

Pulmonary abscess due to *Streptococcus intermedius* in pregnancy: unusual presentation and complication of a commensal bacteria during pregnancy

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Abstract

Streptococcus intermedius is a commensal bacterium reported in few cases as the causative agent of brain and lung abscesses, pneumonia, and endocarditis. Lung abscesses due to *Streptococcus intermedius* are rare, especially in pregnancy. We describe the first case of lung abscess due to *streptococcus intermedius* in a pregnant woman.

Introduction

Streptococcus (*S.*) *intermedius* is a catalase-negative, gram-positive cocci, whose most isolates are non-hemolytic with small-colony-forming species, which belongs to the *Streptococcus anginosus* group (SAG), which has also been referred to as the *Streptococcus milleri* group, which includes 3 organisms: *S. anginosus*, *S. intermedius*, and *S. constellatus*¹. This bacterial group has not been recognised as a causative pathogen. However, with the presence of certain factors, SAG could induce noninvasive infections and also invasive infections after getting into sterile body sites, such as the blood and serosal cavity, which is why it could affect the tissues and organs of several systems of the body².

The SAG species differ in the virulence factors that they produce. Because *S. intermedius* produces sialidase and hyaluronidase, which can destroy host tissues, converting them into nutrients for bacterial growth, while *S. constellatus* produces only hyaluronidase and *S. anginosus* none of these³. Probably for this reason, *S. intermedius* has the ability to form abscesses in several body locations. However, its virulence factors are unclear at present⁴. This feature gives it a unique distinction compared to other alpha-hemolytic streptococcal species and makes its management require, in most cases, surgical intervention along with antibiotic therapy⁴.

S. intermedius is part of the commensal oral flora in humans, and it is frequently associated with brain and liver abscesses, but less frequently with pleuropulmonary infections including pneumonia, pleural effusion, and empyema, and in a few cases, it can also be the causal agent of lung abscesses.^{1,5} Among the risk factors for these infections, smoking, alcoholism, dental diseases, chronic obstructive pulmonary disease, malignant neoplasms, liver cirrhosis, and diabetes have been described¹. Through this case report with a literature review, we discuss an acute presentation of *S. intermedius* lung abscess in a pregnant woman with radiological findings that make it difficult to distinguish it as a lung neoplasm, empyema or abscess.

Case Report

A 25-year-old woman with a 34-week and 5-day pregnancy, with a history of astigmatism, consulted the emergency department, stating that in the 3 previous weeks she had presented with cough with hemoptysis,

fatigue, headache, odynophagia, and 6 kilogramme weight loss. On physical exam, vital signs were within the normal ranges; a gravid uterus, foetal heart rate, and foetal movements were present. Initially, the SARS-CoV2 antigen test was negative. However, chest radiography showed a lung mass in the upper segment of the right lower lobe. Also, serial sputum smear microscopy for tuberculosis was negative.

Given the persistence of symptoms, a polymerase chain reaction (PCR) to SARS-CoV2 was performed with a positive result, confirming a mild acute respiratory infection due to SARS-CoV2 that evolved satisfactorily with management at home. Nevertheless, a high-resolution chest computed tomography (CT) was taken, reporting a lung mass in the upper segment of the right lower lobe adjacent to the horizontal pulmonary fissure of origin to be determined (figure 1). Then, a sputum PCR was performed for *Mycobacterium tuberculosis* and tuberculin test, which were negative, so given the characteristics of the mass, tuberculosis or pulmonary mycosis were discarded. The Pneumology service performed a fibrobronchoscopy and bronchoalveolar lavage, obtaining a negative cytology for malignancy and also a gramme stain, KOH test, smear microscopy for tuberculosis, and PCR for mycobacteria with negative results, so the patient was discharged with ambulatory management.

Ten days later, the patient was again consulted at the emergency department due to the persistence of respiratory symptoms. A high-resolution chest CT reported an increase in the lung lesion size (figure 2), so she was hospitalized. A lung biopsy was performed by interventional radiology after the pregnancy ended, draining purulent material. Besides, the microscopical examination of this material reported an acute bronchopneumonic process. The KOH test, Chinese ink, and smear microscopy for tuberculosis studies were also performed with negative results. However, the culture was positive, isolating a *S. intermedius* with the usual antibiotic susceptibility profile. The antibiotic management in the hospital was started with ceftriaxone and, 4 days later, given a good response to treatment, the patient was discharged with amoxicillin for one month. After discharge, symptoms resolved one week later, and tomographic findings reversed progressively after 4 months (Figure 3).

Discussion

Epidemiology

S. intermedius infections have been described in a wide age range: For example, Nakagawa et al. reported a lung abscess and empyema caused by *S. intermedius* in an immunocompetent 6-month-old boy⁶, while Yanagihara et al. reported a brain abscess as a complication of hepatopulmonary syndrome coexisting with interstitial pneumonia in a 76-year-old woman⁷. However, the oldest patient reported was 80 years old and developed an empyema and a psoas abscess due to *S. intermedius*⁸. Our patient was also in this wide age range. Regarding the sex predominance, respiratory infections due to SAG have been described more frequently in male patients with comorbid diseases who are typically complicated by pleural effusion⁹.

Clinical presentation

Patients with infections due to *S. intermedius* usually present nonspecific symptoms such as fever, chills, and general discomfort among the cases described. However, additionally, patients would exhibit symptoms related to the body side affected by it, for example, seizures, headaches, nausea and vomiting in brain abscesses^{10,11} or cough, sputum production, shortness of breath, and hemoptysis in pneumonia, empyema, and lung abscesses^{5,12,13}, which are uncommon clinical complications from *S. intermedius* with few cases currently described (Table 1). Moreover, chest pain, chest distress, and even respiratory failure have been described in pleural effusion and mediastinal abscess due to SAG, besides, odynophagia and cervicodynia in oropharynx infections².

Also, it has been described with *Haemophilus parainfluenzae* as the causative pathogens in a pulmonary abscess in a 75-year-old man¹⁴. Besides, other rare infections in body sites due to *S. intermedius* have been described, such as a recently described case in which discitis was reported due to contiguous infection due to a lung abscess of the posterior right lower lobe due to *S. intermedius*¹⁵. It has also been described as a causative pathogen in Lemierre syndrome in a 21-year-old man with *S. intermedius* bacteremia¹⁶ and in

a 29-year-old woman who developed multiple lung abscesses secondary to a uterine empyema caused by an intrauterine device with the *S. milleri* group as the causative agent isolated¹⁷. Furthermore, isolated pulmonary nodules and infective endocarditis due to *S. intermedius* have also been described^{4,18,19}. In our case, blood cultures were performed with a negative result, and no signs or symptoms related to probable or confirmed endocarditis were found. Moreover, a left thoracic artery pseudoaneurysm has been described as a secondary complication of a lung abscess in a 66-year-old man²⁰.

Imaging discussion

A lung abscess is defined as a circumscribed area of pus or necrotic deposits in the lung tissue with the formation of cavities containing necrotic deposits or fluid caused by a microbial infection, and if suspected, chest computed tomography (CT) should be done because CT provides a more accurate anatomical definition than a chest x-ray and can identify other abscesses and chest lesions that are not clearly delineated on a chest x-ray²¹. On CT, an acute lung abscess is usually surrounded by a less well-defined area of lung parenchyma filled with thick necrotic debris, often involving the apical segment of the inferior lobe of the right lung, which corresponds to the location in our case²¹. Furthermore, in some cases, CT can distinguish between lung carcinomas and abscesses because malignant lesions have a thicker wall and are more irregular than abscesses²¹. In our case, this differential diagnosis was considered due to the presence of irregular borders on CT, absence of fever, purulent sputum, and leukocytosis, as well as persistence of the lesion. However, histological studies ruled out malignancy and confirmed a bacterial lung abscess due to *S. intermedius*.

Therapeutic approach

The first lines of treatment for susceptible *S. intermedius* strains to beta-lactams could be penicilins, cephalosporins, and carbapenems²². Besides, a drainage procedure must be considered and performed in most abscess cases²².

Conclusion

Pulmonary abscess due to *S. intermedius* is an uncommon clinical scenario, even more so in pregnancy. A few cases have been reported of *S. intermedius* associated with brain and lung abscesses, pleuropulmonary disease, and infective endocarditis. Thus, physicians should take this anaerobic gram-positive organism into account in these clinical scenarios in order to allow a proper diagnosis and management.

Author contributions

Edgar Augusto Bernal García: Studied the conception and designed the study, also reviewed the manuscript.

Diana Jimena Cano Rosales: Studied the conception and designed the study, also reviewed the manuscript.

Cristian Orlando Porras Bueno: Wrote, reviewed the manuscript and also was involved in acquisition of data and analysis of data.

Sharon Julieth González Trillos: Wrote, reviewed the manuscript and also was involved in acquisition of data and analysis of data.

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Figures

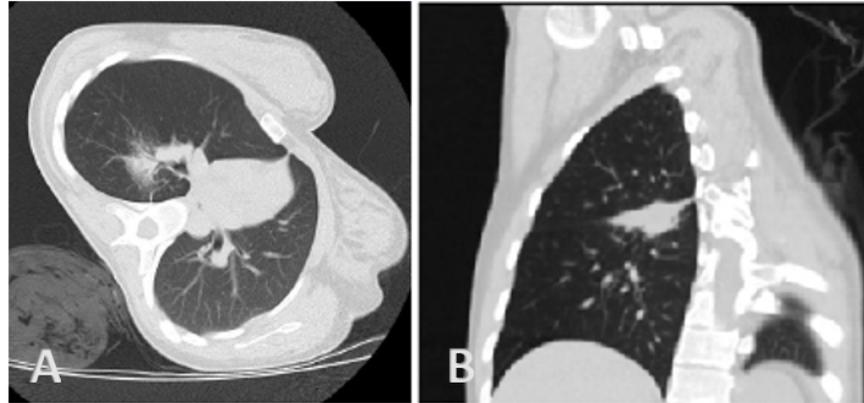


Figure 1. A. Axial computed tomography view showing a lesion in the upper segment of the lower lobe on the right side. B. Coronal computed tomography view.

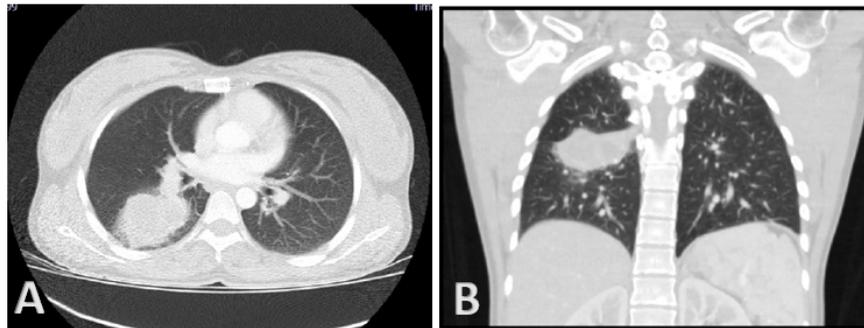


Figure 2. A. Axial computed tomography view, showing an increase in the abscessed lesion in the upper segment of the lower lobe on the right side. B. Coronal computed tomography view.

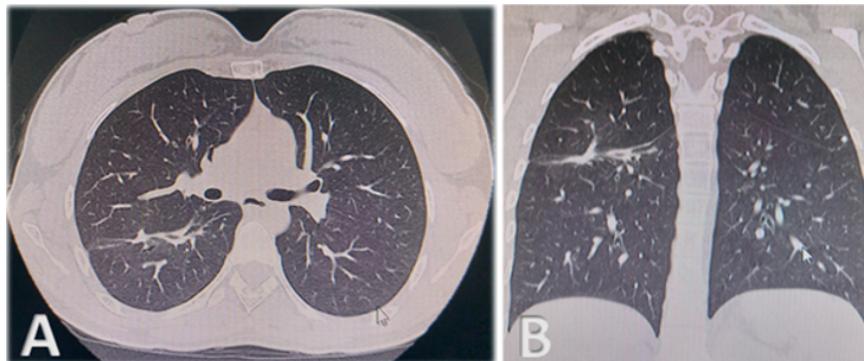


Figure 3. A. Axial computed tomography view, showing thickening of the major fissure of the right lung

associated with a small hyperdense image of irregular subpleural shape adjacent to the major fissure of the lower lobe, as residual changes in relation to pathological and surgical history. **B.** Coronal computed tomography view.

