Occurrence of Gastrointestinal Opportunistic Parasites in Immunocompromised Patients in Northern India

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Abstract

Gastrointestinal infections are more common and more severe in immunocompromised individuals. This study was performed on immunocompromised patients namely those infected with HIV, transplants recipient and those with haematological malignancies. Work was carried out in the parasitological laboratory, Department of Microbiology, SGPGIMS, Lucknow from 1st February 2008 to 31st June 2008. We found that opportunistic parasitic infections were more common in immunocompromised patients. Most of the HIV patients were young and renal transplant patients were middle age, however, males were found to be at higher risk. Cryptosporidium was the most common opportunistic pathogen followed by Microsporidia. Most of the infections were found in the patients with low CD4 count. Thus patients with low CD4 count must be screened for opportunistic infections.

Keywords: Immunocompromised, HIV, Cryptosporidium, CD4, Microsporidia

1. Introduction

Intestinal parasitic infections are amongst the widest spread of all chronic human infections worldwide. Opportunistic infections occur in patients with impaired host defences and are caused by infectious agents that do not ordinarily produce disease in healthy individuals. These are common in immunocompromised persons (Rotterdam & Tsang, 1994). The term compromised host refers to an individual who has one or more defects in the body’s natural defence mechanism; sufficiently significant that the individual is rendered predisposed to severe, often life-threatening infection (Smith, 1994). These defects may be physiological as in premature infants or pathological as in malignancy or Acquired Immunodeficiency Syndrome (AIDS).

Among the parasites, that cause gastrointestinal infections in the immunocompromised patient population, are of the Cryptosporidium species i.e. Isospora, Microsporidia, Giardia lamblia, Entamoeba histolytica, Strongyloides stercoralis (Kang, 2000). Gastrointestinal (GI) diseases are frequent in all types of immunocompromised patients namely AIDS, organ transplant and patients with malignancies but occur with greatest frequency in patients with (AIDS) (Rotterdam & Tsang, 1994). Intestinal opportunistic parasitic infection in Human Immunodeficiency Virus (HIV) infected subjects present commonly as diarrhoea. Reports indicate that diarrhoea occurs in 30-60% of AIDS patients in developed countries and upto 90% of AIDS patients in developing countries (Framm & Soave, 1997). Cryptosporidium parvum appeared to be the predominant parasite associated with diarrhoea among HIV patients & the next commonest was Isospora belli (Raizada, 2004).

In India, Cryptosporidiosis is an important cause of morbidity in HIV infected individuals in India, resulting in chronic diarrhoea (Ajjamur et al, 2007). Children in the age group of 6-12 months were found to be the most vulnerable (Nagamani et al, 2007). This is caused largely by anthropogenic transmission (Das et al, 2006). Thus studies
from India and abroad stress the need for screening of
these parasites in routine stool testing. Its incidence is like-
ly to go up in the coming years as the large number of HIV
positive cases enter the AIDS stage of the disease (Chaud-
hury, 2001). Thus the present study was carried out in
order to:

1) To study the occurrence of opportunistic parasites in
immunocompromised patients.

2) Comparative evaluation of different pathogens for the
diagnosis of opportunistic parasites pathogens.

2. Materials and Methods

This work was carried out in the parasitology Laboratory,
Department of Microbiology, SGPGIMS Lucknow from
1st February 2008 to 31st June 2008. Immunocompromis-
ed patients namely those infected with HIV, transplants
recipients and those with haematological malignancies we-
re selected for the study. Three consecutive stool samples
were collected from each patient. A proforma containing
detail about patient and the result was maintained.

2.1. Light Microscopy

Macroscopic Examination: Stool samples were examined
to look for mucus, blood and parasites

Microscopic Examination: Involved direct wet mount and
concentrated wet mount examination.

Stool Samples collected in a wide mouth container were
further concentrated by new modified formalin ether conc-
centration technique.

Kinyouns’s Acid Fast Stain: We used pellet to prepare a
smear which was stained by this method. This method is
useful in identifying three important opportunistic pathog-
ens namely Isospora, Cryptosporidium and Cyclospora.

Weber’s Modified Trichrome Staining for Microsporidia:
10ul of pellet of concentrated stool was used for smear
preparation. Smear made were thin.

Cryptosporidium ELISA was done in few cases using the
protocol by Cryptosporidium antigen detection micro well
ELISA kit.

3. Results

A total number of 100 immunocompromised patients were
used for study. Age distribution of the patients showed that
maximum number of patients belongs to the age group of
31-40 (Table 1).

Sex distribution of the patients shows that there were 71
males and 29 Females patients and Male: Female ratio was
2.44:1 which was near to 3:1 (Table 1). Similar finding of
male preponderance has been quoted by many workers
(Fariba et al, 2007).

Table 1. Age Distribution of Immunocompromised Patients

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Age Groups</th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0-10</td>
<td>7</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>11-20</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>21-30</td>
<td>11</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>4</td>
<td>31-40</td>
<td>19</td>
<td>10</td>
<td>29</td>
</tr>
<tr>
<td>5</td>
<td>41-50</td>
<td>15</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>6</td>
<td>51-60</td>
<td>14</td>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td>7</td>
<td>&gt;60</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>71</td>
<td>29</td>
<td>100</td>
</tr>
</tbody>
</table>

Opportunistic parasitic infection was more commonly fou-
nd with diarrhoea (Table 2). Out of twenty one parasites
detected twenty were detected in patients with diarrhoea
and one in patient without diarrhoea. Three cases of Mixed
Infection were observed where mixed infection of Crypto-
sporidium and Microsporidia detected in patients with
diarrhoea.

Table 2. Opportunistic Parasites in Patients and The Relation
with Diarrhoea

<table>
<thead>
<tr>
<th>Parasites</th>
<th>Diarrhoea</th>
<th>Without Diarrhoea</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cryptosporidium</td>
<td>7</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Isospora belli</td>
<td>6</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Cyclospora</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Microsporidia</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>1</td>
<td>21</td>
</tr>
</tbody>
</table>

Three Cryptosporidium and three Microsporidia were de-
etected in HIV patients. However, Opportunistic parasites
were found in patients with low CD4 count specially those
having CD4 count less than 200 cells/µl (Table 3).

Table 3. Opportunistic Parasites and Their Relation with CD4
Count

<table>
<thead>
<tr>
<th>Parasites</th>
<th>CD4 Count (0-100)</th>
<th>CD4 Count (100-200)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cryptosporidium</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Isospora belli</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Cyclospora</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Microsporidia</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
Male: female ratio was 4.2:1 in renal transplant patients and transplant was more common to patients belonging to age group of 51-60. Two cases of Cryptosporidium and one case of Microsporidia were detected in renal transplant patients all presented with diarrhoea; however, no parasites were found in the patients with haematological malignancy.

4. Discussion

Age distributions of the patients revealed that most of the patients were young in between 31-40. This may be due to the fact that patients infected with HIV are young (mean age 33) and those who undergo renal transplantation are mostly middle age. Most of the workers have found maximum number of cases in the age group 30-40 years, which is very close to our study in the age group 31-40 years (Kumar et al, 2002). However, few workers reported that 83.3% cases account in age group between 15-24 years in their study (Noskin et al, 1997).

A Total of 21 (21%) intestinal opportunistic parasites were isolated from 100 patients. Yazari et al (2004) also reported parasite in 18.4%. In the present study parasites were more commonly isolated from patients with diarrhoea [(n=20) i.e. 30%] as compared to those without diarrhoea [(n=1 i.e.1%)], this difference is statistically significant. These findings are in agreement with the observations of Raizada (2004). But in contrast to the findings of previous work of El-diffrawy et al (2002). Cryptosporidium antigen in stool was detected by ELISA in 7/38 (18.42%) of these 7 samples 4 (57.14%) were microscopically positive and 3/42.85% sample were microscopically negative but positive in antigen detection. In the rest, 31 cases both in microscopy and antigen detection were negative. This may be due to the fact that the sensitivity of antigen detection is very high i.e. 30 ng/ml as compared to microscopy.

In our study, 8/19 (42.1%) HIV infected patients were presented with diarrhoea. In contrast other authors like Jelink et al (1997), have reported low percentage (15%) of diarrhoea in immunocompromised patients. Both 100% patient with Cryptosporidium had diarrhoea. Similar finding has been reported earlier in HIV infected patients with Cryptosporidium (Dionisio, 2002). But it is not in agreement with findings of Raizada (2004) who reported only 35.2% of their patients with Cryptosporidium had diarrhoea. In our study one patient with Cryptosporidium in HIV sub group has CD4 count, less than 200 cell/µl, where as both (100%) patients with Microsporidia had CD4 count, less than 200 cell/µl. Similar findings have been reported by other workers like Donglas (1999) and Chai (2005).

Only 5/26 patients with renal transplantation were female, male: female ratio was 4.2:1. The spectrum of parasites in patients with renal transplantation revealed that oocyst Cryptosporidium were detected in 2/26 cases and 1/26 Microsporidia detected. All three (100%) had diarrhoea. Our findings are in agreement with findings of previous workers i.e. Hong (2007). In contrast Pape (1994) has reported mixed infection in renal transplant recipients.

There were very few patients in haematological malignancy subgroup, 2/3 (22.2%) presented with diarrhoea. No opportunistic parasitic pathogen was detected in any case. This is in contrast with the findings of Fariba et al (2007) who could detect parasites in 22% cases in Haematological Malignancies.

5. Conclusions

Thus we can summarize that:

1. Most of the patients infected with HIV are young and those who undergo renal transplantation are middle age. Males are at higher risk.
2. Opportunistic parasitic pathogens are common in immunocompromised patients.
3. Opportunistic parasitic pathogen may be missed on routine stool examination. Strong clinical suspicion and special staining methods must be used for their diagnosis.
4. Cryptosporidium is most common opportunistic pathogen followed by Microsporidia.
5. Most of these parasites are detected when the CD4 count is low (200 cell/µl). So immunocompromised patient with low CD4 count must be screened for opportunistic parasitic infections

Acknowledgement

The authors thanks to the Head of the Department, SGPGI for providing the facility and permission to carry out the research work in the department.

References


