A CLINICAL STUDY OF NEWLY-DIAGNOSED HIV PATIENTS AT ICTC, BASAVESHWARA HOSPITAL WITH CORRELATION TO CD4+ COUNT

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ABSTRACT

BACKGROUND

Timely assessment of the burden of HIV/AIDS is essential for policy setting and programme evaluation. Human Immunodeficiency Virus (HIV) infection is a global pandemic with cases reported from virtually every country. According to World Health Organization (WHO), globally 35 million (32.8-38.8 million) people were living with HIV at end of 2013. To study the various pulmonary opportunistic infections in HIV/AIDS and association with CD+4 T-cell count.

The aim of the study is to study clinical profile of pulmonary opportunistic infections. A cross-sectional study was done among 100 newly-diagnosed HIV patients of all the age groups and either gender admitted from March 2013 to April 2014 in Basaveshwara Teaching and Teaching Hospital attached to MR Medical College, Kalaburagi.

MATERIALS AND METHODS

A detailed history was recorded with emphasis on personal history, high-risk behaviour, history of migration, mode of transmission of infection and complete thorough clinical examination was done. Data analysis was done by calculating P value using Chi-square test. ICTC was done in Basaveshwara Hospital for confirming HIV status of the patients.

RESULTS

Out of 100 patients, 3 patients were asymptomatic, while 97 patients were symptomatic. Main symptoms were cough (75%), fever (65%), weight loss (55%), dyspnoea (32%) and diarrhoea (10%). The most common opportunistic infection was pulmonary tuberculosis (77%) followed by candidiasis (58%).

CONCLUSION

The Antiretroviral Therapy (ART) has reduced the incidence of OI among HIV infected individuals. Majority of the patients with opportunistic infections have CD4 count less than 200 cells/μL. Enormous progress has been made in reducing HIV deaths, especially in low-income countries through the expansion of prevention of mother-to-child transmission and by early detection of HIV infection by easily available and free of cost ICTC testing through the ART programmes funded largely through development assistance for HIV.

KEYWORDS

AIDS, HIV, Tuberculosis, Candidiasis, Pneumocystis Carinii, Opportunistic Infections.

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BACKGROUND

AIDS (Acquired Immunodeficiency Virus) is a severe disease syndrome that resents the late clinical stage of infection with HIV (Human Immunodeficiency Virus). It is termed "the greatest pandemic of modern times." The syndrome probably existed at a low endemic level in Central Africa earlier began to occur in several areas of the world during the 1970s. The syndrome was first recognised in 1981.[1] Although, HIV was introduced much later in Asia than the rest of the world, over 4 million people are now thought to be infected.[2]

WHO estimates that with continued escalation of HIV transmission, nearly 9 million HIV-infected people will reside in South-East Asia by the turn of the century. In India, two new infections occur every minute. National Aids Control Organisation (NACO) estimates that by year 2025, the majority of new HIV infections in the world will occur in Asia and India will probably have the largest number of infected persons of any single country.[3,4]

NACO has introduced Integrated Counseling and Testing Centers (ICTCs) in India in an effort to curb the devastating impact on our society of HIV infection. It has a role in both HIV prevention and as an entry point to care.[5]

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Integrated Counseling and Testing is the process by which an individual undergoes counseling enabling him or her to make an informed choice about being tested for HIV.[6]

The main functions of an ICTC include-

- Early detection of HIV.
- Provision of basic information on modes of transmission and prevention of HIV/AIDS for promoting behavioural change and reducing vulnerability.
- Link people with other HIV prevention, care and treatment services.

This study is an attempt to study the baseline values of CD4+ count in patients newly diagnosed to be infected with Human Immunodeficiency Virus (HIV) by the Integrated Counselling and Testing Centre and hence determine how early during the natural course of the disease these patients are detected by ICTC.

Aims and Objectives

The following are the aims and objectives of this study-

- To study the baseline values of CD+ count in newly diagnosed to be infected with Human Immunodeficiency Virus (HIV) in Basaveshwar Hospital and hence determine how early during the natural course of the disease these patients are detected.
- To study the correlation between CD4+ cell counts and various opportunistic infections in HIV.

MATERIALS AND METHODS

Study Type- Cross-sectional study.
Study Period- March 2013 to April 2014.
Study Place- Basaveshwara Teaching and Teaching Hospital attached to MR Medical College, Kalaburagi.

Subjects under Study- 100 newly-diagnosed HIV patients of all the age groups and either gender.

Inclusion Criteria

All newly-diagnosed HIV patients in Basaveshwara Teaching Hospital either asymptomatic or presenting with one or other opportunity infections are included in the study.

Exclusion Criteria

- Patients with all other immunocompromised states such as malignancies, organ transplant recipients, patients on corticosteroids or immunosuppressive therapy are excluded from the study.
- Patients on ART are excluded from the study.
- HIV seropositive individuals whose CD4+ T-cell count cannot be done are also excluded from the study.
- Patients who didn't give consent.

Methodology- All HIV positive patients satisfying the inclusion and exclusion criteria are registered in the study group. These individuals are subsequently assessed thoroughly as per the protocol in a predesigned semi-structured proforma. This includes a detailed clinical history and a complete physical examination followed by appropriate baseline and specific laboratory tests to identify the nature and extent of opportunistic process if any present. HIV infection is confirmed according to NACO and ICTC guidelines and assessment of the HIV-related immune status is made by estimating the CD4+ cell counts.

Lab Procedures

- HIV diagnosis-
  1. Coomb's test.
  2. Tri-Dot test.
  3. Capillary test.
- CD4+ count was done in District Government Hospital, Gulbarga.
- All other relevant test was done at the study hospital only.

Statistical Methods- Statistical package SPSS version 16 was used for the analysis.

Ethical Consideration-

- Confidentiality of the data collected was maintained.
- All invasive procedures were done after taking consent.

RESULTS

100 newly-diagnosed HIV individuals in ICTC, Basaveshwara Hospital were included in this study.

Sex Distribution- Of the 100 patients studied, 68% were males and 32% were females. The male-to-female ratio was 2.1:1.

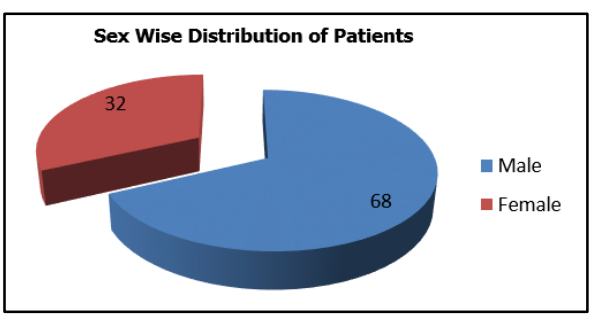


Figure 1. Shows the Sex Distribution of Individuals in this Study

Age- The age of patients in this study ranges from 19 yrs. to 65 yrs. The majority of the patients were in the age group between 35-45 yrs. (39%).

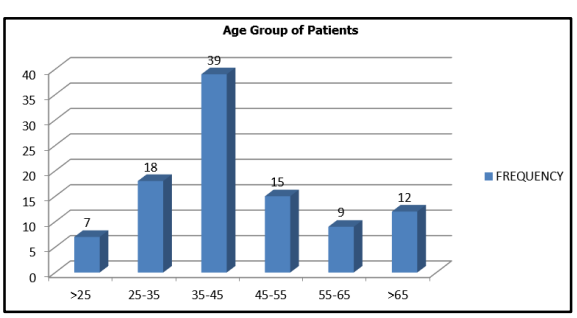


Figure 2. Shows the Age Distribution of Patients in this Study

Mode of Transmission

Heterosexual contact (mainly polygamous) was the common risk factor in all. Significantly, up to 99% subjects of the study group admitted to promiscuous contact clustered in and around Gulbarga, while 1 patient acquired infection through vertical transmission.

Mode of Transmission	Frequency Percentage
Sexual	99
Vertical	1

Table 1. Shows Modes of Transmission of HIV in this Study

Symptoms at Presentation- Out of 100 patients, 3 patients were asymptomatic, while 97 patients were symptomatic. The symptom profile in the study patients is as follows-

Cough was hence the most common symptom (77%) at presentation followed by fever (74%) in the study group.

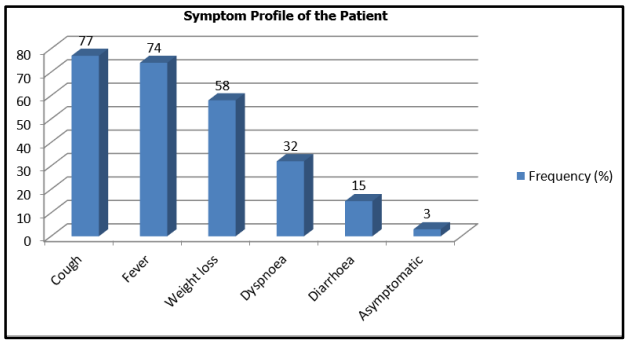


Figure 3. Shows the Frequency of Symptoms in the Study Population

Opportunistic Infections at Presentation- The most common opportunistic infection at presentation was pulmonary tuberculosis (74%) followed by Candidiasis (62%). Pulmonary tuberculosis was the most common form of tuberculosis (10%).

Opportunistic Infection	Frequency Percentage
Tuberculosis	74
Pulmonary	38
Meningeal	10
Lymphadenitis	8
Disseminated	5
Pleural effusion	7
Miliary	1
Abdominal	2
Endometrial	3
Candidiasis	62
Pneumocystis pneumonia	7
Cryptosporidium	5
Herpes	8
Cryptococcal meningitis	6

Table 2. Shows the Incidence of Opportunistic Infections in the Study Group

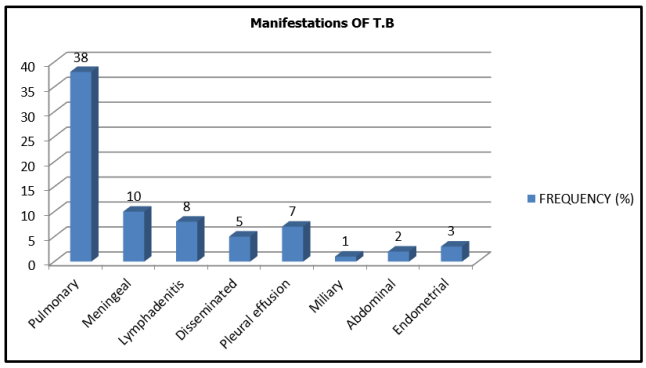
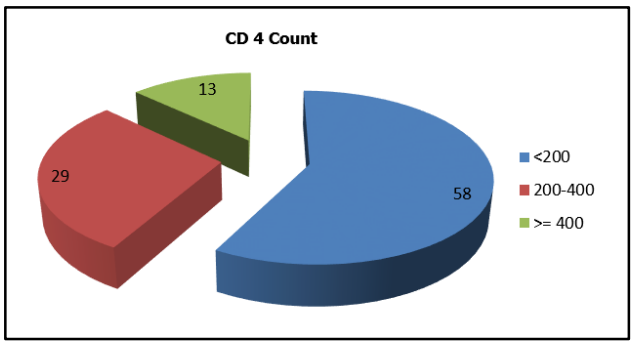


Figure 4. Shows the Frequency of Manifestations of Tuberculosis

CD4 Count in the Study Group- The minimum CD4 count among the individuals studied was 20 cells/µL, whereas the maximum was 524 cells/µL with a mean value of 180 cells/µL. Majority of the patients had a CD4 count of ≤200 cells/µL (58%).

CD4 Count	Minimum CD4 Count	Maximum CD4 Count	Mean CD4 Count
	20.00	524.00	181.2

Table 3. Shows the CD4 of the Study Group



Figures 5. Shows the Distribution of CD4 Count among the Study Population

Correlation of Age Group with CD4 Count- Among the population studied, majority were in the 35-45 yrs. age group (39) out of which 25 individuals had a CD4 count of <200 cells/µL.

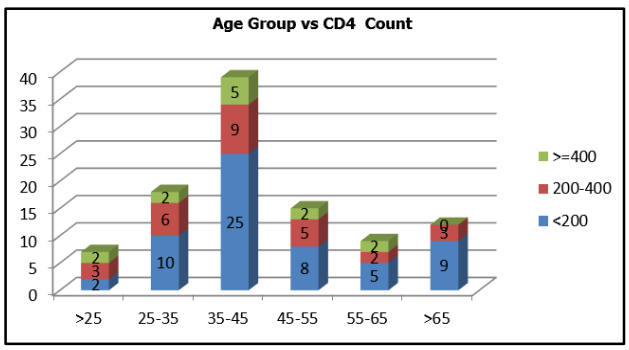


Figure 6. Shows the Correlation between Age Group and CD4 Count

Correlation between CD4 Count and Opportunistic Infections

The most common opportunistic infection in the study was tuberculosis, which was seen in 74 patients. All 10 patients diagnosed to have meningeal tuberculosis had a CD4 count of <200. The majority of the cases of pulmonary tuberculosis occurred between a CD4 counts of 200-400 cells/µL. All the other extrapulmonary forms of tuberculosis occurred most frequently at a CD4 count of <200 cells/µL.

The second most common infection was Candidiasis seen in 62 patients of them 51 had CD4 count less than <200.

Opportunistic Infection	Total	CD4 <200	CD4 200-400	CD4 >400
Tuberculosis	74			
Pulmonary		13	15	10
Meningeal		10	-	-
Lymphadenitis		6	2	-
Disseminated		5	-	-
Pleural effusion		5	-	2
Miliary		1	-	-
Abdominal		2	-	-
Endometrial		3	-	-
Candida	62	51	11	-
Pneumocystis	7	7	-	-
Cryptosporidium	5	3	2	-
Herpes	8	7		1
Cryptococcal	6	6	-	-

Table 4. Showing the Correlation of Opportunistic Infections Vs. CD4 Count

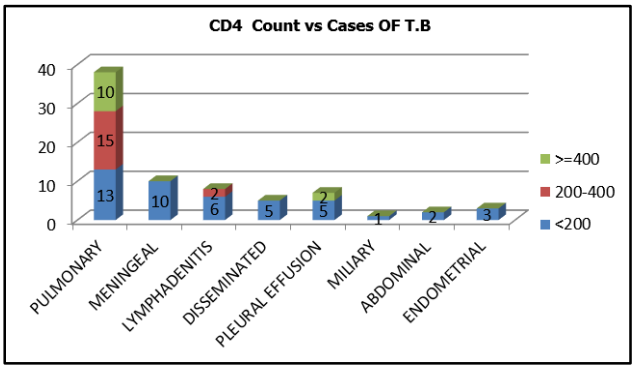


Figure 7. Shows the Correlation between CD4 Count and Various Forms of Tuberculosis

DISCUSSION

Age- Majority of the patients in this study were in the age group between 35-45 yrs. (39%) with the mean age being 39.25 yrs. The mean age of presentation was 30.3 ± 6.4 yrs. in the study done by George J et al[7] of clinical profile of AIDS patients at a referral hospital. In another study by Kothari K et al,[8] mean age at presentation was 32.76 ± 8.14 yrs.

Sex- In this study, males accounted for 68%, while females accounted for 32%. Male predominance was also seen in most of the studies done in India. George J et al[7] reported male:female ratio of 5:1 in their study of AIDS patients in South India. Kumarasamy N et al reported a male-to-female ratio of 3.3:1. Male predominance could be attributed to social behavioural pattern of the population.

Mode of Transmission

This study showed heterosexual promiscuity as the major mode of transmission (98%). Only two cases were attributed to vertical transmission. None of the patients acquired infection by homosexual relationship or by blood transfusion. Similar modes of transmission was seen in other studies done in India. Heterosexual transmission was the predominant mode of transmission (96.7%) in the study done by George J et al[7] in South Indian. Similar results were obtained in other studies also (Kothari K et al[8] Kumarasamy N et al).

Symptom Analysis- In this study, cough was documented in 77% and fever was present in 74% of patients. 58% patients had weight loss as the presenting symptom. Fever, cough and weight loss were the main symptoms in most of the studies. George J et al[7] reported that fever was the commonest presentation (98.3%), followed by weight loss (85%) and cough (36.7%). Kothari K et al[8] reported that fever was the presenting complaint in 96% patients. Only 3% patients were asymptomatic at presentation.

Opportunistic Infections

Tuberculosis- In this study, tuberculosis was most common opportunistic infection with 74 out of 100 patients having tuberculosis of that pulmonary tuberculosis was the most common followed by meningeal tuberculosis and tuberculous lymphadenitis.

Data from other observers in India show tuberculosis is the most common opportunistic infection in HIV in India. Kaur A et al[9] reported that pulmonary tuberculosis was the commonest mode of presentation in their study concluded in Tamil Nadu, India. Numerous studies by George J et al,[7] Kumarasamy N et al and M. Vajpayee et al have shown tuberculosis as the most common opportunistic infection in AIDS.

Infection with tuberculosis was found in all subsets of CD4+ T-cell count. With CD4+ T-cell count more than 200 cells/µL, pulmonary involvement was the most common. However, as CD4+ T-cell count falls to below 200 cells/µL, incidence of extrapulmonary tuberculosis increases especially meningeal tuberculosis in this study.

Data from other studies confirm the observations made in the study. Nagalingeswaran K et al[10] reported that pulmonary tuberculosis manifested itself at a mean CD4+ count of 144 cells/µL, whereas increased incidence of disseminated tuberculosis was seen with a mean CD4+ count of 125 cells/µL, M. Vajpayee et al[11] also reported that pulmonary tuberculosis occurred at a CD4+ count of 189 cells/µL and the incidence of extrapulmonary tuberculosis increased as the CD4+ count decreased further.

Candidiasis- In this study, oral candidiasis was the second most common opportunistic infection. It was present in 62 out of 100 patients. The incidence of candidiasis in the study is comparable to that of other Indian studies. Data from Nagalingeswaran K et al[10] showed that candidiasis was the

commonest opportunistic infection with an incidence of 69.9%.

Significantly, candidiasis was present in 51 out of the 62 patients who had a CD4 count <200 cells/µL. Nagallngeswaran K[10] reported that oropharyngeal candidiasis occurred at a mean CD4 count of 177 cells/µL. Data from M. Vajpayee et al[11] showed that oral candidiasis occurred at a mean CD4 count of 189 cells/µL.

Pneumocystis Pneumonia- Pneumocystis pneumonia was observed in 7 patients in this study. Kothari K et al[8] reported a 10% incidence of pneumocystis pneumonia in their study. Kumarasamy N et al reported an incidence of 4.6%, whereas Nagalingeswaran K et al[10] reported an incidence of 8.3%.

All the 10 patients in the study had CD4+ count of <200 cells/µL. Nagalingeswaran K et al[10] observed that infection with pneumocystis occurred at a CD4+ count of 62 cells/µL. As the number of opportunistic infections in individuals increase, there is a significant increase in the mean viral load and decrease in the CD4 counts.

Cryptosporidium- In this study, cryptosporidium species was isolated in 5 patients. Kumarasamy N et al reported 16% incidence of cryptosporidium diarrhoea. M. Vajpayee et al[11] also reported 43.5% incidence of the infection.

Three of the five patients had a CD4+ count of <200 cells/µL, whereas two patients had a CD4+ count between 200-400 cells/µL. Nagalingeswaran K et al[10] reported that cryptosporidium diarrhoea occurred at a CD4+ count of 122 cells/µL, whereas M. Vajpayee et al[11] observed the occurrence of parasitic diarrhoea at 227 cells/µL.

Herpes Zoster- In this study, 8 patients were diagnosed with this infection. Kumarasamy N et al reported an incidence of 7.3% of herpes zoster. Nagalingeswaran K et al[10] showed a 14.1% incidence, seven out of the eight patients had a CD4+ count of <200 cells/µL and the remaining had a CD4+ count between >400 cells/µL. Nagalingeswaran K et al[10] reported that herpes zoster occurred at a mean CD4+ count of 248 cells/µL.

Cryptococcal Meningitis

Six of the patients presented with cryptococcal meningitis. The incidence is comparable to that of other Indian studies. Data from Kumarasamy N et al shows an incidence of 0.5%, while Nagalingeswaran K et al[10] reported an incidence of 1.9%.

All the patients diagnosed with cryptococcal meningitis had CD4+ count <200 cells/µL. Nagalingeswaran K et al[10] mean CD4+ T-cell count of 34 inpatients with cryptococcal meningitis in their series.

Correlation between Opportunistic Infections and CD4+ Counts-

In the natural course of HIV infection with CD4+ T-cell count >400 cells/µL majority of the patients were asymptomatic. However, as the CD4+ T-cell count falls between 200 and 400, incidence of pulmonary tuberculosis, cryptosporidium and herpes zoster increases. Infections with pneumocystis, cryptococcus and meningeal tuberculosis were seen exclusively with CD4+ T-cell count <200 cells/µL. This finding is in accordance with the data published by the Centre for Disease Control, Kumarasamy N et al and Nagalingeswaran K et al.[10]

CONCLUSION

The following were the conclusions of this study-

1. HIV infection is a very common disease in this part of the country.
2. It predominantly affects males in their 3rd and 4th decades of life.
3. The most common route of transmission was the sexual route, predominantly heterosexual route.
4. The most common presenting symptom was cough, fever and weight loss.
5. The most common opportunistic infection seen was tuberculosis followed by candidiasis and pneumocystis.
6. Only 8 cases of herpes zoster infection were seen with no statistically significant correlation with CD4 count.
7. 74% of patients had tuberculosis in patients with CD4 count of <200 extrapulmonary TB was the most common and pulmonary TB was most common in those with CD4 >200. This was statistically significant.
8. 7% cases of pneumocystis were seen all in those with CD4 count <200 with statistical significance.
9. 62% of patients had candidiasis, 51 cases in those with CD4 count <200 and 11 cases between CD4 count of 200-400 and this was very highly significant.
10. 60% cases of cryptosporidium seen with CD4 <200 and 40% cases with CD4 count between 200-400, which was statistically not significant.
11. All 100% cases of cryptococcal meningitis were noted at CD4 <200 with statistical significance.
12. 13% of patients had a CD4 count >400 at presentation and 58% of patients had CD4 <200 cells/µL.
13. Despite the efforts being put by the Government of India for early detection of HIV infection by establishing ICTCs in every state, we are unable to trace individuals at an earlier stage in the course of HIV infection. The patients being diagnosed with HIV infection present with one or more of the opportunistic infections and frequently have a CD4+ count <200 cells/µL. This calls for increasing awareness about HIV in the general population, so as to identify the disease at the earliest.

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