

## Pleural Effusion Caused By *Balantidium coli* in a Patient of Pulmonary Tuberculosis: A Rare Case Presentation

Dr. Smita Kulshrestha, Dr. Seema Susana, Dr. K.L. Seervi, Dr. Usha verma\*, Dr. P.K. Khatri

Department of Microbiology, Dr. S.N. Medical College, Shastri Nagar Jodhpur-342003 Rajasthan, India

### Case Report

#### \*Corresponding author

Dr. Usha verma

#### Article History

Received: 18.12.2017

Accepted: 25.12.2017

Published: 30.01.2018

#### DOI:

10.36347/sajb.2018.v06i01.001



**Abstract:** *Balantidium coli*, a ciliated protozoan parasite that infects primates and pigs, and is the largest protozoan to infect humans, is a well-known cause of diarrhea and dysentery in humans. Extra-intestinal infections have rarely been reported. We report a case of extra-intestinal involvement, with secondary spontaneous pneumothorax in a 32-year-old man of rural background, tractor driver by occupation, chronic alcoholic & chronic bidi smoker. Diagnosis was made by wet mount of pleural fluid which showed actively motile numerous trophozoites with classical rotatory boring motility compatible with *Balantidium coli* with a background of very few acute inflammatory cells. The origin of infection was not clear, but inhalation of rodent manure was postulated as there was no history of intestinal disease. The patient was treated with Tetracycline and Metronidazole with dramatic improvement within 48 hours & complete cure within 10 days. *Balantidium coli* infection should be considered as part of the Differential diagnosis of haemoptysis & pulmonary hemorrhage especially in patients with cavitary lung involvement who have contact with the pig industry.

**Keywords:** *Balantidium coli*, dysentery, Tetracycline, haemoptysis

### INTRODUCTION

A 30 years old man of rural background, tractor driver by occupation, chronic alcoholic & chronic bidi smoker, resident of Baleser Jodhpur district of Rajasthan-India, already on treatment of category 2<sup>nd</sup> pulmonary tuberculosis presented with history of haemoptysis, shortness of breath, chest burning & mild grade fever since last 5 days.

Patient was diagnosed as secondary spontaneous left pneumothorax with pleural effusion by X-ray chest as shown in Figure 1 & treatment started with antibiotics but there is no improvement in patient's condition after two weeks antibiotics treatment so later on Romson's intercostals drainage was done & fluid was sent to Microbiology laboratory for AFB, Gram's staining & culture & sensitivity. In our laboratory, wet mount of this light greenish yellow fluid after centrifugeon in a sterile test tube, we found actively motile trophozoites with classical rotatory boring motility compatible with *Balantidium coli* along with plenty of RBCs, very few pus cells & occasional bacterial rods. In Gram's staining smear of this fluid, we found multiple trophozoites like structures, RBCs, occasional pus cells & Gram negative bacilli. In ZN staining of fluid no AFB were found.

After above findings, we went to Kamla Nagar T.B. & Chest hospital Jodhpur-Rajasthan for detail clinical history of patient where he was admitted. On detail history of patient we wonderfully found that there is no history of any chronic constipation alternating with diarrhea, pain abdomen or other intestinal

symptoms of parasitic infection. But patient gave strong history of day or night stay in rodent prone field under heavy alcohol drunken position & unhygienic dietary habits. We instructed the patient for complete blood-count, sputum examination, stool examination & liver function test, in which we found trophozoites like structures in sputum, CBC was normal except raised eosinophills & lymphocytes count. LFT was also normal. No abnormality was found in stool. The patient had no history of and previous diarrheal illnesses from intestinal protozoa. The HIV serology & multiple (five) stool examinations for ova and parasites were reported to be negative during this illness.

Till our diagnostic report patient was on heavy antibiotics without any relief. Along with our report we suggested to treating clinician to start Metronidazole & Tetracycline. After starting with this treatment, we found dramatic improvement in patient's condition. After 3 days treatment, we repeat the examination of ICD fluid in which we found that there is more than 90% reduction in no. of trophozoites. Patient was cured with course of Tetracycline & Metronidazole for 10 days.



Fig-1: X-ray chest showing left pneumothorax with pleural effusion



Fig-2: Gram's staining of pleural fluid showing numerous trophozoites like Structures in 10x



Fig-3: Gram's staining of sputum showing trophozoites like structure in 40x

## DISCUSSIONS

Protozoal infections are the most prevalent intestinal infections worldwide; they rarely involve the lungs and pleura. Pulmonary infections with free-living amoebas, *Toxoplasma* species, *Babesia* species,

*Cryptosporidium* species, *Leishmania* species, and *Microsporidia* species have been well documented.

There have been very rare published reports of *B. coli* involving lungs in humans. *B. coli*, originally described by Malmsten [1] in 1857, is a large ciliated protozoan that has a trophozoites and a cyst stage. The trophozoites are ovoid in shape, are of greenish-yellow colour, and measure 50 to 70  $\mu\text{m}$  in length and 40 to 50  $\mu\text{m}$  in breadth (Figure-3). The organism is covered by short cilia that propel the body forward in a spiral

motion, and contains two nuclei and several contractile vacuoles. The cysts are ovoid or spherical, measure 40 to 60 µm in diameter and appear greenish-yellow in colour.

The natural habitat of *B. coli* is the large intestine of pigs, monkeys and humans [2-4]. The organism has also been reported in chimpanzees, new world monkeys, domestic and wild hawks and wild rats [2]. Human infection usually occurs through contact of fecal matter. The cysts are infective; following ingestion excystation releases trophozoites that invade the colonic mucosa, multiply and set up colonies. Within the tissues the *B. coli* propagates, produce ulcers and form abscesses that may extend to the muscular layer. Invasion of the colonic tissue induces a cellular response consisting of lymphocytes and eosinophils, and leads to ischemic necrosis of the epithelium. Three clinical presentations from *B. coli* infection have been described: asymptomatic carrier; chronic symptomatic form - these patients may have diarrhea alternating with constipation and nonspecific abdominal symptoms; and acute form - these patients frequently have bloody stools, associated epigastric pain, weight loss and dehydration. The fulminant form may lead to exsanguinations from intestinal hemorrhage or severe dehydration and shock.

Widespread infection from *B. coli* is encountered where human exposure to pigs is common. Rare cases of extra-intestinal balantidial infections have been published in the literature. Two cases of peritonitis were reported from Colombia following the rupture of fulminating colon ulcers [9, 10]. A case of urethritis and cystitis in a female patient and a few cases of inflammatory vaginitis have also been reported [11, 12]. These extra-intestinal infections most likely occurred secondary to colonic balantidiasis. While the cervicovaginitis may follow rectovaginal fistula, the common mode of spread may be genital contamination from the anus due to poor personal hygiene [13]. Multiple case reports of hepatic abscess caused by *B. coli* also exist in the literature. Several of these cases were associated with appendicitis or intestinal perforation and treatment with antibiotics along with surgical drainage was curative [14].

Rare cases of lung involvement from *B. coli* have also been reported. A case report from Venezuela described a 16-year-old pig farmer who died from perforation of the appendix and peritonitis [15]. Histological examination of the patient's lungs revealed trophozoites of *B. coli* around blood vessels and inflammatory cell infiltration. Another case of pulmonary involvement was reported in a 70-year-old farmer who lived on an Aegean island [16]. He had several years history of diarrhea, and chronic colitis. A Case Report in the French literature published in 1986 described a 24-year-old man who presented with respiratory distress, weight loss, fever and bloody

diarrhea [17]. He had a one-week history of worsening dyspnea, anorexia and weight loss. A chest radiograph showed nodular infiltrate in the right lung and cavitations in both right and left apices. This is the only other case in the literature where *B. coli* was associated with lung cavitations. Cespedes *et al.* [18], Coleman and Root [19] and Mackie [20] have also described pleural and lung involvement in various case reports. In all of these cases, lung or pleural involvement was identified at autopsy. The *B. coli* infection most likely occurred secondary to the intestinal perforation in these cases - the organism likely travelled across the diaphragm into the pleural space causing pleuritis and lung infection.

This is a rare report of necrotizing lung infection caused by the ciliated protozoan, *B. coli*. Our patient had a strong history of close contact with rats and rat's manure, likely aerosolized rat excrement containing *B. coli* cysts. The tissue invasion and destruction led to a thick-walled cavitory lesion in the left lung. The organism is known to prefer an alkaline or neutral habitat and avoids acidic environments. Therefore, the respiratory tract would have offered a favorable environment for the organism's survival. The patient's immunocompromised condition may have played a role in the acquisition of the infection because it has been suggested that debility, intercurrent disease or malnutrition is necessary for tissue invasion by this organism [5]. Interestingly, neither *B. coli* nor any other parasite was found in the patient's stools despite repeated examinations. Our patient was treated with an extended course of Tetracycline & Metronidazole which resulted in the resolution of hemoptysis and radiological findings. Human infection from pig parasites is rare, even among pig producers and their families. However, watershed contamination and subsequent drinking of untreated surface water, unsafe handling of pig manure, poor personal hygiene and impaired immune system may lead to the acquisition of infection from various parasites common in healthypigslikepig-roundworm (*Ascaris suum*), *Giardia* species, *Cryptosporidium* species and *B. coli*. Unless contamination of surface or ground water occurs, a public health risk does not exist. Furthermore, the housing of pigs indoors and the use of manure containment systems have further reduced the risks of watershed contamination.

## CONCLUSION

Balantidium coli infection should be considered as part of the Differential diagnosis of haemoptysis & pulmonary hemorrhage especially in patients with cavitory lung involvement who have contact with the pig industry.

## REFERENCES

1. Malmsten PH. Infuorien Als Intestinal- Thiese beim Menschen. Virchows Arch Path Anat. 1857; 12:302-9.

2. Van deHoeven JA, Rijpta AC. [Intestinal parasites in Central Mountain District of Netherlands New Guinea. An important focus of *Balantidium Coli*]. Documenta de Medicina Geographica et Tropica. 1957; 9:225-8.
3. Delgado GR, Brito Lugo P. Balantidiasis en la Ciudad de Mexico. Revista Invetigacion en Salud Publica. 1971; 31:106-12.
4. Schmidt GD, Roberts LS. Phylum coli. In: Schmidt GD, Roberts LS, eds. Foundation of parasitology. 4th edn. St. Louis: Times/Mirror/Mosby College Publication. 1989; 1975-80.
5. Young MD. Attempts to transmit human *Balantidium coli* Am J Trop Med. 1950; 30:71-2.
6. Brooke MM, Wilcox DE, Kaiser RL, Melvin DM. Investigation of factors associated with the decline of intestinal protozoa in a Kansas mental institution. American journal of hygiene. 1962; 76(1):52-60.
7. Sholten T, Yang J, Palmer J. Parasitism in an Ontario mental institution: Preliminary report. CMAJ. 1977; 116:1114-5.
8. Giacometti A, Cirioni O, Balducci M, Drenaggi D, Quarta M, De Federicis M, Ruggeri P, Colapinto D, Ripani G, Scalise G. Epidemiologic features of intestinal parasitic infections in Italian mental institutions. European journal of epidemiology. 1997 Oct 1;13(7):825-30.
9. Currie AR. Human Balantidiasis. A case report. S Afr J Surg. 1990; 28:23-5.
10. Alvarez VR, Garcia TR. Estudio de un caso mortal de balantidiosis humana. Revista Investigacion en Salud Publica. 1967; 27:217-24.
11. Isaza Mejia G. Balantidiasis vaginal. Antioquia Med. 1955; 5:488-91.
12. Francesco R, Giannotti T. *Balantidium coli* in cervico-vaginal cytology. A case report. Pathologica. 1983; 75:439-42.
13. Gulanowska H, Soroczyn W. [3 cases of vaginal balantidiasis]. Pol Tyg Lek. 1971; 26:64-5.
14. Areal VM, Koppisch E. [Balantidiasis. A review and report of cases]. Am J Pathol. 1956; 32:1089-116.
15. Dorfman, Rangal O, Bravo LG. Balantidiasis: report of a fatal case with appendicular and pulmonary involvement. Trans R Soc Trop Med Hyg. 1984; 78:833-4.
16. Ladas SD, Savva S, Frydas A, Kaloviduris A, Hatzioannou J, Raptis S. Invasive balantidiasis presented as chronic colitis and lung involvement. Digestive diseases and sciences. 1989 Oct 1; 34(10):1621-3.
17. Daoudal P, Wagschal G, Delacour JL. Balantidiasis pulmonaire un cas en Franche-Comté. La Presse Médicale. 1986; 15:257
18. Cespedes R, Rodriguez D, Valverde O, Fernandez J, Gonzales UF, Jara PJW. Estudio de un caso anatomoclinico masivo con lesiones y presencia del parasito en el intestino Delgado y pleura. Acta Medica Costarricense. 1967; 10:135-51.
19. Coleman DL, Root RK. Pulmonary infections in Southeast Asian refugees. Clin Chest Med. 1981; 2:133-43.
20. Mackie TT. Parasitic infections of the lungs. Chest. 1948; 14:894-905.