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Research Article

Profile of HIV Patients with Opportunistic Infections in a Tertiary Care Hospital in Bangalore

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ABSTRACT

Background: Due to the advent in molecular research aimed at AIDS chemotherapy, Scientists have succeeded in developing the chemotherapy sufficient enough to halting or atleast slowing the progression of HIV infection to AIDS by the use of life prolonging anti HIV/AIDS regimens termed as Antiretroviral drugs known as ART therapy. So far ART is the only effective treatment available to HIV/ AIDS patients. Provision of combined package treatment, care, adherence as well as regular assessment of the therapy increases its effectiveness.

Objective: The aim of this study was to study the efficacy of antiretroviral therapy based on CD 4 cell count as well as to study the incidence and spectrum of various opportunistic infections in the above HIV patients.

Materials and Methods: Study subjects were followed up for the period from June 2009 to February 2010.Their clinical status and CD_4 counts were checked at each visit and opportunistic infections recorded if any.

Results: We observed that as per the WHO staging system for HIV infection, majority of the study participants were presented with advanced stages of disease. 198 patients (86.1%) had stage 4 disease and 26 patients (11.3%) stage 3. The mean CD 4 counts at stage 4 as 127.76±78.80 cells/mm3 showing improvement post ART to 289.30±117.09. All patients were prescribed prophylaxis treatment of Cotrimoxazole while 179 patients (77.7%) were given other treatments for opportunistic infections. 41.7% had to be on ATT therapy. Pulmonary Tuberculosis was found to be the most common OI, (36.5%) followed by Candidiasis in 52 patients (22.6%).

Conclusion: The spectrum and frequency certain OI' s highlight the urgency of studying HIV/AIDS in resource limited countries where locally specific disease patterns maybe observed. This study gives an insight on the profile of opportunistic infections in HIV patients, thus presenting an optimistic future outlook by addressing key issues of concern and emphasing the need to enhance the knowledge and awareness locally and possibly contribute globally in the
fight against this disease.

Key words: HIV, Opportunistic infections,CD_4 count.

INTRODUCTION

According to World Health Organization (WHO) the human immunodeficiency virus (HIV) is a retrovirus that infects cells of the immune system, destroying or impairing their function. The most advanced stage of HIV infection is Acquired Immunodeficiency Syndrome (AIDS) leading to life threatening opportunistic diseases (OI).[1] The infections are called 'opportunistic' because they take advantage of the opportunity offered by a weakened immune system.

Since the beginning of the HIV epidemic, OI's have been recognized as common complications of HIV infection. OI's cause substantial morbidity and hospitalization, necessitate toxic and expensive therapies and shorten the survival of people with HIV infection.

HIV infection is a global pandemic. According to the United Nations AIDS (UNAIDS) and World Health Organization (WHO) reports there are approximately

39.4 million people living with HIV/ AIDS worldwide. It is estimated that 90% of HIV infected persons live in the developing countries with Indian estimates being 5.1 million.[2]

Antiretroviral drugs (ARVs), which can significantly delay the progression from HIV to AIDS – have been available in developed countries since 1996. Unfortunately, in many resource-poor areas, access to this treatment is severely limited. Some of these people manage to access the drugs through private health facilities, which dominate India's healthcare sector, but the vast majority of people cannot afford to buy treatment privately.

Treating some opportunistic infections is easier than others. Infections such as herpes zoster and candidiasis of the mouth, throat or vagina, can be managed effectively in most environments. On the other hand, more complex infections such as toxoplasmosis, need advanced medical equipment and infrastructure, which are lacking in many resource-poor areas.

Antiretroviral treatment can prolong the time between HIV infection and the onset of AIDS. Emerging opportunistic infections and their treatment in patients with HIV is of major importance for the outcome of the disease. Better treatment and prevention for opportunistic infections have also helped to improve the quality and length of life for those diagnosed with AIDS[3].

Due to prevailing socio-economic conditions, poor awareness and lack of facility for diagnosis in the resource limited set up, the incidence of HIV is highly under-reported. The clinical course of HIV infection varies considerably from patient to patient and a regional variation in the spectrum of opportunistic infections has also been observed[4]. Hence the aim of the present study was to profile the HIV infected people, in a tertiary care hospital in Bangalore, based on CD4 count and their opportunistic infections.

MATERIALS AND METHODS:

This study was conducted at the ART Centre of, a tertiary level referral center and teaching hospital in South India. The hospital has its own ART Care & Support Centre including a 40 bedded male and female ward for HIV/AIDS patients providing free services for the HIV positive patients in and around Bangalore. The Antiretroviral Treatment (ART) Centre was launched by NACO, Govt.of India with the support from WHO/UNAIDS. The ART Centre was launched on April 2008 and this is one of the 25 such centers set up across 15 states in India.

A total of 230 patients from the ART centre at a tertiary care hospital diagnosed as HIV positive and who were on Antiretroviral therapy were selected for the study, and the spectrum of opportunistic infections shown in these patients were studied. Patient treatment records/ cards, data collection form, ART records/ follow-up book were reviewed prospectively to assess the opportunistic infections. The HIV antibody status of all the study subjects were assessed by Enzyme linked immunosorbent assay (ELISA) as recommended by the National AIDS Control organization (NACO), Ministry of Health and Family Welfare, Government of India. After having confirmed the diagnosis, a written informed consent was taken from all the patients.

The complete project work was done according to the permission granted by the ethical committee of Visveswarapura Institute of Pharmaceutical Sciences, KIMS Hospital, Bangalore and The Karnataka State AIDS Prevention Society (KSAPS), Bangalore.

Patient's medical charts were reviewed for demographic information including age, weight, sex, home setting (urban/rural), occupation, mode of transmission/ risk factors for HIV. Opportunistic infections of the patients were collected depending on the patient's symptoms and the clinical presentation. The CD4 counts were estimated by flow cytometer using FACS machine (Fluorescence Activated Cell Sorting).Baseline CD4 counts were done for each patient to determine the degree of immunodeficiency at the time of admission and then at regular intervals of three and six months. The repeat CD4 count of the HIV- seropositive subjects was done at the discretion of the treating physicians. The changes in the median CD 4 counts at follow up visits were observed and the information generated through the data collected and entered. In our study, follow up was carried out in most of the patients after 6 months and hence only one reading was recorded at the end of the study.

RESULTS AND DISCUSSION

Among 230 patients included in the study, 140 (60.9%) were males and 87 (37.85) were females.

A maximum of 96 patients (41.7%) were in the age group of 31-40 years of which 65 patients (46.4 %) were males and 37 patients (42.5%) females in the age groups 31-40 years and 21- 30 years respectively (Table No 1). Generally most studies have reported higher incidence of HIV infection in males in the age group 30-39 years while 18-29 years in females. These findings are also consistent with studies done in other parts of Nepal by Subedi et al., which showed 89% males in the age group of 30 -39 years and 11% females in the age group 18-29 yrs[5]. Female patients were involved at younger age group which is consistent with a study conducted in Phillipines[6].The high incidence of HIV infection in the age group of 31-40 years followed by 21- 30 years maybe due to unsatisfied sex and the desire for satisfaction. Only 2

children under the age of 12 were HIV positive in the study-10 yrs and 11 yrs respectively in which both parents were HIV positive. Hence, it is possible that HIV was transmitted from mother to child as we have no data on administration of transfusions or injections. Only 1 case of HIV infection was found in the age group of 14 years. This case is more likely to be related to initiation of sexual activity, underlying the need to include young people in HIV prevention programmes since sexual transmission of HIV may start as early as 14 years of age.

Majority of patients 111 (48.3%) were from a rural background, while 93 patients (40.4%) indicated to be semi urban. The rural patients indicate to have acquired the infection from their local village and this implies that migrant workers maybe working as a link population and spreading the disease from high prevalence region to the areas with low level epidemic states. These are similar to the studies carried out in India on the HIV epidemic. Poverty, illiteracy and lack of awareness are playing a major role in the spread of this deadly disease. HIV seems to be affecting the economically productive sexually active group and thus having a tremendous impact on the livelihood of the affected family[2].

Most of the patients, 176 (76.5%) were married, reflecting that a large majority of married individuals are engaged in extra marital contacts especially with commercial sex workers which reinforce the need to target not only the married for counseling on safe sexual practices but unmarried population as well. Although most of the patients were currently married, yet the highest risk of HIV infection maybe in the small number of men and women, who were unmarried, divorced, separated or widowed. A study of men and women in Rakai, Uganda found that those in unmarried relationship had highest risk of seroconversion[8].

In the present study 55 patients (23.9%) out of the 230 HIV positive patients had education up to primary level while 51 patients (22.2%) were illiterate .These finding were supported by other studies done by Joshi et al[9]. This explains the lack of awareness about safe sexual practices like protective role of condoms in transmission of sexually transmitted infections.

According to the present study 77 patients (33.5%) were employed as laborers or private employees while 62 patients (27%) were unemployed. 31 patients (13.5%) were housewives. Most of the patients were of lower socio- economic status living away from family. Studies have shown that over the years the HIV infection has increased sharply among commercial sex workers, rapidly increasing among attendants and steadily progressing among low risk populations[10]. The present study has shown that now HIV infection is not only limited to commercial sex workers and truck drivers but it has spread to the agriculturists, laborers and other low risk populations.

HIV transmission is predominantly by sexual intercourse in our study population. as shown in Table 2. Transmission was largely heterosexual (sex workers and clients of sex workers) which comprised 215 patients (93.5%) by sexual route. This is comparable with the National HIV/AIDS Registry of the Dept. of Health which showed sexual transmission (84.65%) with heterosexual contact as the predominant mode of transmission[11]. Our study also reported 2 cases of transmission from known HIV + mothers and 5 cases through injection and though blood products. This definitely calls for immediate health education to the vulnerable youths with regard to sharing of needles. In remote places of our country such as in the villages, patients tend to report a history of receiving injectable drugs administered by unqualified medical practitioners where adequate sterilization measures are not always followed.

In the study population, the average CD 4 count at baseline was found to be 141.44mm^3 while 294.19mm^3 post treatment, which suggests a high significance (p=0.001). This shows a trend of increasing median CD 4 counts at subsequent follow up visit after initiation of ART as compared to the baseline median CD 4 count. The increase in counts being more apparent at the follow up is similar to studies carried out in Seti Zonal Hospital, Katmandu and others[12]. Although low CD_4 results were obtained at their first count indicating that the patients were in the late stage of HIV infection, figure No 1, clearly shows that the ART was effective enough to replenish CD_4 count within 6 months of the initiation of ART as suggested by the significant statistical value. According to the WHO staging system for HIV infection, majority of the study participants were presented with advanced stages of disease. 198 patients (86.1%) had stage 4 disease and 26 patients (11.3%) stage 3, with the mean CD 4 count at stage 4 as 127.76±78.80 cells/mm^{3}during baseline, showing improvement to 289.30±117.09 at follow up. (Table 4)

Overall prevalence of OI, at the start of the study was 58.7% at baseline and 14.35% at follow up. Pulmonary Tuberculosis was found in 84 patients (36.5%) and Candidiasis in 52 patients (22.6%).Extrapulmonary tuberculosis was seen in 7 patients (3%) while Cryptococcal Meningitis was present in 6 patients (2.6%) .Candidiasis (16 patients) and Pulmonary Tuberculosis(14 patients) was the most prominent OIs found on follow up but seen in lesser number of patients when compared to baseline.

The important finding related to CD $_4$ count also revealed that irrespective of the different infections, the patients always exhibited a greater prevalence of OI's when the CD $_4$ count was below 200 i.e when they were in the AIDS stage compared to the lower prevalence of the same infection among patients with HIV seropositivity more than 200. Higher incidence of pulmonary Tuberculosis (31 patients) was found in the CD $_4$ range of 101-200 cells/mm3 at baseline, while high incidence of candidiasis (22 patients) at CD_4 range 51-100 cells/mm3. Similarly there was a lower prevalence of Pulmonary tuberculosis (12 patients) at the CD $_4$ range 101-200 while 5 cases of candidiasis at CD $_4$ range 51-100 cells/mm3 at follow up.(Table No 5a and 5b). The OIs are presumed to result from our geographical, climatic, socio economic condition.

In our study 7 patients were hospitalized and the average CD $_4$ counts were less than 50 cells/mm3. They had severe immunodeficiency and consequently had opportunistic infection (TB). The lower CD_4 count seen in our study maybe due to later detection of the infections, reflecting an infrastructure inadequacy of laboratory facilities at primary health care centers.

Different drugs were prescribed to treat opportunistic infections. Cotrimoxazole was given to all the patients (100%). Antitubercular therapies (ATT) were given to 96 patients (41.7%) for the treatment of tuberculosis. Candid mouth paint was given to 59 patients (25.6%) who were on candidiasis. Fluconazole was prescribed to 24 patients (10.4%) for other OI's like cryptococcal meningitis or herpes zoster.

Majority of the study participants were in stage 4 of HIV infection having a mean CD 4 count of 127.76 cells/mm3, (Table 4) with the presence of OI's on being newly diagnosed and subsequently showed improvement in CD 4 counts as well as their health thus improving their clinical stage post treatment. Achieving a CD 4 count of at least 200cells/mm^3 following initiation of ART is a valuable marker for a reduction in the risk for subsequent opportunity infections[13].

CONCLUSION

Before the widespread use of ART, opportunistic infections were the main cause of morbidity and mortality among the people living with HIV/AIDS[14]. However despite the improved availability of ART in recent times, opportunistic infections continue to cause morbidity and mortality as the patients are either unaware of their HIV infection or do not undergo treatment because of the stigma associated with the disease or due to economic or psychosocial factors.

The spectrum and frequency of certain OIs highlight the urgency of studying HIV/AIDS in resource limited countries where locally specific disease patterns maybe observed. This study gives an insight on the efficacy of ART and the profile of opportunistic infections in HIV patients thus presenting an optimistic future outlook by addressing key issues of concern thus emphasizing the need to enhance knowledge and awareness locally and possibly contribute globally in the fight against this disease.

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Table No 1 : Age distribution of patients studied

Age In Years	Total		Male		Female	
	Number	%	Number	%	Number	%
10-20	3	1.3	3	2.1	0	0
21-30	67	29.1	29	20.7	37	42.5
31-40	96	41.7	65	46.4	30	34.5
41-50	44	19.1	28	20	15	17.2
51-60	14	6.1	10	7.1	4	4.6
>60	6	2.6	5	3.6	1	1.1
Total	**230**	**100.0**	**140**	**100.0**	**87**	**100.0**
Mean± SD	36.67±9.84 years		37.69±9.88 years		35.14±9.67 years	

Table No.2 Mode of Transmission

Mode of Transmission	Number of patients	%
Heterosexual	215	93.5
Men having sex with men	3	1.3
Mother to child	2	0,9
Injection & blood products	5	2.2
Unknown	5	2.2
Total	230	100

Table No 3: Evaluation of CD_4 Counts

Mean CD_4 Counts Of the patients	Baseline	Follow up	P- Value
Cells/mm^3	141.44±90.0	294.19±119.65	<0.001

Table No4 : WHO Staging

WHO Staging	Number of patients	% of patients	CD_4 Count(cells/mm^3	
			At Baseline	At Follow up
Grade I	1	o.4	116.00±0.0	342.0±0.0
Grade II	5	2.2	325.60±96.38	206.20±26.2
Grade III	26	11.3	211.19±101.59	346.46±135.30
Grade IV	198	86.1	127.76±78.80	289.30±117.09
Total/Mean	230	100	141.44±90.02	294.19±119.65

Table No .5 a: Association of CD_4 count in patients with Opportunistic infections (at baseline)

Baseline CD_4 count (cells/$mm^{3)}$	NUMBER OF PATIENTS									
	C	PTB	EPTB	M/CM	D	MBL	CMV	Z	TC	PCP
1-50	8	18	1	3	0	1	1	0	0	0
51-100	22	25	2	1	3	0	0	1	1	0
101-200	10	31	4	2	1	0	1	3	1	3
201-300	12	10	0	0	0	0	0	1	0	0
>300	0	0	0	0	0	0	0	0	0	0
Total	**52**	**84**	**7**	**6**	**4**	**1**	**2**	**5**	**2**	**3**

Table No 5 b: Association of CD_4 count in patients with Opportunistic infections (at follow up)

Post ART CD_4 count(cells/$mm^{3)}$	NUMBER OF PATIENTS									
	C	PTB	EPTB	M/CM	D	MBL	CMV	Z	TC	PCP
1-50	1	0	0	1	0	0	0	0	0	0
51-100	6	2	1	0	0	0	0	0	0	0
101-200	3	12	1	0	1	0	1	0	0	0
201-300	1	0	0	0	0	1	0	0	0	1
>300	1	0	0	0	0	0	0	0	0	0
Total	**12**	**14**	**2**	**1**	**1**	**1**	**1**	**0**	**0**	**1**

C- Candidiasis; PTB- Pulmonary Tuberculosis; EPTB- Extra Pulmonary Tuberculosis ;
M/CM- Cryptococcal Meningitis; D- Diarrhoea; MDL- Molluscum contagiosum
CMV- Cytomegalovirus ; Z- Herpes Zoster; TC- Taenia capitis; PCP- Pneumonocystis carnii Pneumonia

Tables 5a and 5b reveal that irrespective of the different infections, patients exhibit a greater prevalence of OI's when the CD_4 count was below 200 cells/mm^3 ie when they were in the AIDS stage compared to the lower prevalence of the same infection among patients with seropositivity more than 200 cells/mm^3.

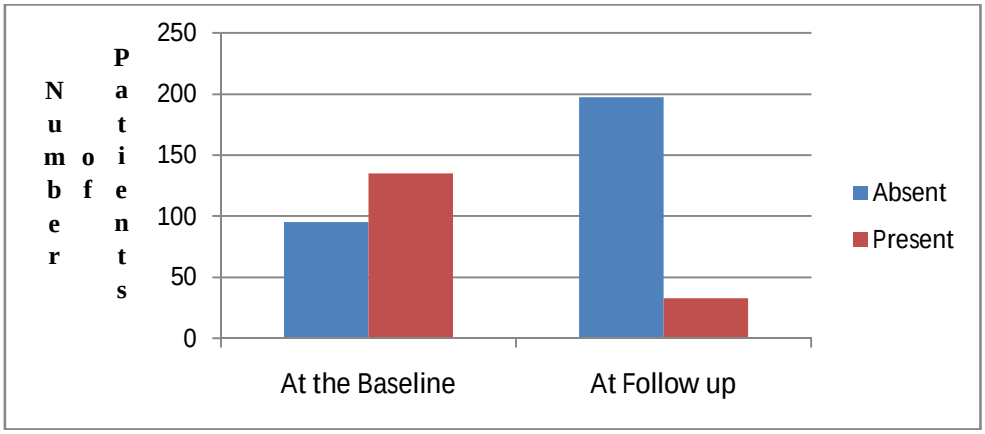

Figure No 1
Opportunistic Infections in patients

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