

Case Report

## Pneumonia due to *Lophomonas* spp. About a case






### *Neumonía por *Lophomonas* spp. a propósito de un caso*

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Abstract

*Lophomonas* is a genus of flagellate protozoa that contains two species, *Lophomonas striata* and *Lophomonas blattarum*. Both are considered endocommensals from the intestinal tract of arthropods such as termites and cockroaches. Although *Lophomonas striata* is not considered important in public health, *Lophomonas blattarum* is the causative agent of a respiratory infection called lofomoniasis that particularly affects immunocompromised individuals (HIV/AIDS), transplants, neoplasms, and corticotherapies, in turn, asthmatic patients, whether these children or Adults. The clinical case of a 23 years old man treated at the Hospital de Infectología Dr. José Daniel Rodríguez Maridueña who came for generalized weakness, weight loss, accompanied by a thermal rise of three months of evolution. In the microbiological study, *Lophomonas* spp. A rare microorganism in clinical presentations.

**Key words:** Pneumonia , Immunosuppression , Respiratory Tract Diseases.

## Resumen

**Introducción:** Lophomonas es un género de protozoos flagelados que contiene dos especies, Lophomonas striata y Lophomonas blattarum. Ambas son consideradas endocomensales provenientes del tracto intestinal de artrópodos tales como termitas y cucarachas. Aunque Lophomonas striata no se considera importante en salud pública, Lophomonas blattarum es el agente causal de una infección respiratoria llamada lofomoniasis que afecta particularmente a individuos inmunocomprometidos (VIH/sida), trasplantados, neoplasias, corticoterapias a su vez pacientes asmáticos, ya sean estos niños y adultos. Se presenta el caso clínico de un hombre de 23 años atendido en el Hospital de Infectología Dr. José Daniel Rodríguez Maridueña, quien acude por debilidad generalizada, pérdida de peso, acompañado de alza térmica de tres meses de evolución. En el estudio microbiológico se evidenció Lophomonas spp. microorganismo poco frecuente en presentaciones clínicas.

**Palabras clave:** Neumonía, Inmunosupresión, Enfermedades Respiratorias.

## Introduction

Lophomonas is a genus of multiflagellate and anaerobic protozoa belonging to the family Lophomonadidae (order Lophomonadida, Phylum Metamonada), in which two species are currently recognized: Lophomonas blattarum and Lophomonas striata. Of the two species of the genus, L. blattarum is relevant in public health because it is the causal agent in humans of the bronchopulmonary disease known as lofomoniasis. This disease can affect the maxillary sinuses, bronchi and lungs producing different respiratory signs and symptoms <sup>1</sup>.

In most of the cases reported in China, Peru, Iran, and other countries <sup>2,3-6</sup>, it is a clinical situation underlying suppressed immunity states (AIDS, transplants, malignant blood diseases, corticosteroids, etc.) <sup>2</sup>.

In Ecuador it had its first case registry (Valdiviezo Allauca et al., 2019) <sup>4</sup>, this being the second case reported in the country, and implies that microbiological diagnostic laboratories must be alert in the direct study carried out to respiratory samples, laboratory specialists should take special care in microscopy of this parasite, since the cells of the lower respiratory tract (ciliates) could be confused with this microorganism <sup>5</sup>.

## Presentation of the case

23-year-old male patient from the rural area of the province of Guayas-Ecuador, with habitual consumer habits of the psychoactive "H", so that he lived in a street condition. No relevant personal, family, or surgical pathological history.

She was admitted to the emergency area due to presenting a clinical picture of three months of evolution characterized by generalized weakness, weight loss, accompanied by unquantified thermal rise without predominance of hours, cough with yellowish expectoration and dyspnea on medium efforts that progressed to a minimum, respiratory failure acute, yellowish diarrheal stools in a number of more than 4 in 12 hours;

- vital signs:
- blood pressure: 100 / 70mmHg
- heart rate: 126x'
- respiratory rate: 43x'
- temperature: 36.8°C
- weight: 39 kg
- height: 1.49 m
- Glasgow: 15/15
- oxygen saturation: 77%.

Physical examination revealed a patient with painful, long-line, asthenic facies, presence of intercostal traction, lung fields: hypo ventilated in the left base and ipsilateral wheezing, heart sounds: rhythmic, abdomen: tense pain in the right upper quadrant, air-fluid sounds: increased, extremities: symmetric, peripheral pulses: palpable.

A chest X-ray was performed (Figure 3), where a cardiac area was observed within normal limits. Free cost and cardiophrenic sinuses, diffuse interstitial infiltrates in the right lower and middle lobe and in the left pulmonary field. Cavitory images at the level of the left lower lobe.

Microbiological tests were also requested; blood culture (one shot), stool culture negative, Kinyoun stain negative for Cryptosporidium spp. and Isosporas belli; Xpert MTB / RIF and negative sputum Ziehl Neelsen stain, negative stool Ziehl Neelsen stain. Regarding the other paraclinical tests:

- hemogram: white series: leukocytes 28.43 x 10<sup>3</sup>uL,
- lymphocytes 12.3%,
- monocytes 7.2%,
- neutrophils 78.5%,
- eosinophils 1.9%,

- basophils 0.1%;
- red series: red cells 4.98 x 10<sup>6</sup>uL,
- hemoglobin 11.9 g / dl,
- hematocrit 36.1%,
- platelets 592 x 10<sup>3</sup>uL.

Peripheral blood smear: red series: anisocytosis, anisochromia; granulocytic series: marked involvement of polymorphonuclear granulocytes, maturation asynchrony, 80% toxic granulations, moderate cytoplasmic vacuolation, hyposegmentation of neutrophils, no pathological blasts; thrombocytic series: thrombocytosis. Serology: HIV negative, rapid syphilis test positive / RPR reagent 4th dilution.

- Blood chemistry: urea 27.2 mg / dl,
- glucose 98.4 mg / dl,
- creatinine 0.7 mg%,
- PCR positive latex 24th dilution,
- direct bilirubin 0.31 mg / dl,
- indirect bilirubin 0.18 mg / dl,
- total bilirubin 0.49 mg / dl;
- electrolytes: sodium 123 mEq / L,
- potassium 4.4 mEq / L,
- chlorine 88 mEq / L,
- calcium 1.10 mEq / L;
- enzymes: TGO 49 U / L, TGP 23.8 U / L,
- GAMMA GT 58.6 U / L, LDH 327 U / L.
- Haemostasis: TP 14'', TPT 49 increased: +;

Brown color; consistency: soft; Entamoeba coli: cysts. In turn, a direct examination and sputum culture are requested. The study is carried out by microscopy (10XC observation) of the sample (table 1 and 2).

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Treatment was started with albendazole 400 mg every 12 hours for 3 days, plus metronidazole 500 mg orally every 8 hours, during his hospitalization (8 days) and subsequently completed the scheme for a total of 21 days on an outpatient basis. An appointment was scheduled to assess his evolution, but to date he did not attend this hospital.

## Methods

Reference is made to a clinical case of a patient who presented respiratory symptoms. Sputum sample was received by spontaneous expectoration in a sterile container with a disposable wide-mouth screw cap, which underwent an evaluation of the quality of the sample according to the Washington and Murray criteria for the evaluation of the quality (10X observation) of samples.

Results

It is evidenced in the direct microscopic examination (table 1) with objectives of 10X, and 40X parasite of spherical shape, pyriform (15 to 40 µm) with multiple flagella (figure 1) in a pole and in movement, characteristic (figure 2), differing from the morphology of ciliated bronchial cells. The Gram stain (Table 2) performed on the sputum sample showed a predominance of Gram-Negative Bacilli, characteristic of patients with parasitic migration. Identification and antimicrobial susceptibility test carried out with Vietk<sup>2</sup> Compac from Biomerieux, a polymicrobial culture (three germs) was obtained, two of these being Gram negative (characteristic in patients with parasitic migration), and one Gram positive germ (table 3)

also provided by the begging state the user lives in. The clinical manifestations that lead the disease are the general ones, the main ones being fever, asthenia and weight loss with frequency of 90 to 95% of the cases, followed by mucocutaneous involvement (such as malar rash, alopecia, mucous ulcers, discordant lesions) and musculoskeletal

**Table 1: Direct study carried out on the sputum sample**

Epithelial cells of the upper respiratory tract:	1 - 5 XC
Epithelial cells of the lower respiratory tract:	27 - 31 XC
Leukocytes:	Uncountable
Piocytes:	16-20 XC
Red blood cells:	ABUNDANT
Mucous filaments:	
No fungal elements observed	
The following are observed: Blastocystis hominis (+), and Lophomonas spp. (++)	
Note: the parasite was spherical in shape, pyriform (15 to 40 µm) with multiple flagella in one pole and in movement, characteristic of Lophomonas spp.	

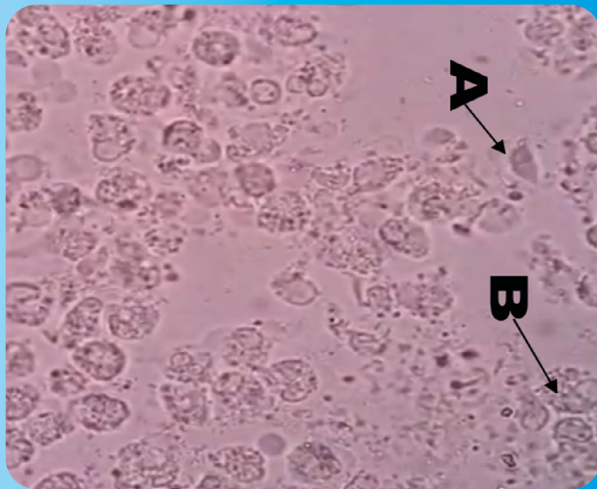
**Table 2: Gram stain performed on the sputum sample**

Epithelial cells of the upper respiratory tract:	Scarce
Epithelial cells of the lower respiratory tract:	Scarce
Polymorphonuclear leukocytes	+++
Monomorphonuclear leukocytes	++
Gram negative rods: abundant.	
Gram positive cocci in chains and clusters: scarce.	
Note: a predominance of Gram-Negative Bacilli was observed, characteristic in patients with parasitic migration.	

**Table 3: Identification and antimicrobial susceptibility test performed with Vietk2 Compac from Biomerieux**

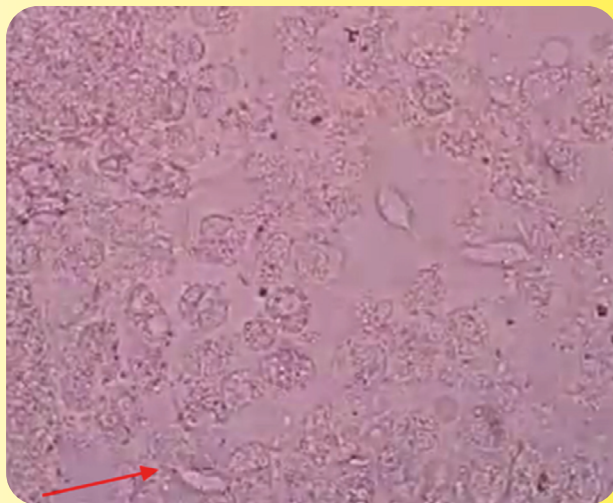
1. Germ Identified: Oxacillin / methicillin sensitive Staphylococcus aureus. Method: "MIC" (minimum inhibitory concentration), automated:	
Gentamicin:	<= 0.5 sensitive
Clindamycin:	<= 0.25 sensitive
Tetracycline:	<= 1 sensitive
Sulfatrimethoprim:	<= 10 sensitive
Note: numerical values are expressed in ug / ml.	
2. Identified germ: Acinetobacter baumannii complex. Method: "MIC" (minimum inhibitory concentration), automated:	
Ampicillin sulbactam:	<= 2 sensitive
Piperacillin / tazobactam:	<= 4 sensitive
Ceftazidime:	<= 1 sensitive
Cefepime:	<= 1 sensitive
Gentamicin:	<= 1 sensitive
Note: numerical values are expressed in ug / ml.	
3. Germen i identificado: Pseudomonas aeruginosa. Método: "CIM" (concentración inhibitoria mínima), automatizado:	
Ceftazidime:	<= 1 sensitive
Cefepime:	<= 1 sensitive
Imipenem:	<= 2 sensitive
Meropenem:	<= 0.25 sensitive
Gentamicin:	<= 1 sensitive
Note: numerical values are expressed in ug / ml.	
Method: "Kirby - Bauer" disk diffusion:	
Sensitive: Aztreonam.	

**Figure 1. Accumulation of Lophomonas spp.**



- A)** *Lophomonas spp.* its multiple flagella are observed.
- B)** Accumulation of *Lophomonas spp.* Source: Direct study carried out at the Dr. José Daniel Rodríguez Maridueña Infectiology Hospital, Diagnostic and Therapeutic Service, Clinical Laboratory - Microbiology.

**Figure 2. Morphological characteristics of Lophomonas spp**



*Lophomonas spp.* Ovoid multiflagellate protozoan, the cytoplasm in the middle part, numerous irregular flagella at the apical end.

**Source:** Direct study carried out at the Dr. José Daniel Rodríguez Maridueña Infectiology Hospital, Diagnostic and Therapeutic Service, Clinical Laboratory Microbiology.

**Figure 3. Lophomonas lung infection: Chest X-ray**



**Source:** Diagnostic Imaging Service carried out at the Dr. José Daniel Rodríguez Maridueña Hospital for Infectious Diseases.

### Discussion

Immunosuppression was due to the poor nutritional status of the user, in addition to exposure to unfavorable hygienic conditions due to their begging state, added to the consumption of illicit drugs that limit the immune response of patients.

Although it is a rare disease, the cosmopolitan presence of cockroaches suggests that *L. blattarum* infections could be more common than is believed. Pneumonia with or without eosinophilia, mainly in immunosuppressed patients, should be considered by the doctor when making a differential clinical diagnosis<sup>7</sup>.

The clinical presentation of bronchopulmonary infection by *L. blattarum* is indistinguishable from any process that affects the respiratory tract, since the signs and symptoms resemble common symptoms, such as fever, cough, dyspnea, among others, occurring in 35% of eosinophilia patients, without a characteristic feature in imaging tests, varying between pulmonary nodulations that have been reported migratory in isolated cases, cavitation, pleural effusion and abscesses<sup>8</sup>. Regarding transmission to humans, a hypothesis has been raised that the cystic form of the parasite is the infective form (inhalation route or by contaminated fluids), with excystation (production of a trophozoite from the cyst stage) being carried out<sup>10</sup>, and release of trophozoites into the respiratory tract<sup>9</sup>. Through their feces, termites

and cockroaches can expel parabasalids (class of flagellated protist), under unfavorable environmental conditions they can form cysts for protection, which under suitable conditions such as those in the respiratory tract can be released through excystation; cysts can easily spread through the air or soil, and inhalation of protozoan cysts by humans is possible <sup>11</sup>.

Discrimination of *L. blattarum* and ciliated epithelial cells under light microscopy is usually subtle. However, there are some morphological differences to aid judgment. The first is the recognition of flagella and cilia through their length and orientation, which belonged to *L. blattarum* and ciliated epithelial cells, respectively. The flagella plume of *L. blattarum* is composed of 50 or more flagella, with an unequal length range of 5 to 10 µm, the longest being in the center of the tuft and the shortest in the periphery. The ciliated epithelial cell tuft is composed of approximately 200 cilia, with an almost identical length of 7-8 µm. Under the light microscope, the flagella are irregularly arranged while the cilia are regularly oriented. In second place, the relative position of the nucleus and the flagella or tuft of cilia is different. The nucleus of *L. blattarum* is found at the base of the flagella tuft, both at the anterior end of the cell. While the nuclei of the ciliated epithelial cells are found in the lower part of the cell, in front of the tuft of cilia, which emerges from the apical face of the cell. Third, the axial filament could be found in the posterior end of *L. blattarum*, but not in the ciliated epithelial cells <sup>12</sup>. in front of the tuft of cilia, which emerges from the apical face of the cell. Third, the axial filament could be found in the posterior end of *L. blattarum*, but not in the ciliated epithelial cells <sup>12</sup>. in front of the tuft of cilia, which emerges from the apical face of the cell. Third, the axial filament could be found in the posterior end of *L. blattarum*, but not in the ciliated epithelial cells <sup>12</sup>.

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