurrence and improve outcomes. The findings emphasize the need for heightened awareness among clinicians regarding the interplay between oral and respiratory health.

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