

Case Report

Pneumonia caused by *Sphingomonas paucimobilis* infection after a dental intervention

Jelena Janković^{1,2}, Milija Gajić¹, Andrej Zečević¹, Ivan Milivojević¹, Ivana Buha^{1,2}

¹ Clinic for Pulmonology, University Clinical Center of Serbia, Belgrade, Serbia

² School of Medicine, University of Belgrade, Belgrade, Serbia

Abstract

Introduction: *Sphingomonas paucimobilis* can be found in air, water systems, dialysis fluid, nebulizers and laboratory instruments in hospitals. Despite its low pathogenicity, it can cause severe infections.

Case report: A 54-year-old man presented with fever, cough and pain in the right hemithorax. The laboratory results showed elevated inflammatory parameters. Chest radiography showed right upper lobe pneumonia. Empiric antibiotic therapy (cephalosporin) was prescribed. On control examination chest radiography showed incomplete regression. Chest computer tomography (CT) finding was bronchopneumonia in the right upper lobe. Bacteriological examination of fiberoptic aspirate revealed *Sphingomonas paucimobilis*. Trimethoprim-sulfamethoxazole was prescribed based on the antibiogram. After two weeks the control laboratory analysis was normal. The patient was fully recovered.

Conclusions: Our patient had no comorbidities or malignancies, and no hospitalization in the recent past. He had a dental intervention 5 days prior to the onset of symptoms. We propose that it was an infection after the dental intervention.

Key words: *Sphingomonas paucimobilis*; pneumonia; immunodeficiency.

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Introduction

Sphingomonas paucimobilis (*S. paucimobilis*) is a glucose-non-fermenting, strictly aerobic, Gram-negative bacillus [1]. Currently, there are more than 30 species of this genus, but the best-known species is *S. paucimobilis*. It is ubiquitous, and widely distributed in both the natural environment and hospitals. In hospitals, it can be found in air, water systems, dialysis fluid, nebulizers and laboratory instruments [2]. This bacterium can be isolated from sputum, bronchoalveolar lavage (BAL), blood, urine, wound swab, cerebrospinal fluid, and genital area [2]. It is an opportunistic pathogen. Despite its low pathogenicity, it can cause severe infections, such as sepsis [1,2]. *S. paucimobilis* is associated with bacteremia, pneumonia, meningitis, cutaneous infection, osteomyelitis, septic arthritis, postoperative wound, lung empyema, catheter-related infections, splenic abscesses, urinary and biliary tract infections and peritoneal dialysis-associated peritonitis [1,3].

Case report

We present the case of a male patient, who was treated for right-sided lobar pneumonia caused by *S.*

paucimobilis. A 54-year-old patient presented in the emergency unit in July 2021 with symptoms of fever up to 39 °C, cough and stabbing pain in the right half of the chest. The symptoms had manifested 4 days ago. He was tested twice for the coronavirus 2019 (COVID-19) infection due to the current severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic, and was negative both times. The laboratory results showed significantly elevated inflammatory parameters (C reactive protein (CRP) 392 mg/L) with leucocytosis. Chest radiography showed right upper lobe pneumonia (Figure 1).

Empiric antibiotic therapy (cephalosporin) was prescribed, and control examination was scheduled in 5 days. The patient was advised to give sputum for analysis. On control examination, there was a significant decrease in the inflammation parameters (CRP 135.7mg/L), with a radiographically significant, but incomplete, regression of consolidation. Sputum was negative for the tuberculosis bacillus. The patient was clinically better. Antibiotic therapy was continued for 7 more days and fluoroquinolones was added.

At the next control 7 days later, the patient was subjectively and objectively better. Inflammatory

Figure 1. Right upper lobe pneumonia.



parameters were almost normal (CRP 7.8 mg/L). Radiographic finding was stationary. The patient was advised to perform chest computer tomography (CT). Chest CT scan showed signs of bronchopneumonia in the right upper lobe with small pleural effusion on the same side (Figure 2).

Bronchoscopy was performed at the end of June 2021. Endoscopic finding showed signs of inflammation. Fiberaspirate was negative for the tuberculosis bacillus. Bacteriological examination of

Figure 3. Almost complete regression of pneumonia, with some fibrotic changes.

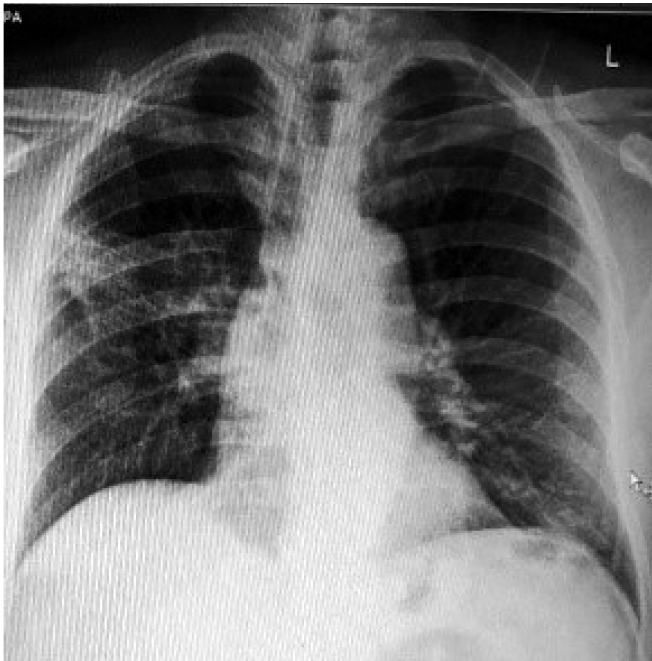
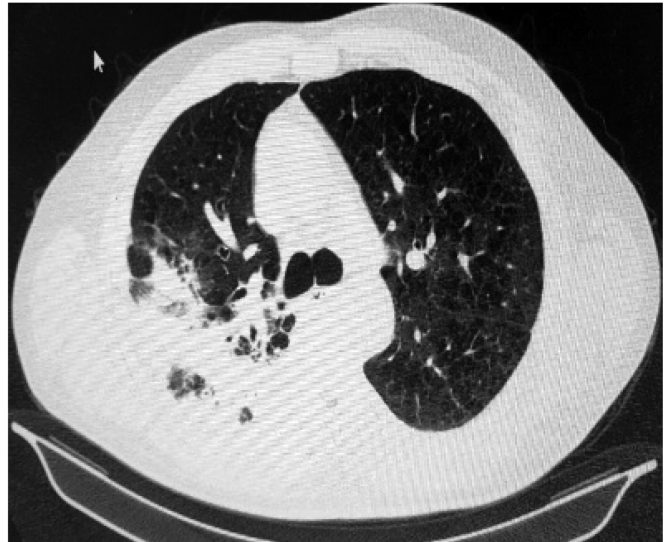


Figure 2. Bronchopneumonia in the right upper lobe.

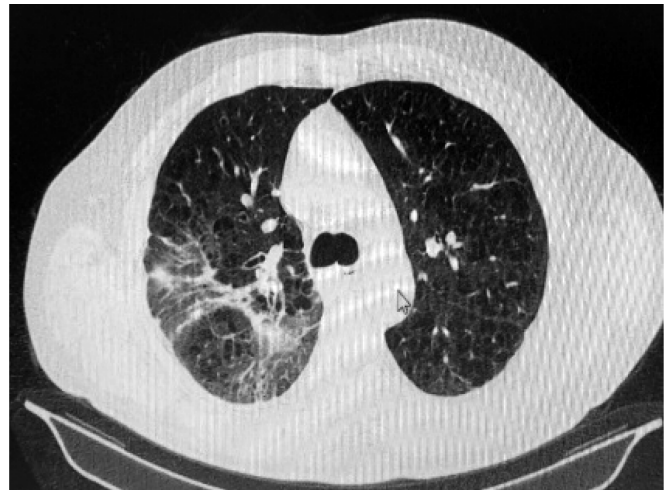


the fiberaspirate revealed *S. paucimobilis* which was sensitive to multiple antibiotics. Antibiotic therapy was corrected and trimethoprim-sulfamethoxazole was prescribed. After 2 weeks a control analysis was performed and CRP and leucocyte count were in the reference range. Immunoglobulins were also in the reference range. *Aspergillus* antibodies were negative. In July 2021, chest radiography showed almost complete regression of the pneumonia with some fibrotic changes (Figure 3).

Control chest CT scan was scheduled in 4 weeks. Chest CT showed zones of ground-glass opacification (GGO) predominantly in the superior segment of the right upper lobe which appeared like possible sequelae of pneumonia (Figure 4).

The next and the final control analysis was in September 2021. and at that time the patient was

Figure 4. Zones of ground-glass opacification (GGO) as sequelae of pneumonia.



asymptomatic. The chest x-ray showed complete regression (Figure 5). The patient was fully recovered.

Discussion

S. paucimobilis mostly causes infection in immunocompromised patients, along with patients with multiple comorbidities such as diabetes mellitus, liver and renal diseases, malignancy and patients who have indwelling catheter and devices [1]. Malignancy (57.1%) and diabetes mellitus (31.3%) are the most common comorbidities [1].

Our patient had no comorbidities or malignancies. He was not hospitalized in the recent past. He reported that he had a dental intervention 5 days before the onset of symptoms.

According to literature, the most common source of infection with *S. paucimobilis* is water. In the case of our patient, water used during dental intervention or dental instruments may be the source of the infection. Microbial contamination of dental unit waterlines may happen due to biofilm formation within the small-bore tubing that brings water to the handpieces. *Sphingomonas paucimobilis*, *Acinetobacter calcoaceticus*, *Methylobacterium mesophilicum* and *Pseudomonas aeruginosa* were the predominant bacteria in dental unit waterlines [4].

Usual resolution time of pneumonia with clinical and radiological improvement is about 10 days. If there is no improvement despite treatment with empirical antibiotics, the pneumonia is called “non-resolving pneumonia (NRP)”. Our case report was a non-resolving consolidation due to an uncommon low

virulence organism *S. paucimobilis*. Bronchoscopy is the initial diagnostic technique and a diagnostic choice in establishing the etiology of NRP [5]. After about 3 weeks of treatment with antibiotics, our patient had clinical resolution of the pneumonia.

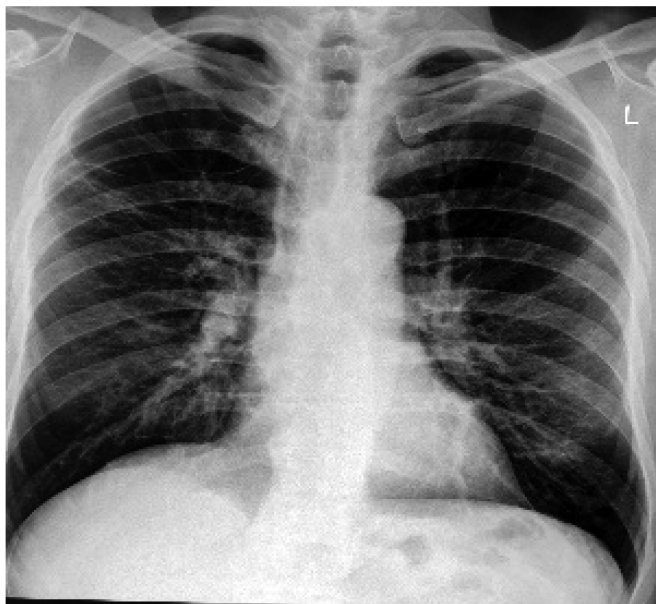
At the beginning, our patient was treated with cephalosporin, then fluoroquinolones, and later after antibiogram results with trimethoprim-sulfamethoxazole. There are no established guidelines for antimicrobial therapy for *S. paucimobilis* infections [6,7]. Literature recommends therapy with imipenem or aminoglycoside with a third-generation cephalosporin or with trimethoprim-sulfamethoxazole. *S. paucimobilis* is usually resistant to penicillins and first generation cephalosporins [6,8]. Despite the identification of β -lactamases-associated genes in *Sphingomonas paucimobilis* genome, rare cases were still sensitive to penicillins [9].

Prognosis is generally very good. A small number of cases need a more aggressive therapy, like in case of NRP and in immunocompromised patients with comorbidities. A small number of cases were lethal [3,9].

Conclusions

S. paucimobilis may cause infections in previously healthy individuals, but also in immunocompromised patients. The bacterium is of low virulence and it is not associated with serious life-threatening infections, but it can sometimes cause severe clinical presentation. Patients without any comorbidities or malignancy can be infected by *S. paucimobilis* in an unusual way, as was our patient.

Figure 5. Complete regression of pneumonia.



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Corresponding author

Ivana Buha, MD

Head of the Pulmonary Function Testing Laboratory, Clinic for Pulmonology, University Clinical Center of Serbia

Dr Koste Todorovića 26, Belgrade, Serbia

Tel: +381113663467

Email: ivanabuha1@hotmail.com

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