

Clinical profile of human immunodeficiency virus patients with opportunistic infections: A descriptive case series study

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ABSTRACT

Background: Human immunodeficiency virus (HIV) virus, causative agent in acquired immunodeficiency syndrome, is fast becoming a major threat in the Indian subcontinent, with an estimated 3.7 million persons being infected with HIV. HIV infection is complicated by various opportunistic infections (OIs) such as tuberculosis (TB), candidiasis, herpes zoster, *Pneumocystis jirvoceii*, cytomegalovirus (CMV) etc., This study carried out to know the clinical profile of HIV patients with OIs. **Methods:** A case series study was carried out at a tertiary care hospital in Bellary, Karnataka, India. A hospital based case series study was conducted among 164 HIV patients with OIs admitted to various wards as well as attending outpatient department at Vijayanagara Institute of Medical Sciences Hospital, Bellary during Jan 2013 to Nov 2013. Both primary and secondary data was collected to gather information on clinical profile. The statistical tests used were descriptive statistics and independent *t* test. **Results:** Among 164 patients, 29.3% were females and 68.3% males. High proportions of patients were observed in 28–37 years of age group and heterosexual route was the most common mode of transmission. TB (50%) is the most frequent OI followed by candidiasis (49%), pneumocystis (16%) and others. The mean CD4 cell count in TB was 237.02/ μ L and in candidiasis 189.07/ μ L. Low values were observed in promyelocytic leukemia (18.10/ μ L), CMV (18.5/ μ L) and in toxoplasmosis (73.1/ μ L). **Conclusions:** Respiratory system was the most common system involved by OIs and most of patients with OIs had CD4 T cell count below 200/ μ L, whereas there were no patients in the study with counts above 500/ μ L.

Key words: Human immunodeficiency virus, opportunistic infections, CD4 cell and tuberculosis

Submission: 05-06-2014 **Accepted:** 30-08-2014

INTRODUCTION

People with advanced human immunodeficiency virus (HIV) are vulnerable to infections called “opportunistic infections” (OIs) because organisms take advantage of the opportunity offered by a weakened immune system. Since the beginning of the

HIV epidemic, OIs have been recognized as common complications of HIV infection.^[1-3] OIs cause substantial morbidity and hospitalization, necessitate toxic and expensive therapies, and shorten the survival of people with HIV infection.^[4,5] A decrease in CD4⁺ count is at least partially responsible for the profound immunodeficiency that leads to various OIs in HIV-infected persons.^[6]

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The introduction of antiretroviral therapy (ART) has dramatically reduced the incidence of OI among HIV-positive people who have received ART; however, around the world, millions of people living with HIV in resource-poor communities have no access to ART.^[1] At present, the initiation of primary prophylactic therapies for OIs is based chiefly on the absolute CD4⁺ count, which has been shown to be an excellent predictor of the short term overall risk of developing acquired immunodeficiency syndrome (AIDS) among HIV-infected patients.^[7] The relative frequencies of specific opportunistic diseases may vary in different

Access this article online	
Quick Response Code:	Website: www.ijabmr.org
	DOI: 10.4103/2229-516X.157166

countries and even in different areas within the same country.^[8] The identification of such pathogen is very important for HIV and AIDS case management.

Human immunodeficiency virus causes progressive impairment of the body's cellular immune system leading to increased susceptibility to tumours and infections, and the fatal condition is known as AIDS.^[9] The unique feature in the pathogenesis of HIV/AIDS is that the primary target cell for HIV is immune cells bearing the CD4 marker at their surface. With HIV infection, there will be a gradual decrease of human immune cells bearing CD4 antigen receptor, the most important being T helper cells (CD4 T cells), B lymphocytes, macrophage and natural killer cells leading to development of wide varieties of OIs that is, severe infections induced by agents that rarely cause serious diseases in immune competent individuals. In this way AIDS related mortality and morbidity, which is significantly higher in number as compared to other diseases, is actually due to OIs rather than HIV itself.^[10] In the era of effective ART, diagnosis and treatment of OIs is an integral part of this treatment strategy because some OIs regimens (for e.g., antituberculosis drugs) and ART regimen should not be administered at the same time to prevent drug induced toxicity and mortality and morbidity due to immune reconstitution inflammatory syndrome.^[11] CD4 cell count is the best validated predictor of the likelihood of developing OIs. Besides, it has great utility in clinical consideration of HIV disease classification and AIDS definition, assessment of prognosis and designing of clinical trials, for e.g., decision about initiation of ART/prophylaxis.^[12] There are wide range of OIs affecting different system, for example, respiratory tract infection, gastrointestinal tract infection, urinary tract infections, sexually transmitted infection and disseminated infection.^[13]

Once the standard value of CD4 count and the OIs incidence rate at that stage is obtained, this can be used as a model for other resource limited settings (where CD4 count facilities are not available) to take decision about the initiation of ART in relation to CD4 status were done in a local setting with limited sample size but specific studies aimed at making standard profile of different OIs according to CD4 were lacking.^[14]

Hence, this study is conducted with a general objective to explore the relationship between CD4 level and different types of OIs which may be helpful for the development of guidelines regarding the initiation and monitoring of ART/prophylaxis. Furthermore, the result of the findings will be helpful in the prognosis of different OIs in HIV/AIDS patients.

METHODS

Descriptive study was carried out during January 2013 to November 2013 at medicine Out Patient Department,

medicine wards and ART centre of a tertiary care hospital. Human immunodeficiency virus positive patients older than 18 years with OIs were the study subjects. The exclusion criteria were - Patients harbouring OIs who are immune-suppressed because of causes other than HIV; non-consenting patients; seriously ill patients from whom data collection was impossible. Total of 164 HIV positive patients with OIs were considered for the study and the sampling technique adopted was non probability purposive sampling.

Primary data was collected from patients by interview technique and secondary data from case records after obtaining written informed consent. Primary data: Includes basic socio demographic and other information. Secondary data: Includes data related to clinical findings and investigation reports. Data was analyzed by computing proportions, mean and t-test; by using microsoft excel and SPSS 20.0 trial version downloaded from www14.software.ibm.com.

Data was collected after getting informed consent from the patient. Confidentiality of the patients' detail was maintained.

RESULTS

The current study revealed that the maximum number of patients who had OIs were in the age group of 28–37 years (45.7%), followed by the age group 18–27 years (27.4%) and 38–47 years (21.3%). No patients were found in the age group above 60 years. There was higher proportion of males (68.3%) as compared to females (29.3%). The male to female ratio was 2.3:1. The HIV patients with OIs were less educated that is, 27.4% were illiterate and 39% had primary education. Only 11.6% subjects had education of college. Most of the patients, who harboured OIs, were unskilled labourers (39%), followed by semiskilled (14.6%), skilled (10.9%) business, professional and others constituted 35%.

Of all the cases maximum number of HIV positivity with OIs were seen in the married group (54.3%), followed by people who were unmarried (20.7%), who were separated (17.7%) and least among widows (7.3%). Heterosexual mode of transmission was the commonest mode of transmission, accounting for 84.7% [Table 1].

In the current study as depicted in Table 2, the most common symptoms at presentation were fever (78%), loss of appetite (76%), weight loss (74%), cough (58%), where as diarrhoea was seen in only 18% of the cases [Table 2].

Among patients who presented with history of fever, 88.5% of them had fever of more than 1-month duration. Among patients who presented with history of weight loss, 62.2% of them had loss of body weight of more than 10%. Among

patients who presented with history of diarrhoea, 83.3% of them had diarrhoea of more than 1-month duration. Among

patients who presented with history of cough, 91.4% of them had cough of more than 1-month duration.

Table 1: Sociodemographic characteristics of study subjects

Variables	Frequency (n=164)	Percentage
Age (years)		
18-27	45	27.4
28-37	75	45.7
38-47	35	21.3
48-57	09	05.5
Gender		
Male	112	68.3
Female	48	29.3
Transgender	04	02.4
Education		
Illiterate	45	27.4
Primary	64	39.0
Secondary	36	21.9
College and above	19	11.6
Occupation		
Unskilled	64	39.0
Semi skilled	24	14.6
Skilled	18	10.9
Business	14	08.5
Professionals	06	03.6
Others	38	23.2
Marital status		
Married	89	54.3
Unmarried	34	20.7
Separated	29	17.7
Widow/widower	12	07.3
Mode of HIV transmission		
Heterosexual	139	84.7
Homosexual	12	07.3
Blood transfusion/needle prick	04	02.5
Unknown	09	05.5

HIV: Human immunodeficiency virus

Table 2: Distribution of study subjects based on symptoms

Symptoms	Frequency	Percentage
Fever	128	78
Weight loss	121	74
Diarrhoea	30	18
Cough	95	58
Loss of appetite	125	76
Dysphagia	79	48
Dyspnoea	77	47
Tachypnoea	38	23
Genital lesions	16	10
Body swelling	20	12
Headache	48	29
Convulsions	33	20
Abdominal pain	24	15
Abdominal distension	05	3
Chest pain	43	26
Visual blurring	26	16
Vomiting	54	33
Altered sensorium	30	18

On general examination, the most common signs found were emaciated built (73%), fever (60%), tachycardia (94%), tachypnoea (62%) and pallor (76%). Genital lesions and skin lesions constituted 18% [Table 3]. Among patients with OIs, respiratory system was more commonly affected (56%) followed by nervous system (26%), skin (15%), genitals (10%). Only 5–6% of patients had abnormality in chorionic villus sampling and abdomen [Table 4]. It is evident from the present study that TB is the most of frequent OIs accounting for 50% of all OIs, followed by candidiasis in 49% of cases [Table 5].

In this study, 65% of the patients with OIs had CD4⁺ T-Cell counts below 200/ μ L, where as there were none with counts above 500/ μ L [Table 6]. The mean CD4⁺ cell count in TB was 237.72/ μ L and in candidiasis 189.07/ μ L. Low values were observed in promyelocytic leukemia (18.10/ μ L), cytomegalovirus (18.5/ μ L). Statistically significant association was found between CD4 count and TB, candidiasis, cryptosporidiosis, isosporiosis, and strongyloidiasis [Table 7].

DISCUSSION

In the present study, majority of patients were in the age group of 28–37 years. This is consistent with other studies reported

Table 3: Distribution of study subjects based on clinical signs on general examination

Important signs	Number of cases	Percentage of cases
Emaciated built	120	73
Fever	98	60
Tachycardia	154	94
Tachypnoea	102	62
Pallor	125	76
Icterus	05	03
Cyanosis	26	16
Clubbing	15	09
Edema	08	05
Lymphadenopathy	22	13
Genitals	16	10
Skin lesions	13	08
Thrush	74	45

Table 4: Distribution of study subjects based on systemic examination

Systemic examination	Abnormality detected	Percentage
Respiratory system	92	56
Cardiovascular system	10	06
Abdomen	08	05
Nervous system	43	26
Genitals	16	10
Skin	25	15

Table 5: Distribution of study subjects based on type of opportunistic infections

Opportunistic infections	Number of cases	Percentage of cases
Tuberculosis	82	50
Candidiasis	80	49
Pneumocystosis	26	16
Cryptococcosis	15	09
Cryptosporidiosis	11	07
Strongyloidiasis	05	03
Isosporiasis	08	05
Toxoplasmosis	07	04
CMV retinitis	05	03
PML	05	03
Herpes	10	06
Molluscumcontagiosum	10	06
Pneumococci	03	02
Scabies	05	03
Sebhorreic dermatitis	03	02

CMV: Cytomegalovirus; PML: Progressive multifocal leukoencephalopathy

Table 6: Distribution based on CD4T cell

CD4 ⁺ cell ranges (µL)	Number of cases	Percentage of cases
>500	Nil	0
200-499	58	35
<200	108	65
Total	164	100

Table 7: Comparison of CD4 cells among opportunistic infections

Opportunistic infections	Mean CD4 ⁺ cell count (µL)	P
Tuberculosis	237.02	0.001
Candidiasis	189.07	0.001
Cryptococcosis	062.89	0.12
Pneumocystosis	141.73	0.34
Cryptosporidiosis	202.00	0.01
Isosporiasis	246.80	0.02
Strongyloidiasis	264.02	0.003
Toxoplasmosis	073.15	0.06
Cytomegalosis	018.56	0.14
PML	018.10	0.67

PML: Progressive multifocal leukoencephalopathy

from India and abroad.^[15,16] It was observed that the frequency of OI was highest in the sexually active age group of society. This indicates a trend of young and productive generation being affected; a reflection of the devastating effects India will face as the this work force is affected.

The incidence of OI was significantly high in patients who were less educated and this directly indicates the impact of level of education on the transmission of the disease, as education is directly related to the level of awareness.^[17]

The commonest mode of transmission was heterosexual (84.7%) followed by others, as heterosexual transmission remains the commonest mode since other sexual practices being very uncommon in this part of the world.^[18] This

study also found that a small proportion of transmission attributed to blood transfusion/needle prick as observed in other studies.^[19,20]

In this study, it was found that fever was the most frequently occurring symptom present in 78% of the cases followed by loss of appetite, weight loss and cough. These findings are consistent with studies reported in literature.^[21,22] Numerous OIs occur in HIV infected patients due to down regulation of the immune system. In the present study, it was found that TB was the most frequent OI accounting for 50% of all infections followed by candidiasis in 49% of cases. Similarly in a study of Sharma^[23] and Vajpayee,^[24] TB was most common OI followed by candidiasis, whereas contradictory to this in a study of Patel,^[25] Giri,^[26] and Singh,^[27] candidiasis was the most common followed by TB.

Human immunodeficiency virus-TB co infection is a serious problem worldwide but especially of concern in India where background rates of TB is highest in the world.^[28] In India, the most common OI among people with HIV infection is pulmonary TB.^[27,29] Hence respiratory system is most commonly involved as observed in our study.

The mean CD4 count was low for TB in our study compared to western data. Candidiasis in our study occurred at a wide range of CD4 levels; but mean CD4 count was 189.07. Compared to our study, studies by Moore *et al.* and Crow *et al.* showed that the mean CD4 count was much lower for candidiasis. The mean CD4 count for cryptosporidiosis, isosporidiosis, and strongyloidosis in our study was very similar to the mean CD4 count of Moore *et al.*^[4]

CONCLUSION

In our set up most frequent OIs are accounted by TB and candidiasis and there is a direct correlation between the values of CD4 count and the severity of the OIs, hence indicating the level of immunity and the severity of the disease.

ACKNOWLEDGEMENT

We are thankful to our guide Dr. Gangadhar Goud T, Head of the Department, Department of Community Medicine. We are also thankful to staff of ART centre and Physicians of VIMS. Thank full to all study subjects participated in this study.

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How to cite this article: Ramesh K, Gandhi S, Rao V. Clinical profile of human immunodeficiency virus patients with opportunistic infections: A descriptive case series study. *Int J App Basic Med Res* 2015;5:119-23.

Source of Support: Nil. **Conflict of Interest:** None declared.