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A Case Report of Pulmonary Actinomycosis: A Diagnostic Quagmire

Sarah Akbani

Piedmont Macon Medical Center, sarah.akbani@piedmont.org

Aderinsola O. Ademiluyi

Mercer University, aderinsola.ademiluyi@piedmont.org

Jonathan Dean

HCA coliseum medical centers, rjd@cgpa.mgacoxmail.com

Vinita Mathur

Piedmont Macon Medical Center, vinita.mathur@piedmont.org

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A Case Report of Pulmonary Actinomycosis: A Diagnostic Quagmire

Author ORCID ID:

<https://orcid.org/>

0000-0002-8574-2251

Abstract

The implications of misdiagnosis can be drastic, especially when the correct diagnosis is treatable. Pulmonary actinomycosis is one of the complications of infection with actinomyces, an anaerobic gram-positive organism that is usually found as a part of the normal flora in the human body infection. It is a very rare disease and is frequently mistaken with other diagnoses owing to its nonspecific presentation. In this report, we present a 67-year-old male with a mass like lesion on a CT scan of his chest that was done due to progressively worsening productive cough, weight loss and fatigue. These symptoms could have swayed any physician into the diagnosis of possible malignancy. A misdiagnosis that could have led to further unnecessary invasive interventions, as well as cause the patient significant distress regarding management and prognosis. However, high degree of suspicion and confirmation by cultures and histopathological exam done through bronchoscopy and bronchial alveolar lavage eventually revealed and confirmed the diagnosis of pulmonary actinomycosis caused by actinomyces oris. Treatment of which was done successfully and resulted in significant improvement in the patient's clinical condition and CT results.

Keywords

Pulmonary Actinomycosis, Actinomyces

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Conflict of Interest Statement

The authors declare no conflicts of interest.

CASE REPORT

A Case Report of Pulmonary Actinomycosis: A Diagnostic Quagmire

Sarah Akbari ^{a,*}, Aderinsola O. Ademiluyi ^b, Jonathan Dean ^c, Vinita Mathur ^a

^a Piedmont Macon Medical Center, United States

^b Mercer University, United States

^c HCA Coliseum Medical Centers, United States

Abstract

The implications of misdiagnosis can be drastic, especially when the correct diagnosis is treatable. Pulmonary actinomycosis is one of the complications of infection with actinomyces, an anaerobic gram-positive organism that is usually found as a part of the normal flora in the human body infection. It is a very rare disease and is frequently mistaken with other diagnoses owing to its nonspecific presentation. In this report, we present a 67-year-old male with a mass like lesion on a CT scan of his chest that was done due to progressively worsening productive cough, weight loss and fatigue. These symptoms could have swayed any physician into the diagnosis of possible malignancy. A misdiagnosis that could have led to further unnecessary invasive interventions, as well as cause the patient significant distress regarding management and prognosis. However, high degree of suspicion and confirmation by cultures and histopathological exam done through bronchoscopy and bronchial alveolar lavage eventually revealed and confirmed the diagnosis of pulmonary actinomycosis caused by actinomyces oris. Treatment of which was done successfully and resulted in significant improvement in the patient's clinical condition and CT results.

Keywords: Pulmonary actinomycosis, Actinomyces

1. Introduction

Actinomycosis is a rare chronic disease caused by *Actinomyces* species. An in-depth literature review revealed 94 cases mentioned in articles between 1980 and 2010, and only a handful of case reports around the world since then.¹⁻⁴ It is an anaerobic gram-positive bacteria that is typically found in the mouth, digestive tract, and genitalia.⁵ Most infections with *Actinomyces* occur due to inadequate oral hygiene and are usually found in patients with chronic alcohol abuse; however, infections can also occur in immunosuppressed individuals with HIV. Often, patients present with nonspecific symptoms of pulmonary actinomycosis—typically with productive cough, fever, shortness of breath and unintentional weight loss—and the diagnosis is initially confused with other pulmonary etiologies, including tuberculosis and lung cancer.⁶

This case report discusses the challenges in diagnosing and differentiating pulmonary actinomycosis from other lung pathologies including malignancy, especially in a patient who fits the medical picture, but may or may not have the appropriate risk factors as described above.

2. Case presentation

A 67-year-old male with a past medical history of type 2 diabetes mellitus, hypertension, and hyperlipidemia presented with complaints of worsening productive cough, night sweats, and weight loss. His cough started about two months prior and was productive with thick greenish sputum without blood. He reported loss of appetite with an approximate 20-pound weight loss in two months. The patient also smoked about two packs of cigarettes a day for the past 50 years. Additionally, he lived and worked on a cattle farm. Of note, he

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* Corresponding author.

E-mail addresses: sarah.akbari@piedmont.org (S. Akbari), aderinsola.ademiluyi@piedmont.org (A.O. Ademiluyi), rjd@cgsa.mgacoxmail.com (J. Dean), vinita.mathur@piedmont.org (V. Mathur).

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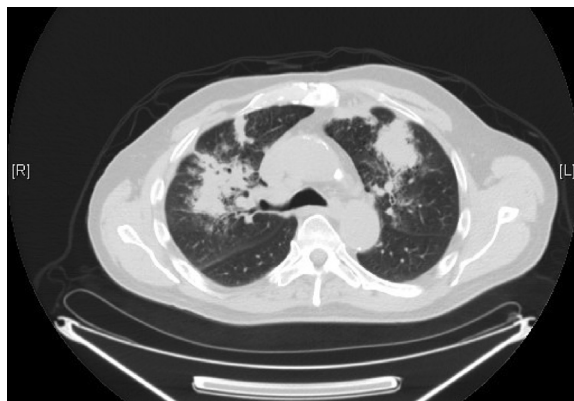


Fig. 1. CT scan of the chest showing mass like lesions in the bilateral upper lobes of the lungs.

revealed a distant history of a sore tooth about four to five months prior to presentation for which he was seen by his dentist. He was told that there was no acute infectious process going on at the time; however, he was still treated with amoxicillin with resolution of his symptoms. Physical examination at the time of this presentation revealed mild wheezing noted in the right side of his chest but was otherwise unremarkable. His vital signs were stable including a maximum temperature of 37.1 °C. There was no evidence of active infection or inflammation in the oral cavity or jaw. Labs revealed an elevated white blood cell count at 17.0 with predominance of neutrophils at 77.4%.

He was initially seen by his primary care physician and was treated for community-acquired pneumonia. His symptoms never resolved, and he was thereafter referred to pulmonology where a CT scan of his chest was done, which revealed a right upper lobe mass with adenopathy (Fig. 1). Due to the concerning mass, a PET scan was done, which demonstrated bronchograms in the right upper lobe with opacity, and an upper lobe opacity on the left side (Fig. 2). The patient underwent bronchoscopy

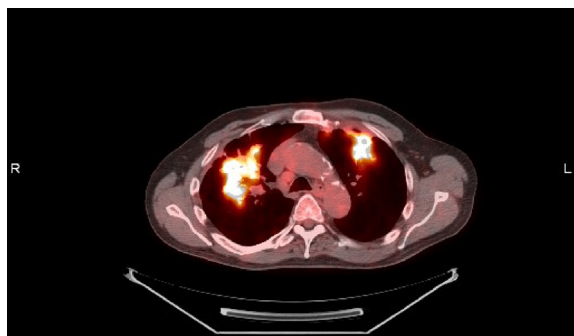


Fig. 2. Upper lobe patchy airspace consolidations measuring up to 7.4 cm in diameter in the right apex on PET-CT scan.

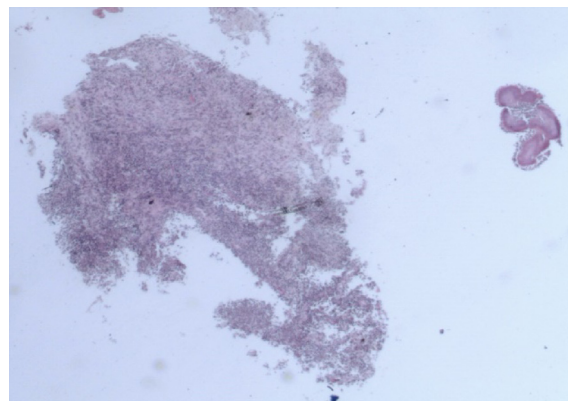


Fig. 3. Hematoxylin-eosin stain of sulfur granule of *Actinomyces* within an abscess, low power.

with bronchial washings, which revealed sulfur granules suggestive of *Actinomyces* (Fig. 3). Histopathology of a specimen from the right upper lobe revealed a mass of branching filamentous bacteria with a neutrophilic infiltrate, consistent with *Actinomyces* (Fig. 4). After the diagnosis of *Actinomyces* was confirmed, the patient was treated with four weeks of intravenous Penicillin G followed by a prolonged course of oral Amoxicillin, leading to a decrease in the size of the mass on repeat CT thereafter.

3. Discussion

Actinomycosis has been found to be an endogenous infection. The bacteria are usually found on the mucosal surface and make their way into deep tissues by means of disruption of the mucosal area through trauma, surgical procedures, or foreign bodies.⁷

Pulmonary actinomycosis is the third most common type of complication noted by this organism, after cervicofacial and abdominopelvic locations.

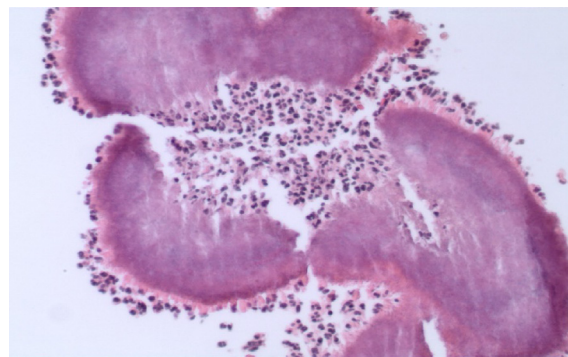


Fig. 4. High power histopathological view of specimen obtained from the right upper lobe of the lung. Hematoxylin-eosin stain shows a mass of branching filamentous bacteria with a neutrophilic infiltrate.

Pulmonary actinomycosis accounts for about 15% of all actinomycosis cases.⁸ It is rarely seen in children and is mostly seen in males at a ratio of 3:1.⁹ Although pulmonary actinomycosis can occur from direct spread from local infections or hematogenous spread, ingestion or aspiration of oral secretions is regarded as the key source of infection.⁷ This is especially true in patients with certain conditions, including alcohol abuse, diabetes mellitus, and periodontal disease.¹⁰

As seen in our patient, he did have a prior history of tooth ache. However, nothing was confirmed that showed active infection in the tooth. Thus, although the possibility that this may have been the source of his infection cannot be excluded, the patient had no other obvious risk factors that would link him to this diagnosis. This may mean the need to expand on the risk factors and settings in which development of this disease is possible to broaden the scope and prevent misdiagnosis. Patients with other prior pulmonary diseases, including COPD and bronchiectasis, are also at an increased risk for pulmonary actinomycosis. Although our patient did not have a history of any of these conditions, he did have a history of chronic tobacco abuse.

In the early stages of this disease, patients present with consolidation and some associated pulmonary nodules without pulmonary symptoms. As time goes on, there is constitution of a peripheral mass which is slow-growing and at this point is usually confused with malignancy. Imaging studies are generally not specific. CT scan of the chest may reveal consolidation, lymph node enlargement, atelectasis, cavitation, ground-glass opacities, and pleural effusions with no specific location in the lung.⁵ Chest CT done in our patient was consistent with adenopathy and a mass in the right upper lobe of the lung.

Prior studies have attempted to diagnose pulmonary actinomycosis from sputum culture, but these have been shown to be possible colonization, thus diagnosing pulmonary actinomycosis can be difficult.⁵ Current guidelines suggest the gold standard for diagnosing pulmonary actinomycosis is histological and microbiological cultures from biopsy.⁵ Biopsies may be done by VATS, CT-guided or bronchoscopy with transbronchial biopsies and bronchoalveolar lavage, which were done in our patient. While PET scan might be helpful, it has been shown that up to 25% of cases with patients with pulmonary actinomycosis were mistaken for malignancies, as was the case with our patient.⁷ Thus, it is crucial for physicians to have an inclusive differential diagnosis list and utilize proper diagnostic modalities.

The choice of treatment is usually penicillin, and the length of treatment can vary depending on the severity of the disease. There is typically a combination of intravenous penicillin with oral penicillin analog depending on the clinical response of the patient. Our patient was treated with intravenous antibiotics (IV penicillin) and showed significant improvement in his symptoms during his hospital stay. He was transitioned to oral amoxicillin-clavulanic acid upon discharge and repeat chest CT about one month later demonstrated improvement in the size of the mass. The patient was instructed to follow up regularly for monitoring to continue oral antibiotics until full resolution of the mass.

4. Conclusion

Pulmonary actinomycosis is a rare condition requiring a high level of suspicion to diagnose due to the likelihood of it being mistaken for other pulmonary conditions. Since symptoms of this disease overlap with many other lung pathologies, histopathological and microbiological examination of biopsy samples are crucial to help correctly diagnose this condition. It is also important to note how patients can undergo unnecessary invasive medical test and exams in search of an accurate diagnosis and treatment plan. Management includes long term antibiotic treatment once an accurate diagnosis has been made.

Conflict of interest

The authors declare no conflicts of interest.

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