_____

A cross sectional study of occurrence and outcome of opportunistic infections among haart experienced patients in a tertiary care hospital

G.Naga Sumanth Reddy[1*], K.V.Somasekhar Reddy[2]

[1*]*Assistant Professor, Department of General Medicine, Santhiram Medical College, Nandyal, AP, India*
[2]*Associate Professor, Department of General Medicine, Santhiram Medical College, Nandyal, AP, India*
Received: 02-01-2020 / Revised: 25-01-2021 / Accepted: 30-01-2021

Abstract

Introduction: The HIV-scenario in India is a bit different from western society as a result of the difference in socioeconomic and cultural environment, which are also important determinants in disease transmission. Opportunistic infections (OI) constitute a major cause of morbidity and mortality in PLHAs. This is even more critical where the standard of living is generally poor and access to ART (anti-retroviral therapy) is still inadequate. In developing regions such as Sub-Saharan Africa and South-East Asia, OIs in the pre-ART era were tuberculosis, candidiasis, infective diarrhoea, meningitis, dermatitis and recurrent Herpes simplex infection.**Materials and Methods:** 100 patients of HIV on HAART for at least 1 year were taken up for a descriptive study with respect to the prevalence of OIs and their outcome. Clinical assessment and investigations were done as per the NACO guidelines. The data was analysed using multivariate and computerised statistical methods.**Results:** The mean age of 100 patients in our study was 33.8 ± 1.10;71% of the patients were male. Mean CD4 count was 239.9 ± 11.25. Most common presentation was fever (64%) and weight loss (35%). Tuberculosis was the most common opportunistic infection (55%) followed by candidiasis (51%), Pneumocystis carinii 16%, cryptosporidium diarrhoea 10%, cryptococcal meningitis 6%, cerebral toxoplasmosis 2%. 74 patients were successfully treated. 12 succumbed to death, of which 3 were of tubercular meningitis and pneumocystis carinii pneumonia and 2 were of cryptococcal meningitis, cerebral toxoplasmosis and bacterial pneumonia each. Mean CD4 count of those who survived was 263.17 ± 12.47 and those who succumbed was 133.25 ± 21.38. This was statistically significant showing that death occurred at a lower CD4 count.**Conclusion:** Our descriptive study done at a tertiary care hospital of south India showed that the main burden of opportunistic infections in HAART experienced HIV patients still lies on tuberculosis followed by candidiasis. However, Pneumocystis carinii and tubercular meningitis are among the leading causes of mortality.
Key Words: HIV, HAART, CD4, candidiasis.

Introduction

The HIV-scenario in India is a bit different from western society as a result of the difference in socioeconomic and cultural environment, which are also important determinants in disease transmission. Opportunistic infections (OI) constitute a major cause of morbidity and mortality in PLHAs[1,2] This is even more critical where the standard of living is generally poor and access to ART (anti-retroviral therapy) is still inadequate. In developing regions such as Sub-Saharan Africa and South-East Asia, OIs in the pre-ART era were tuberculosis, candidiasis, infective diarrhoea, meningitis, dermatitis and recurrent Herpes simplex infection[3,4]. Fortunately, following the widespread use of highly active anti-retroviral therapy (HAART) and implementation of guidelines for prevention of opportunistic infections, the incidence of secondary infection has declined dramatically[5]. However, there is insufficient knowledge about the burden and spectrum of OIs in HIV-infected populations receiving HAART in developing countries[6].An evidence-based assessment of the prevalent OIs in PLHAs in the era of HAART is necessary in order to define local priorities in HIV/ AIDS care and

form a targeted expenditure on prophylaxis and treatment of HIV-related comorbidities. Our study was devised keeping in mind to study the occurrence of OIs in HAART experienced HIV persons at a tertiary care hospital in eastern India and to study the outcome of opportunistic infections in these patients and correlation with CD4 counts[7].

Materials and methods
Study Area
1. Apex Clinic for HIV patients at Santhiram Medical College, Nandyal.
2. General Medicine outpatient department.
3. Inpatients of Medicine ward, Santhiram Medical College, Nandyal.

Study Population : Patients receiving ART at least for one year and attending Apex clinic, Medicine OPD at Santhiram Medical College, Nandyal or are admitted in IPD at Santhiram Medical College, Nandyal.

Study Period
Jan 2020 to October 2020.

Sample Size : Approximately, 100 HIV patients were taken into this study conveniently.

Inclusion Criteria
1. HIV infected patients documented at any ICTC centre who are on HAART for at least 1 year.
2. Patients from both sexes.

Exclusion Criteria
1. Those with concomitant illness unrelated to HIV.

Correspondence
Dr. G.Naga Sumanth Reddy
Assistant Professor, Department of General Medicine, Santhiram Medical College, Nandyal,AP,India.
E-mail: kvssreddy3105@gmail.com

_____

2. Those with poor adherence to ART (< 95% as per ART centre record).
3. Those with more than 1 HAART interruption in last 1 year (not taken medicines for more than 15 days at a stretch).

Study Design :It is a descriptive study. All cases have been followed up for one year.

Parameters Studied

1. Diagnosis of OIs has been made from signs and symptoms driven test as per NACO guidelines.
2. Outcome of OIs among HAART experienced patients has been recorded from clinical case records (from OPD tickets and BHTs).
3. The occurrence and outcome of OIs have been correlated with CD4 count estimation.

Study Tools

1. History taking and a standard questionnaire for assessment of symptoms in HIV patients.
2. Clinical examination including haematology, biochemistry, serology, culture and relevant imaging studies in a case to case basis for diagnosis of OIs. Depending on the patient's clinical features specimens were collected which included blood, sputum (two sputum specimens, first spot, early morning), cerebrospinal fluid, lymph node aspirate, oral swab, stool and urine. Occurrence of different types of opportunistic infections in HAART experienced group was the purpose of the study. All sputum samples were used to make separate smears and stained by Ziehl-Neelsen staining method for diagnosis of tuberculosis. Diagnosis of tuberculosis was made as per Revised National Tuberculosis Control Programme (RNTCP) guidelines.(6) Giemsa stain was done for detection of Pneumocystis jirovecii in suspected patients. Stool specimens were collected as per WHO standard procedures and examined microscopically. Saline wet Lugol's iodine mount was used for detection of ova, trophozoites, larvae and cysts of intestinal parasite. Smears of stool specimens were subjected to modified acid-fast staining for Cryptosporidium parvum, Isospora belli and Cyclospora. Also gram-staining and bacteriological culture of stool specimens was done following the WHO standard procedures to mainly identify Salmonella and Shigella[7]. Diagnosis of cryptococcal meningitis was established by India-ink preparation and by culture on Sabouraud's dextrose agar. Specimens were also inoculated on different media like MacConkey's agar, blood agar and chocolate agar for isolation of various pathogens. For the diagnosis of candidiasis, oral swab was cultured on Sabouraud's dextrose agar. Identification of microorganisms was done following the standard protocol.

3. CD4 count facility at the ART Centre of Medical College and Hospital for immunological parameter.
4. Medical records of the patients to determine the duration of HAART therapy, adherence and other relevant and necessary information.

Study Techniques : This hospital-based descriptive study required detailed history taking, clinical examination and relevant investigations for diagnosis of OIs among HAART experienced patients and their outcome.

Data Analysis :All the data have been tabulated into a master chart and analysed using standardized statistical techniques for calculating the mean values, standard deviation and standard errors. ANOVA with post-hoc test is used. Computerised statistical program SPSS V 20 software was used to determine significant difference between the groups of patients having single OI, two OIs and three OIs. Comparative outcome in relation to CD4 count between the deaths and successfully treated HAART patients was determined with T-test. A p-value of < 0.05 was significant, < 0.001 highly significant and > 0.05 was not significant.
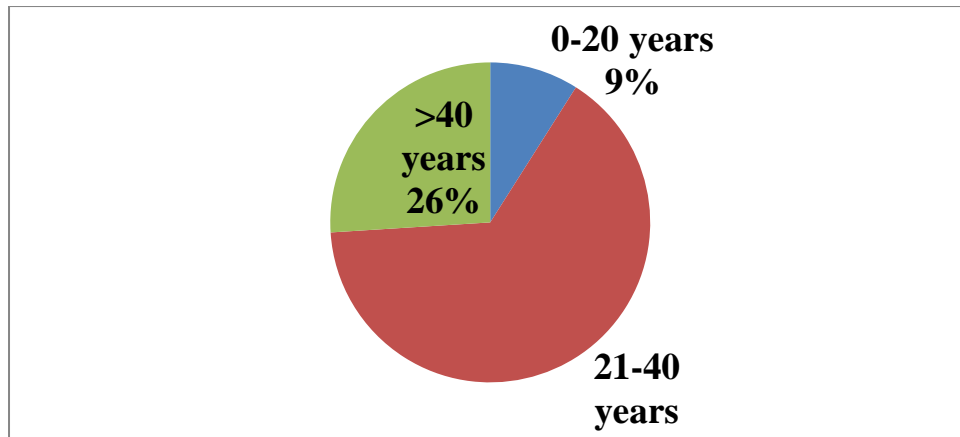
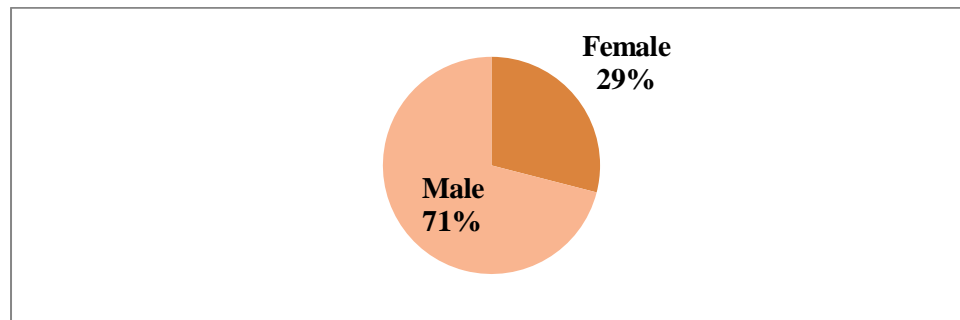**Results**

Fig 1: Distribution of study population According to age

Fig 2: Distribution of study population According to age

Table 1: Distribution of the Study Population according to the CD4 Count

CD4 Count	HAART Experienced Group
<200	43
200-350	40
>350	17
Total	**100**

Table 2: Clinical Presentations in HAART Experienced HIV Patients

Clinical Presentations	Number of Patients/ Percentage
Fever	64/ 64%
SOB/ Cough	31/ 31%
Diarrhoea	31/ 31%
Weight Loss	35/ 35%
Altered Sensorium	14/ 14%
Dysphagia	15/ 15%
Lymphadenopathy	12/ 12%
Dermatologic Manifestations	5/ 5%
Genital Ulcer	5/ 5%

Table 3: Correlation of Individual Opportunistic Infections with CD4 Count

Sl. No.	OI	No. of Patients/100	Mean CD4 Count	SE
1	Herpes	14	145.21	16.46
2	TB	55	210.38	11.89
3	Candidiasis	51	176.16	9.97
4	Cryptococcal Meningitis	6	77.67	6.41
5	PCP	16	119.94	11.41
6	BAC Pneumonia	8	270.25	33.49
7	Cryptosporidiosis	10	119.2	20.83
8	Toxoplasma	2	64.5	8.5

Discussion

100 HIV positive patients on HAART and presenting with one or more clinical features suggestive of opportunistic infections such as fever, diarrhoea, cough, altered sensorium, lymphadenopathy and dysphagia were taken into the study and investigated for various pathogens including opportunistic ones after they fulfilled the laid down inclusion and exclusion criteria[7].The majority of our patients belonged to the 21 - 40 years' age group (9% in Group A, 65% in Group B and 26% in Group C) (Figure 1). The mean age of our study population was 33.85 ± 1.10 years (65% of the population). This is also observed in other studies from India and aboard. Findings of our study are similar to findings of SK Sharma et al 2004 and J Chakravarty et al 2006.The mean age among the male patients of our study population was 34.42 ± 11.236 years and among female patients was 32.45 ± 10.789 years and there was no statistically significant difference between the two groups (P value 0.422 at 95% level of significance)[8].Most of the patients presented with more than one symptoms. Fever and weight loss were the most common presentations. Fever was present in 64 patients (64%) and weight loss was present in 35 patients (35%). Among the others, shortness of breath (SOB)/ Cough were present in 31 (31%) patients, diarrhoea was present in 31 (31%) patients, altered sensorium in 14 (14%) patients, dysphagia in 15 (15%) patients and lymph node swelling and dermatologic manifestations were present in 12 (12%) and 5 (5%) patients respectively and genital ulcer was present in 5 (5%) patients (Table 2). These findings are similar with studies of SK Sharma et al 2004 and Gupta V et al 2007, where fever was the chief complaint in 70.4% and 51% patients respectively followed by weight loss in 65.2% and 43% patients respectively[9-11]

Out of the total 100 patients admitted with one or more opportunistic infections, 74 patients were successfully treated/ followed up for this episode of infection. But unfortunately, 12 patients succumbed to their infection and 14 were lost for follow-up. The cause-specific mortality is given in the table below. The key-findings of this study revealed that:

1. Lost in follow-up cases were= 14 nos.

2. Total followed-up patients 100 - 14= 86 nos.

3. Total fatality= 12 nos.

4. Mortality percentage amongst those followed up= 12/86= 13.95%.

5. Cause of Fatality • PCP: 3/12(25%)

- TBM: 3/12 (25%)
- Cryptococcal Meningitis: 2/12 (16.67%)
- Cerebral Toxoplasmosis: 2/12 (16.67%)
- Bacterial Pneumonia: 2/12 (16.67%)

Conclusion

Our study done at a tertiary care hospital of South India showed that the main burden of opportunistic infections in HAART experienced HIV patients still lies on tuberculosis followed by candidiasis. However, Pneumocystis carinii and tubercular meningitis are among the leading causes of mortality.

References

1. Kaplan JE, Hanson D, Dworkin MS, et al. Epidemiology of human immunodeficiency virus-associated opportunistic infections in the United States in the era of highly active antiretroviral therapy. Clin Infect Dis 2000;30(Suppl 1):S5-14.
2. Park K. Park's textbook of preventive and social medicine. 19th edn. Jabalpur: Banarsidas Bhanot, 2007:pp 352.
3. World Health Organization. Basic laboratory methods in medical parasitology, Geneva: World Health Organization, 1991:9-31.
4. Forbes BA, Sahm DF, Weissfeld AS. Bailey and Scott's diagnostic microbiology. 11th edn. China: Mosby, 2002:782-92.
5. Chakravarty J, Mehta H, Parekh A, et al. Study on clinico-epidemiological profile of HIV patients in eastern India. J Assoc Physicians India 2006;54:854-7.
6. Ayyagari A, Sharma AK, Prasad KN, et al. Spectrum of opportunistic infections in human immunodeficiency virus (HIV) infected cases 339 in tertiary care hospital. Ind J Med Microbiol 1999;17:78-80.

7. Kumarasamy N, Solomon S, Flanigan TP, et al. Natural history of human immunodeficiency virus disease in southern India. Clin Infect Dis 2003;36(1):79-85.
8. Joshi HS, Das R, Agnihotri AK. Clinico-epidemiological profile of HIV/AIDS patients in western Nepal-a study from teaching hospital. Indian J Prev Soc Med 2004;35(1-2):69-76.
9. Nair SP, Moorty KP, Suprakasan S. Clinico–epidemiological study of HIV patients in Trivandrum. Indian J Dermatol Venereol Leprol 2003;69(2):100-3.

10. Gupta V, Singla N, Lehl SS, et al. Clinico-epidemiological profile of HIV infection over a period of six years in a North Indian tertiary care hospital. Indian J Med Microbiol 2007;25(2):171.
11. Pandey S, Sundar S, Hasan H, et al. Clinical profile and opportunistic infection in HIV/-AIDS patients attending S.S. hospital, Varanasi. Indian J Prev Soc Med 2008;39:1-2.

Conflict of Interest: Nil
Source of support:Nil