Title: Surgical Management of Refractory Pulmonary Actinomycosis: A Case Report.

Article type: Case Report

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Acknowledgment: None to declare.

Financing: None to declare.

Conflict of interest statement by authors: None to declare.

Compliance with ethical standards: The informed consent of publication was obtained from the patient.

Authors Contribution Statement:

Conceptualization: MASR, JEEM, and FOA. Formal Analysis: JEEM, MLRS, and LDTG. Data Curation: JEEM, Investigation: MASR, JEEM, MLRS, FOA, and LDTG. Resources: MASR, MLRS, and LDTG. Writing – Original Draft: MASR, JEEM, MLRS, FOA, and LDTG. Writing – Review & Editing: MASR, JEEM, and FOA. Visualization: MASR, JEEM, MLRS, and FOA. Supervision: JEEM, and FOA. Project Administration: MASR.

Highlights

- Pulmonary actinomycosis is rare and often misdiagnosed as malignancy.
- Diagnosis relies on identifying sulfur granules.
- Treatment involves penicillin; surgery is used for persistent cases.

Manuscript word count: 1062

Abstract word count: 247

Number of Figures and Tables: 1

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ABSTRACT.

Background: Pulmonary actinomycosis is an uncommon disease with a non-specific clinical presentation, challenging and usually leads to a misinterpretation of malignancy rather than infection.

Case: A 30-year-old female patient began her illness a year and a half ago with cough, chest pain, weakness, and hemoptysis. She received medical treatment; however, the episodes of hemoptysis persisted. A bronchoscopy was performed, where a mass was found, and a biopsy was taken. Subsequently, a diagnosis of pulmonary actinomycosis was made when sulfur granules with dystrophic calcification were found in the biopsy. Therefore, treatment with amoxicillin was given for 12 months. Three months later, she persisted with occasional hemoptysis, so it was decided to perform a right lung lobectomy, showing clinical improvement. After six months, the symptoms improved completely.

Conclusion: Since the introduction of penicillin, the incidence of pulmonary actinomycosis has decreased significantly to the point that only 94 cases were reported in the first decade of the 21st century. In addition to this, it is a great mimic of malignancy, being misdiagnosed as a pulmonary neoplasm. The most used treatment is penicillin for six to 12 months. Pulmonary lobectomy can be an effective treatment for refractory pulmonary actinomycosis with persistent hemoptysis despite prolonged antibiotic therapy. It is important to consider it among the differential diagnoses in patients with non-specific symptoms and a negative result for the most common pathogens.

Key Words: Actinomycosis, Cardiothoracic surgery, Penicillin, Case report, Pulmonary actinomycosis, Lobectomy, Refractory hemoptysis, Antibiotic therapy, Surgical management.

INTRODUCTION.

Pulmonary actinomycosis is a disease caused by a gram-positive filamentous bacteria which, under normal circumstances, is part of the normal commensal flora of several human mucosal sites, including the oropharynx, urogenital tract, and gastrointestinal tract.[1] It is characterized by suppurative granulomatous inflammation, abscess formation, and the presence of sulfur granules.[1]

Due to its nonspecific presentation, pulmonary actinomycosis often mimics malignancies, leading to delayed or incorrect diagnoses, rather than an infective process.[2] We present the case of a patient with pulmonary actinomycosis with nonspecific clinical symptoms.

THE CASE

Clinical Presentation

A 30-year-old female patient with no relevant history who began her current condition a year and a half ago with cough, chest pain, weakness, tiredness, dizziness and hemoptysis. She received unspecified medical treatment, improving her symptoms, however, two days later the symptoms returned, and she went to consult with a physician and was later referred to our unit for further management.

Initial Evaluation

Upon arrival, laboratories were taken (Table 1). She was started on proton pump inhibitors and benzonatate, as a more common infection was suspected, then she was hospitalized for further management.

Hospital Course

The treatment was subsequently modified to benzonatate and Ambroxol Hydrochloride, which reduced her cough episodes, however, she continued with hemoptysis at least once a day.

Diagnostic Workup

A simple computed tomography (CT) scan of the chest was performed for suspicion of malignancy, which revealed bronchiectasis of the right posterior basal segment with no evidence of active infection or neoplasm. Acid-fast staining was negative, ruling out mycobacterial infection.

Bronchoscopy Findings

One week later a bronchoscopy was performed, reporting erythematous, edematous mucosa and a mass in the right lower lobe which caused an obstruction of 80% of the airway, an endobronchial biopsy, bacterial culture, gram staining, acid-fast stain and KOH test were performed, with negative results for bacterial culture, acid-fast stain and KOH test. The patient remained stable and was discharged with follow-up by the pneumology service.

Histopathology

Endobronchial biopsy results revealed squamous metaplasia, acute and chronic inflammation, and sulfur granules with dystrophic calcification, confirming pulmonary actinomycosis. Due to the diagnosis, the patient was referred to the infectious disease service for specialized management.

Management and Treatment

The patient started treatment with amoxicillin 2 g every 12 hours for 12 months, due to the lack of Penicillin G in the institution. Three months later, the patient came for follow-up showing clinical improvement but with occasional presence of symptoms, so the same treatment was continued, and chest CT was requested in 3 months. Three months later a new simple CT scan was performed, which showed progression of bronchiectasis and recurrent pneumonia, so it was decided to perform a new bronchoscopy, which reported a brown mass suggestive of necrosis, mucopurulent plug and abundant whitish mucopurulent secretions in the bronchial tree, a new biopsy was performed, reporting again pulmonary actinomycosis and squamous metaplasia.

Due to persistent hemoptysis and progression of bronchiectasis despite prolonged antibiotic therapy, right lower lobectomy was performed, showing clinical improvement and disappearance of hemoptysis.

Follow up

After six months of follow-up, the patient continued without recurrence of symptoms.

Three months post-surgery, the patient reported marked clinical improvement with a significant reduction in cough episodes, so treatment with amoxicillin was suspended, and an appointment was made in three months for follow-up. She attended the follow-up visit and reported resolution of the cough, so it was decided to discharge her from the infectious disease department.

DISCUSSION

This case highlights the diagnostic challenges of pulmonary actinomycosis, a rare infection that can mimic lung malignancies, and underscores the role of surgical intervention in refractory cases.

Historically, pulmonary actinomycosis was an infection with high mortality,[3] however, its incidence has been drastically reduced since the introduction of penicillin, reaching an annual incidence of 1 case per 300,000 people.[4]

It has been shown to affect two to four times more men than women and to occur at any age, showing a bimodal distribution between 11-20 and 40-50 years of age,[5] none of which matches the patient, who was a 30-year-old female at the time of diagnosis.

The most common symptoms are cough, chest pain, hemoptysis, fever and weight loss,[5] most of them observed in the patient. Due to the nonspecific symptoms, more common diagnoses such as bacterial pneumonias, lung cancer, and tuberculosis are usually considered.[6]

In addition to this, few cases have been reported, Kim et al. (2013) reported 94 cases during the first decade of the 21st century,[7] so it is unlikely to be considered among the main differential diagnoses.

The diagnosis is often challenging because it is a great mimic of malignancy,[8] as in the case of the patient who was found to have a mass on bronchoscopy. Zhang et al. (2017) demonstrated the misdiagnosis in their retrospective study, in which only five patients had the correct initial diagnosis, 60 were diagnosed with lung cancer, the rest between tuberculosis and lung abscesses.[9]

For all this, bronchoscopy is used as part of the management and if any mass is located, take a biopsy to rule out malignancy, then perform a microbiological examination identifying sulphur granules, they are formed by masses of filaments extending in a radiating, spoke-like fashion and is the hallmark of identification and diagnosis,[10] as in the case of the patient.

Regarding treatment, Endo et al. (2002) in their review of the literature, indicate that the treatment of choice is with antibiotics of the penicillin group and in some cases, surgery,[11] in the case of the patient it was decided to use amoxicillin for 12 months with surgery because the surgical intervention is indicated in refractory hemoptysis ,[12] which has shown better results than in patients in whom it is not performed.[13] Although there is a risk of complications due to the complexity of the procedure, the benefits are greater and have demonstrated better outcomes.

In the medical literature, Aydin et al. (2022) [14] reported a case in which lobectomy was performed for refractory fhemoptysis, with positive outcome.

There is no established follow-up period, different articles reported a follow-up between three to 12 months,[11] in the case of the patient, at the time of writing this article, she was followed up at three months, without complications.

Pulmonary actinomycosis remains a diagnostic challenge due to its nonspecific presentation and ability to mimic malignancies. While prolonged antibiotic therapy is the mainstay of treatment, surgical intervention, such as lobectomy, should be considered in cases of refractory hemoptysis or disease progression. This is a single case report, and outcomes may vary in larger patient populations. Further studies are needed to establish guidelines for surgical intervention in refractory pulmonary actinomycosis.

SUMMARY - ACCELERATING TRANSLATION

Pulmonary actinomycosis is a rare condition with nonspecific clinical presentation, often mimicking malignancy or other chronic infections. Diagnosis can be challenging and is frequently delayed. This case highlights the role of lobectomy in managing refractory hemoptysis, highlighting surgical intervention as a viable treatment for refractory cases."

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FIGURES AND TABLES.

Table 1. Initial Laboratory Findings on Admission in a Patient with Refractory Pulmonary Actinomycosis.

Paraclinical report	Value	Reference value
Leukocytes (cells/mm^3)	10,300	4,000 – 10,000
Platelets (cells/mm^3)	238,000	150,000 – 400,000
Glucose (mg/dL)	96.3	70 - 99
Sodium (mEq/L)	137	135 – 145
Potassium (mEq/L)	3.3	3.5 - 5