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Lophomonas blattarum cockroach parasite that causes uncommon pneumonia in humans*Lophomonas blattarum* parásito de cucarachas que causa neumonías infrecuentes en humanos

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LOPHOMONAS BLATTARUM PARÁSITO DE CUCARACHAS QUE CAUSA NEUMONÍAS INFRECIENTES EN HUMANOS

Lophomonas blattarum is a protozoan that parasites the intestinal tract of termites and cockroaches; It belongs to the supergroup Excavata, Parabasalia of first rank and Cristamonadida of second rank (1). They are unicellular, flagellated, free-living, symbionts and endosymbionts diners (2).

L. blattarum is eliminated in the cockroach feces and as has been shown for other flagellated protozoa (3,4), and according to Martínez-Girón and Ribas (5) the organism develops cysts that can survive in the environment if External conditions are adverse. Therefore, *L. blattarum* cysts could be inhaled to the respiratory tract and with the right conditions of humidity, temperature and oxygen, they could suffer excystation. This last process is produced by contact with reducing agents, usually bile salts or digestive enzymes, although it can also occur spontaneously. This would produce free and therefore mobile trophozoites in the airway epithelium, which would probably affect humans through protease activated receptors (5), or by interaction with specific receptors in the respiratory tract. It is proposed that the antigens penetrate the mucosa of the gastrointestinal tract by disruption and this in turn correlates with an allergic process, which is mediated by activated protease receptors (6).

Chen and Meng (7) reported the first case of human lung infection with *L. blattarum* in China in 1993. However, in the literature only 140 cases have been reported between 1993 and 2016 and most of them were in China, about few in Spain and others in Peru (8). A case of a patient co-infected with tuberculosis was recently reported in India (2).

L. blattarum can cause infections in a variety of tissues and organs, including maxillary sinus, respiratory system and reproductive system. Infections are difficult to differentiate from others with similar clinical symptoms such as pneumonia and bronchitis. About 96% of cases are associated with respiratory tract infection, although there are reports of sinusitis and urinary infections. The most frequent symptom is cough

without expectoration and more than 50% of patients have fever. Laboratory findings have shown some cases of eosinophilia with opacity and condensation of images on radiological examination (9,10).

The symptoms of this parasitic lung infection are like those of other respiratory infectious etiologies, such as bronchial asthma, bronchiectasis, pneumonia, lung abscesses and cough. They have expectoration of different characteristics (white, purulent or bloody sputum), fever between 37.5 and 39 ° C in most cases, signs of airway obstruction, dyspnea, chest tightness and auscultation, crackles and wheezing are heard in both lungs (11).

Specific radiological findings (radiographs and CT scans) range from reticular opacities to the alveolar consolidation compromise, presence of pleural effusion in some cases, with hypoxemia of different grade according to the severity and clinical response of the patients. In cases of patients with bronchoscopy, respiratory secretions, congestive bronchial mucosa, inflammation, edema, foci of hyperplasia and some of necrosis and increase in circulating eosinophils are documented in 35% of patients (11).

The samples frequently used for diagnosis are bronchoalveolar lavage and sputum; however, throat swabbing could be used (9, 10). The laboratory diagnosis is mainly based on the observation of parasitic morphology through the light microscope. However, in some studies the hair cells of the respiratory tract of patients with *L. blattarum* and some multiflagellated protozoa have been confused (12). The molecular diagnosis is carried out through a specific polymerase chain reaction (PCR) where a 214 bp band can be observed that would confirm the genus *Lophomonas* spp (13).

As mentioned earlier, it is believed that inhalation of aerosols with oocysts of *Lophomonas* infects humans, but ingestion of food contaminated with cockroach feces is also considered. Poor hygienic conditions and the presence of high populations of cockroaches in human habitats constitute important risk factors (12).

Immunosuppression is a predominant factor in patients with poor nutritional status, exposure to unfavorable hygienic conditions and multiple comorbidities that limit the immune response of patients. The treatment is carried out with nitroimidazole derivatives such as metronidazole. Treatment consists of 500 mg of oral metronidazole every 8 to 12 hours or 2g per day in adults and 7.5 to 15 mg / kg every 8 hours in children for one week. Severe cases can be treated with intravenous metronidazole 15mg / kg / h followed by 7.5 mg / kg / 6h as maintenance (13). Other therapeutic alternatives with Tinidazole and Albendazole are described and up to now no failed cases related to pharmacological management have been described (8).

Although it is a rare disease, the cosmopolitan presence of cockroaches makes it possible to assume that *L. blattarum* infections could be more common than previously believed. Pneumonia with or without eosinophilia, mainly in immunosuppressed patients, must be considered by the physician when making a differential clinical diagnosis.

There are 4.600 species of cockroaches and of these, only 30 have been identified. Cockroaches exist about 320 million years ago, which corresponds to the Carboniferous period (14), so there will be cockroaches for a long time and apparently we will have to know how to live with them and their microorganisms.

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ADDITIONAL INFORMATION

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