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Cryptosporidiosis: Opportunistic Infection in HIV/AIDS Patients in Nepal

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Abstract

One hundred and forty-eight stool specimens were collected from 75 confirmed cases of HIV/AIDS. To assess the prevalence of cryptosporidiosis in patients with human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS) the specimens were analyzed using Kinyoun-modified acid fast staining. Cryptosporidiosis was found in 10.7% of the total 75 cases studied. Out of 75 cases, 30.7% (23) suffered from diarrhea, of which *Cryptosporidium parvum* accounted for 34.8% (8) cases. Four out of 62 (6.5%) HIV-seropositive patients and four out of 13 (30.8%) AIDS patients were found infected with *C. parvum*. All infected cases were clinically diarrhoeagenic. In AIDS patients, all four infections were accompanied by chronic watery diarrhea and wasting. Among the total 75 cases studied, 13 were full-blown AIDS and 62 HIV-seropositive cases. In conclusion, *C. parvum* is probably the most prevalent parasitic pathogen found in patients with diarrhea in HIV/AIDS individuals. Routine testing of the stool specimens for cryptosporidial oocysts may be helpful in an early start to antiparasitic chemotherapy, which will ultimately play a major role in reducing morbidity due to HIV/AIDS in Nepal.

Keywords: cryptosporidiosis, HIV, AIDS, Nepal

Introduction

Cryptosporidium parvum is an enteric coccidian parasite that has become a cause of concern as an important agent of diarrhea because of the AIDS epidemic. Cryptosporidiosis in immunocompetent hosts is usually mild, self-limiting and recovers within a few weeks. In contrast, the infection may have a severe, chronic and even fatal clinical course in immunocompromised individuals, such as those with AIDS [1]. Laboratory-confirmed cryptosporidiosis of greater than one month's

duration in an HIV-infected person is an AIDS-defining condition [2]. In addition to being a zoonosis, cryptosporidiosis is transmitted person-to-person and through contaminated water and food [3]. Several aspects of *C. parvum* indicate a high proportion for sexual transmission [4]. Small unfilterable size (3-5 μm) of oocysts, their resistance to chlorine disinfection and low infective dose are the major infective potential of *C. parvum*, which is an opportunistic pathogen and one of the most common parasites in HIV/AIDS patients [5].

HIV infection and AIDS are becoming a major threat in Nepal. As of December 31, 2003, 3,312 HIV-seropositive cases have been detected, with 704 cases of AIDS; the estimated number is much

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higher – about 60,000 [6]. On the other hand, the prevalence of cryptosporidiosis in such patients in the country has still not been assessed. Knowledge of the pattern of cryptosporidiosis can often guide therapy, with paromomycin, when resource limitations hamper the exact diagnosis of the etiological agent in HIV-associated diarrhea, at least in developing countries like Nepal. Since there is no effective treatment available for cryptosporidiosis, its prevention is rather critical, and studies like this will help to show the increased importance of preventive measures against cryptosporidiosis. The objectives of our study were to report the evaluation of *C. parvum* infection in the Nepalese HIV/AIDS population, and to investigate the association of these infections with diarrhea. The present study highlights the importance of detecting oocysts of *C. parvum* in HIV/AIDS patients, and shows the necessity of increased awareness among clinicians regarding the occurrence of this parasite in this population.

Materials and methods

During the study period, November 2002 to July 2003, a total of 148 stool specimens were collected from 75 HIV/AIDS patients from Maiti Nepal, Kathmandu and HOSPICE, Jhapa (non-governmental organizations with hostels for HIV/AIDS women) and from patients visiting Sukra Raj Tropical Disease Hospital, Kathmandu. The collected samples were examined at the research laboratory of the Central Department of Microbiology, Tribhuvan University, Kirtipur. All study cases were confirmed cases of HIV/AIDS with or without gastrointestinal symptoms and at least

three repeated specimens were taken from those diarrheal patients who showed no oocysts in first/second specimens.

Patients were counseled as per local standard practice and about 20 g or 20 ml of stool specimen was collected from each of them [7]. Specimens were immediately examined after collection or preserved with 10-times-diluted Bayer's solution when spot-examination was not possible [8]. Patients were classified into asymptomatic HIV infection, persistent generalized lymphadenopathy and acute (primary) HIV infection with accompanying illness or history of acute HIV infection based on criteria proposed by the Center for Disease Control (CDC), USA [2]. Each stool specimen was examined by Kinyoun-modified cold acid-fast staining technique for the detection of *C. parvum* oocysts [9]. Sheather's sucrose flotation and formalin-ethyl acetate sedimentation techniques were used to concentrate the oocysts [1].

Results

C. parvum oocysts were identified by Kinyoun-modified Ziehl-Neelsen technique in the stool specimens of 10 out of 75 HIV/AIDS patients giving the overall prevalence of 10.7% in this population.

Among the total of 75 patients, 62 were HIV-seropositive and 13 had full-blown AIDS (Table 1). Four out of 62 (6.5%) HIV-positive patients and four out of 13 (30.8%) AIDS patients suffered from cryptosporidiosis.

Diarrhea was present in 23 out of 75 (30.7%) HIV/AIDS patients. Of 23 cases of diarrhea,

Table 1 Clinical presentation based on which AIDS patients were diagnosed.

Manifestation	No. of patients
Chronic cryptosporidiosis	4
Cryptococcosis	1
Toxoplasmosis	1
Systemic herpes simplex virus infection	1
<i>Pneumocystis carinii</i> pneumonia	2
CD ₄ count below 200/mm ³	4
Total	13

C. parvum accounted for 8 (34.8%) cases. None of the patients harboring *C. parvum* was free of diarrhea and all four cases of its infection in AIDS patients were accompanied by chronic watery diarrhea of more than one month's duration, and by wasting.

Discussion

An overall prevalence of 10.7% of cryptosporidiosis was noted in HIV/AIDS patients during this study. The prevalence was found to be 6.8% in non-HIV/AIDS individuals in Nepal [11]. The increased prevalence (10.7%) in cases of HIV/AIDS in the country is probably due to the increased susceptibility of this population to infections. An immunodeficient state is a risk for *C. parvum* infection. The high burden of cryptosporidiosis in Nepal may also be due to the fact that *C. parvum* is zoonotic, and, Nepal being an agricultural country, there being a higher possibility of its transmission, including those with HIV/AIDS.

Reported cases of *C. parvum* infection in HIV/AIDS patients range between 6 to 37% [12]. One possible explanation for differences in prevalence figures is differences in laboratories, identification methods, experience and skill. The study with findings closest to ours is from Northern India, which reported cryptosporidiosis in 10.8% of the HIV/AIDS patients studied [13]. The method used in this study might not have contributed much to different prevalence as compared to the findings in North American study.

We were unable to assess any statistical association of cryptosporidiosis with HIV-positive patients and AIDS patients, due to the small sample size and lack of comparison group. However, it is quite suggestive from our study that relatively more AIDS patients are infected, and all AIDS patients infected with the parasite were suffering from chronic watery diarrhea of more than one month's duration. In fact cryptosporidiosis among adults appears to occur principally at CD₄ lymphocyte levels less than 200/mm³ [14].

C. parvum accounted for a major proportion (34.8%) of diarrheal cases. Stool specimens are not routinely tested for cryptosporidial oocysts in

Nepal, our study results revealed that it is necessary to examine every diarrheal HIV/AIDS patient for further proliferation and to decrease mortality in HIV/AIDS. It is concluded that *C. parvum* is one of the most important prevalent agent of diarrhea in Nepalese HIV/AIDS patients, and considering the severe and untreatable nature of cryptosporidiosis in such patients, it is rather essential that control measures be taken to achieve improved management among HIV/AIDS population.

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