

The Prevalence of Intestinal Parasitic Infections in HIV Infected Patients in a Rural Tertiary Care Hospital of Western Maharashtra. (A 5 year study)

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ABSTRACT

Purpose:- To determine the prevalence of intestinal parasites in patients with HIV infection.

Methods:- Stool samples from 332 HIV infected patients with diarrhoea and 246 patients HIV infected patients without diarrhoea were examined for intestinal parasites by microscopy

Results:- Intestinal parasites were seen in 68.57% HIV patients

with diarrhoea as compared to their presence in 30.08% HIV patients without diarrhoea. *Giardia intestinalis* was the most common parasite which was detected. **Conclusion :-** There is a high prevalence of intestinal parasitic infection in HIV patients. *Giardia intestinalis* is a predominant intestinal parasite which causes diarrhoea among HIV patients, followed by *Cryptosporidium parvum*.

Key Words : Human immunodeficiency Virus, Diarrhoea, Intestinal parasites, Western Maharashtra

INTRODUCTION

Infections with the Human Immunodeficiency Virus (HIV) are being increasingly reported from South East Asia[1]. Despite the widespread HIV awareness programmes which are going on at present, a large number of patients either go undiagnosed or present late with multiple infections[2]. Diarrhoea is a common complication of infection with HIV, leading to weight loss and cachexia. It occurs in almost 90% of the HIV patients[3].

Parasitic infections of the gastrointestinal tract are a major cause of morbidity in developing countries and are increasingly important in certain populations from the developed countries, particularly in patients with Acquired Immuno Deficiency Syndrome (AIDS)[4].

Several species of intestinal parasites have been associated with diarrhoea which occurs with HIV infection. The most commonly reported parasites include *Cryptosporidium parvum*, *Isospora belli*, *Microsporidium* Spp, *Giardia intestinalis*, *Entamoeba histolytica* and *Cyclospora* spp. Besides these, the nematode, *Strongyloides stercoralis* can cause diarrhoea and an overwhelming infestation in patients with such immunosuppressive disorders[2,5].

Opportunistic parasitic infections can cause severe morbidity and mortality. Because many of these infections are treatable, an early and accurate diagnosis is important. The detection of these parasites will help in the proper management of these patients, because drugs are available for the treatment of most of these infections[5].

The diarrhoeal diseases due to the parasitic aetiology among HIV patients is on the rise during recent times and only few studies regarding the prevalence of intestinal parasites are available from rural setups. So, we have undertaken this study at a rural tertiary care hospital of Western Maharashtra.

MATERIAL AND METHODS

A retrospective study was carried out in the Parasitology section of the Department of Microbiology, Rural Medical College, Loni, for a period of 5 years (August 2004-July 2009). Loni is a small

town in the district of Ahmednagar and is located around 180 km from Pune, Maharashtra. A total of 578 HIV seropositive patients were included in the study. The HIV seropositive patients were defined as those who had been tested positive for HIV antibodies by any of the two tests i.e. ELISA/ Rapid/Simple as per the recommendations given by WHO[6].

STOOL EXAMINATION

A total of 3 freshly voided stool samples were obtained in sterile plastic containers from all the subjects who were enrolled in the study. Diarrhoea is defined as the passage of abnormal liquid or unformed stool at an increased frequency. Diarrhoea may further be defined as 'acute' if it is present for < 2 weeks, 'persistent' if it is present for 2-4 weeks and 'chronic' if it is present for > 4 weeks in duration[7]. The stool samples were macroscopically examined for consistency, colour, the presence of blood and mucus, adult intestinal helminths and segments of tapeworm. Saline and iodine preparations were examined microscopically for the ova of helminths, as well as for the cysts and the trophozoites of protozoa. Formalin ether concentration was done when the stool did not reveal any parasite by direct microscopy [8]. The modified Ziehl Neelsen staining method was used for the detection of the coccidian parasites [8].

STATISTICAL METHOD

Statistical analysis was done by using the Chi square test and the Z test.

OBSERVATIONS AND RESULTS

Out of the 578 HIV seropositive patients who were studied, 332(57.44%) presented with diarrhoea, whereas 246(42.56%) did not have diarrhoea. The maximum incidence of diarrhoea which was associated with HIV infection was seen in the age group of 31-40 years, followed by the age group of 21-30 years [Table/Fig-1]. The percentage of HIV infected females presenting with diarrhoea (70.3%) was more than that of the males (51.9%) [Table/Fig-2]

| Age group (Years) | With diarrhoea (%) | Without diarrhoea(%) | Total |
|-------------------|--------------------|----------------------|-------|
| 0-10 | 13 (59.1) | 09(40.9) | 22 |
| 11-20 | 27 (40.3) | 40(59.7) | 67 |
| 21-30 | 84 (52.50) | 76(47.5) | 160 |
| 31-40 | 138 (65.7) | 72(34.3) | 210 |
| 41-50 | 46 (56.8) | 35(43.2) | 81 |
| > 50 | 24 (63.2) | 14(36.8) | 38 |
| Total | 332 (57.4) | 246(42.6) | 578 |

$\chi^2=16.12$, $p < 0.05$, significant.

[Table/Fig-1]: Age and diarrhoea wise distribution of HIV positive patients

| | With diarrhoea | Without diarrhoea | Total |
|--------|----------------|-------------------|-------|
| Male | 209(51.9) | 194(48.1) | 403 |
| Female | 123(70.3) | 52 (29.7) | 175 |
| Total | 332 (57.4) | 246 (42.6) | 578 |

$\chi^2=16.85$, $p < 0.001$, highly significant

[Table/Fig-2]: Sex and diarrhoea wise distribution of HIV positive patients

| Total Parasites observed | Positive by direct wet mount | Positive after formalin ether concentration |
|--------------------------|------------------------------|---|
| 303 | 265 | 38 |

[Table/Fig-3]: Comparison between direct microscopy and concentration technique

Out of the 578 stool samples which were screened, 303 samples revealed intestinal parasites, 229 in HIV positive patients with diarrhoea and 74 in HIV positive patients without diarrhoea (Table/Fig-4). Initially, 265 parasites were seen by direct microscopy and an additional 38 parasites were seen after the formalin ether concentration technique [Table/Fig-3].

Of the 332 HIV seropositive patients with diarrhoea, 147(44.28%) patients had episodes of acute diarrhoea, while 185(55.72%) had chronic diarrhoea. In 147 patients who presented with acute diarrhoea, 113(76.87%) stool samples revealed intestinal parasites, while in stool samples from 185 patients with chronic diarrhoea, 116(62.7%) showed the presence of intestinal parasites.

Giardia intestinalis (27.41%) was the most common parasite in patients with diarrhoea, followed by *Cryptosporidium parvum* (9.64%). The prevalence of *Entamoeba histolytica* (12.6%) was more in patients without diarrhoea as compared to the prevalence of *Giardia intestinalis*. Among the intestinal helminths, *Ancylostoma duodenale* (8.73%) was the commonest helminth which was detected, followed by *Hymenolepis nana* (2.85%), *Ascaris lumbricoides* (3.61%), *Taenia spp* (1.51%) and *Strongyloides stercoralis* (0.60%) [Table/Fig-4].

In case of *Taenia spp*, *Hymenolepis nana*, *Ancylostoma duodenale* and *Ascaris lumbricoides*, there was no significant difference in the diarrhoea and the non diarrhoea groups. It indicates that in these parasitic infections, diarrhoea was not a common symptom or they are asymptomatic infections [Table/Fig-4].

DISCUSSION

Intestinal parasitic infections are the commonest and the major causes of morbidity and mortality in HIV positive patients, worldwide[2]. These organisms usually cause a self limiting illness

| Parasites detected | No. of parasites in patients with diarrhoea (n=332) | No. of parasites in patients without diarrhoea (n=246) | Z value |
|----------------------------------|---|--|---------|
| <i>Entamoeba histolytica</i> | 21(6.33%) | 31(12.60%) | 2.5* |
| <i>Giardia intestinalis</i> | 91(27.41%) | 17(6.91%) | 12.73* |
| <i>Balantidium coli</i> | 09(2.71%) | 01(0.41%) | 2.37* |
| <i>Cryptosporidium parvum</i> | 32(9.64%) | 02(0.81%) | 5.2* |
| <i>Isospora belli</i> | 19(5.72%) | - | |
| <i>Taenia spp</i> | 05(1.51%) | 01(0.41%) | 1.41 |
| <i>Hymenolepis nana</i> | 09(2.71%) | 07(2.85%) | 0.1 |
| <i>Ancylostoma duodenale</i> | 29(8.73%) | 12(4.88%) | 1.85 |
| <i>Ascaris lumbricoides</i> | 12(3.61%) | 03(1.22%) | 1.92 |
| <i>Strongyloides stercoralis</i> | 2(0.60%) | - | |
| Total | 229(68.97%) | 74(30.08%) | 10.04* |

* $p < 0.05$, significant

[Table/Fig-4]: Sex and diarrhoea wise distribution of HIV positive patients

in immunocompetent individuals, but in the case of immune compromised patients, they can cause life threatening, profuse, watery diarrhoea[9]. The present study documents that infections with intestinal parasites are common in HIV seropositive patients of this rural area of Western Maharashtra.

Figures from various studies demonstrate the striking geographical variations with respect to the prevalence of intestinal parasites in HIV infected patients,[9,10,11]. Ayyagari et al[12] has reported a high prevalence of *Isospora belli* from the northern parts of India, whereas Kumar et al[3] has reported *Cryptosporidium parvum* as the commonest parasite which was associated with HIV infections in southern India.

Giardia intestinalis was the most common parasite which was detected in patients with diarrhoea (27.41%), which is comparable to the study of Sethi et al[13], whereas Mukhopadhyaya et al [14] reported *Giardia intestinalis* predominately in non diarrhoeal patients. Basak et al[15] from Wardha reported a low incidence of *Giardia intestinalis* in their study.

Our study projects *Cryptosporidium parvum* as the most common coccidian parasite which was associated with HIV positive patients, both with diarrhoea and without diarrhoea. Studies by Basak et al[15], Tuli et al[16], Mohandas et al[17] and Sadraei et al[18] have also shown the same results, while Gupta et al[2] and Mukhopadhyaya et al[14] have reported a low prevalence of *Cryptosporidium parvum* as compared to *Isospora belli*. Among the intestinal helminths, *Ancylostoma duodenale* was reported to be the commonest parasite, which was comparable to that which was reported by Sethi et al[13]. The major parasite which was detected in HIV positive patients without diarrhoea was *Entamoeba histolytica*, which was in contrast to that which was reported by Sethi et al [13]. The trophozoites containing ingested RBCs were identified as *E.histolytica*, but the cysts of *E. histolytica* and *E. dispar* are morphologically identical and therefore, they cannot be differentiated microscopically. The cysts were presumed to be that of *E.histolytica*, as *E.dispar* is a non invasive and non

pathogenic species[5]. The cysts of *E.histolytica* were considered in asymptomatic patients, because asymptomatic, non invasive, intestinal infections by *E.histolytica* are the most common events and the excretion of *E.histolytica* cysts characterized them. The facility for the isoenzyme electrophoresis technique was not available in our setup.

A high prevalence of intestinal parasitic infections in HIV positive individuals may be due to poor water supply and lack of personal hygiene, which is common in a rural scenario. A significant number of intestinal parasites were also seen in HIV positive patients without diarrhoea (30.08%), thus indicating that there may be asymptomatic infections which may be going undiagnosed, thereby increasing the morbidity and mortality which are associated with them.

However, the techniques which were employed for diagnosing the common parasitic infections are simple and rapid as compared to those which are used for bacterial, fungal and viral infections. But, timely diagnosis is hampered by the delay in the diagnosis of HIV and the lack of resources for its investigation in rural parts of the developing countries. Patients from the rural areas belong to a poor socio economic background, and cannot afford diagnosis and treatment. The authors suggest that along with early diagnosis and treatment, steps should be taken to improve the water supply and sanitation and to provide health education to prevent the morbidity and mortality which are associated with HIV infected individuals in rural areas.

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