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CASE REPORT

COMMUNITY-ACQUIRED PNEUMONIA WITH AN UNUSUAL RADIOGRAPHIC PATTERN RELATED TO *Lophomonas* SP. INFECTION

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ABSTRACT

Lophomonas sp. is a flagellated protozoan, described in the literature as a commensal in the digestive tract of insects such as cockroaches and termites. It has little association with the development of symptomatology in immunocompetent patients. However, there are a few cases of bronchopulmonary infections. We report a patient who started presenting respiratory symptoms focused initially on community-acquired pneumonia, with no response to empirical therapy following clinical management guidelines. It required a thorax tomography that evidenced alveolar occupation in an unusual pattern, leading to a fiberoptic bronchoscopy plus bronchoalveolar lavage, achieving microbiological isolation of *Lophomonas* sp. *Lophomonas* pneumonia is a rare respiratory clinical condition. In case of slow-resolution pneumonia or one that does not respond to treatment, it is recommended to perform a new evaluation of the patient in their clinical history and request complementary diagnostic imaging to make it possible to reach a timely diagnosis and thus decrease mortality.

KEY WORDS: Respiratory disease; protozoan infection; cockroaches; metronidazole.

INTRODUCTION

Lophomonas is a protozoan that parasitizes the intestines of termites and cockroaches. It belongs to the supergroup *Excavata*, *Parabasalia* of the first rank, and *Cristamonadida* of the second rank. These are unicellular, flagellated, free-living protists that are symbiotic and, in some cases, associated with human pathogenicity (Camargo et al., 2020). According to the reviewed literature, approximately 307 cases have been reported globally between 1993 and 2020,

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including cases from China, Spain, Turkey, India, Egypt, Iran, Malaysia, Mexico, Panama, Peru, Ecuador, Colombia, and the United States (Nakhaei et al., 2022).

We present the case of a patient in northern Colombia with community-acquired pneumonia without documented immunosuppression. Computed tomography findings revealed heterogeneous interstitial infiltrative involvement diffusely affecting both lungs, predominantly in the right upper lobe. A direct smear from a bronchoalveolar lavage (BAL) sample was compatible with *Lophomonas* sp. The patient showed clinical improvement after intravenous antiparasitic treatment. This case highlights the need to consider this microorganism as a potential etiological agent of pneumonia in our country, given the high global mortality rate due to delayed diagnosis and inadequate treatment of this infection.

CASE REPORT

The patient was a 63-year-old man residing in the Santa Marta district, Magdalena Department in Colombia, working as a secondary school teacher in a rural area. His medical history included hypertension, diabetes mellitus, and a prolonged smoking habit of approximately 25 packs a year. He presented to the emergency room with a clinical condition characterized by progressive respiratory distress, cough with yellow sputum and traces of blood, asthenia, adynamia, and dysregulation of body temperature. Initial imaging revealed alveolar infiltrates on chest X-ray that tended toward consolidation in the right middle lobe and left perihilar lobe (Figure 1), leading to a diagnosis of community-acquired pneumonia. Intravenous ceftriaxone 2g every 24 hours was initiated for three days. The Ethics Committee of the Clinical General del Norte, Colombia, approved this study under process code T.I-474, and informed written consent was obtained from the patient to publish this case report.

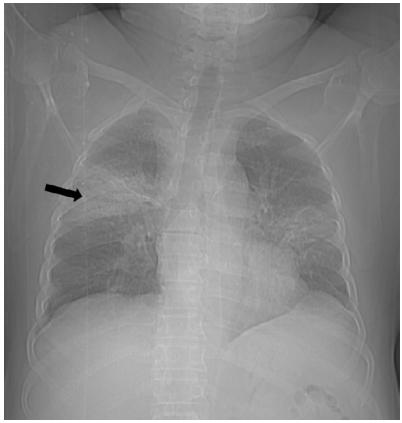

Figure 1. Anteroposterior thorax X-ray showed bilateral pulmonary infiltrate with a tendency for left perihilar consolidation, left base, and alveolar infiltrate in the middle lobe of the right lung (black arrow).

Subsequently, the patient did not respond satisfactorily, presenting with tachypnea, use of intercostal and supraclavicular muscles, and reduced vesicular breath sounds at the left lung base with more acute bibasilar crackles in the left hemithorax. This condition required high-flow oxygen support and a rotation of antimicrobial therapy to intravenous vancomycin 1.2 g every 12 hours plus piperacillin/tazobactam 4.5 g every six hours for ten days. Despite the new treatment, he experienced slow resolving pneumonia.

A chest computed tomography revealed interstitial opacities in the upper and lower lung lobes with initial consolidation in the left lower and right upper lobes (Figures 1 and 2). A bronchoscopy with bronchoalveolar lavage (BAL) was performed in the right anterior segment (microbiology and cytopathology) and the lingual segment of the left upper lobe (microbiology). Samples were sent to the microbiology laboratory at the treating healthcare institution, where smear microscopy, Gram stain, KOH, mycobacterial culture, culture for fungal and common pathogens, PCR for *Mycobacterium tuberculosis*, and cytopathology were performed, all yielding negative results.

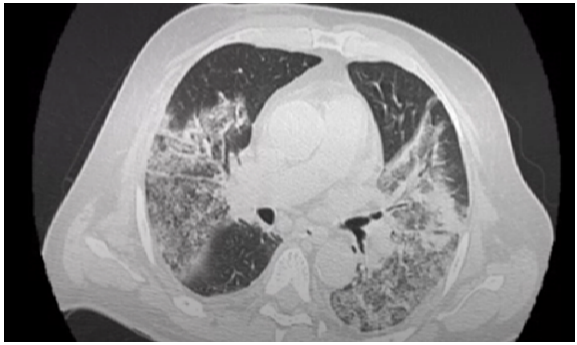

Figure 2. The axial cut of a thorax tomography with a heterogenous interstitial infiltrative compromise with diffuse pattern in both lungs, predominantly in the superior right lobe, characterized by interlobular septal thickening and ground-glass opacity infiltrative spots.

Direct microscopic examination at 400× magnification revealed flagellated protozoa consistent with *Lophomonas sp.* (Figure 3), prompting a switch to intravenous metronidazole 500 mg every 12 hours. He demonstrated respiratory pattern improvement, with adequate clinical response and a marked reduction in acute-phase reactants and respiratory pattern within 72 hours of starting treatment. During his hospital stay, he tested negative for human immunodeficiency virus serology. He was discharged with oral metronidazole 500 mg every 12 hours for ten days.

Figure 3. Direct smear from the bronchoalveolar lavage sample in saline solution. A flagellated mobile trophozoite of *Lophomonas* sp. is observed under light microscopy at 400× magnification (black arrow).

DISCUSSION

Lophomonas sp. is a multiflagellated protozoan initially described as a commensal organism within the digestive tracts of cockroaches and termites, aiding in the digestion of nutrients such as cellulose. Despite being an uncommon human pathogen, it has been identified as an etiological agent of bronchopulmonary infections, predominantly associated with immunocompromised patients (Camargo et al., 2020). Affected patients include both adults and children, with or without underlying immunosuppression. This microorganism is often incidentally identified during bronchoalveolar lavage sample analysis conducted to investigate other pathogens and is not commonly associated with human disease. However, recent findings have prompted some authors to designate it as a pulmonary pathogen, as it has also been detected in sputum samples from asthmatic patients (Zerpa et al., 2010).

Lophomonas pulmonary infection's clinical manifestations are similar to infections with other etiological agents. Symptoms include expectoration with variable characteristics, such as purulent white or bloody sputum, fever ranging from 37.5 to 39 °C, signs of airway obstruction, dyspnea, chest tightness, and the presence of crackles and wheezing in both lung fields on auscultation. Degrees of hypoxemia varied according to the severity of the infection and were prominently observed in this case. Specific radiological findings (X-rays and computed tomography) associated with *Lophomonas* infections include alveolar consolidation (26.5%), ground-glass opacity (5.9%), centrilobular nodules (23.5%), tree-in-bud pattern (38.2%), cavitation

(23.5%), and pleural effusion (23.5%) (López-Aguilar et al., 2021; Taheri et al., 2024).

No pathognomonic bronchoscopy findings are associated with *Lophomonas* infections, though the right bronchus often presents a higher frequency of pathological observations. Nonetheless, more studies are needed to characterize better its pulmonary manifestations (Aliyali et al., 2022). Although it is a rare disease, the cosmopolitan presence of cockroaches suggests that *Lophomonas* infections could be more common than previously believed.

In this case, the patient had adequate socioeconomic conditions, access to basic services, sanitary standards, and a stable income that provided a good quality of life. However, he worked in an educational institution in a rural area where he spent most of his time with limited access to essential healthcare services and regular sanitary conditions.

In this context, the probability of developing *Lophomonas* sp. infection with respiratory and systemic involvement in an immunocompetent patient is low due to the host's innate immune response mechanisms. The presence of infection in this patient suggests the possibility of some degree of immunocompromise, with type 2 diabetes mellitus likely playing a prominent role. Diabetes interferes with the activation of the classical complement pathway and alters granulocyte chemotaxis and phagocytosis (Lontchi-Yimagou et al., 2013; Thakkar et al., 2023), affecting cellular response to infection. Additionally, the imaging findings on computed tomography could not exclude a previously undiagnosed interstitial disease as a predisposing structural condition.

Microbiological isolation during bronchial lavage detected the microorganism only after 48 hours, as molecular testing and polymerase chain reaction (PCR) were unavailable due to the low prevalence of this pathogen group in our setting, possibly resulting in underdiagnosis owing to low clinical suspicion. In this patient, direct observation confirmed the isolation of the microorganism in bronchial lavage, where numerous mobile trophozoites were identified.

The patient showed positive clinical progress after a ten-day course of metronidazole. However, there is limited literature on this subject, and no established guidelines for treatment duration or optimal dosage are available.

Pulmonary infection by *Lophomonas* sp. is infrequent, which makes it an underdiagnosed entity with inadequate treatments that could increase morbidity and mortality. Since Colombia has abundant zones devoid of basic conditions for healthy life conditions, it would be clinically helpful to carry out disease prevalence studies to estimate the necessity of unifying concepts in diagnostic and therapeutic measures.

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CONFLICTS OF INTEREST

The authors report no conflicts of interest in this work.

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