***Balantidium Coli* liver abscess: first case report from India**

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Received: 16 October 2013 / Accepted: 8 April 2014 / Published online: 26 April 2014
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Abstract Protozoal infections are common in the tropics. Amoebic colitis is the commonest of these infections and can lead to liver abscess as a complication. *Balantidium coli* is a rare free moving protozoal parasite which is known to infest human large intestine causing a type of colitis very similar to that caused by *Entamoeba histolytica*. However this pathogen is not known to cause liver invasion in humans. We report here a case of liver abscess caused by *B. coli*, which is probably the first such case reported in Indian literature.

Keywords *Balantidium coli* · Ciliate · Liver abscess

Introduction

Balantidium coli is the largest known protozoan parasite to infect humans beings (Anargyrou et al. 2003). It is transmitted by faecal oral route and known to infect colon and cecum. Infection is mainly seen in tropical and subtropical regions. Even though extra intestinal *Balantidium* infection has been reported rarely from India, there has been no case reported of hepatic infection by the parasite. Here we report first such case of *Balantidium* liver abscess from India in a middle aged immuno-competent man.

Case history

A 48 years male, tailor by occupation, presented with chief complaints of fever and pain upper abdomen. The patient started having fever one month back which was mild to moderate, increased during evening and night hours and was associated with chills but no rigors. The patient also had pain in upper abdomen which was dull aching, continuous and increased in intensity on deep breathing. This pain was also being referred to his right shoulder. He also gave history of intermittent loose stools without blood or mucous during last 3 months. There was no history of rash or itching. Past history revealed nothing suggestive of diabetes, hypertension or tuberculosis. He had been consuming approximately 60 ml alcohol per day for last 15 years but had left smoking 4 years back.

On examination, he was found to be of average built with a Body Mass Index (BMI) of 26. His blood pressure was 100/70 mmHg, respiratory rate-16/minute, pulse rate 80/min and temperature 98.6 °F. Abdomen was soft, mildly distended with tenderness in right hypochondrium area. Liver was just palpable, soft, smooth and tender with sharp margins.

Blood examination after admission revealed the following: Haemoglobin-9.2 g %, Total leukocyte count (TLC)-13,100/cu mm, Differential leukocyte count (DLC): Polymorphs-72, Lymphocytes-20, Eosinophils-08, Blood Sugar-76 mg %, Bilirubin 1.0 mg %, SGOT-76 IU %, SGPT-61 IU %, Urea-14 mg %, Creatinine-1.3 mg %, Sodium (Na)-133 meq %, Potassium(K)-4.6 meq %. Stool examination showed no ova or cysts. Blood test were negative for HBsAg, antibodies against HIV 1 and 2 and IgG antibodies against *Entamoeba histolytica*. X-ray chest was normal, upper abdomen ultrasound showed an enlarged, fatty liver with an abscess in the right lobe

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Fig. 1 Gram stained smear of liver aspirate showing *B. coli* trophozoites

(7 cm × 6 cm). USG guided aspiration of liver abscess was done and 30 ml of pus removed. The sample was sent to the microbiology laboratory for microscopy and culture. There were no bacteria seen on smear examination and no bacterial growth after 48 h of incubation. The gram stained smear of the liver aspirate contained oval to spherical structures of around 25–30 μm with a visible macronucleus (Fig. 1). Microscopic wet mount examination of the aspirated pus showed trophozoites of *B. coli* with rolling ball motility.

The patient was treated with I.V. fluids, antipyretics and injection metronidazole (1 g thrice a day for 7 days). Inj. amikacin (500 mg I.V. twice a day for the initial 5 days) was also given with a presumptive diagnosis of mixed infection causing the liver abscess. The patient was followed up in the medical OPD on weekly basis. Clinically he was monitored for fever and pain abdomen which subsided in 2–3 days. Complete blood count and Kidney function tests were done as part of follow-up investigations. He made an uneventful recovery.

Discussion

Balantidium coli is the largest and the only ciliate protozoan parasite of humans (Panicker 2007). Infection by *B. coli* is limited to tropics, seen mainly in Latin America, Eastern Asia and New Guinea, where pig breeding is common.

The pathogenic capacity of *Balantidium* was first observed way back in 1857 by Malmsten who named it as *Paramecium coli*. *Balantidium* is a free moving ciliate. The size of trophozoite varies from 30 × 25 μm to 150 × 120 μm and is ovoid or spherical in shape. The trophozoite features an oral opening at the anterior and the cytopyge at

the posterior end. The whole external surface is covered with cilia. It has one micro and a macro nucleus. The cystic form is spherical in shape and is around 40 to 60 μm in diameter (Schuster and Ramirez-Avila 2008). Trophozoite can inhabit the large intestine as commensal without causing any symptom. However when the trophozoites invade the mucosa causing ulceration and submucosal abscesses, it results in a clinical disease resembling amoebic colitis with diarrhoea or dysentery (Panicker 2007).

The spectrum of infection can range from asymptomatic, mild diarrhoea to bloody stools and tenesmus. The production of proteolytic enzymes by the parasite can manifest intestinal perforation and haemorrhage (Anargyrou et al. 2003). *Balantidium* is not known to produce any toxin, but can cause ulceration of the colon wall due to production of the enzyme hyaluronidase (Templis and Lysenco 1957). Following the perforation there is always a risk of infection by pathogenic bacteria (e. g., *Salmonella*) which can easily invade the colonic lesions produced by *Balantidium* (Levine 1961; Skotarczak 1997).

The large intestine is the most common site of *B. coli* infection, but there are reports of extra-intestinal infection too. These sites include appendix and lungs but rarely the liver. In one such case, the parasite was reported in a 16-year old boy with gangrenous appendix. Inflammation, ulceration, necrosis and *B. coli* trophozoites were found on pathological examination (Dodd 1991). Very rarely, *B. coli* may lead to intestinal perforation with peritonitis and may also involve the genitourinary tract (Anargyrou et al. 2003).

Uterine infection, vaginitis and cystitis by *B. coli* can occur through direct spread from the anal area. It may also manifest through recto-vaginal fistulas created by *B. coli* infection (Schuster and Ramirez-Avila 2008). Lung infections by *B. coli* are noteworthy. A necrotizing lung infection was reported by Sharma and Harding (2003) in a 42-year old farmer who routinely used pig manure to fertilize his vegetables.

Balantidium coli liver infection is an extremely rare condition throughout the world. The only other reported case was from Spain where the organism was isolated from liver abscess (Auz 1984).

There are only a few reported case of *B. coli* infection from India. Umesh (2007) reported *B. coli* in urine microscopy from Mumbai. He summarised that trophozoites can metastasize from the gastrointestinal tract to other parts of the body through the blood stream. Majumdar et al. (2013) reported a case of *Balantidium* ascites.

Table 1 lists some of the reported cases of extra-intestinal *Balantidium* infection. It is evident that presence of any underlying condition or immuno-suppression is not an absolute predisposing criterion for spread of the parasite to extra intestinal sites.

Table 1 List of few reported cases of extra-intestinal *B. coli* infection

S. no.	Year	Place	Site of infection	Underlying condition
1	1989	Greece	Lungs	chronic colitis and inflammatory polyposis of rectum and colon (Ladas et al. 1989)
2	1998	Tehran, Iran	Urinary bladder	None (Maleky 1998)
3	2003	Athens, Greece	Lungs	Anal cancer (Vasilakopoulou et al. 2003)
4	2003	Manitoba, Canada	Lungs	None (Sharma and Harding 2003)
5	2003	Greece	Lungs	Lymphocytic leukemia (Anargyrou et al. 2003)
6	2004	France	Peritoneum	None (Ferry et al. 2004)
7	2007	Spain	Lungs	Pulmonary Hydatid cyst (Lalueza et al. 2007)
8	2007	Mumbai	Urinary bladder	None (Umesh 2007)
9	2010	South Africa	Lungs	None (Koopowitz et al. 2010)
10	2010	Milan, Italy	Urinary Bladder	Non-Hodgkin's lymphoma (Maino et al. 2010)

The present case, with a background of alcoholism, was suspected to have an amoebic liver abscess, which is a common infection in this part of the world. But to our surprise, while doing the microscopic examination of the pus aspirate from the abscess, *B. coli* was found to be present. Due to its large size and also lack of any potent proteolytic enzymes, it has not been reported to invade the hepatic portal circulation and cause liver abscess in human beings. As per our knowledge this is the first case of *B. coli* being isolated from a liver abscess in Indian literature. Whether it reflects the increasing virulence of the organism or increased susceptibility of human beings to this protozoan, needs to be debated.

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