

Pathogenicity of *Blastocystis hominis*, A Clinical Reevaluation

Selçuk KAYA¹, Emel SESLİ ÇETİN¹, Buket CİCİOĞLU ARIDOĞAN¹,
Salih ARIKAN¹, Mustafa DEMİRCİ¹

¹Süleyman Demirel Üniversitesi Tıp Fakültesi, Mikrobiyoloji Anabilim Dalı, Isparta, Türkiye

SUMMARY: *Blastocystis (B.) hominis* was considered to be a member of normal intestinal flora in the past, but in recent years it has been accepted as a very controversial pathogenic protozoan. In this study, 52 individuals whose stool examination revealed *B. hominis* were evaluated for clinical symptoms. Metronidazole was administered for 2 weeks to the patients infected with *B. hominis*. After 2 weeks of treatment they were called for a follow-up stool examination. No other bacteriological and parasitological agents were found during stool examination of these patients. The frequency rate of intestinal symptoms was 88.4% in the *B. hominis* cases. Abdominal pain was the most frequent symptom (76.9%). Diarrhea and distention followed at a rate of 50.0% and 32.6%. Intestinal symptoms may be seen frequently together with the presence of *B. hominis* and this protozoan may be regarded as an intestinal pathogen, especially when other agents are eliminated.

Key Words: *Blastocystis hominis*, symptoms, pathogenicity

***Blastocystis hominis* Patojenitesi: Bir Klinik Değerlendirme**

ÖZET: *Blastocystis (B.) hominis*, dışkı incelemelerinde genellikle flora üyesi olarak kabul edilmekle birlikte, son yıllarda patojenliği daha fazla tartışmalı bir protozoon olarak kabul edilmektedir. Bu çalışmada bakteriyolojik ve parazitolojik olarak başka bir etken saptanmayan *B. hominis* saptanan 52 kişi klinik bulguları açısından değerlendirildi. *B. hominis* saptanan kişilere 2 hafta süreyle metronidazol tedavisi uygulandı ve 2 hafta sonra kontrole gelmeleri istendi. *B. hominis* saptanan kişilerdeki intestinal semptomların oranı %88,4 olarak saptandı. Karın ağrısı (%76,9) en sık rastlanan semptomdu. Bunu ishal (%50) ve distansiyon (%32,6) izledi. Sonuç olarak *B. hominis* ile birlikte intestinal semptomlar sıklıkla görülmektedir. Olası diğer etkenlerin elimine edilmesi durumunda *B. hominis*'in de patojenlik açısından değerlendirilmesi yararlı olacaktır.

Anahtar Kelimeler: *Blastocystis hominis*, semptomlar, patojenite

INTRODUCTION

Blastocystis hominis is a unicellular protozoan and one of the most common parasites found in the human intestinal tract. It was first described in the medical literature by Alexeieff and was considered as a harmless yeast at that time. But *B. hominis* is now getting acceptance as an agent of human intestinal disease (5, 9, 10). *B. hominis* in stool samples of symptomatic and asymptomatic individuals was evaluated as a possible cause of gastro-intestinal troubles (5).

As well as *B. hominis* is accepted in agents of tourist diarrhoea, it can cause persistent or recurrent diarrhoea in patients with AIDS and other immunodeficiencies (3, 17). It is also

reported that it can be seen in nosocomial diarrhoea cases (1). Infection with *B. hominis* has a worldwide distribution and occurs in both children and adults. The incidence of *B. hominis* in different regions is reported to be between 2-65% (4, 7). It has been reported that while *B. hominis* is being detected in 15-20% of acute gastroenteritis cases with direct microscopic investigation, detection rates can reach to 65% with Trichrome stain (8). Watery diarrhoea, abdominal pain, meteorism, lack of appetite and constipation are reported symptoms that may be present in the patients with *B. hominis* in stool examination (7, 10). At present, the first choice of chemotherapeutic agent is Metronidazole as described in the literature (9, 10).

In this study, carried out in the parasitology laboratory of Suleyman Demirel University Medical Faculty, 52 patients from whom *B. hominis* was detected in stool samples, were

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Yazışma /Corresponding Author: Selçuk Kaya
Tel: - Fax: -
E mail: selcuk@med.sdu.edu.tr

evaluated to clarify the clinical findings and pathogenicity of these protozoa. Bacteriological and parasitological examination of these stool samples revealed no other microorganism to be responsible for the clinical symptoms.

MATERIAL AND METHODS

Fifty two individuals whose stool examination made in our parasitology laboratory revealed only *B. hominis* were enrolled and evaluated for clinical symptoms. The patients whose stool examination revealed other pathogenic agents beside *B. hominis* were excluded. Patients with *B. hominis* in stool examination were 22 male, 30 female with a mean age of 38.8 ± 20.2 (range 3-61). Anamnesic history of the patients was noted in detail. None of the patients were immunocompromised. Three consecutive stool specimens were examined. The obtained material was first evaluated macroscopically. Later, stool specimens were investigated for intestinal parasites microscopically by using a wet mount (fresh and lugol), modified formol ethyl acetate concentration method and trichrome and Kinyoun acid-fast stain methods (6). Presence of more than 5 *B. hominis* in 40x magnification field was taken as a criterion for the presence of the protozoan. For the bacteriological examination, stool samples were inoculated on to blood agar, eosin methylene blue agar, Thiosulfate-citrate-bile salts-sucrose (TCBS) agar and on to xylose lysine deoxycholate and Salmonella-Shigella agar after enrichment in Selenit F buyyon. *Clostridium difficile* toksin A was investigated in these stool specimens with *C. difficile* toksin A test (Oxoid Ltd, UK). In addition, leucocyte counts of stool specimens were determined microscopically.

Metronidazole was administered to the patients with *B. hominis* for 2 weeks. After 2 weeks of chemotherapy they were called for control stool examination.

RESULTS

Abdominal pain was the most frequent symptom (76.9%). Diarrhoea and distention followed it with a rate of 50% and 32.6%. Other symptoms and their frequency rates are given on table 1. Intestinal symptoms (abdominal pain, diarrhoea and distention) were noted in 46 (88.4%) of 52 *B. hominis* detected patients. A second stool specimen was obtained from 41 (78.8%) of 52 patients after metronidazole therapy. The consecutive parasitological investigation revealed no intestinal protozoa in 39 (95.1%) of 41 *B. hominis* positive stool specimens. Intestinal symptoms, except diarrhoea persisted in remaining 2 patients. Clinical symptoms disappeared in 36 of 39 (92.3%) patients whose consecutive stool examinations revealed no intestinal parasites. 39 of 46 *B. hominis* positive patients with intestinal symptoms were evaluated after metronidazole therapy. Intestinal symptoms disappeared in 36 (92.3%) of them. Of 26 patients who complained of diarrhoea, 24 attended for control examination and all of them showed improvement in their clinical symptoms with no intestinal parasites in their stool examination.

Fecal leucocyte counts of patients with *B. hominis* are given on table 2. While diarrhoea was present in all of 21 patients

whose stool examination revealed 1 or more leucocyte on every 100x field, it was detected in only 5 of 31 patients with rare or no leucocytes. Leucocyte count in stool examination was found to be statistically associated with presence of diarrhoea ($p < 0.0001$, Fisher's Exact Test).

Table 1. Frequency of symptoms in patients with *B. hominis* detected in stool examination and clinical response rates after metronidazole therapy

Symptoms	Patients (n=52)		Follow-up Patients (n=41)		Clinical response	
	%	n			n	%
Intestinal symptoms	88.4	46	39	36	92.3	
Abdominal pain	76.9	40	31	28	90.3	
Diarrhoea	50	26	24	24	100	
Distention	32.6	17	12	11	91.6	
Urticaria	5.7	3	2	1	50	
Perianal pruritus	5.7	3	2	1	50	
Constipation	3.8	2	2	1	50	
Loss of weight	3.8	2	1	0	0	

Table 2. Leukocyte counts of *B. hominis* detected stool samples

Leukocyte count	<i>B. hominis</i> detected stool sample (n=52)	
	n	%
No leukocyte	3	5.7
rare Leukocyte	28	53.8
1-2 Leukocyte on every field	9	17.3
3-4 Leukocyte on every field	12	23

DISCUSSION

The pathogenicity of *B. hominis* is still controversial. The organism is considered at least as a potential pathogen by some, whereas other authors concluded that it is not pathogenic (10, 15, 16). The investigators claiming the pathogenicity of this organism accepted more than 5 *B. hominis* on every 40x magnification field as pathogenicity criterion (13). El-Shazly et. al indicated that in 23 symptomatic patients, *B. hominis* represented the only causative parasitic agent. The most common symptoms were diarrhoea (30.4%), abdominal pain (26.1%), flatulence (21.7%), vomiting (13.1%) and fatigue (8.7%). High concentrations of *B. hominis* were found in symptomatic patients than in asymptomatic ones with statistical significant difference (8.2 cells/100 x field versus 3.8 respectively). The mean number of *B. hominis* was significantly high in patients complaining of diarrhoea and abdominal pain (5). Our study showed that in patients complaining of diarrhea, fecal leucocyte counts were as important as number of *B. hominis* as pathogenicity criterion.

Baldo et al reported that in children of the residential institutions and street communities in Philippines among 172 children, the prevalence for *B. hominis* was 40.7%. This high rate of *B. hominis* was considered to be because of the poor water quality and sanitation in the shelters (2). In a study in Jordan, stool specimens were collected from 180 patients who presented with acute or persistent diarrhoea and other symptoms. Pathogens and potential enteropathogens were identified from 140 (77.8%) of the patients, 54 of which were *B. hominis* and 32 of 54 were the only pathogen isolated (11).

Taşova et al have investigated the clinical significance and frequency of *B. hominis* in patients suffering from hematological malignancy who displayed symptoms of gastrointestinal diseases during the period of chemotherapy-induced neutropenia and in conclusion, they have suggested that *B. hominis* is not rare (13%) and should be considered in patients with hematological malignancy who have gastrointestinal complaints while being treated with chemotherapy (14).

Dogan N reported presence of intestinal symptoms like abdominal pain, distention, lack of appetite and diarrhoea in 88 patients with *B. hominis*, detected in stool examination (4). In a study evaluating the intestinal parasitic infections in children in an orphanage in Thailand, *B. hominis* was found at the highest prevalence (45.2%). During the investigation, stools of all infected cases were noted for six characteristics including formed, soft, loose, mucous, loose-watery and watery and the symptoms disappeared after chemotherapy (12). In our study, the common symptoms in patients with *B. hominis* were abdominal pain and diarrhoea. In addition, 39 of 41 *B. hominis* positive stool samples were detected to be free of *B. hominis* and all of the patients with diarrhoea recovered after metronidazole therapy.

In our study, intestinal parasites were detected in only 2 of 41 patients with *B. hominis* infection in consecutive stool examinations after chemotherapy. This is thought to be because of using medicines out of order. Abdominal symptoms improved in 36 (92.3%) of 39 follow-up patients after metronidazole therapy. All of these patients with diarrhoea recovered after metronidazole therapy. So we can put forward this protozoan as possible pathogenic, according to the good response to metronidazole therapy in these patients, but treatment directed at eradication of *B. hominis* is generally not indicated. In addition, in a symptomatic patient with a positive stool smear for *B. hominis*, a thorough search should be performed to look for other unrecognized enteric pathogens and non-infectious causes of intestinal symptoms should be carefully excluded. However, in the absence of an alternative explanation, a presumptive treatment with metronidazole may be offered keeping in mind that the resolution of symptoms may be secondary to elimination of unidentified pathogens rather than to the treatment of *B. hominis* (10).

In conclusion, *B. hominis* seem to be able to reveal various intestinal symptoms by causing intestinal pathologies alone or with other factors which we do not still know much about. Thus, it will be reasonable to consider them as pathogenic when other possible factors are eliminated.

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