

## Diarrhoea in patients infected with *Blastocystis hominis*

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### Abstract

Stool specimens received in the last two years at the Department of Parasitology, Faculty of Medicine, University of Malaya, Kuala Lumpur were screened for faecal pathogens (parasites, bacteria and viruses). *Blastocystis hominis* was the commonest parasitic infection, occurring in 59 of the 1041 stool specimens examined. *Giardia* was present in 6 patients and *Trichuris* in 6 others. *B. hominis* was present as the only pathogen in 24 stool samples. Diarrhoea was the leading symptom and was present in 20 of 24 *Blastocystis*-infected patients. The next common symptom was abdominal pain occurring in 12 patients, followed by bloated sensation in the abdomen in 6 cases, fever in 5, vomiting and nausea in 4, and heartburn in 3 others. A few non-specific symptoms like anorexia, headache, fatigue, backache, myalgia and arthralgia were present in a small number of patients. The parasite rate was highest in the age group 20-40 years. This study provides evidence to incriminate *Blastocystis* as a diarrhoea causing pathogen, as we could detect no other pathogen in these 20 *Blastocystis*-infected patients. As more reports around the world implicate the pathogenic potential of the parasite, clinicians should consider *Blastocystis hominis* as a possible cause of diarrhoea.

Key words: *Blastocystis hominis*; diarrhoea; symptoms

### Introduction

Diarrhoea is still a major problem in poor developing countries where public health and primary care facilities are inadequate. It is the most common gastrointestinal symptom in those with human immunodeficiency virus infections, occurring in 50-90% patients (Dworkin *et al.*, 1985; Malebranche *et al.*, 1983). Protozoa are the most common diarrhoea pathogens involved as many of these organisms are refractory to treatment (Laughon *et al.*, 1988).

In recent years, *Blastocystis hominis*, a gastrointestinal protozoan parasite, has been incriminated as a diarrhoea causing pathogen (Zaki *et al.*, 1991; Telalbasic 1991; Vennila *et al.*, 1999) but there is controversy about its pathogenic role in humans. Currently, the inability to fulfil Koch's postulates (Ashkenazi & Pickering, 1991; Vickerman, 1994) because of the lack of animal models and the difficulty in excluding all other causes, prevent clear conclusions about its pathogenic role (Hazen, 1993; Kain & Noble, 1989).

In the present study, a total of 1041 stool specimens, received in the past two years were subjected to routine stool examination at the Department of Parasitology, Faculty of Medicine, University of Malaya, Kuala Lumpur. Of these, 935 were from outpatients at the University Hospital while the remaining 106 were from the Gastroenterology Unit of a private hospital in Kuala Lumpur.

### Materials and Methods

A formal-ether concentration technique was performed to detect ova and cysts of helminths and other protozoa. Smears were made on glass slides and stained for *Microsporidium* and *Cryptosporidium*. *B. hominis* was detected using the *in vitro* culture technique (Zarnan & Khan, 1994; Suresh *et al.*, 1997). A pea-sized sample of the stool was cultured in Jones' medium, at 37°C for 24 hours, followed by examination under 400x light microscopy. Bacteriological analyses were performed using standard culture techniques (Sack *et al.*, 1980) for *Salmonella* spp., *Shigella* spp., *Campylobacter jejuni*, *Yersinia enterocolitica*, *Staphylococcus aureus*, *Aeromonas* spp., *Clostridium difficile* and *Candida* spp. Samples were also screened for rotavirus and adenovirus. Endoscopy and biochemical tests were conducted in relevant cases to screen for any other pathological causes.

### Results

*B. hominis* was the most common parasitic infection in the study with 59 of the patients positive, followed by *Giardia* and *Trichuris* infections (Table 1). Of the 935 patients seen at the outpatient clinic, University Hospital, 5% (43/935) were *Blastocystis* positive while 15.1% (16/106) from the Gastroenterology Unit were positive. The findings concur with other reports which show the parasite to be the most frequent protozoan reported in human faecal samples from symptomatic patients

(Pikula, 1987; Vickerman, 1994; Zierdt *et al.*, 1995).

**Table 1. Parasitological findings in the 1041 stool specimens received**

No. of Cases	Parasites Detected
59	<i>Blastocystis hominis</i>
6	<i>Giardia lamblia</i>
6	<i>Trichuris trichuria</i>
4	<i>Ascaris lumbricoides</i>
3	<i>Cryptosporidium parvum</i>
3	<i>Microsporidium sp.</i>
2	<i>Cyclospora</i>
2	<i>Strongyloides stercoralis</i>
1	Hookworm
1	<i>Entamoeba coli</i>

Mixed infections were common and in many instances the parasite was seen with either a helminth (*Trichuris* or *Ascaris*) or another protozoon (*Giardia*). *Salmonella* spp. and *Campylobacter* were detected in 2 each, *Aeromonas*, *Mycobacterium tuberculosis*, *Streptococcus pneumoniae* and *Helicobacter pylori* in 1 each, and a viral infection in 2 others.

No other pathogen other than *B. hominis* was found in 24 patients. Diarrhoea was the leading symptom in 20, while 4 others had only abdominal pain and discomfort as the main complaint. Of these 20, 11 had watery diarrhoea that subsided within 2 weeks while the other 9 showed loose stools. Twelve and 6 other patients, who had diarrhoea also complained of abdominal pain and bloated abdomen respectively. In 3 patients symptoms persisted for over two months while in 6 others, these persisted for almost a year. In these patients diarrhoea and abdominal pain occurred intermittently throughout the period. Mucus was present in 5 of these stools and blood was seen in 5 others (Table 2).

### Discussion

Our findings concur with others (Babb & Wagener, 1989; Gurses & Al-Waili, 1987; Zierdt, 1991) who showed that symptoms commonly attributed to infection with *B. hominis* include diarrhoea, abdominal pain, cramps or discomfort. Profuse watery diarrhoea has been reported in patients with acute infections of *Blastocystis* (Logar *et al.*, 1994; Zaki *et al.*, 1991). Various possible mechanisms for these symptoms in *B. hominis* infected patients have been postulated (Schulzke & Riecken, 1989). These include malabsorption or reduced enzymatic digestion leading to retention of water in the intestinal lumen; parasite enterotoxins inducing active secretion of chloride or bicarbonate ions leading to osmotic diarrhoea; functional impairment of the epithelial barrier, inducing passive leakage of ions,

**Table 2. Frequency of symptoms in patients infected with *Blastocystis hominis* as the only pathogen**

Symptoms	No. of Patients
Diarrhoea	20
Abdominal pain	12
Bloatedness	6
Flatulence	5
Fever	5
Vomiting	4
Nausea	4
Anorexia	1
Lethargy	2
Myalgia	1
Arthralgia	2
Headache	1
Backache	1
Mucus in stool	5
Blood-stained stool	5
Heartburn	3
Weight loss	1

substrates, and water leading to diarrhoea. These mechanisms, to the best of our knowledge have not been proven.

The parasite has been shown to multiply at a fast rate in cultures (Rajah *et al.*, 1997) and possess reproductive mechanisms other than binary fission (Suresh *et al.*, 1994; Suresh *et al.*, 1998). It is highly likely that certain co-factors can trigger the parasite to multiply in large numbers, thus altering the gut flora and disturbing the normal intestinal physiology. This probably accounts for the abdominal pain present in 12 cases and the bloated abdomen in 6 others in the present study. Other symptoms observed include nausea and vomiting seen in 4, fever in 5, heartburn in 3, arthralgia and fatigue in 2. Anorexia, headache, myalgia, backache and indigestion were present in case each (Table 2). The findings concur with previous reports of fatigue, anorexia, flatulence and other non-specific gastrointestinal effects seen in *B. hominis* infection (Gallagher & Venglarcik 1985; Zaki *et al.*, 1991).

Studies have shown that adults are more likely to be infected than children are. The median age of those infected with *Blastocystis* was reported as 31 years (Kain *et al.*, 1987) and 37 years (Doyle *et al.*, 1990). In another survey of 515 persons, 72% of infected persons were aged 13-50 years. In the present study the parasite was found to occur in those aged between 20 to 40 years (Table 3). The maximum activity of this age group occurs outside the home and since the most likely mode of transmission is through the faecal-oral route (Ash & Orihel 1990; Boreham & Srenzel 1993; Garavelli 1991), it is highly likely that they acquire the infection through

contaminated water and food.

We are aware that more studies need to be done to include cases with only *Blastocystis* as the sole pathogen. The present study, we believe is the first report from this part of the world highlighting the possible correlation of the parasite to the clinical symptoms especially diarrhoea in *Blastocystis*-infected patients. It is important for clinicians to include *Blastocystis hominis* in the differential diagnosis as there are increasing reports incriminating the parasite to be a diarrhoea causing pathogen.

**Table 3. Age distribution of patients infected with *Blastocystis hominis***

Age-group (years)	No. of Patients
0-9	3
10-19	3
20-29	11
30-39	12
40-49	2
50-59	5
60-69	4
70-79	2
80-89	2

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