

## Short Communication

# Prevalence of Intestinal Parasitic Pathogens in HIV-Seropositive Individuals in Northern India

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**SUMMARY:** To assess the prevalence of intestinal parasitic infections in human immunodeficiency virus (HIV)-seropositive subjects, fecal samples were collected from 120 HIV-seropositive patients and were analyzed for various intestinal parasites. Thirty-six patients (30%) were found to harbor an intestinal parasite. *Cryptosporidium parvum* was the most common (10.8%), followed by *Giardia lamblia* (8.3%). *Cyclospora cayetanensis* and *Blastocystis hominis* each were detected in 3.3% of the patients, while *Isospora belli* and *Enterocytozoon bienewisi* were each detected in 2.5% of the patients. The other parasites observed were *Entamoeba histolytica/E. dispar* in two cases and hookworm ova in one patient. Of the 36 patients who tested positive for intestinal parasites, 27 (75%) had diarrhea. The most common parasite, which was associated with diarrhea, was *C. parvum*. The present study highlights the importance of testing for intestinal parasites in patients who are HIV-positive, and emphasizes the necessity of increasing awareness among clinicians regarding the occurrence of these parasites in this population.

Intestinal opportunistic parasitic infections in human immunodeficiency virus (HIV)-infected subjects present commonly as diarrhea. Reports indicate that diarrhea occurs in 30-60% of AIDS patients in developed countries and in about 90% of AIDS patients in Haiti and Africa (1). Moreover, HIV/AIDS is fast becoming a major threat in the Indian subcontinent. As of June 2000, 98,451 HIV-seropositive cases had been detected, with 12,389 cases of AIDS, and an estimated 3.7 million persons were infected with HIV (2). Chronic diarrhea is responsible for considerable morbidity and mortality in such patients. Protozoan parasites, namely *Cryptosporidium parvum*, *Isospora belli*, *Cyclospora cayetanensis*, Microsporidia, *Entamoeba histolytica/Entamoeba dispar*, and *Giardia lamblia* account for a significant number of cases of diarrhea in this population.

The Nehru Hospital attached to the Postgraduate Institute of Medical Education and Research, Chandigarh, India, is a tertiary care hospital catering to a large population from Northern India. The present study reports the prevalence of intestinal parasites in HIV-seropositive patients coming to the hospital, and investigates the correlation of these infections with diarrhea.

One hundred and twenty HIV-seropositive patients chosen randomly from the Inpatient and Outpatient Departments of Internal Medicine and allied specialties of the hospital were included in the present study. Written consent was obtained from all participants. HIV-seropositive patients were defined as those who had tested positive for HIV-1 and -2 infection by two sequential ELISA tests (UBI: United Biochem Inc., Hauppauge, N.Y., USA and Detect: Biochem Immunosystem, Montreal, Canada) and one rapid test (ImmunoComb: Organics, Yavne, Israel) (2). Fifty persons, employees of the Department of Parasitology at the Institute or their relatives, all apparently healthy, were included as controls. Fecal samples were

collected in 10% buffered formalin in clean wide-mouthed plastic containers and were subjected to concentration by a formalin-ethyl acetate sedimentation concentration technique (3). Specimens were examined as wet saline mounts and in iodine preparation for the detection of protozoan ova, cysts, and helminthic eggs and larvae (3). A modified version of the Ziehl-Neelsen technique was used for staining for coccidia (4). Modified trichrome and Gram chromotrope stains were used for detecting microsporidia (3).

A total of 186 fecal samples were collected from 120 HIV-positive patients. Among these, majority (113; 94.2%) was from adults, with a male preponderance (64%).

Fifty-three (44.2%) patients had a history of diarrhea, which was the presenting complaint in 26 (49.05%) subjects. The remaining 27 patients (50.94%) had a history of episodic diarrhea in the recent past. Thirty-six (30%) patients with diarrhea were found positive for parasitic pathogens (Table 1). These findings are similar to those from previous reports (1).

Among the 120 patients studied, 13 had *C. parvum*, 10 had *G. lamblia*, 4 had *C. cayetanensis*, 4 had *B. hominis*; 3 had *I. belli*, and 3 had *Enterocytozoon bienewisi*, while 2 had *E. histolytica/E. dispar*, 1 had hookworm, and 1 had *E. coli*

Table 1. Intestinal parasites detected in HIV-positive individuals and their correlation with diarrhea

Parasite detected	Number (%)	Diarrhea (%)
<i>Cryptosporidium parvum</i>	13 (10.8)	12 (92.3)
<i>Giardia lamblia</i>	10 (8.3)	4 (40)
<i>Cyclospora cayetanensis</i>	4 (3.3)	3 (75)
<i>Blastocystis hominis</i>	4 (3.3)	3 (75)
<i>Isospora belli</i>	3 (2.5)	3 (100)
<i>Enterocytozoon bienewisi</i>	3 (2.5)	3 (100)
<i>Entamoeba histolytica/E. dispar</i>	2 (1.7)	2 (100)
Hookworm	1 (0.8)	0
<i>Entamoeba coli</i>	1 (0.8)	0

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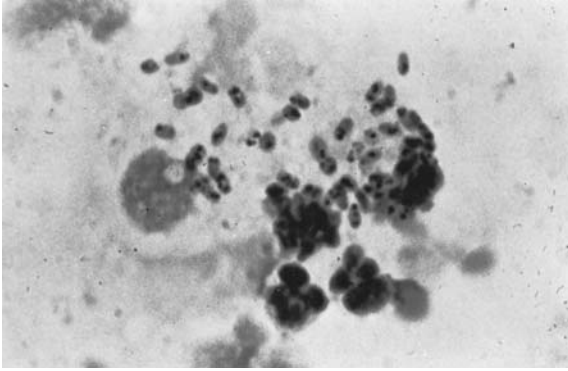


Fig. 1. Spores of *E. bienewsi*. Gram-chromotrope staining.  
( $\times 1000 = \text{Opti. mag. } 10 \times \text{Subj. mag. } 100$ )

(Table 1). Diarrhea was present in 92.3% of the patients with *C. parvum*, 75% of the patients with *B. hominis* and *C. cayetanensis*, 40% of the patients with *G. lamblia*, and in all of the patients with *I. belli*, *E. histolytica/E. dispar*, and *E. bienewsi* (Table 1). Of the 53 patients with a history of diarrhea, 27 patients showed a presence of a parasitic etiology (50.9%). CD4<sup>+</sup> cell counts were available for 14 of 36 patients in whom parasites were detected. A majority of the HIV/AIDS-positive patients did have diarrhea, irrespective of the CD4<sup>+</sup> cell counts. The only exception was the patients with *G. lamblia* infection, in whom diarrhea appears to be associated with counts of lower than 30 cells/mm<sup>3</sup>. *C. parvum* was the most common parasite isolated (10.8%) in HIV-seropositive patients, whereas earlier reported rates ranged from 6-37% (1). *G. lamblia* was the second most common parasite detected (8.3%). Earlier studies have reported rates of infection with *G. lamblia* between 1-11% (5). However, in 8% of the normal controls, *G. lamblia* was detected. This finding shows that giardiasis does not occur in greater frequencies in HIV-positive patients than in HIV-negative individuals. *C. cayetanensis* was present in 3.3% of the patients, a rate that is slightly lower than the 11% incidence reported by another study (6). Studies from Southern India have reported a higher prevalence of *I. belli* than that of *Cryptosporidium* (7). *E. bienewsi* was identified in three cases (2.5%) in the present study (Fig. 1). This result appears to be the first report of this microsporidial species from this country. The relatively low number of microsporidia identified may be due to the difficulty of detecting these organisms in fecal specimens by

conventional staining techniques.

Of the 50 control samples tested, *G. lamblia* was detected in 4 subjects (8%), and *E. histolytica* and *C. parvum* were found in 1 person each (2%).

In conclusion, the present study highlights the presence of various intestinal parasites, especially *E. bienewsi*, which is reported in this area for the first time. Symptomatic parasitic infections in patients infected with HIV were analyzed in this study as well. Knowledge of the pattern of infection can often guide therapy when resource limitations hamper the exact diagnosis of the etiological agent in HIV-associated diarrhea.

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