Study of Intestinal Parasitic Infection in HIV Infected Patients

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Abstract :

Introduction : Intestinal parasites are major cause of diarrhoea in HIV infected individuals. The present study was undertaken to detect enteric parasites in HIV infected patients of diarrhoea with different levels of immunity. **Methods :** The study was carried out at tertiary care center of Ahmedabad between the period of January 2009 and September 2010. One hundred stool samples were collected and examined for enteric parasites by microscopy and special staining methods. **Results :** Intestinal parasitic pathogens were detected in 88% of enrolled patients. The most predominantly identified parasites was *Cryptosporidium parvum* (74%) with statistic significance (P<0.001) followed by Isospora *belli* (4%), *Entamoeba histolytica* (2%), *Giardia lamblia* (1%), *Ascaris lumbricoides* (1%), and *Ancylosotoma duodenale* (1%). Amongst patients with CD4 count < 200 cells/µl, C. *parvum* was the most commonly observed pathogen (66%). The proportion of opportunistic pathogens in patients with CD4 counts <200 cells/µl was significantly higher as compared to patients with CD4 count ≥ 200cells/µl (P<0.0005, P=0.014 respectively). **Conclusion :** Intestinal parasitic infection and diarrhea were common in HIV infected patients with low CD4 cell counts. Amongst opportunistic parasites, *Cryptosporidium parvum* was the most common followed by *Isospora* belli. Detection of etiological pathogens might help clinicians to decide appropriate management strategies for diarrhea in HIV infected individuals.

Introduction :

HIV infection is a significant health problem with most of the cases in Asia and Africa. Globally, India has the highest number of HIV infected people in any single country next only to South Africa. Highest number of AIDS cases has been reported from Tamilnadu, Maharashtra, Karnataka, Andhrapradesh, Manipur, and Nagaland.[1]

Superimposed infections due to defective immunity are a major health problem among HIV positive persons. Intestinal infection which is also one of the basic health problems in tropical region is common in these patients.[2]

The association between selected enteric parasites and HIV infection is well documented, for example the intracellular intestinal protozoan Cryptosporidium parvum, Cyclosporidium cayetenensis, Isospora belli, and the Microsporidia are opportunistic in patients with AIDS. They are often major cause of uncontrollable, debilitating diarrhea[3, 4, 5, 6]

HIV treatment programs can be benefited from the knowledge of the magnitude and predictors of important HIV coinfections. The current study was undertaken to investigate the frequency and distribution of intestinal opportunistic parasitic infections in HIV positive patients attended tertiary care hospitals of Ahmedabad, Gujarat.

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Materials and Methods

The study was carried out at tertiary care centre of Ahmedabad. Stool Samples were collected from 100 HIV positive cases between January 2009 and September 2010. These patients were already confirmed for HIV infection as per strategy III of National AIDS Control Organization guideline. Single Stool specimen was collected from each patient in a clean wide mouthed container. Freshly voided stool specimens were processed using formal-ether concentration technique and examined microscopically for presence of ova, cysts or parasites using saline and iodine mounts on grease free slides.[7]. A smear was prepared on a grease free slide, fixed with methanol and stained by modified Ziehl-Neelsen stain as described by Akino et al.[8]. This was used to detect oocyst of Cryptosporidium parvum, Isospora belli, and Cyclospora cayetanensis. Part of stool specimens was preserved in 10% formal-saline for future study. The prevalence of intestinal parasitic infection was correlated with CD4 T cell counts of the patient.

Result

Total one hundred patients were screened for the intestinal parasitic infection. About 73(73%) were males and 27(27%) were females (Table: 1). In a similar vein the prevalence of opportunistic intestinal parasitic infection among the HIV positive cases with CD4 cell count <200cells/µl and ≥ 200 cells/ µl was 60 (81%) and 19

(73%) respectively (P ≤ 0.005) (Table: 1, 3). The prevalence of intestinal parasitic infections was significantly more in laborers and farmers (22%, 12% respectively) while businessman and serviceman were least affected (7% and 6%). The parasite with highest prevalence was Cryptosporidium parvum (74%) with statistical significance (P<0.001) followed by Isospora belli (4%), Entamoeba histolytica (2%), Giardia lamblia (1%), Ascaris lumbricoides (1%), and Ancylosotoma duodenale (1%) (Table: 4/Fig.1, 2, 3).

Table 1 : Gender distributions and CD4 cell counts amongst the HIV positive cases.

CD4 count (/µl)	Male	Female	Total
<200	55	19	74
≥200	18	08	26
	73	27	100

Table 2 : CD4 counts and its relation with diarrhea.

CD4 count cells/micro l	With diarrhoea No. (%)	Without diarrhoea No. (%)	Total	P value
<200	43(58%)	31(42%)	74	0.0141
≥200	07(26%)	19(73%)	26	0.0052

Table 3: Opportunistic Intestinal parasitic infection and CD4 T-cell counts.

Pathogens	CD4 Count		
	<200	≥200	P value
Cryptosporidium parvum	56(76%)	18(69%)	<0.0001
Isospora belli	04 (5%)	(3.87%)	0.0052

Table 4 : Prevalence of intestinal parasites among HIV positive patients compared with other studies.

Parasites	Present Study (n=100)	Study by SV.kulkarni, R.kairon, SS .Sane, NARI (ICMR)(10) PUNE.	Study by Basak, Boses. S.Mallick S K Ghosh AK.(11)
Cryptosporidium parvum	74%	12%	28.4%
E.histolytica	2%	7%	14%
Giardia lamblia	1%		8.1%
Isospora belli	4%	8%	4.7%
E. coli	5%		
Ascaris lumbicoides	1%		
Ancylostoma duodenale	1%		
Total	**88%**	**35%**	**35.1%**

Figure : 1 Cryptosporidium parvum in modified ZN stain.

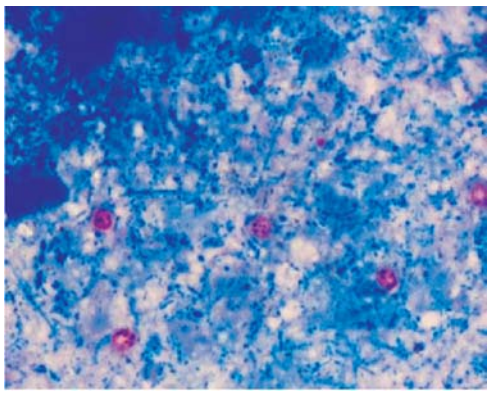

Figure : 2 Isospora belli in Modified ZN stain

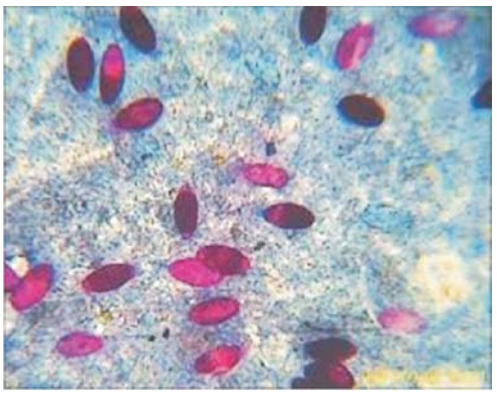

Figure : 3 Fertilized and unfertilized egg of Ascaris lumbricoides in wet mount preparation.

Discussion :

Parasitic infection remains an important cause of morbidity and mortality in developing countries especially among HIV infected persons.[9]. HIV infection is a significant risk factor for acquiring an intestinal parasitic infection. In the present study, males were found more prone to develop intestinal parasitic infection as compared to females possibly due to occupational ground. The level of education among the HIV positive patients significantly affects the prevalence of intestinal parasitic infections i.e. laborers and farmers were significantly affected while businessman and serviceman were least affected. In present study, prevalence of infection with Cryptosporidium parvum was 74%, which is quite higher than other two studies (Table 4). The prevalence of Cryptosporidium parvum was 12% in the study by SV.kulkarni, R.kairon, SS .Sane, at NARI (ICMR) PUNE [10], and in another study by Basak, Boses.sMallick S K Ghosh AK [11] its prevalence was 28%. This difference was due to different level of endemicity of parasites and sample size. In present study infection with Cryptosporidium parvum was the most common parasite followed by Isospora belli (4.2%), Entamoeba histolytica (2%), Giardia intestinalis (1%), Ascaris lumbricoides (1%), Acylostoma duodenale (1%),. Detection of Cryptosporidium parvum and Isospora belli significantly below the CD4 T-cell count of <200/µl indicates the typical opportunistic nature of these parasites. [12, 13, 14, 15]

Conclusion :

Intestinal parasitic infection and diarrhoea were common in HIV infected patients with low CD4 cell counts. Rate of diarrhea was found to be in inverse proportion with CD4 counts of HIV patients i.e. diarrhea in patients with HIV infection with low CD4 counts (<200 cells/µl) found to be more common (58%) as compared to the patients with HIV infection with high CD4 (≥ 200 cells/µl) counts (26%). Amongst opportunistic parasites Cryptosporidium parvum (74%) was the most common followed by Isospora belli (4.2%). Amongst non opportunistic parasites Entamoeba histolytica (2%) and Giardia intestinalis (1%) were most commonly detected followed by Ascaris lumbricoides (1%) and Ancylostoma duodenale (1%). Management of HIV treatment programs should consider these facts for more effective outcome of diarrhoeal cases.

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