

Study of Opportunistic Infection in Relation with CD4 Cell Count and HIV Prevalence

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Abstract

Background: In India, an opportunistic infection with HIV and associated complications accounts for considerable proportion of mortality. There exists definite CD4 cell count correlation with opportunistic infection in HIV patients. **Objectives:** To document the prevalence of HIV with correlation of different opportunistic infection with CD4 cell count. **Material and Method:** A total of 174 HIV positive patients either hospitalized or ART POD were studied for finding the spectrum of opportunistic infection and for HIV prevalence. Various samples were collected as per symptoms and clinical presentation. **Result:** Among opportunistic infection, most common were bacterial infection with 72.5%, followed by fungal infection 42.1% and parasitic infection with 25.8%. TB in 21 patients and candidiasis in 5 patients were found in CD4 cell count <500 cell/ μ l followed by chronic diarrhoea with CD4 cell count <200 cell / μ l. **Conclusion:** Prevalence of HIV infection in persons attending ICTC is 11.3%. TB is the most common opportunistic infection followed by candidiasis and diarrhoea.

Keywords: CD4 Cell Counts; OIs (Opportunistic Infections); HIV Prevalence.

Introduction

AIDS is a disease which came in light only in 1981. Presently HIV accounts for highest number of death attributable by single infective agent. Opportunistic infection associate complication account for considerable proportion of mortality. Opportunistic infections also cause substantial mortality and hospitalization necessitates toxic and expensive therapies and shortens the survival of people with HIV infection [2, 4].

Early diagnosis of opportunistic infection and prompt treatment definitely contributes to increased life expectancy among infected patients delaying the progression of AIDS [1].

We, therefore, conducted this HIV prospective observational study to document the HIV prevalence

pattern and correlation of different opportunistic infections with CD4 cell count.

Material and Method

A prospective observational cohort study was conducted for prevalence of HIV, considering all persons attending integrated counseling and testing centres (ICTC). Blood samples were collected and tested with patients consent.

After they were identified as HIV positive, post test counseling was given and they were referred to ART centre in our hospital. For finding the spectrum of opportunistic infection, a total of 174 HIV positive patients either hospitalized or attending ART OPD were studied during a period of 1 year from June 2012-June 2013.

CD4/CD3 Enumeration

single BD FACS count machine Becton

The CD4/CD3 enumeration was done using the

Table 1: Age and Sex wise distribution of symptomatic patients studied for opportunistic infections

Age (Yrs)	Male	Female	No. of patients	Percentage
18 -28	22	7	29	17.4 %
29-38	71	23	94	53.3 %
39-48	31	5	36	21 %
49 -58	10	3	13	7.3 %
59 and above	2	0	2	1 %
Total	136	38	174	100 %

Dickinson and company, San Jose, and the United States of America, strictly follow the manufacturer's instructions.

Depending on the patients clinical features various specimens were collected which included a stool, sputum and oral swabs all three sputum samples were used to make separate smears and stained by a Ziehl - Neelson method.

Stool specimens were collected and examined microscopically using saline wet mounts. Lugol's iodine was used for the detection of ova, larva, trophozoites and cysts of intestinal parasites. Smears were examined by Modified Acid Fast Staining for *Cryptosporidium parvum*, *Isospora belli* and other. Also bacteriological culture of stool was done for identifying bacterial infections.

Candidiasis were diagnosed by taking oral swab specimens and were cultured on Sabourad's Dextrose agar and suspected colony was identified by Germ tube test. Cryptococcal meningitis was diagnosed by using India ink preparation of CSF and by culture on SDA.

Observations

In this study out of 174 patients of opportunistic infections maximum 53.3% were in the age group of 29-35 years, followed by 21 % in the age group of 39-48 years. 17.4% were in the age group of 18-28 years while 7.3 % were in 49 - 58 years age group. Only 1% of patients were in 59 and above age group.

Table 2: Distribution of opportunistic infections

Infection	No. of patients	Percentage
Bacterial	129	72.5 %
Fungal	75	42.1 %
Parasitic	46	25.8 %

It was found that 77% were male and 23% were females, with male to female ratio is 3.09:1.

Among different opportunistic infections, bacterial infections were seen in 72.5% patients followed by fungal in 42.1% and parasitic infections in 25.8% patients.

In this study total 250 events of opportunistic infections were found comprising of bacterial, fungal and parasitic infections.

Opportunistic Infections Associated with CD4 Cell Counts less than 50 cells/ μ l

Among bacterial infections 3 patients of TB were found in this age group. Among the fungal, *Candida* species found in 4 patients followed by *Cryptococcus neoformans* in 2 patients. Among parasitic infections only *cryptosporidium parvum* were isolated in 3 patients.

Opportunistic Infections Associated with CD4 Cell Counts between 51- 100 cells/ μ l

TB were found in 11 patients followed by *S. aureus* in 2 and *Klebsiella pneumoniae* in 1 patient. *candida* sp. Found in 6 patients followed by *Cryptococcus neoformans* in 3 among fungal infections. In parasitic infections *cryptosporidium parvum* was isolated in 5 patients followed by *Strongyloides stercoralis* and *Giardia lamblia* in 1 patient each.

Opportunistic Infections Associated with CD4 Cell Counts between 101-150 cells/ μ l

Here TB was found in 18 patients followed by *klebsiella pneumonia* in 2 patients, *Staph. aureus*, *strep. Pneumoniae* and *Salmonella typhi* were found in 1 patient each. *Cryptosporidium parvum* was isolated in 10 patients, *H.nana* in 3 patients. *Isospora belli* and *Entamoeba histolytica* were found in 2 patients each. In fungal, *Candida* species were found in 17 patients.

Opportunistic Infections Associated with CD4 Cell

Table 3: Correlation of OIs with CD4 cell counts

Type of Etiology	Opportunistic pathogen		CD4 cell count					Total
			I (<50)	II (51 - 200)			III (201-500)	
				IIa (50 - 100)	IIb (101-150)	IIc (151-200)		
Bacterial	<i>Mycobacterium tuberculosis</i>	Pulmonary	2	7	11	30	12	62
		Ext. pulmonary	1	4	7	22	9	43
	<i>Klebsiella pneumoniae</i>	-	1	2	6	2	11	
	<i>Staphylococcus aureus</i>	-	2	1	3	-	6	
	<i>Streptococcus pneumoniae</i>	-	-	1	2	-	3	
	<i>Escherichia coli</i>	-	-	-	2	-	2	
	<i>Salmonella typhi</i>	-	-	1	1	-	2	
Fungal	<i>Candida spp.</i>	4	6	17	35	5	67	
	<i>Cryptococcus neoformans</i>	2	3	-	-	-	5	
	<i>Trichophyton rubrum</i>	-	-	1	1	1	3	
Parasitic	<i>Cryptosporidium parvum</i>	3	5	10	14	-	32	
	<i>Isospora belli</i>	-	-	2	2	-	4	
	<i>Strongyloides stercoralis</i>	-	1	1	1	-	3	
	<i>Hymenolepis nana</i>	-	-	3	-	-	3	
	<i>Entamoeba histolytica</i>	-	-	2	-	-	2	
	<i>Giardia lamblia</i>	-	1	1	-	-	2	
Total		12	30	60	119	29	250	

Counts between 151- 200 cells/ μ l

Here TB found in 52 patients, followed by *klebsiella pneumoniae* in 6 patients. *Candida* found in 35 patients and *Trichophyton rubrum* in 1 patient. In parasitic infections *Cryptosporidium parvum* was isolated in 14 patients. In present study only TB and *Candidacies* were found in the CD4 cell count range of 201-500. In the CD4 cell count range of 51-200, along with TB and *Candidacies*, the most common infections found were cryptosporidiosis and other parasitic diarrhoea. *Cryptococcal meningitis* was found in CD4 cell count of less than 50.

Discussion

Out of 174 patients under study, 250 isolates of OIs were seen in present study singly/ in mixed form. Among bacterial infections TB was found to be most common bacterial infections which were seen in 59%

of patients. After TB, next common bacterial infections found were bacterial pneumonia in 11.8% of patients. Fungal infections were second common infections found in 42.1% of patients after bacterial infections. Among those candidacies was found to be the most common [2, 6] that is 37.6% in present study. After bacterial and fungal infections next common group of infection was found to be parasitic infections in 25.8% patients. Among parasitic infections cryptosporidium parvum was the commonest organism causing diarrhoea [5].

For correlation of OIs with CD4 cell count, we divided the study cases into three groups based on CD4 cell counts (cells / mm³) that is <50, 51-200, and 201- 500 cells / mm³. In this study we found out of 250 isolates of OIs only TB and candidacies were found in range of 201-500 cell/ mm³ [3].

In this study, CD4 cell count range of 51-200, we found TB, candidacies and parasitic diarrhoea and other bacterial infections. We also found cryptococcal meningitis in patients of CD4 cell count range

50-100 cells /mm³ [8].

When severe immunodeficiency occur that is CD4 cell count less than 50 cell / mm³, almost all OIs become manifest at this terminal stage of AIDS. However we found only TB, candidacies, cryptococcal

meningitis, and diarrhoea due to cryptosporidium parvum. This might be because we have got less patients with CD4 cell counts <50 cells /mm³.

Conclusion

Table 4: Correlation of opportunistic infections with CD4 count

CD4 counts (cells / μ l)	Opportunistic infections
200 -500	T.B. Candidacies.
51-200	TB, Candidacies, Cryptosporidiosis, other parasitic diarrhoea, bacterial pneumonia.
< 50	Cryptococcal meningitis, cryptosporidiosis, candidacies,

In the present study, prevalence of HIV persons attending ICTC is 11.3%. Male to female ratio was 3.09:1%. Maximum cases were found 20-40 years age group. Among OIs most common were bacterial infections (72.5%), followed by fungal infections (42.1%), and parasitic infections (25.8%).

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