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Case Report

A Rare Case of Bronchopulmonary Infection Due to *Lophomonas Blattarum*: Case Report and Review of Literature

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ABSTRACT

Lophomonas blattarum is a recently discovered rare parasitic protozoan infecting humans and causing serious respiratory symptoms. Common manifestations include fever, cough with expectoration, chest stuffiness or shortness of breath, bronchiectasis and pulmonary abscess making it difficult to differentiate from other pulmonary infections. Here we report a case of *L. blattarum* infection diagnosed by microscopic observation of bronchoalveolar lavage (BAL) fluid smear. The etiological characteristics, mode of transmission, clinical symptoms, possible diagnostic basis and treatment of this disease is discussed in order to provide a better understanding of *L. blattarum* infection also referred as pulmonary lophomoniasis.

Keywords: *Lophomonas blattarum*, Pulmonary Lophomoniasis, Cristamonadida.

INRODUCTION

L. blattarum is a rare but potentially important cause of bronchopulmonary infection and respiratory symptoms. [1] A member of the order hypermastigote in the protozoan division Mastigophora, *L. blattarum* is a protozoan parasite that occurs in the intestine of some arthropods such as termites and cockroaches. [2] Chen and Meng described the first case of pulmonary lophomoniasis in 1993 and since then 136 cases have been reported in China [Table1]. [3] The present article describes a case of pulmonary Lophomoniasis from Meerut, Western Uttar Pradesh along with its clinical presentation.

The identification of this Protozoan in human samples is based on the morphological features observed under light microscopy using fresh and stained sample smears from the respiratory tract which include sputum, BAL fluid, bronchial brushings and tracheal aspirates. Multiflagellate protozoa are often difficult to differentiate from ciliated bronchial epithelial cells and misidentification under light microscopy is a significant risk. [4] This risk may be reduced in the future with development of molecular methods of identification.

CASE REPORT

A 55-year old female was admitted to the Department of Respiratory Medicine, Chhatrapati Shivaji Subharti Hospital, Meerut, (Western U.P.), on 19th January 2015 with chief complaints of cough with purulent expectoration, chest pain and sweating on and off, since past one week. She also gave history of haemoptysis once. She had been diagnosed as a case of tubercular pleural effusion 3

years back for which she took a complete course of anti tubercular treatment. She also gave a history of Diabetes mellitus since past 5 years.

On admission, her vital parameters were recorded as follows: blood pressure 100/86 mm Hg, pulse rate 96 beats/min, respiratory rate 26 breaths/min and body temperature 100°C. Routine biochemical tests and complete blood count were within normal limits. ESR was 30mm/hr. Chest computed tomography (CT) scan showed irregular cavitating speculated lesion in apico-posterior segment of left upper lobe.

BAL fluid collected by bronchoscopy was received in the lab. Zeihl Neelsen staining of the BAL fluid smear was positive for acid fast bacilli. Wet mount and Wright-Giemsa stain was done. Moderate number of trophozoites of the protozoan, *L.blattarum* was observed on light microscopy of both the wet mount as well as the Giemsa stained smear of BAL fluid. The trophozoite was about 20-30 µm in size with a round or oval shaped body and 30-40 flagella on one end, actively motile on wet mount (figure1A,B). The Wrights-Giemsa stained smear demonstrated pear shaped trophozoite with mauve colored cytoplasm (figure 2 A,B). The flagella length was 8 to 18 µm arranged in bundles on one end.

Two pathognomonic morphological characteristics of ciliated epithelial fragments were used to differentiate them from flagellated protozoa: the observation of a round-oval nucleus at the basal end of the cell (if a nucleus was present) and a marked terminal bar at the apical end of the cell with regular, unidirectional cilia inserted into the terminal bar (figure 3 A, B).

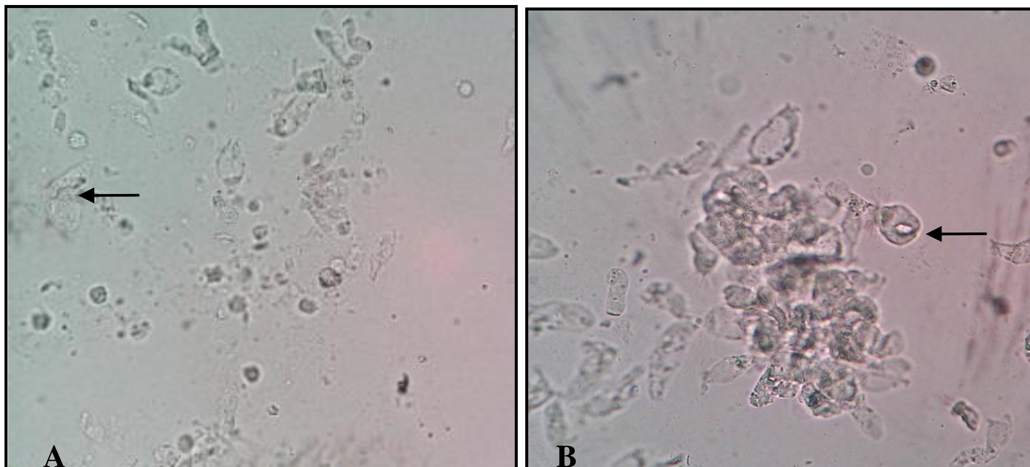

Fig.1(A,B): ***Lophomonas blattarum*** **detected from BAL fluid of the patients by microscopic observations : Direct smear (A,B ×400)**

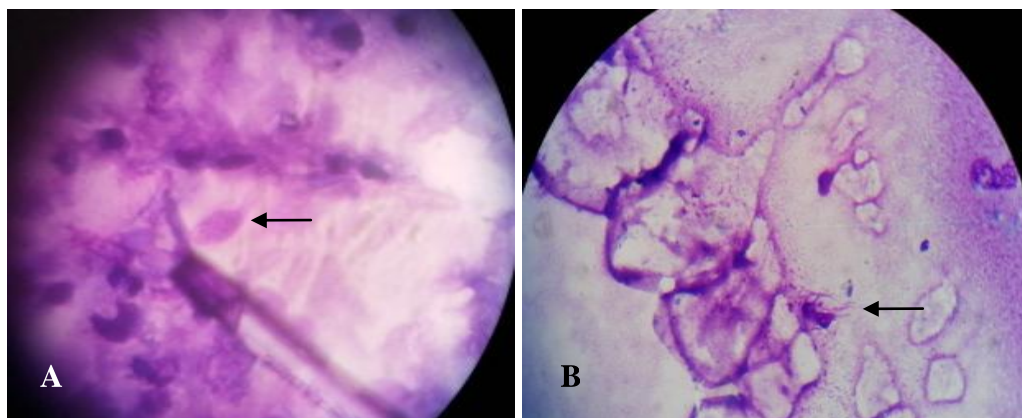

Fig.2 (A,B): ***Lophomonas blattarum*** **detected from BAL fluid of the patients by microscopic observations: Wright-Giemsa stain (A,B ×1,000).**

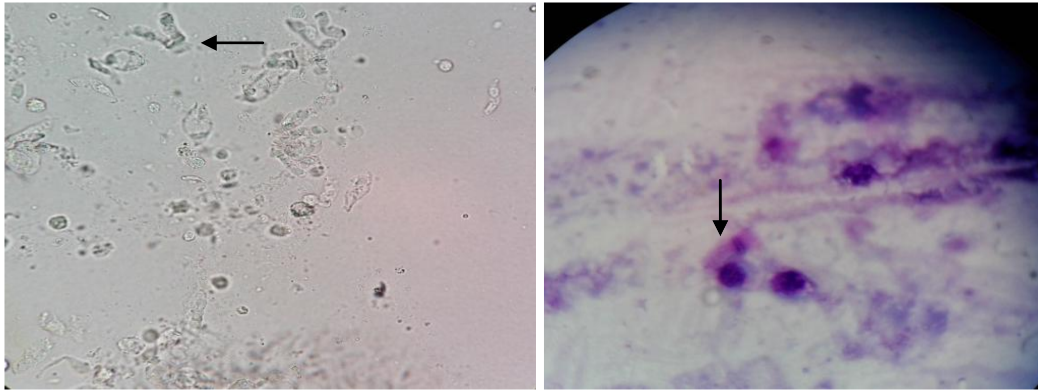

Fig.3 (A, B): A ciliated bronchial cell in fresh / Giemsa stain of BAL fluid sample

DISCUSSION

After reviewing the literature, [2-10] we found 136 cases of previous reports of *L. blattarum* infections that had occurred in China since 1993. Among the patients, 80 cases were male and 55 cases were female, besides 1 with unknown gender, with ages ranging from 9-days to 95 years-old. It was shown that the infection had no significant differences by gender and age.

As a part of the reported cases was identified without giving the pest species only to families, it could be called 'hypermastigote' in many databases (now called Cristamonadida). [11] We detected the patients infected with 'hypermastigote' or *L. blattarum* as the search keyword in PubMed and Google Scholar, which is now one of the most comprehensive online databases, retrieved all the reports in recent 20 years [Table 1].

According to diagnosis of reported cases clues of pulmonary lophomoniasis were as follows: First, patient presents with respiratory symptoms of an infection along with a marked peripheral blood eosinophilia non responsive to the anti-infection treatment. Second, affected patients are those having either some underlying disease or have been on immunosuppressants for a long time or those who develop pulmonary infection post surgery. Third, X-ray and CT imaging features of the patients show ground glass opacity, patchy consolidation and patchy or streaky shadows distributed in bilateral lungs. Fourth, the detection of *L.blattarum* trophozoites in sputum or bronchoscopy aspirates smears. All the reported cases in China responded to metronidazole and tinidazole treatment and prevention can be achieved by controlling the source of infection.

Table 1: Review of clinical and radiological analysis of 136 cases of *Lophomonas blattarum* infection (1993-2014)

Clinical and radiological analysis	No. cases (%)
1. Infection sites	136 (100)
Respiratory tract infection	131 (96.3)
Urinary tract infection	2 (1.5)
Sinusitis	3 (2.2)
2.Diagnostic samples in respiratory tract infection	131 (100)
BAL fluid	101 (77.1)
Sputum	27 (20.6)
Throat swab	1 (0.76)
Bronchial mucosa smear	1 (0.76)
Cystic fluid	1 (0.76)
3. Clinical symptoms and peripheral blood examination	131 (100)
Cough with expectoration	108 (82.4)
Fever	79 (58.1)
Eosinophilia	28 (24.8)
4. X-ray imaging manifestations	30 (100)
Patchy or streaky shadows	23 (76.7)
5. CT imaging manifestations	67 (100)
Ground-glass opacity	22 (32.8)
Patchy consolidation	26 (38.8)
Nodular opacities	11 (16.4)

L. blattarum is gut parasite of cockroach and the termite. Pulmonary lophomoniasis of humans may be from inhalation or injestion of cysts contaminating food, clothing, supplies etc. In fact, human infections with *L. blattarum* are relatively rare. When the human body's resistances to pathogens have dropped, the *L.blattarum* would produce bronchial and pulmonary lesions. [12]

So far, except for the 136 cases being concentrated in China, *L. blattarum*

infection was also reported in humans in Peru in 2010, [13] Spain in 2007 and 2010 [14,15] and India in 2014. [16] The occurrence of patients from the southern China area was 76.5% and the others came from the northern area which might be due to warm and more humid weather.

Table 2: Review of human infections with *Lophomonas blattarum* (1993-2014)

Reportd case no.	Sex/age of patient	No. of cases	Year	Country (region)
1	F/35y	1	1993	China (S)
2	M/38y, F/32y	2	1997	China (S)
3	F/51y	1	1998	China (S)
4	F/34y	1	1999	China (S)
5	M/15y	1	2000	China (S)
6	F/20y	1	2003	China (S)
7	M/56y	1	2004	China (S)
8	M/5y	1	2005	China(N)
9	M/58y	1	2006	China (S)
10	M/21y	1	2007	Spain
11	M/39	1	2007	China(N)
12	(19M+7F) /(19-95y)a	26	2007	China (S)
13	F/34y	1	2007	China(N)
14	M/65y, M/55y, F/53y	3	2008	China (S)
15	M/35y	1	2008	China(N)
16	M/16y	1	2008	China (S)
17	F/32y	1	2008	China(N)
18	(11M+6F)/(19-65y)	17	2009	China (S)
19	NA	1	2009	China (S)
20	F/9d	1	2009	China (S)
21	M/25y	1	2009	China (S)
22	F/78y	1	2009	China (S)
23	NA	1	2010	Spain
24	NA/(4m-15y)	6	2010	Peru
25	(14M+10F)/(28-84y)	24	2010	China(N)
26	F/51y, M/73y	2	2010	China (S)
27	M/41y	1	2010	China (S)
28	F/54y	1	2010	China(N)
29	M/21y	1	2011	China(N)
30	(17M+15F)/(20-86y)	32	2011	China (S)
31	M/41, M/55	2	2011	China (S)
32	M/67y	1	2012	China (S)
33	F/59y, M/77y	2	2012	China (S)
34	F/47y, F/61	2	2013	China (S)
35	M/69y	1	2013	China (S)
36	F/25y	1	2013	China(N)
37	M/60y	1	2014	India

Pulmonary lophomoniasis is a treatable infection. Metronidazole is drug of choice. [18] The usual dose is 500 mg every 8 h orally for 7–10 days in adults, and 7.5 mg/kg every 8 h in children. A single intravenous dose of 15 mg/ kg over 1 h (as a loading dose) followed by 7.5 mg / kg every 6 h has also been used. The drug is not advised for use during pregnancy and lactation; it also interacts with alcohol to produce an adverse reaction. Alternatives would be Tinidazole 500 mg every 12 h orally for 5 – 6 days.

Above all, it is strongly needed to have knowledge on *L. blattarum* infection before giving diagnosis and treatment of this protozoan infection.

This review highlights some important areas for future work. Electron microscopy studies of *L.blattarum* are needed which might be of use in a diagnostic context. The development of specific culture media for the organism and the development of reliable molecular markers would also be very helpful. These steps would facilitate full characterization of this potentially important organism and clarification of the true prevalence of lophomoniasis.

CONCLUSION

L. blattarum is increasingly being recognized as an important pulmonary protozoal infection. [19] This may in part be due to a rise in the number of individuals who have compromised immune function and are consequently susceptible to atypical infections, [20] including infection with species of protozoa that are not parasitic under normal circumstances. [21] Hence, immunosuppressed patients with bronchopulmonary symptoms should attentively be examined with regard to flagellated protozoa which can easily be misidentified as epithelial cells. Also, diagnosis should be based on one or more of bronchoscopic brush smear, bronchoscopic biopsy smear and bronchoalveolar lavage fluid smear. Metronidazole treatment for at least 7 days appears to be effective in controlling L. *blattarum* infection.

Conflicts of interest: The authors had no conflicts of interest to declare in relation to this article.

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