OPPORTUNISTIC INFECTIONS IN HUMAN IMMUNODEFICIENCY VIRUS (HIV) INFECTED PATIENTS FROM RURAL TERTIARY CARE HOSPITAL OF WESTERN MAHARASHTRA

Sachin C Deorukhkar* and Santosh Saini

* Department of Microbiology, Rural Medical College, Pravara Institute of Medical Sciences, Loni, Taluka-Rahata, Ahmednagar, Maharashtra, India-413736.
E-mail of Corresponding Author: deorukhkar.sachin@gmail.com

Abstract

Background: The wide ranging clinical manifestations and pathological changes in patients infected with HIV / AIDS are both fascinating and challenging to health care professionals. Opportunistic infections (OIs) constitute a major health problem in patients infected with HIV. The type of pathogens responsible for morbidity and mortality vary from country to country and even from region to region within the same country.

Objective: This study was designed with an aim to document the trends of opportunistic infections in HIV infected patients from rural tertiary care hospital of Western Maharashtra. Such studies have not been worked out before in this region.

Methods: Depending on the patient’s clinical features, specimens were collected which included stool, sputum (three sputa specimen-first spot, early morning and second spot), cerebrospinal fluid, lymph node aspirate, oral swab, blood and urine. All specimens were processed as per standard microbiological protocol for demonstration or isolation of pathogens.

Results: HIV infection was more in males (62.6%). The most common clinical feature was weight loss (47.8%). Infectious agents were demonstrated or isolated in 81.6% HIV infected patients. Mycobacterium tuberculosis (44.8%) was the most common isolate followed by Candida species (23.2%).

Conclusion: Opportunistic infections (OIs) are common complication in HIV infection. They cause substantial morbidity and hospitalization, necessitate toxic and expensive therapies and shorten the survival of people with HIV. Hence the early and accurate diagnosis of OIs is important.

Keywords: Candida, HIV, opportunistic infections, tuberculosis

1. Introduction

The Acquired Immunodeficiency Syndrome (AIDS) caused by Human Immunodeficiency Virus (HIV) is the most important public health problem of 20th century [1]. India is experiencing a rapid and extensive spread of HIV and at present is in advance stage of epidemic in some states of the country [2]. Despite the widespread HIV awareness programmes going on at present, a large number of patients either go undiagnosed or present late with multiple infections [3]. The infection is alarming due to the unique pathogenesis of the virus which decreases the CD4 cells, signaling the emergence of opportunistic infections (OIs) in host [4]. OIs are major cause of morbidity and mortality in such patients. Infectious microbial agents causing OIs could be asymptomatic or mildly symptomatic in immunocompetent individuals and it is often self limiting. However, in immunosuppressed individuals and individuals with malignancy these agents lead to severe life threatening diseases [5].

Many organisms responsible for OIs in HIV infected patients mimic similar clinical presentation. The type of pathogens responsible for morbidity and mortality vary from country to country and even from region to region within the same country. Though there are well documented studies from the western world and Africa [6, 7], the numbers of studies from India on this aspect are comparatively lesser [8, 9] especially from rural parts. Therefore, the present study was undertaken to study the various bacterial, fungal and parasitic pathogens causing OIs in HIV infected patients. No viral cultures were performed due to lack of facilities.

2. Material and methods

This study was conducted at Department of Microbiology, Rural Medical College and hospital of Pravara institute of Medical Sciences. One hundred and forty two HIV infected patients were investigated for various pathogens including opportunistic ones. They presented with various signs and symptoms like weight loss, diarrhea,
dysphagia, chronic cough, meningitis, pyrexia of unknown origin (PUO), lymphadenopathy. 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 recommendation given by WHO \[10\].

2.1 Specimens: Depending on the patient’s clinical features, specimens were collected which included stool, sputum (three sputa specimen-first spot, early morning and second spot), cerebrospinal fluid, lymph node aspirate, oral swab, blood and urine.

2.2 Processing of the specimens: All sputum samples were used to make separate smears and stained by Ziehl-Neelsen staining method. Diagnosis of tuberculosis was made by strictly following the Revised National Tuberculosis Control Programme (RNTCP) guidelines \[11\]. Sputum was also inoculated on Lowenstein Jensen’s media. Giesma stain was done for detection of \textit{Pneumocystis jiroveci}. Stool specimens were collected according to the WHO standard procedures and examined microscopically. Saline wet mounts and Lugol’s iodine mount was used for detection of ova, larvae, trophozoites and cysts of intestinal parasite. Smears of direct specimens were examined by modified acid fast staining for \textit{Cryptosporidium parvum}, \textit{Isospora belli} and \textit{Cyclospora} \[12\]. Also, bacteriological culture of stool specimens was done following the WHO standard procedures to mainly identify Salmonella and Shigella \[13\]. For the diagnosis of candidiasis, oral swab was cultured on Sabouraud’s dextrose agar (SDA). Speciation of Candida isolates was done using CHROMagar. Diagnosis of cryptococcal meningitis was established by India-ink preparation and by culture on SDA. Specimens were also inoculated on different media like blood agar, Macconkey’s agar and chocolate agar for isolation of various pathogens. Identification of microorganisms was done following the standard microbiological protocol\[14\].

3. Results

Figure No. 1 shows the age and sex distribution of the patients included in study. HIV infection was more in males (62.6%). Prevalence of HIV infection was more in age group 31-40 years in males (39.3%), whereas in females it was seen in age group 21-30 years (39.6%). Minimum incidence of HIV infection was seen in age group 0-10 years in both the sexes. Most of the patients presented with more than one complaint. The most common clinical feature was weight loss (47.8%), followed by PUO (36%) and chronic cough (33.1%) (Table No. 1). A total of 116 (81.6%) infectious agents were demonstrated or isolated from 142 HIV infected patients. \textit{Mycobacterium tuberculosis} (44.8%) was the most common isolate followed by \textit{Candida} species (23.2%). Among intestinal parasite \textit{Cryptosporidium parvum} predominated, whereas \textit{Strongyloides stercoralis} was seen in only one patient (Table No. 2).

Table No. 1: Clinical features of patients with HIV infection.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Symptoms</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Weight loss</td>
<td>68 (47.8)</td>
</tr>
<tr>
<td>2</td>
<td>PUO</td>
<td>51 (36)</td>
</tr>
<tr>
<td>3</td>
<td>Chronic cough</td>
<td>47 (33.1)</td>
</tr>
<tr>
<td>4</td>
<td>Chronic diarrhea</td>
<td>46 (32.3)</td>
</tr>
<tr>
<td>5</td>
<td>Dysphagia</td>
<td>34 (24)</td>
</tr>
<tr>
<td>6</td>
<td>Generalised lymphadenopathy</td>
<td>21 (14.7)</td>
</tr>
<tr>
<td>7</td>
<td>Meningitis</td>
<td>16 (11.2)</td>
</tr>
</tbody>
</table>

Table No. 2: Sample wise distribution of pathogens.

<table>
<thead>
<tr>
<th>Sr. no</th>
<th>Sample</th>
<th>Isolate</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sputum</td>
<td>\textit{Mycobacterium tuberculosis}</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td></td>
<td>\textit{Streptococcus pneumoniae}</td>
<td>03</td>
</tr>
<tr>
<td></td>
<td></td>
<td>\textit{Klebsiella pneumoniae}</td>
<td>02</td>
</tr>
<tr>
<td></td>
<td></td>
<td>\textit{Staphylococcus aureus}</td>
<td>02</td>
</tr>
<tr>
<td></td>
<td></td>
<td>\textit{Pneumocystis jiroveci}</td>
<td>02</td>
</tr>
<tr>
<td></td>
<td></td>
<td>\textit{Aspergillus niger}</td>
<td>01</td>
</tr>
</tbody>
</table>
4. Discussion
The wide ranging clinical manifestations and pathological changes in patients infected with HIV / AIDS are both fascinating and challenging to health care professionals. OIs constitute a major health problem in patients infected with HIV.

In the present study the incidence of HIV infection was more in males (62.6%) as compared to females. This finding was consistent with studies conducted by Ayyagari A et al [5] and Kumarasamy N et al. [9]. In our study the HIV infection was more common in age group of 21-40 years. This is also observed in other studies from India and aboard. As HIV affects the economically productive age groups, the overall economic burden on the country is increased. In this study, patients usually presented with more than one symptom, the most common being weight loss (47.8%) which is similar to the observation of other workers. [5, 9]

Tuberculosis (TB) ranks as the most common infection in the developing countries. About 55-89% of AIDS cases in India were found to be suffering from extensive pulmonary TB. [15] In our study, tuberculosis infection was found 52 HIV infected patients and Mycobacterium tuberculosis was the predominant bacterial isolate. Other researchers like Shailaja VV et al [16] have also reported M. tuberculosis as the commonest isolate in HIV positive patients. In the present study, no atypical mycobacterium was isolated. However atypical mycobacteria, commonly reported from Western countries, has been less commonly seen in India. [2] Other bacteria isolated from the sputum were S. aureus, K. pneumoniae and S. pneumoniae. As per the figures from National AIDS Control Organization (NACO), bacterial infections constituted 7% of opportunistic infections and the common organisms encountered in pulmonary infections were S. aureus, H. influenzae and S. pneumoniae. [2] Among the enteric parasites, the prevalence of Cryptosporidium infection was most common. Studies by Deorukhkar S et al [17] and Mohandas K et al [18] have also shown similar results, while our observation is in contrast to that of Gupta S et al [3] and Mukhopadhy A et al [19], where incidence of Cryptosporidium parvum was low as compared to Isospora belli. The coccidian parasites (Cryptosporidium spp, Isospora belli, Cyclospora spp and Microsporidium spp) are foremost among the enteric parasites in HIV infected patients. [17]. These organisms usually cause a self-limiting illness in immunocompetent individuals but as the immune status of the patients falls they are known to cause life threatening profuse watery diarrhea. [20].

Candida spp was the second most prevalent pathogen isolated in this study. A total of 11 Candida isolates were obtained from oesophageal brushing. Although C. albicans was the major isolate, non – albicans Candida (NAC) species like C. glabrata and C. tropicalis, which demonstrate decreased susceptibility to azole group of antifungal agents, have been also isolated, whereas other studies have not reported isolation of NAC species. [5, 8] C. dubliniensis was isolated from blood culture of 2 patients. The importance of C. dubliniensis is that it is emerging as a significant opportunistic pathogen in HIV infected patients and garnering attention for its ability to develop in vitro resistance to fluconazole. [21].

In our study Cryptococcus neoforms was isolated from CSF sample of 6 meningitis patients. Out of which 1 patient showed blood culture positivity for C. neoforms. C.
neoforxans is distributed throughout the world and is one of the most common fungi causing life threatening illness in patient with HIV. The reported incidence of PJP is about 4% of OIs in HIV patients. The prevalence of PJP is low or negligible in India. This probably could be explained by the extensive use of cotrimoxazole in the prophylaxis of PJP in HIV.

Conclusion

Multiple defects in the normal host immune system caused by infection with HIV predispose to an increased frequency of variety of OIs. Due to changing pattern of infection depending upon the degree of immunosuppression constant monitoring of OIs in HIV infection is important for better management.

References