The Prevalence of Intestinal Parasites is Lower Than Expected in Patients with Decompensated Cirrhosis

Dekompanse Sirozlu Olgularda İntestinal Parazit Prevalansı Normal Popülasyondan Düşüktür

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ABSTRACT Objective: The patients with cirrhosis have an acquired immune deficiency because of dyshomeostasis and malnutrition. Mortality due to infections in patients with cirrhosis is increased 20 times. Limited data exist about the prevalence of parasite infection in patients with decompensated cirrhosis. **Material and Methods:** In this study, we prospectively investigated the rate of intestinal parasite infection in 154 patients with Child-Pugh C grade decompensated liver cirrhosis. Stool samples were examined as wet mounts, formalin, ethyl acetate concentration, and trichrome staining for intestinal parasites. All microscopic examinations were made by the same observers. The prevalence of intestinal parasite in patients with cirrhosis was compared with that found in a study which performed community-based and has similar age and gender distribution in the same region. **Results:** Mean age of the patients was 46±13 (19-73), 48% (75/154) were women. In 8% of patients (13/154) were detected intestinal parasite. Distribution of parasites are *Blastocystis hominis* (n=11, 7.2%), *Iodomoeba butschlii* (n= 3, 2%) (in one case, combined with *Entamoeba coli*, in one case, combined with *Blastocystis hominis*), *Giardia intestinalis* (n=2, 1.3%), *Entamoeba coli* (n=2, 1.3%), *Cryptosporodium parvum* (n=1, 0.6%), *Retortamonas intestinalis* (n=1, 0.6%) *Endolimax nana* (n=1, 0.6%). In the community-based study, the prevalence of the intestinal parasites was found to be 24.9% (308/1236). The prevalence of intestinal parasite in patients with cirrhosis was found to be significantly lower than community based control group (p=0.014). There was no statistically significant relationship between the two groups regarding the distribution of the type of parasites. **Conclusion:** The prevalence of intestinal parasite infection in patients with decompensated cirrhosis was found to be lower than that found in community based prospective study. Lower prevalence of parasitic infection in this population may be related to use of drugs such as benzimidasole or antibiotics that might have detrimental effects on parasites. Parasitic infections seem not to cause any serious problems in patients with decompensated cirrhosis.

Key Words: Liver cirrhosis; parasites; immune system

ÖZET Amaç: Sirozlu olgularda dishomeostazis ve malnutrisyon nedeniyle edinilmiş immün yetmezlik vardır. Dekompanse sirozlu olgularda parazit prevalansı ile ilgili veriler kısıtlıdır. **Gereç ve Yöntemler:** Bu çalışmada, prospektif olarak Child-Pugh skoru C olan dekompanse sirozlu 154 olguda intestinal parazit sıklığını araştırdık. Dışkı örnekleri bekletilmeden intestinal parazitler için formalin, etil asetat konsantrasyonu ve Trichrome boyaları ile incelendi. Mikroskobik incelemelerin tümü aynı gözlemciler tarafından yapıldı. Sirozlu olgularda intestinal parazitin prevalansı aynı bölgede yapılmış toplum tabanlı çalışmaki benzer yaş ve cinsiyetteki olguların verileri ile karşılaştırıldı. **Bulgular:** Hastaların yaş ortalaması 46±13 (19-73), %48 (75/154) olgu kadındı. Olguların %8 (13/154)'inde intestinal parazit saptandı. Parazit dağılımı *Blastocystis hominis* (n=11, %7.2), *Iodomoeba butschlii* (n=3, %2) (bir olguda, *Entamoeba coli* ile birlikte, bir olguda, *Blastocystis hominis* ile birlikte), *Giardia intestinalis* (n=2, %1.3), *Entamoeba coli* (n=2, %1.3), *Cryptosporodium parvum* (n=1, %0.6), *Retortamonas intestinalis* (n=1, %0.6) *Endolimax nana* (n=1, %0.6) idi. Toplum tabanlı çalışmada intestinal parazit prevalansı %24.9 (308/1236) bulundu. Sirozlu olgularda intestinal parazit prevalansı kontrol grubu olan toplum tabanlı çalışmadan anlamlı düşük bulundu (p=0.014). **Sonuç:** Sirozlu olgulardaki düşük parazitik enfeksiyon prevalansı parazitler üzerinde zararlı etki oluşturabilen benzimidazol veya antibiyotik gibi ilaç kullanımı ile ilişkili olabilir. Parazitik enfeksiyonlar dekompanse sirozlu olgularda ciddi problem oluşturmuyor gibi görünmektedir.

Anahtar Kelimeler: Karaciğer sirozu; parazitler; bağışıklık sistemi

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In cirrhotic patients there is several abnormalities of defense mechanisms, all of which increase the susceptibility to infection, including deficiency of bactericidal and opsonic activities, impaired monocyte function, depressed phagocytic activity of the reticuloendothelial system (RES), defective chemotaxis, and low levels of complement in serum. In patients with cirrhosis reduced small bowel motility, hypochlorhydria, decrease in intraluminal immunoglobulins, and reduced secretion of IgA also has been shown.[1] The immune response of an immunocompetent host against parasites is a complex system in which both cellular and humoral defense mechanisms intervene. These mechanisms involve the production of proinflammatory cytokines and the presentation of antigens to the T cells by means of antigen-presenting cells that express class II (MHCII) molecules. The intestinal mucosa organized in the Payer's patches and immunoglobulin-secretory plasma cells present important natural barriers. Activated B cells also produce and secrete IgA that impedes the adhesion of extracellular parasites. Intracellular parasites are controlled by T helper type I lymphocytes (Th1).[2]

Bacterial infections are frequent, life-threatening complications in cirrhotic patients. The high incidence of bacterial infections in patients with cirrhosis has prompted an assessment of defects in their immune defenses against microorganisms.[3]

Parasitic infections that cause auto-limited diarrhea in immunocompetent patients may cause profuse diarrhea inimmunocompromised individuals, generally accompanied by loss of weight, anorexia, malabsorption syndrome and in some cases fever and abdominal pain.[2]

The study of Dagci et al shows that protozoan infections increases intestinal permeabilities.[4] The intestinal permeability increased may cause spontaneous bacterial peritonitis which is due to direct transmural migration of bacteria from an intestinal or hollow organ lumen. This may important in patients with end stage liver failure which spontaneous bacterial peritonitis is associated with a poor long-term prognosis. Immunosuppression can affect the presentation of a parasitic disease, the susceptibility of the host to various pathogens, and the efficacy of therapy for these diseases.[5] Parasitic infections may also create problems at the post transplant period which is used intensive immunosupressed therapy.

The aim of our study was to determine the prevalence of intestinal parasite in patients with cirrhosis. We also wanted to evaluate if parasitic infections are any serious problems in patients with decompensated cirrhosis.

MATERIAL AND METHODS

In this study, we prospectively investigated the rate of intestinal parasite infection in 154 patients with end stage liver failure. According to Child Pugh Turcot classification, patients with Child C (score 10-15) were included in this study. Demographic characteristics, history of esophageal varices bleeding, hepatic encephalopathy, spontaneous bacterial peritonitis and presence of ascites, portal vein thrombosis, of all patients were assessed. Serum albumin, sodium, urea, C-reactive protein, platelet counts were tested using standard commercially available assays. MELD scores calculated using website (www.unos.org/resources/meldpeldcalculator.asp).

Stool samples were collected fresh daily from all patients. Stool samples were examined as wet mounts, formalin ethyl acetate concentration, and trichrome staining for intestinal parasites which was suggested by Garcia et al.[6] All microscopic examinations were made by the same observers who had no access to the individual's history. The prevalence of intestinal parasite in patients with cirrhosis was compared with that found in a study which performed community-based and has similar age and gender distribution in the same region.[7] Statistical analysis was performed using the t test or Mann-Whitney test for comparisons of quantitative variables between groups, Spearman's coefficient for correlations of quantitative variables and corrected chi-squared method or two-tailed Fisher's exact test for qualitative data, when appropriate.

RESULTS

Mean age of the patients was 46±13 (19-73), 48% (75/154) were women. The demographic and biochemical characteristics of all patients are shown in Table 1. Distribution of parasites are *Blastocystis hominis* (n=11, 7.2%), *Iodomoeba butschlii* (n=3, 2%) (in one case, combined with *Entamoeba coli,* in one case, combined with *Blastocystis hominis), Giardia intestinalis* (n=2, 1.3%), *Entamoeba coli* (n=2, 1.3%), *Cryptosporodium parvum* (n=1, 0.6%), *Retortamonas intestinalis* (n=1, 0.6%) *Endolimax nana* (n=1, 0.6%) (Table 2).

In 13 (8%) of patients were detected intestinal parasite. Percentages of parasites among themselves is shown Table 3. In the community-based study, the prevalence of the intestinal parasites was found to be 24.9% (308/1236). The prevalence of intestinal parasite in patients with cirrhosis was found to be significantly lower than community based control group (p=0.014) (Figure 1). There was also no statistically significant relationship between the two groups regarding the distribution of the type of parasites. Similar to control group, the most common parasite is *Blastocystis hominis*. There were no significant differences sex, etiology, serum albumin level, platelet counts, INR, ascites, esophageal varices bleeding, hepatic encephalophaty between in cirrhotic patients with parasite and wit-

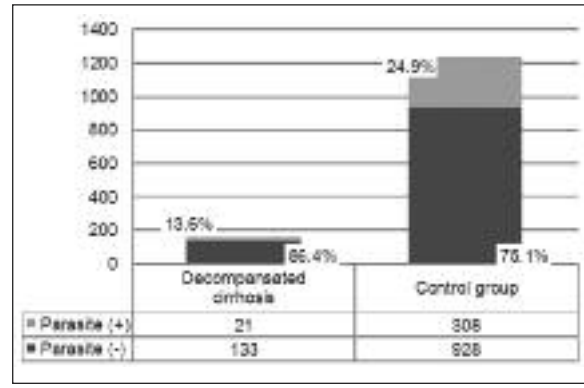

FIGURE 1: The prevalence of intestinal parasite in patients with cirrhosis and control group (p=0.014).

TABLE 1: Demographic and biochemical characteristics of 154 patients with end stage liver failure.

Patients' characteristic	n	%
Sex (female)	75	48
Ascites	100	65
Esophageal varices bleeding	48	31
Hepatic encephalopathy	49	32
	Mean	Range
Age	46±13	19-73
Bilirubin (mg/dl)	3.5±0.7	1.8-4.9
Albumin	2,8±0.7	1.8-3.2
INR	1.4 ±0.34	0.84-2.95
Platelets count (109/l)	98.000±69000	19.000-450.000
MELD	11.2 ±2.9	9-25

TABLE 2: The Distribution of parasites in patients with cirrhosis.

Intestinal parasite	n	%
Blastocystis hominis	11	7.2
Iodomoeba butschlii	3	2
Giardia intestinalis	2	1.3
Entemoeba coli	2	1.3
Cryptosporodium parvum	1	0.6
Retortamonas intestinalis	1	0.6
Endolimax nana	1	0.6
Total	21	13.6

TABLE 3: Prevalance of parasites in control group.

Intestinal parasite	Prevalance
Blastocystis hominis	15.5
Giardia lamblia	4.1
Entamoeba coli	2.8
Entamoeba histolytica/dispar	1.8
Dientamoeba fragilis	0.6
Endolimax nana	0.7
Hymenolepis nana	0.1
Iodomoeba butschlii	0.3
Trichomonas intestinalis	0.2
Enterobius vermicularis	0.1
Chilomastix mesnilii	0.4
Retortamonas intestinalis	0.1
Entamoeba hartmanni	0.2
Taenia saginata	0.1

TABLE 4: Demographic and biochemical characteristics of in patients with and without parasite.

	Parasite (+)	Parasite (-)
Sex (M/F)	11/8	69/66
Mean		
Age	36±13	47 ±12*
Albumine (gr/dl)	3.8 ±0.6	3.4 ±0.7
INR	1.32 ±0,25	1.39 ±0,37
Bilirubin (mg/dl)	1.3±0.6	2.5±1.6
Platelets count (10^9/l)	88.000	100.000
MELD	7.6 ±2.7	11 ±6+
%		
Esophageal varices bleeding	27	29
Hepatic encephalopathy	16	35
Ascites	50	65

*p=0.005 + p=0.01

TABLE 5: Etiology of cirrhosis.

Etiology	n	%
HBV	65	42
HCV	26	17
Alcohol	13	8.5
HDV	12	8
Cryptogenic	11	7.5
Autoimmune	8	5.5
Budd-Chiari	5	3
PBS	5	3
NASH	5	3
PSC	4	2.5

hout parasite. Although there was no statistically significant, parasite rate was higher in patients with encephalopathy. MELD score was significantly higher in patients without parasite (p=0.01). We also observed that parasites detected in the younger group of patients similar to the control group (p=0.005) (Table 4).

HBV was the most common etiology of cirrhosis in our patients. The distribution of etiology in the patients with and without parasite are shown in Table 5. We did not observe any differences according the etiology in the cirrhotic patients with and without parasite.

DISCUSSION

Intestinal parasites are the causative agents of common infections with significant public health problems in developing countries. They infect a total of 3.5 billion people globally and kill almost 450 million every year. Main symptoms of these infections are gastrointestinal, such as abdominal pain and appetite change; they may also cause anemia and physical and mental problems such as growth retardation in children.[7]

In immunocompromised person such as patients with decompansated cirrhosis, cellular or humoral responses have qualitative and/or quantitative alterations that impede them from acting efficiently against the parasitic infections, manifested in deterioration of their general condition.[8,9] So that we intend to determine if parasitic infections are any serious problems in patients with decompensated cirrhosis. In the literature, this study is the first study which is investigated the prevalence of intestinal parasite infection in patients with decompensated cirrhosis.

In our study, *B. hominis* was the leading parasite, followed by *Iodomoeba butschlii*, *G. intestinalis* and *E. coli*. *B. hominis* is an anaerobic protozoan parasite frequently found in the human gastrointestinal tract.[10] *B. hominis* has an estimated prevalence of approximately 10 to 15 percent and 30 to 50 percent in stool samples from healthy asymptomatic individuals in developed and developing countries. One of the largest series from Saudi Arabia, *B. hominis* was found in 17.5 percent in.[11] This prevalence rate was closest to that reported in Turkey (15.5%) which performed community-based.[7] The prevalence of *B. hominis* was 7.2% in our study. The prevalence of the intestinal parasites was 13.6% in patients with cirrhosis. This ratio of prevalence is istatistically lower than control group. Lower prevalence of parasites in end stage liver failure may be related to use of drugs such as benzimidasole or antibiotics that might have detrimental effects on parasites.

B. hominis is most probably commensal in our patients with decompansated cirrhosis. Debate remains over whether *B. hominis* is an intesti-

nal commensal or a true pathogen. Some authors have suggested that *B. hominis* is more likely to represent a pathogen if the parasite is abundant (usually classified as >5 organisms per oil immersion field) and that, at numbers less than this, it should be disregarded as a potential cause of symptoms.[12] However, many others have found no association between parasite concentrations and symptoms.[13] Symptoms have been described in transplant recipients.[14] In our study, there was no clinical complaint such as diarrhea, abdominal pain etc. that might be related with parasitic infection.

We did not observed any differences according the etiology in the cirrhotic patients with and without parasite. A study from Portuguese, alcoholic cirrhosis was found higher prevalence when compared to the patients with nonalcoholic cirrhosis.[15] The increased susceptibility to parasitic infections seen in alcoholic individuals could be explained by their increased exposure to the parasite, malnutrition, breakdown of local immune responses, and/or alterations in intestinal barriers.[16] We have interestingly observation that MELD score was significantly higher in patients without parasite than in patients with parasite.

In conclusion, the prevalence of intestinal parasite infection in patients with decompensated cirrhosis was found to be lower than that found in community based prospective study. Lower prevalence of parasitic infection in this population may be related to use of drugs such as benzimidasole or antibiotics that might have detrimental effects on parasites. Parasitic infections seem not to cause any serious problems in patients with decompensated cirrhosis.

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