CLINICAL CASE

Massive hemoptysis as a complication of pulmonary actinomycosis: a case report

Hemoptisis masiva como complicación de actinomicosis pulmonar, un reporte de caso

Jesús M. Ibarra-Celaya[1], Eduardo Leyva-Moraga[2], Ahmed Soualhi[3], Oscar A. Sánchez-García[1] Francisco A. Leyva-Moraga[2], Fernando Leyva-Moraga[2], Alejandra I. Albores-Ibarra[2], and Graciano Castillo-Ortega[4]*

[1]Department of Surgery, Hospital General de Querétaro, Santiago de Querétaro, Querétaro, Mexico; [2]Departamento de Medicina y Ciencias de la Salud, Universidad de Sonora, Hermosillo, Sonora, Mexico; [3]GKT School of Medical Education, King's College London, London, United Kingdom; [4]Surgery Department, Hospital General del Estado de Sonora, Hermosillo, Sonora, México

Abstract

Massive hemoptysis is a rare life-threatening complication of pulmonary actinomycosis that should be treated promptly due to the risk of asphyxiation and hemodynamic instability. We present the case of a 57-year-old female who was presented to our center with massive hemoptysis. Thoracic computed tomography scan revealed a cavitated lesion with perilesional ground-glass opacity. Right lower lobectomy was then performed using uniportal video-assisted thoracic surgery, excising a 13 × 12 × 8 cm cavitated lung fragment. The pathology service reported the presence of microscopical evidence of filamentous gram positive bacterial colonies, showing compatible features of pulmonary actinomycosis. The patient was discharged with oral penicillin with an uneventful post-operative course.

Keywords: *Actinomycosis. Pulmonary. Hemoptysis.*

Resumen

La hemoptisis masiva es una complicación poco frecuente de la actinomicosis pulmonar que pone en peligro la vida del paciente y que debe ser tratada con prontitud debido al riesgo de asfixia e inestabilidad hemodinámica. Presentamos una mujer de 57 años que acudió a nuestro centro con hemoptisis masiva. La tomografía reveló una cavitación con opacidad perilesional en vidrio deslustrado. Realizamos lobectomía mediante cirugía uniportal, extirpando un fragmento de lesión. Patología informó de la presencia de colonias bacterianas filamentosas grampositivas, mostrando características compatibles con actinomicosis pulmonar. El paciente fue dado de alta con penicilina oral, con un curso postoperatorio sin incidentes.

Palabras clave: *Actinomicosis. Pulmonar. Hemoptisis.*

Introduction

Pulmonary actinomycosis is a rare disease caused by the Gram-positive bacteria *Actinomyces israelii*, which is normally found in the oropharyngeal, urogenital, and digestive tracts. The disease presents as a granulomatous inflammation with central necrosis, peripheral fibrosis, and characteristic sulfur granules[1,2].

Clinical presentation often mimics neoplasms, mycobacterial infections, and pulmonary aspergilloma.

Correspondence:
*Eduardo Leyva-Moraga
E-mail: leyvamoragaeduardo@gmail.com

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Symptoms of pulmonary actinomycosis are nonspecific: cough, hemoptysis, anorexia, chest wall pain, weight loss, dyspnea, and fever. Radiological findings include pulmonary infiltrates or consolidation, suppurative necrosis, and fibrotic infiltrates[3,4].

Massive hemoptysis is a rare life-threatening complication of pulmonary actinomycosis that should be treated promptly due to the risk of asphyxiation and hemodynamic instability. Most cases will require arterial embolization and surgical intervention[5,6].

The literature is sparse on reports of massive hemoptysis as a complication of pulmonary actinomycosis and the subsequent management. We present a rare case of massive hemoptysis secondary to pulmonary actinomycosis that was refractory to arterial embolization and subsequently managed with uniportal video-assisted thoracoscopic surgery.

Case

A 57-year-old female patient with history of type 2 diabetes mellitus and glaucoma was referred to our center with new-onset hemoptysis of 30-50 cc. 3 days later, the patient produced a hemoptysis of 300-500 cc with breathless cough and general discomfort. The patient had a history of recurrent hemoptysis 3 years prior which remitted. The patient had been experiencing nocturnal sweating for the past 4 months, but she had no weight loss, fever, diarrhea, or vomiting.

On admission, the patient had normal vital signs, and oxygen saturations of 93% with high-flow supplemental oxygen. The physical examination was unremarkable. Laboratory tests are shown in table 1.

Chest X-ray showed right pericardial radiopacity. A subsequent computed tomography (CT) showed a lost aortopulmonary relationship, multiple nodular mediastinal nodular calcifications in the pre-tracheal space, irregular consolidation in the right lower lobe with central areas of air attenuationand some macro calcifications in the interior, as well as air bronchogram. Toward the lower portion of the consolidation, there was attenuation component similar to hematic attenuation and IV contrast medium as well as the presence of perilesional ground-glass opacity (Fig. 1). Embolization of the right intercostal arteries was performed at the level of T6, T11, and T12, after observing hypervascularity to the lung parenchyma and active bleeding. The right bronchial branch was cannulated at the level of T5, after observing hypervascularization without active bleeding. After the procedure, the patient had an episode of hemoptysis of 50 cc. Right lower lobectomy was, then, performed using uniportal video-assisted thoracic surgery, excising a 13 × 12 × 8 cm cavitated lung fragment, with microscopical evidence of filamentous Gram-positive bacterial colonies, showing compatible features of Actinomyces spp. (Fig. 2). Subsequent chest X-ray showed good expansion, and the patient was discharged from our center without supplementary oxygen with an oxygen saturation of 92%.

The patient was discharged with oral penicillin. Follow-up at 1 month after the surgery showed an uneventful post-operative course without any evidence of recurrence.

Table 1. Laboratory data on admission

White blood cells	7.6×10^3/u
Hemoglobin	10.6 g/dL
Platelets	290×10^3/u
pH	7.43
pCO_2	28.5 mmHg
pO_2	60.7 mmHg
SaO_2	90%
Base excess	–3.8 mmol/L
Lactate	0.6 mmol/L

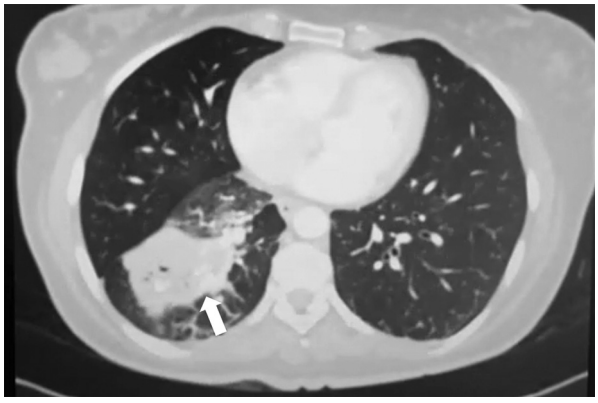

Figure 1. *Thoracic computed tomography scan showing large heterogeneous consolidation in the right lower lobe with central areas of air attenuation, macrocalcifications and hematic dense component toward the lower region with perilesional ground-glass opacity.*

Discussion

Pulmonary actinomycosis is a rare disease with a subacute and chronic presentation that represents a

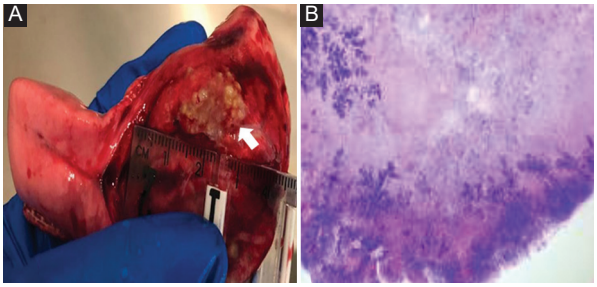

Figure 2. A: *Macroscopic view of lung fragment with a 5 cm cavitated lesion.* **B:** *Image of histopathological sample stained with H and E showing multiple actinomycotic granules surrounded by lymphoplasmacytic infiltrate.*

diagnostic challenge. The diagnosis is made by isolating the bacteria and through histological examination of a lung biopsy. Early detection offers a better prognosis for patients[7]. Normally, pulmonary actinomycosis has a good response to antibiotics, however, when presented with persistent hemoptysis (as in the case of our patient) or a complication such as bronchopleural fistula, surgery is indicated. In fact, cases have been reported where surgery may completely cure the patient, even without medical treatment, as long as complete resection is assured[5,8].

Thoracic involvement in actinomycosis is uncommon (15-20%). It can be acquired by aspiration of infected oropharyngeal secretions, or due to cervical or abdominal trauma, or through a hematogenous route. This disease is more frequent in patients with chronic bronchitis, emphysema, bronchiectasis, tuberculosis, or aspergillosis. The radiographic manifestation of this disease is a consolidation or mass, so the differential diagnosis includes tuberculosis, aspergillosis, and lung cancer. The chest CT scan alone is not diagnostic, but it can help to evaluate the exact location of the lesions, as well as their extension. Normal findings are reported as central areas of low attenuation within the consolidation in 62-75% of cases and adjacent pleural thickening in 50-73%, as seen in our patient's case[9,10].

To diagnose pulmonary actinomycosis, the symptoms must correlate with imaging studies, usually present as infiltrates, masses, and involvement of the mediastinal and hilar-ganglia. Moreover, the work-up of suspected pulmonary actinomycosis involves a CT-guided puncture biopsy, bronchoscopy, and histological examination.

Prognosis of patients with thoracic involvement in actinomycosis is less favorable compared to other clinical forms due to late diagnosis. Adequate diagnosis and treatment lead to a resolution of 90% of cases, with a mortality of 0-28%. High-dose penicillin G has demonstrated high effectiveness. In about 20% of cases, surgical intervention is considered. This is done in patients who require resection of infected tissue (such as lung abscesses or empyemas that cannot be drained by simple aspiration), fistulas, sinuous tracts, failure of medical treatment, recurrence, impossibility of ruling out other diseases such as neoplasms, and in rare cases the presence of massive hemoptysis[7,11,12].

Conclusion

Thoracic presentation of actinomycosis with massive hemoptysis is rare, but with adequate antibiotic treatment and surgical management, there is a good prognosis. Thoracic actinomycosis should be considered as a differential diagnosis in cases of suspected lung cancer and tuberculosis due to the development and signs and symptoms that patients with this disease present.

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Conflicts of interest

The authors certify that they have no involvement in any organization with any financial or non-financial interest, in the subject matter discussed in the manuscript.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors declare that no patient data appear in this article.

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