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# Correlation Between Intestinal Parasitic Infection and Chronic Diarrhea in HIV-Positive Patients in a Tertiary care Hospital in Eastern India

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**ABSTRACT**

*Objectives: To do study of parasite identification and investigate the correlation between parasitic infection and chronic diarrhea in HIV patients. Materials and Methods: A cross sectional prospective study was done between February 2010 to August 2011 at anti retroviral therapy (ART) centre in R. G. Kar Medical College and Hospital. The subjects divided in two groups, 100 HIV-positive patients with diarrhea as case and 100 HIV-positive without diarrhea patients as control. In all the patients with freshly passed stool samples were examined by microscopy and CD4 count of blood was done by BD FACS machine (D858001657) with flow cytrometry technique. Results: Intestinal parasites were seen in 34 (35.79%) of the cases whereas only in 6 (6.59%) of the controls. A total of 40 parasite samples were detected from all subjects and Cryptosporidium parvum (50%) detected the most abundantly and Ascaris (2.5%) found least common. The parasitic pathogens in between cases and controls were compared and p=0.00008, i.e highly significant. Moreover, average CD4 count in between cases and controls were compared and p=0.0000002 i.e also highly significant. Conclusion: The identification of the parasitic agents in HIV-positive with chronic diarrhea is very important as it can help appropriate therapy and reduce of morbidity and mortality in these patients. Moreover, the low CD4 cells count in HIV-positive patients are higher rate of parasitic diarrhea infection. Therefore, to improve the CD4 cells count in HIV-positive patients which reduce the parasitic diarrhea, further reduce the financial burden of the patients.*

**KEYWORDS: Intestinal parasite, HIV/AIDS, Opportunistic agent**

## INTRODUCTION

Despite the widespread human immunodeficiency virus (HIV) awareness programmes going on at the present, a large number of patients either go undiagnosed or present late with multiple infections [1]. Diarrhea has been reported to be one of the most common presenting complaints in HIV-infected individuals with the infectious etiological agents including both opportunistic agents that consistently cause severe, chronic or frequent gastrointestinal disease and non-opportunistic agents that usually cause acute treatable diarrheal illness [2]. Much attention is currently being focused on the detection of specific pathogens as cause of diarrhea in HIV patients since its correct treatment could improve the patients general well being [3]. This study therefore aims to determine the parasitic infections and investigate the correlation between parasitic infection and chronic diarrhea in HIV patients.

## MATERIALS AND METHODS

A cross-sectional prospective study was conducted between February 2010 to August 2011 on HIV-infected patients with diarrhea and without diarrhea at anti retroviral therapy (ART) centre in R. G. Kar Medical College and Hospital. All the tests were done after due patient consent and in accordance with institutional ethical guidelines. HIV-infected patients were defined as those who had tested positive for HIV antibodies by two sequential ELISA/rapid tests as per the recommendations given by the WHO. The subjects divided in two groups, 100 HIV-positive patients with diarrhea as case and 100 HIV-positive without diarrhea patients as control. Samples of freshly passed stool in sterile leak proof container were collected and transported to laboratory within one hour of collection for identification of parasites. Iodine and saline wet mount preparation were made after formol-ether concentration and examined under microscope. For coccidian parasites modified acid fast staining (Kinyoun method) were used. The CD4 count of each patient was done by BD FACS machine (D858001657) with flow cytrometry technique.

Statistical analysis was done using Chi-square test ($\chi 2$) to evaluate any association between HIV-positive patients with diarrhea and parasitic infections. The result was also expressed in terms of correlation of CD4 count with parasitic infection. Observed differences in data were considered significant and noted in the text if $p<0.05$ was obtained.

## RESULTS

In this study total 200 patients were interviewed as case and control in equal number but five from HIV positive with diarrhea (cases) and nine from HIV positive without diarrhea (control) were lost from follow-up. Thus available data for analysis was 95 cases and 91 controls. Male and female ratio was 1.5:1 and average age of all the patients was calculated 28 years (Table I). Intestinal parasites were seen in 34 (35.79%) of the 95 samples from HIV-positive with diarrhea individuals whereas only in 6 (6.59%) of the 91 HIV positive without diarrhea samples (Table II). A total of 40 parasite samples were detected from all subjects and Cryptosporidium parvum (50%) detected the most abundantly and Ascaris (2.5%) found least common (Table II).

In the cases, the majority comprised of (73.53%) the coccidian parasites. Among the coccidian parasites was preponderance of Cryptosporidium parvum, Cyclospora spp, and Isospora spp. Among the non-coccidian parasites, Giardia cyst (5.26%) was the commonest followed by strongyloid larva, Entamoeba histolytica and Ascaris unfertilized eggs (Table II)

**Table I: Shows age and sex distribution of HIV-infected patients with diarrhea (case) and without diarrhea (control)**

| Age group | Number of HIV with diarrhea cases | | Number of HIV without diarrhea controls | |
|---|---|---|---|---|
| | Male | Female | Male | Female |
| 20-30 years | 31 | 25 | 30 | 24 |
| 31-40 years | 15 | 6 | 16 | 9 |
| 41-50 years | 7 | 4 | 5 | 2 |

| | | | | |
|---|---|---|---|---|
| 51-60 years | 5 | 2 | 3 | 2 |

**Table II: Number of different parasites identified and mean CD4 count in HIV positive with diarrhea and without diarrhea subjects.**

| Parasites identified | HIV with diarrhea N=95 | | HIV without diarrhea N=91 | |
|---|---|---|---|---|
| Name of parasites | Number of cases | Mean CD4 count (cells/ul) | Number of control | Mean CD4 count (cells/ul) |
| Strongyloid larva | 3 (3.16%) | 74.33 | 0 | |
| Crptosporidium parvum | 18 (18.95%) | 160.61 | 2 (2.19%) | |
| Cyclospra spp | 4(6.32%) | 144.75 | 0 | 192 |
| Isospora spp | 3(3.16%) | 144.33 | 0 | 232 |
| Giardia cyst | 5(5.26%) | 137.8 | 1(1.09%) | 214 |
| Entamoeba histolytica | 1(1.05%) | | 2(2.19%) | 287 |
| Ascaris unfertilized eggs | 0 | 187 | 1(1.09%) | |
| Total | 34 (35.79%) | 147.12 | 6 (6.59%) | 205.16 |

In this current study the overall mean CD4 cells count in cases and controls noted 147.12 and 205.16 respectively (TableII). The statistical analysis made with EPI INFO version 3.2software. The parasitic pathogens compared between HIV-positive with diarrhea and without diarrhea subjects, the $\chi 2$=15.47 and p=0.00008, i.e highly significant. Moreover, average CD4 count in between cases and controls were compared, the $\chi 2$ =27.02 and p=0.0000002 i.e also highly significant. The CD4 cells count were compared with cases and controls for parasites Cryptosporidium, Giardia and Entamoeba histolytica and calculated, $\chi 2$=13.22 and p=0.0002(Yates corrected), $\chi 2$=3.54 and p=0.06(Yates corrected), $\chi 2$=0.01 and p=0.9(Yates corrected) respectively.

**DISCUSION**

Opportunistic infections constitute a major health problem in patients infected with HIV. Aomng these, intestinal parasitic disease are the commonest and are a major cause of morbidity and mortality in HIV positive individuals worldwide [4]. The coccidian parasites ( Cryptosporidium spp., Isospra belli, cyclospora spp. and Microsporidium spp.) are foremost among the enteric parasites in these patients [2, 5, 6]. The organisms usually cause a self limiting illness in immunocompetent individuals but as the immune status of the patient falls they are known to cause life-threatening profuse watery diarrhea [7].

In the present study enteric parasites were recovered in 35.79 % of HIV positive with diarrhea cases with the coccidian parasites comprising 73.53%. Our study shows that Cryptosporidium spp (50%) was the most common parasite in HIV positive patients both diarrhea and without diarrhea followed by giardia cyst. Earlier studies from North India have also reported a higher prevalence of Cryptosporidium than Isospora spp [8,9].

Although these opportunistic parasites can be acquired at any time during the course of HIV infection, previous reports suggest that most of the infections with Cryptosporidium are established in patients with CD4 cells count less than 200 cells/µl [9,10]. In this present study we also found that HIV positive with chronic diarrhea patients were low CD4 cell count (average 147.12 cells/µl ).

**CONCLUTION**

Detection of etiologic pathogens might help clinicians to decide appropriate management strategies. In a developing country like India, magnitude of intestinal parasitic infections in HIV patients further adds to the existing financial burden of the disease. Patients usually belong to poor socio-economic backgrounds and can hardly afford treatment. Therefore, it is suggested that steps should be taken to prevent the occurrence of these diseases in AIDS patients. This can be done by drinking safe water, avoiding contact with contaminated soil, education about practicing personal hygiene, proper food preparation, private good sanitation facility and taking timely and appropriate prophylactic measures. It is needful to screen all HIV positive with diarrhea subjects for parasitic infection as well as to determined the CD4 cells count these will improve their clinical management and outcome.

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