

Study of Opportunistic Intestinal Parasitic Infections in HIV Seropositive Patients at a Tertiary Care Teaching Hospital in Karnataka, India

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ABSTRACT

Introduction: Opportunistic intestinal parasitic infections are the major source of diarrheal disease in developing countries, mainly in Human Immunodeficiency Virus (HIV) infected patients. The aim of this study was to determine the intestinal parasites in HIV seropositive patients with and without diarrhea

Material and Methods: The study was conducted during January 2015 - December 2015. A total of 200 stool samples from 100 HIV seropositive patients were examined microscopically for the presence of ova and cysts using wet mount preparations and stained smears. Out of 100 patients, 63 had prolonged diarrhea for more than 4 weeks, 10 had acute diarrhea of lesser than 7 days and 27 were asymptomatic cases, who attended out-patient department. Patients with and without diarrhea participated in the study after giving consent. Enteric pathogens were detected in 49 (49 %) of the 100 patients.

Results: The parasites identified were *Cryptosporidium* (21), *Isospora belli* (7), *Cyclospora* (4), *Microsporidia* (2), *Entamoeba histolytica* (9), Hookworm (6). Intestinal parasites in chronic diarrhea were significantly higher than acute diarrhea (42% vs. 6%, $P < 0.05$). Parasitic pathogens are frequently associated with HIV seropositive patients with diarrhea in Southern India.

Conclusions: Intestinal opportunistic parasitic infections were detected in 49 % among HIV-seropositive patients. Early detection of opportunistic intestinal parasitic infections will help in the management and will improve the quality of life of HIV infected individuals.

Keywords: Chronic diarrhea, HIV, Opportunistic parasites, *Cryptosporidium*, intestinal parasites

INTRODUCTION

Microbial health threats are once more a source of concern due to emerging infectious diseases. In some cases, these diseases are resurgent, like tuberculosis. Some emerging infectious diseases are completely new to humans, such as cryptosporidiosis, isosporiasis, cyclosporiasis and microsporidiosis. Emergence of human diseases is due to various factors, depending upon the particular disease.^{1,2} The factors may be environmentally acquired or due to genetic immune deficiencies on the part of the host. One such example is the epidemic of acquired immune deficiency syndrome (AIDS), which has made us vulnerable to opportunistic infections.³

In Human Immunodeficiency Virus (HIV) infected individuals, enteric infections occur with increased frequency and some of these are more likely to be persistent, severe, recurrent and associated with extraintestinal manifestations. In developing countries, intestinal parasitic infections are a major cause of morbidity. Common parasites associated with HIV infected persons are either well-established enteric pathogens, e.g., *Entamoeba histolytica*, *Giardia lamblia* and *Strongyloides*

stercoralis or an opportunistic pathogen, e.g., *Cryptosporidium*, *Isospora*, *Cyclospora* and *Microsporidia*. In case of immunocompetent hosts, only some individuals harboring pathogenic intestinal parasites suffer from symptomatic disease, but the scenario has changed with the advent of HIV/ AIDS. In HIV/ AIDS patient, the rate of infection with a particular intestinal parasite depends on the endemicity of a particular intestinal parasite in the community.^{4,5}

As the parasitic diarrheal diseases in HIV/ AIDS patients is on the rise, the present study was conducted on HIV seropositive patients with or without history of diarrhea.

MATERIAL AND METHODS

The study was conducted in the department of Clinical microbiology of Srinivas Institute of Medical Science and Research Centre, Mukka, Surathkal, Mangalore, between January 2015 to December 2015, after obtaining essential institutional ethical clearance. A total of 200 stool samples from 100 patients were examined for intestinal parasites. Fresh stool samples of patients were examined both macroscopically and microscopically in the laboratory.

A total of 100 HIV seropositive patients from skin, medicine and Integrated counselling and testing centre (ICTC) attached with microbiology department were included in this study. After giving consent, 100 patients with and without diarrhea participated in the study and provided two consecutive stool samples. Before sample collection, patient information was obtained such as name, age, sex, occupation, clinical history including history of diarrhea, antibiotic and antiparasitic treatment history. Patients on antiparasitic and antibiotic treatment were not included in the study.

Stool samples were collected in clean wide mouthed, leak proof plastic containers from each patient. Processing of stool samples was done for investigation of intestinal parasites. As per the standard protocol, parasites were detected. Both saline and iodine preparation as well as wet preparation from formal ether concentrated samples were examined microscopically for the presence of protozoan trophozoites and cysts, helminth ova and larvae. To detect intestinal coccidian parasites, smears

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were prepared from stool samples and stained with modified acid fast method.⁶

STATISTICAL ANALYSIS

Microsoft Excel and Microsoft Word (version 8.1) were used to generate the tables. Results are based on descriptive statistics.

RESULTS

In this study, a total of 200 stool samples from 100 HIV seropositive patients were examined for intestinal parasitic infections. Out of 100 seropositive cases, 73 were symptomatic cases and 27 were asymptomatic patients. The symptomatic patients were further divided into two groups according to the duration of diarrhea as acute (10) and chronic diarrhea (63). Among the total seropositive patients, 49 (49%) showed intestinal parasitic infections, which include 42% from chronic diarrhea stool samples, 6% from acute diarrhea samples and 1% from the stool of asymptomatic cases. Among the total seropositive patients, 98% of the parasites were identified from

symptomatic patient samples and 2% parasites in asymptomatic cases (Table-1).

In the present study, five types of intestinal protozoal cysts and one helminthic ova were observed and the most common among them was *Cryptosporidium parvum* (21), followed by *E. histolytica* (9), *Isospora belli* (7), *Hookworm* (6), *Cyclospora* (4) and *Microsporidium* (2). Out of the total 100 patients in the study, majority were males (75%, 75/100). Remaining 25% (25/100) were females. Age distribution in this study group showed that the lowest age of the case whose stool was examined was 20 years and highest age was 65 years. The age distribution results showed that maximum number of intestinal parasites were identified from the age group 20 -30 years followed by 31-40, 41-50 and > 51 year age groups. The study showed that more than 95% of intestinal parasites were identified in young and middle age group of patients, i.e., between 20-50 years. In the age group greater than 51 years, only 2% of the intestinal parasites were observed (Table-2).

Total no. of HIV seropositive patients	No. of patients	Positive for intestinal parasitic infection (%)	P value
Symptomatic patients (73)			< 0.05
Acute diarrhea	10	6	
Chronic diarrhea	63	42	
Asymptomatic patients (27)	27	1	
Total	100	49	

Table-1: Distribution of intestinal parasitic infections in HIV seropositive cases

Age	No. of cases	Distribution of Parasites						Total no. of intestinal parasites
		<i>C. parvum</i>	<i>I. belli</i>	<i>Cyclospora</i>	<i>Microsporidia</i>	<i>E. histolytica</i>	Hookworm	
20-30	28	7	5	2	1	4	3	22
31-40	49	8	1	1	1	4	2	17
41-50	19	5	1	1	0	1	1	9
> 51	4	1	0	0	0	0	0	1
Total	100	21	7	4	2	9	6	49

Table-2: Intestinal parasites in different age groups

Parasites	Symptomatic cases		Asymptomatic cases (%)	Total parasites (intestinal) (%)
	Acute diarrhoea (%)	Chronic diarrhoea (%)		
<i>C. parvum</i>	1	19	1	21
<i>I. belli</i>	1	6	0	7
<i>Cyclospora</i>	0	4	0	4
<i>Microsporidia</i>	0	2	0	2
<i>E. histolytica</i>	2	7	0	9
Hookworm	2	4	0	6
Total	6	42	1	49

Table-3: Intestinal parasites identified in HIV seropositive patients

Author	Place	Year	Isolation rate (%)
Pape et al. ⁹	Peru	1990-1993	57.33
Punpoowong et al. ¹⁹	Thailand	1994-1995	50
Abaza et al. ²⁰	Egypt	1995	23
Prasad et al. ¹²	Lucknow, India	1995-1998	50
Brandonisio et al. ¹¹	Italy	1998	27.92
Escobedo and Nunez. ³	Cuba	1999	51
Mohandas et al. ¹³	Chandigarh, India	2002	30
Kumar et al. ¹⁴	Chennai, India	2002	30.67
Mathur M.K et al. ¹	Jamnagar, India	2009-2010	50.36
Present study	Mukka, Mangalore, India	2015	49

Table-4: Comparative study of intestinal parasitic infections in HIV seropositive patients

This study showed that about 69.4% of the identified intestinal parasites were coccidian parasites, whereas 30.6% were the other protozoans and helminths. *C. parvum* 21 (42.85%) was the most common coccidian parasite identified. In this study, only two cases showed *Microsporidial* cyst, a least commonly identified parasitic cyst. *E. histolytica* was detected in 9% and *Hookworm* ova were detected in 6% cases (Table-3)

DISCUSSION

The emergence and pandemic spread of AIDS is the greatest challenge to public health in modern times. HIV infection is a serious problem in the present day. A high rate of infection is found in many regions of the world, including the Southeast Asia. Association of AIDS pandemic with intestinal parasitic infections is now a serious concern.^{7,8}

In the present study, 49% of intestinal parasites were identified from the stool samples of HIV seropositive patients. In a study conducted by Pape et al. from Peru, 57.33% of parasites were identified. This was high when compared to our studies. In 1993, Cotte et al. in France reported the prevalence of intestinal parasitic infections to be 70.6%, which was very high when compared to our studies. Brandonisio et al. in Italy reported the prevalence of intestinal parasitic infections in HIV/ AIDS patients to be 27.92%.⁹⁻¹¹

Intestinal parasitic infections have been reported from different parts of India. Prasad et al. from Lucknow reported the prevalence of intestinal parasitic infestation in HIV seropositive patients to be > 50%.¹² In the study conducted by Mohandas et al. from Chandigarh observation was on 120 HIV seropositive patients and reported the prevalence of intestinal parasitic infestations to be 30%.¹³ In another study conducted on 150 HIV/ AIDS patients by Kumar et al. in 2002, the prevalence of intestinal parasitic infestations was found to be 30% in Chennai.¹⁴ The difference in prevalence of intestinal parasitic infestations can be due to the difference in the geographical distribution of parasites, personal hygiene and sanitary habits. Other factors for difference in prevalence may be due to selection of cases with different immune status and difference in stool examination method. The patients may be infected with multiple intestinal parasites because of poor sanitary conditions.

In our study, the most common parasite was *Cryptosporidium* and was found in 21% HIV seropositive patients. Other studies have revealed similar findings. In Brazil, Moura et al. in the year 1989, found the prevalence of *Cryptosporidium* to be 18.2% whereas in another study conducted in Brazil by Cimerman et al. in the year 1999, the prevalence was reported to be 7%. Chacin et al. in Venezuela found *Cryptosporidium* in 41.3% of HIV/ AIDS patients. Anand et al. from Manipur in the year 1996 reported the prevalence of *Cryptosporidium* as 46.6%.¹⁵⁻¹⁸ Prasad et al. reported the prevalence of *Cryptosporidium* in Northern India to be 11% during 1995-98.¹² In another study, conducted in Chandigarh by Mohandas et al. in 2002, found *Cryptosporidium* in 13% of HIV seropositive patients.¹³ In a study conducted by Kumar et al. in Chennai, 12% of the stool samples were positive for *Cryptosporidium*.¹⁴ *Cryptosporidium* was found to be the etiological agent of diarrhea in 10-20% of patients with AIDS worldwide.¹⁷

In USA and Europe, Isospora is an uncommon cause of diarrhea in AIDS patients (about 2%). This was low when compared to

our studies, where 7% of the total stool samples were found to be positive for *I. belli*. Prevalence of *I. belli* in some of the countries are Brazil (9.9%), Zaire (12%), Zambia (16%) and Haiti (12%) *I. belli* is commonly isolated in patients with AIDS and chronic diarrhea.¹⁶ Coccidian parasite *Cyclospora* was a common finding in Haiti (11%), but was not a common isolate in our study (4%). In US and Tanzania, < 1% of patients with AIDS and chronic diarrhea were positive for *Cyclospora*.^{16,18} Studies from different parts of the world show varying prevalence rates with marked geographical variations. Stools of all HIV seropositive patients with diarrhea should be thoroughly investigated to identify intestinal pathogens for proper management (Table-4).

CONCLUSION

Parasitic infection is a common finding in HIV associated chronic diarrhea cases. The present study has shown that *Cryptosporidium* is the most important emerging pathogen in HIV infected patients with diarrhea in Southern India. Simple direct, concentrated and stained smear examination of stool can help in identification of enteric parasites in majority of patients. The current finding emphasizes the need for early detection of opportunistic intestinal parasitic infections among HIV seropositive patients. This will help the clinicians to decide appropriate management strategies.

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