

The Intestinal Parasitic Infections and the CD4 Counts in HIV Seropositive Individuals in the Dhule District in Maharashtra, India

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ABSTRACT

Context: Acquired Immunodeficiency Syndrome (AIDS) is fast becoming a major threat in the Indian subcontinent. Numerous opportunistic infections occur in such infected patients due to the downregulation of the immune system. Gastrointestinal parasitic infections are a universally recognized problem in these patients, reaching a rate of upto 50% in the developed and upto 95% in the developing countries. These infections largely present with diarrhoea, leading to life threatening complications.

Aims: The present study was undertaken to determine the opportunistic parasitic infections in HIV AIDS patients and their correlation with the TCD4 count.

Settings and Design: The present study was conducted in the Department of Microbiology, ACPM Medical College, Dhule, Maharashtra, India, a tertiary care hospital, between Dec 2010 to August 2011. The HIV infected patients who presented with diarrhoea were selected.

Materials and Methods: The stool samples which were collected by taking universal precautions were examined by saline and iodine preparations and by the modified acid fast staining.

The CD4 cell counts were estimated by using a FACS count system.

Results: A total of 100 samples were received. Intestinal parasitic pathogens were detected in 55% of the patients. Among these 55 patients, coccidians were detected in 28 (50.9%) patients, protozoa in 15 (27.27%) patients, helminths in 12 (21.8%) patients, *Cryptosporidium parvum* in 15 (27.27%) patients, *Isoospora belli* in 13 (23.63%) patients, *Entamoeba histolytica* in 9 (16.36%) patients, *Giardia lamblia* in 6 (10.9%) patients, *Ascaris lumbricoides* in 5 (9%) patients, *Ancylostoma duodenale* in 3 (5.45%) patients, *Hymenolepis nana* in 2 (3.6%) patients and *Strongyloides stercoralis* in 2 (3.6%) patients.

Conclusion: Low CD4 counts were significantly associated with opportunistic infections. The detection of the aetiological pathogens might help the clinicians in deciding the appropriate management strategies, as an early diagnosis and a prompt treatment definitely contribute to an increased life expectancy by delaying the progression of AIDS.

Key Words: HIV, Opportunistic parasites, Diarrhoea, CD4 count

INTRODUCTION

Parasitic infections are among the most widespread of all the chronic human infections worldwide. The individuals with HIV/AIDS are threatened by a great number of diseases which include those which are caused by different kinds of biological agents. The progressive decline and the ultimate collapse of the immune system functions which are characteristic for AIDS, usually result in morbidity and ultimately death, due to the opportunistic bacterial, viral, and parasitic infections. Though India is a country with a low Human Immunodeficiency Virus prevalence, it has the third largest number of people living with HIV/AIDS. As per the HIV estimates of 2008-09, there are an estimated 2.39 million people living with HIV/AIDS in India [1].

Most of the morbidity and the mortality which are seen in the AIDS patients, result from opportunistic infections which take advantage of the deficient cell mediated and the humoral defense mechanisms [2]. Gastrointestinal infections are very common in such patients and they play a major role in causing chronic diarrhoea, which is accompanied by weight loss [3,4]. Reports have indicated that diarrhoea occurs in 30-60% of the AIDS patients in the developed countries and in about 90% AIDS patients in the developing countries [5]. The incidence and the prevalence of the infection which is caused by an enteric parasite

depend upon the endemicity of that particular parasite in the community [6].

AIDS is rapidly becoming a major threat in the Indian subcontinent. The present study aimed at finding out the intestinal parasitic infections and their simultaneous correlation with the CD4 counts, as an early diagnosis and a prompt treatment help in a better management of these patients.

MATERIALS AND METHODS

This study was carried out in the Department of Microbiology, ACPM Medical College, Dhule, Maharashtra, India, from December 2010 to August 2011, on the 100 HIV infected patients who presented with diarrhoea. Written informed consents were obtained from the subjects, while for minors, the informed consents were taken from their parents. The study patients were interviewed by using a structured questionnaire and information was obtained regarding the present and the past history of the diarrhoea and the antibiotic treatment which was taken. The patients who were already on an antibiotic treatment were excluded from the study. Their HIV status was confirmed by three different types of commercially available Enzyme Linked Immunosorbent Assay (cassette ELISA) kits, as was recommended by the National AIDS Control Organization (NACO).

The stool samples of the subjects were collected in a wide mouthed, clean container by taking the universal precautions. The gross examination of the stool was carried out to note the consistency of the stool, as well as the presence of the body segments of any parasites. The stool specimens were examined microscopically for ova, cysts, or parasites by using saline and iodine mounts on grease-free slides. Following this, each fresh stool sample was preserved in 10% formol saline. The faecal samples which were preserved in 10% formol saline were concentrated by the formal-ether sedimentation method. This was simultaneously done for all the stool samples and they were screened for the presence of parasites.

The smears of all the direct and the concentrated specimens were examined by modified acid-fast staining by using 1% H₂SO₄ for *Cryptosporidium parvum* and *Isospora belli*. 3ml of blood in EDTA was collected for assessing the CD4 cell counts and they were measured by using the FACS count system.

RESULT

Among the 100 patients, 70 were males and 30 were females. The mean ages of the male and female patients were 34.6 ± 7.51 and 33.2 ± 9.95 year respectively. Enteric parasites were detected in 55(55%) stool samples after the formal ether sedimentation. Among these 55 samples, coccidians were detected in 28(50.9%) samples, protozoa in 15(27.27%) samples and helminths in 12(21.8%) samples. *Cryptosporidium parvum* cysts were present in 15(27.27%) samples, *Isospora belli* in 13 (23.63%) samples, *Entamoeba histolytica* in 9(16.36%) samples, *Giardia lamblia* in 6(10.9%) samples, *Ascaris lumbricoides* in 5(9%) samples, *Ancylostoma duodenale* in 3(5.45%) samples, *Hymenolepsis nana* in 2(3.6%) samples and *Strongyloides stercoralis* in 2(3.6%) samples.

Parasite found	Male	Female	Total
<i>E. histolytica</i>	6	3	9(16.36%)
<i>Giardia lamblia</i>	2	4	6(10.9%)
<i>Cryptosporidium parvum</i>	7	8	15(27.27%)
<i>Isospora belli</i>	6	7	13(23.63%)
<i>Ascaris lumbricoides</i>	3	2	5(9%)
<i>Ancylostoma duodenale</i>	1	2	3(5.45%)
<i>Hymenolepsis nana</i>	0	2	2(3.69%)
<i>Strongyloides stercoralis</i>	0	2	2(3.69%)

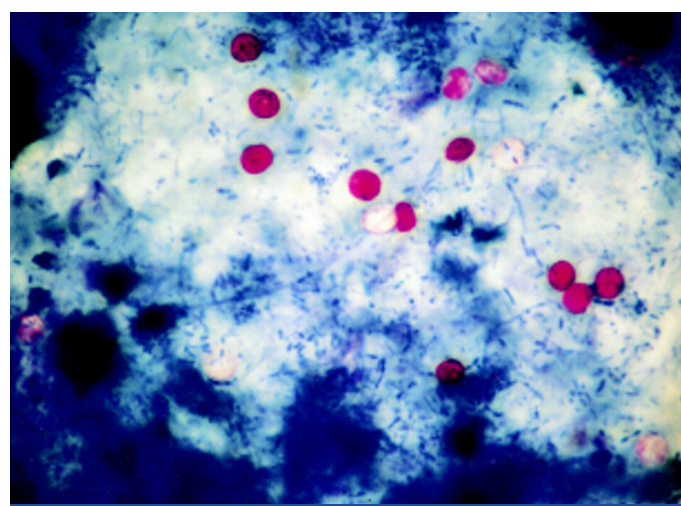
X² (Chi square) test value = 5.938 with degree of freedom 7
P = 0.547 which is > 0.05

Parasite found	CD4 count <200µl	CD4 count > 200µl	Total
<i>E. histolytica</i>	2	7	9(16.36%)
<i>Giardia lamblia</i>	2	4	6(10.9%)
<i>Cryptosporidium parvum</i>	13	2	15(27.27%)
<i>Isospora belli</i>	13	0	13(23.63%)
<i>Ascaris lumbricoides</i>	1	4	5(9%)
<i>Ancylostoma duodenale</i>	0	3	3(5.45%)
<i>Hymenolepsis nana</i>	0	2	2(3.69%)
<i>Strongyloides stercoralis</i>	2	0	2(3.69%)

Chi Square test of Association
Pearson Chi Square value=32.407
P=0.0000341
Exact significance p< 0.0001



[Table/Fig-3]: Necator



[Table/Fig-4]: Crypto

Hence, there was no significant association between the parasite type and the sex of the patient.

The study population consisted of 47 patients with CD4 counts which were >500 cells/µl, 18 patients with CD4 counts which were 200-499 cells/µl and 35 patients with CD4 counts which were less than 200 cells/µl.

[Table/Fig-2] Effect of CD4 count on the prevalence of intestinal parasites among HIV infected patients.

The P value was highly significant between the CD4 count and the parasite type association.

DISCUSSION

The progressive decline in the immunological and the mucosal defensive mechanisms predisposes the HIV positive individuals to gastrointestinal infections. Most of the morbidity and the mortality in such patients is due to opportunistic infections. A wide variety of infections are encountered in the HIV positive patients at different stages, which include bacterial, fungal, viral, protozoal and helminthic infections [7].

The present study was focused on finding the various intestinal parasitic infections in HIV seropositive individuals. The absolute CD4 counts were evaluated in these cases because there were reports which emphasized the importance of the CD4 counts in relation to the species of the intestinal parasites, where the patients with higher CD4 counts took less time to respond well to the treatment, as compared to those who had comparatively low CD4 counts, who responded poorly to the treatment [8,9].

In the present study, enteric parasites were detected in 55% of the HIV infected patients with diarrhoea in the study population. Various studies from India and other countries have reported a high prevalence of the intestinal parasites, which was found to range from 30%-60% [10-14]. Among the opportunistic parasites, *Cryptosporidium parvum* (27.27%) was found to be the predominant pathogen. Several studies from India and other parts of the world also reported the same [15-18]. The prevalence of opportunistic parasites in the patients with CD4 counts of 200-499 cells/ μ l, was found to be 18%.

In our study, non-opportunistic parasites were detected in 49.09% patients. The reported prevalence of the non-opportunistic parasites varied from 5-30% in the HIV infected patients [19,20].

Our findings highlighted the importance of screening the HIV seropositive individuals and evaluating their absolute CD4 counts regularly. As the intestinal parasitic infections vary with the geographical areas, the studies must be aimed out in different regions, to evaluate the frequent causes of the intestinal parasitic infections in the HIV seropositive individuals. This highlights the need for an early detection and treatment of such infections among the HIV infected patients, to reduce the morbidity and the mortality.

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