

(CASE REPORT)



Lung abscess caused by *Streptococcus constellatus*: Case report

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Abstract

This case report presents a detailed case study of Lung abscess caused by *Streptococcus constellatus*. This case underscores the critical role of accurate microbiological diagnosis in the effective management of lung abscesses, highlighting the necessity for precise identification and targeted treatment strategies. A 47-year-old male who exhibited persistent fever and mucopurulent cough, leading to a visit to the Emergency Department of a local hospital in Riobamba, Ecuador. Initially, the patient was diagnosed with pneumonia and treated with moxifloxacin and itraconazole. However, as his condition deteriorated, he was transferred to a specialty hospital in Quito, Ecuador. Chest X-rays identified a cavitory lesion, which was further confirmed by CT chest imaging to be a lung abscess. Additional diagnostic work through CT-guided biopsy and culture confirmed the presence of *Streptococcus constellatus*. The patient's treatment regimen included targeted antibiotic therapy with piperacillin-tazobactam, resulting in a six-week hospitalization. The patient's condition significantly improved, and he was subsequently discharged.

Keywords: Abscess; Ecuador; *Streptococcus constellatus*; Antibiotic; Treatment; Case report

1. Introduction

Lung abscess is a suppurative lung infection leading to the destruction of pulmonary parenchyma, typically presenting with an air-fluid level [1]. The condition usually has an insidious onset with symptoms such as fever, productive cough, and night sweats [1]. Lung abscesses frequently develop as a complication of aspiration pneumonia, caused by anaerobic bacteria from the oral cavity, particularly in immunocompromised patients with a tendency to aspirate [1]. Pleural effusions associated with pneumonia occur in approximately 20-40% of cases, increasing both complications and mortality rates [2].

Streptococcus constellatus, part of the *Streptococcus milleri* group along with *Streptococcus anginosus* and *Streptococcus intermedius*, is a non-hemolytic commensal organism found in the oral cavity, gastrointestinal tract, and vagina [2]. Among the *Streptococcus milleri* group, *S. constellatus* is most frequently isolated from pleuropulmonary, intra-abdominal, and soft tissue infections. In patients with infections caused by these bacteria, up to 86.7% have comorbidities such as alcohol consumption (60%), hepatitis and pancreatitis (33.3%), esophageal surgery (26.7%), respiratory diseases (20%), central nervous system diseases and diabetes mellitus (13.3%), and neoplasms (6.7%) [2]. *Streptococcus milleri* are commensal microorganisms of the oropharynx that can cause thoracic infections through aspiration or manipulation of the upper airway or digestive tract. It is currently the most frequently isolated microorganism in community-acquired pleural infections [3].

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2. Case Presentation

A 47-year-old male from Riobamba, Ecuador, presented with a one-month history of general malaise, chills, evening sweats, intense chest pain, hemoptysis, and foul-smelling mucopurulent cough. Initially diagnosed with pneumonia and treated with moxifloxacin, itraconazole, and fluconazole at the local Riobamba Hospital, the patient was referred to Garcés Hospital, a specialized facility in Ecuador's capital, due to persistent symptoms.

The patient, a cattle rancher, reported social alcohol consumption approximately three times a week and denied any other relevant personal medical history. Physical examination revealed tubular breath sounds in the left lung field. Radiographic evaluation included a chest X-ray, which showed an opaque mass in the middle basal zone of the left lung [Figure 1].



Figure 1 Initial anterior posterior x-ray

The image shows an opaque mass in the middle basal zone of the left lung

A subsequent X-ray demonstrated a cavitated mass of 6 cm and bilateral paracardiac basal nodular images on the left side, appearing cavitated [Figure 2].



Figure 2 Subsequent anterior posterior chest X-ray

The image shows a cavitory mass in the left lung.

A chest CT scan revealed an opaque mass in the middle basal zone of the left lung. A follow-up CT scan for guided drainage showed a lesion occupying segments 4 and 6 of the left lung, with a diameter of approximately 9 cm, containing liquid and gaseous content, with a wall thickness of around 12 mm, adherent to the corresponding pleura [Figure 3A-3B].

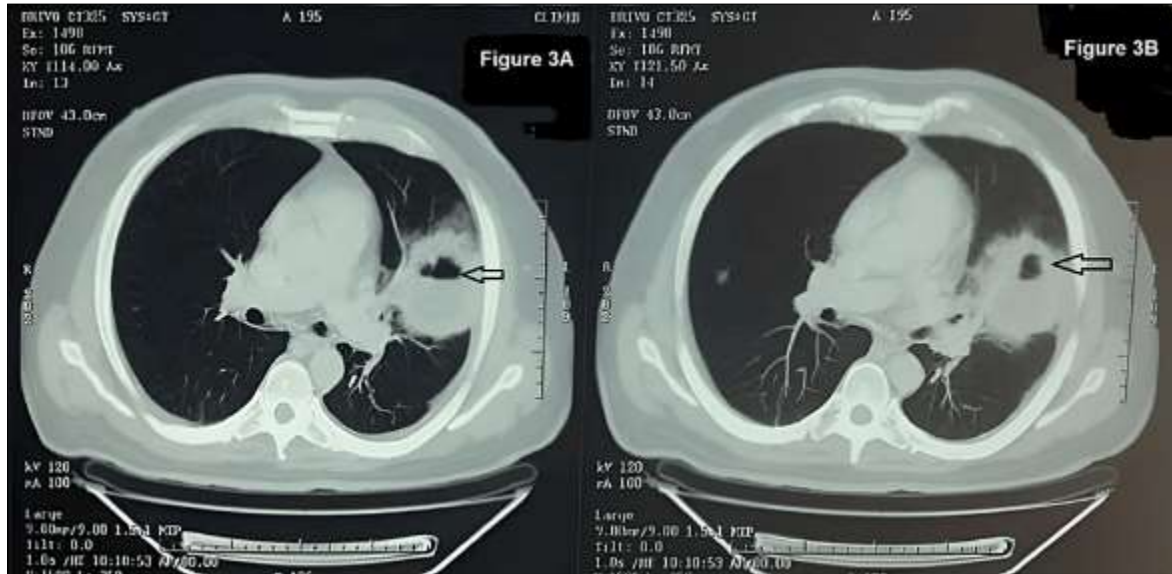


Figure 3 Chest CT scan

Circumscribed mass in the middle zone of the left lung [3A]. The CT scans illustrate a well-defined mass in the middle zone of the left lung, with characteristics consistent with a lung abscess, including liquid and gaseous contents and a thick wall [3A-3B].

Laboratory findings included moderate elevation in transaminases and the presence of ketones in the urine [Table 1].

Table 1 Lab results

Test	Result	Normal Range
White Blood Cells	5.5 x 10 ³ /μL	4.5-11 x 10 ³ /μL
Neutrophils	78%	40-60%
Platelets	271,000/μL	150,000-450,000/μL
Creatinine	0.70 mg/dL	0.6-1.2 mg/dL
Urea	17 mg/dL	7-20 mg/dL
Glucose	87 mg/dL	70-100 mg/dL
TGO	59 U/L	10-40 U/L
TGP	111 U/L	7-56 U/L
Density (Urine test)	1.013	1.005-1.030
pH (Urine test)	6	4.5-8
Ketones (Urine test)	6+	Negative
Bacteria (Urine test)	Negative	Negative

The table lab result shows moderate elevation in transaminases and the presence of ketones in the urine.

A culture of the lung abscess secretion, reported the isolation of *Streptococcus constellatus*, which was sensitive to beta-lactams (penicillin, ampicillin, cefazolin).

The patient was subsequently treated with intravenous antibiotics, including piperacillin/tazobactam, targeting the identified *Streptococcus constellatus*. Supportive care and monitoring were provided, leading to significant improvement in the patient's condition, with follow-up imaging showing resolution of the abscess. The patient was hospitalized for 6 weeks and then discharged.

3. Discussion

Streptococcus constellatus, a member of the *Streptococcus anginosus* group (SAG), which also includes *Streptococcus anginosus* and *Streptococcus intermedius*, is known for its role in abscess formation despite being a commensal organism in the oral, genitourinary, and gastrointestinal tracts [2,3]. In this patient, pus obtained through primary incision and drainage of the parapharyngeal abscess cultured *S. constellatus*. These organisms are typically found in various body sites and have the propensity to cause infections in the genitourinary tract, gastrointestinal tract, central nervous system, skin, bones, and head and neck regions. Although infections attributed to these organisms are relatively infrequent, their potential for causing significant disease should not be underestimated [2].

In this case, the identification of *Streptococcus constellatus* via CT-guided biopsy and culture was pivotal in guiding the targeted antibiotic therapy that led to the patient's recovery. The management of lung abscesses often involves prolonged antibiotic therapy, as seen here with a six-week course of piperacillin-tazobactam. This regimen is consistent with current guidelines that recommend extended antibiotic courses to ensure complete resolution of the abscess and prevent recurrence [4,5,6]. The patient's positive response underscores the importance of using antibiotics to which the pathogen is sensitive.

Previous studies have highlighted the association of *Streptococcus milleri* group infections with various underlying conditions, such as alcohol use disorder, diabetes mellitus, and chronic respiratory diseases [4-6]. For instance, a study demonstrated that alcoholics had an extremely high level of *S. anginosus*, indicating that they, rather than healthy individuals or general esophageal cancer patients, are at higher risk for *S. anginosus* infection [7]. This case adds to the growing body of evidence suggesting that individuals with such comorbidities are at increased risk for severe infections caused by this pathogen. It is essential for clinicians to consider these risk factors when diagnosing and treating similar cases.

A retrospective study conducted at a tertiary care facility in New York identified only 332 cases of cultures positive for SAG organisms over a five-year period, highlighting their rarity in clinical infections. Notably, the successful culture of these organisms often requires an anaerobic environment with elevated carbon dioxide levels, which may contribute to underdiagnosis due to stringent culture conditions [8].

Additionally, the role of imaging in the diagnosis and management of lung abscesses cannot be overstated. Serial chest X-rays and CT scans were instrumental in tracking the progression of the abscess and assessing the effectiveness of the treatment. The detailed imaging findings, including the characteristics of the cavitory lesion, provided crucial insights into the nature of the infection and the appropriate therapeutic approach.

4. Conclusions

In this case, accurate diagnosis and treatment resulted in favorable progress for the patient, underscoring the effectiveness of a multidisciplinary approach in managing complex infections. The collaboration between microbiologists, radiologists, and clinicians was vital in ensuring a comprehensive evaluation and effective treatment plan. Additionally, recognizing risk factors, as demonstrated in this patient, is crucial for early detection and management.

Future research should focus on optimizing diagnostic techniques and exploring new therapeutic options to improve outcomes for patients with lung abscesses caused by *Streptococcus constellatus*. Emphasis on accurate microbiological diagnosis and appropriate antibiotic therapy is essential for effective management. Detailed imaging and a multidisciplinary approach remain invaluable in achieving favorable patient outcomes, highlighting the need for continued collaboration and innovation in this field.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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