



ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2018; 4(8): 36-41
www.allresearchjournal.com
Received: 17-06-2018
Accepted: 22-07-2018

Choudhury SPS
Department of Neurology, IMS
and sum Hospital, Siksha o
Anusandhan University,
Bhubaneswar, Odisha, India

Mohanty PK
Associate Professor,
Department of General
Medicine, V. S. S. Medical
College, Burla, Sambalpur,
Odisha

Mohapatra MK
HOD and Professor,
Department of General
Medicine, V. S. S. Medical
College, Burla, Sambalpur,
Odisha

Dash LK
Professor, Department of
General Medicine, V. S. S.
Medical College, Burla,
Sambalpur, Odisha

Correspondence
Choudhury SPS
Department of Neurology, IMS
and sum Hospital, Siksha o
Anusandhan University,
Bhubaneswar, Odisha, India

Clinico-epidemiological profile of opportunistic infections in Hospitalised HIV infected adults / adolescent in western Odisha with a correlation to cd4+t cell count

Choudhury SPS, Mohanty PK, Mohapatra MK and Dash LK

Abstract

Background: Opportunistic Infections (OIs) are important determinants of morbidity and mortality in HIV infected persons. The spectrum of OIs varies in different regions and appear at different thresholds of CD4+T cell count.

Method: Eighty six hospitalized patients with HIV infections confirmed as per National AIDS Control Organization (NACO) guidelines were studied prospectively for evaluation of opportunistic infections and their co-relation with CD4+T cell count between July 2010 to September 2012.

Results: Of the cases under study 62 patients (72%) were male and 24 patients (28%) were female. Forty five cases (52.3%) were in age group of 31 to 45 years followed by 28% between 15 to 30 years and 19.7% between 46 to 65 year. Heterosexual transmission was the commonest mode in 63 cases (73.3%). In nineteen cases (22%) mode of transmission could not be known. Among the patient studied, 36 cases (42%) had a CD4+T cell count between 101 – 200/ μ l followed by 29 cases (33%) with 200-400/ μ l, 15 cases (18%) with 51 – 100/ μ l and 6 cases (7%) with \leq 50/ μ l. Fifty seven cases (66%) had single OI while rest had multiple OIs. Tuberculosis was the most common OI (51%) with pleural effusion in 23 cases, pulmonary tuberculosis in 18 cases, lymphadenitis in 7 cases, meningitis in 4 cases tuberculous peritonitis and disseminated tuberculosis in 2 cases each and spinal tuberculosis in one case. Median CD4+T cell count was 218/ μ l in those with tuberculosis. Candidiasis was the second most common OI (43%) with oral candidiasis in 36%, oral and oesophageal candidiasis in 5% and vulvo-vaginal candidiasis in 2% cases. Median CD4+ T cell count was 272/ μ l. Among other OIs it is observed that *Cryptosporidiosis* seen in 9.3% cases with median CD4 count of 142/ μ l, *CNS Toxoplasmosis* seen in 7% cases with median CD4 count 76/ μ l, *Pneumocystis jiroveci* pneumonia were seen in 5.8% cases with median CD4 count of 123/ μ l, *Herpes simplex* infection was found in 4.6% cases with median CD4 count of 109/ μ l, *Cryptococcal meningitis* seen in 2 cases with median CD4 count 92/ μ l, *Molluscum contagiosum* and *Progressive Multifocal Leucoencephalopathy* seen in one case each with median CD4 count of 35/ μ l and 28/ μ l respectively.

Conclusion: Most common OI in the study was tuberculosis, of which pleural effusion is commonest manifestation. Other OIs are candidiasis second most common followed by cryptosporidium, toxoplasma, pneumocystis jiroveci, herpes simplex, cryptococcus, molluscum contagiosum and JC virus infection.

Keywords: HIV infection, opportunistic infections, CD4+T cell count

Introduction

HIV infections/AIDS is a global health problem with cases reported virtually from every country. According to 2011 estimates from UNAIDS, WHO and UNICEF around 30.6 million adults and 3.4 million children are living with HIV infection at the end of 2010 [1, 2, 3]. Though India is a country with low HIV prevalence, it has the third largest number of people living with HIV/AIDS. Based on HIV Sentinel Surveillance 2008-09, it is estimated that 23.9 lakhs people are infected with HIV of which 39% are female and 3.5% are children. The four high prevalence states (Andhra Pradesh - 5 lakhs, Maharashtra - 4.2 lakhs, Karnataka - 2.5 lakhs, Tamil Nadu – 1.5 lakhs) account for 55 percent of all HIV infections in the country. The estimated adult prevalence is 0.31%. Among the states Manipur has shown the highest adult prevalence (1.4%), followed by Andhra Pradesh (0.9%), Mizoram (0.81%),

Nagaland (0.78%), Karnataka (0.63%) & Maharashtra (0.55%)^[4].

Although Odisha is a state among low HIV prevalence (0.29%), the prevalence is on rise. There are 26127 people living with HIV infection, among which 35.2% are female and 6.6% are children. Death due to AIDS in our state estimated to be 1347 till August, 2012 according to Odisha State AIDS Control Society (OSACS).

The Human Immunodeficiency Virus (HIV) destroys the CD4+ T cells repertoire progressively and relentlessly thus making the HIV infected persons susceptible to a number of opportunistic infections(OIs). It was also noted that certain OIs manifest below a particular threshold of CD4+T cell count, many of these in a advanced stage of the HIV infection. Since the beginning of HIV epidemic, OIs have been recognized as common complications of HIV infection. OIs cause substantial morbidity and hospitalization, necessitate toxic and expensive therapies and shorten the survival of PLHA (People Living with HIV/AIDS)^[5]. The right diagnosis and proper treatment will improve the quality of life and survival in PLHA. The relative frequencies of specific OIs vary in different countries and even in different areas within the same country. While *Pneumocystis jiroveci* is the commonest in the Western part of world, *Tuberculosis* and *Candidiasis* are the common OIs in India supported by various studies.

The present study was carried out with an aim to study the spectrum of OIs and their correlation with CD4 count in hospitalized patients of Western Odisha.

Methods

It is an observational, analytical and prospective study. The study included all HIV infected patients with OIs admitted to the Department of Medicine, V.S.S. Medical College and Hospital, Burla from July 2010 to September 2012 (a period of 26 months in total). Patient's with known HIV positive status having OIs or patients with different OIs admitted to

the hospital and later found to have HIV positive status were included in the study.

Diagnosis of HIV infection in the included cases was done at ICTC (Integrated Counseling and Testing Centre) as per the NACO guidelines by three different methods *Dot blot (comb AIDs)*, *Immunochromatographic test (Pareekshak)* and *Immunoblot (Pareekshak)*. Those having reactive test results at other laboratories were sent to the ICTC for confirmation. Informed consent was taken in each case as per NACO ethical guidelines. Children below the age of 15 years were excluded from this study^[6, 7].

Detailed history, clinical examination and investigations were done as necessary like CD4+T cell count, CBC, ESR, Blood culture, Arterial Blood Gas analysis, HBsAg, Anti-HCV antibody, Urine routine and culture, Stool routine and culture, Mantoux Test, Sputum AFB & Microscopy, Chest X-ray, USG Abdomen & Pelvis, CT scan Brain, CT Thorax, MRI Brain, MRI Spine, Fundoscopy, Peritoneal fluid/Pleural fluid/CSF analysis, CSF for Indian Ink staining, CSF PCR, FNAC of lymphnode, ELISA for Toxoplasma IgG & IgM, Latex Agglutination for Cryptococcal antigen, Oral Scraping for Microscopy of fungal element, UGI endoscopy. CD4+T cell count was done by *Partec CD4 flow cytometer using flow cytometry*^[8, 9, 10, 11, 12].

Results

Eighty six (86) HIV infected patients with OIs were studied out of which 62 cases (72%) are male and 24 cases (28%) are female with male: female ratio of 2.6:1. The patients were mostly in the age group of 31-45 years (45cases, I.e., 52.3% of total number of cases), followed by 24 cases (28%) in the age group of 15-30 years and 17 cases (19.7%) in the age group of 41-65 years.

The various occupations among the studied patients are mentioned in Table-1. Majority of the patients were labourers (32.5 %) working in the nearby industries on a daily wage basis.

Table 1: Occupation of the patients.

Occupation	Male (n = 62)		Female (n = 24)		Total (n=86)	Percentage %
	Number	Percentage	Number	Percentage		
Labourer	16	25.8	11	45.8	27	31.3
Driver	19	30.7	0	0	19	22.4
Farmer	14	22.5	4	16.6	18	21.0
Employee (government)	6	9.6	3	12.5	9	10.0
Student (upto graduation)	2	3.4	0	0	2	2.5
Housewife	0	0	4	16.6	4	4.6
Others*	5	8.0	2	8.5	7	8.2

*Others include private employees, businessmen, contractors, shopkeepers, commercial sex workers etc.

Different modes of transmission among males and females are as depicted in Table-2. The commonest mode of transmission is the heterosexual mode of transmission i.e.,

73.3%. One case of thalassemia with repeated blood transfusion had possible transmission by blood. In nineteen cases (22%) modes of transmission could not be ascertained.

Table 2: Modes of transmission.

Modes of transmission	Male (n= 62)		Female (n=24)		Number (n=86)	Percentage %
	Number	Percentage	Number	Percentage		
Heterosexual	48	77.4	15	62.5	63	73.3
Homosexual	0	0	0	0	0	0
Blood Transfusion	1	1.6	0	0	1	1.2
I.V. Drug Abuse	3	4.8	0	0	3	3.5
Frequent needle prick	0	0	0	0	0	0
Vertical transmission	0	0	0	0	0	0
Unknown modes	10	16.2	9	37.5	19	22.0

The various clinical manifestations in patient presenting with OIs are depicted in Figure- 1. The most common

symptoms was noted to be weight loss, fever and anorexia.

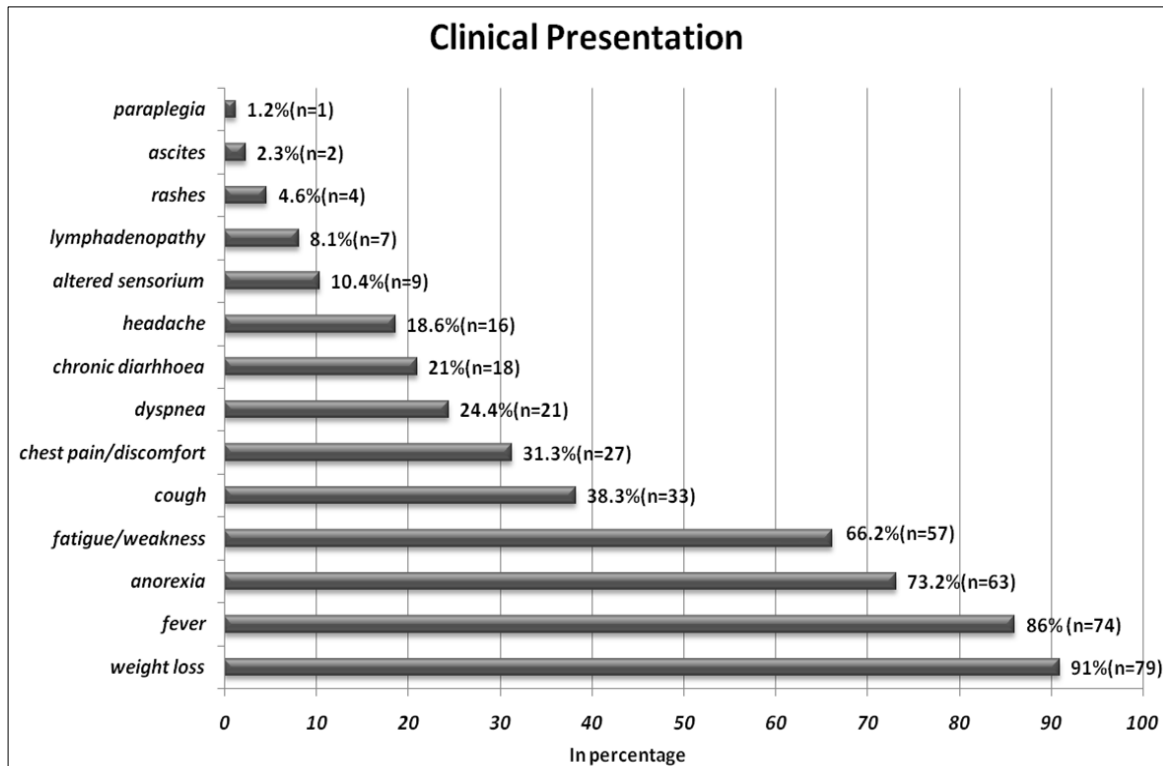


Fig 1: Clinical presentations of hospitalised patients.

The maximum CD4 count in the patients was 387/ μ l and minimum CD4 count is 28/ μ l. Figure- 2 shows the distribution of patients according to CD4 cell range.

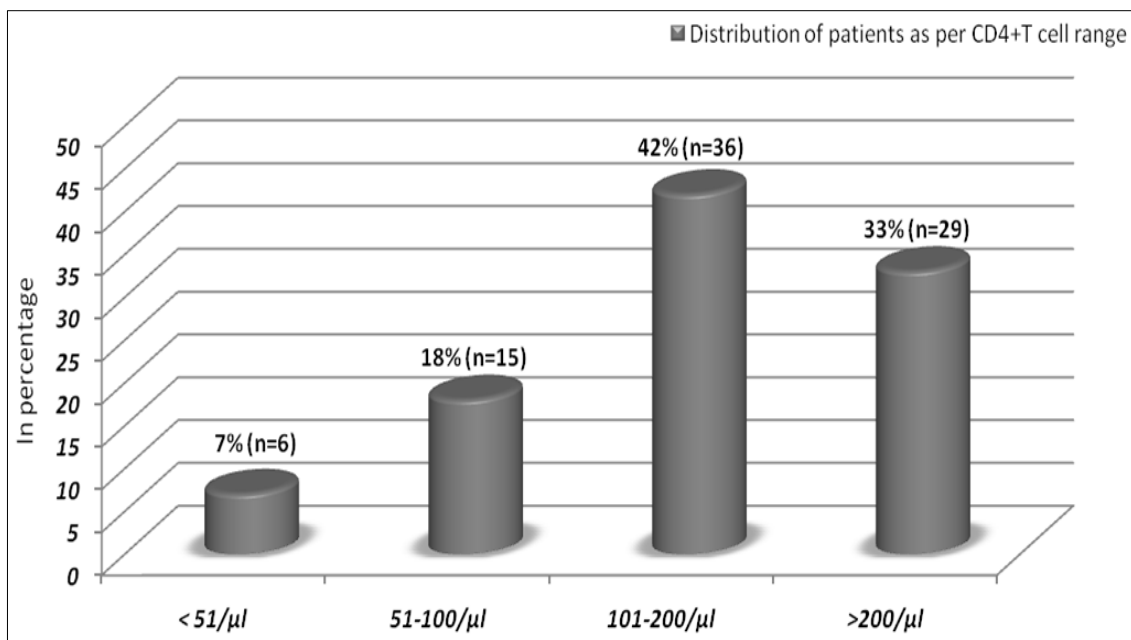


Fig 2: Distribution of patients as per CD4+ T cell range.

The maximum number of patients i.e., 42% cases (n=36) belonged to CD4+T cell count of 101-200/ μ l, followed by 33% cases (n=29) having a CD4+ T cell count of > 200/ μ l. 18% of cases (n=15) had a count between 51-100/ μ l and 7% cases (n=6) had a very low CD4+ T cell count of < 51/ μ l. Thus 57 cases (66.2%) had a CD4 count below 200/ μ l. The Median CD4 Count of the study population was observed to

be 183/ μ l.

In the study population out of 86 cases in toto, single OI were seen in 57 cases (66%), while multiple OIs were found in 29 cases (34%). Table-3 describes the different combinations of OIs. Tuberculosis and candidiasis was the most common type of combination in patient admitted with multiple OIs.

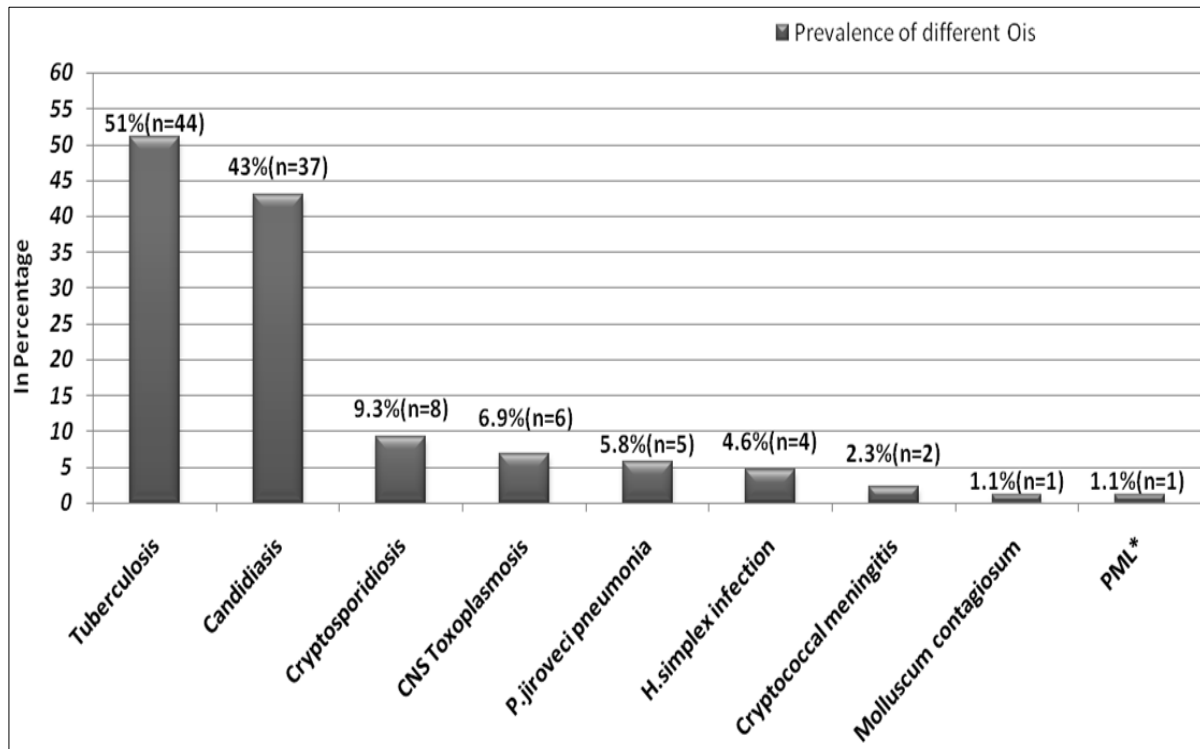
Table 3: Different combinations of OIs.

Different combinations OIs	No. of cases (%) (n=29)
Tuberculosis and Candidiasis	21 (72.8%)
Cryptosporidiosis and Candidiasis	2 (6.8%)
Toxoplasmosis and Candidiasis	2 (6.8%)
PCP* and Candidiasis	1 (3.4%)
Molluscum contagiosum and Candidiasis	1 (3.4%)
Cryptosporidiosis and Tuberculosis	1 (3.4%)
Herpes simplex and Tuberculosis	1(3.4%)

* Pneumocystis jiroveci pneumonia (formerly called as pneumocystis carinii pneumonia).

The prevalence of different OIs are depicted in Figure- 3. Tuberculosis is the most common OI (51% cases, n=44). Candidiasis is the second most common infection seen in 43% cases (n=37), followed by Cryptosporidial diarrhea,

CNS Toxoplasmosis, Pneumocystis jiroveci pneumonia (PCP), Herpes simplex infection, Cryptococcal meningitis, Molluscum contagiosum and Progressive multifocal leukoencephalopathy (PML).



* Progressive multifocal leukoencephalopathy.

Fig 3: Prevalence of different OIs in the study population

The most common manifestation of tuberculosis (TB) in HIV infected patients is Pleural effusion seen in 52.2% cases (n=23) followed by Pulmonary TB, including a case of military TB noted in 41% cases(n=18). Among these, 6 cases presented with both pleural effusion with parenchymal

involvement of TB. Tubercular lymphadenitis, TB meningitis, TB peritonitis and TB spine were seen in 31.8% cases, both as isolated and associated entities in cases having Pulmonary TB and/or Pleural effusion. 2 cases presented with Disseminated TB as shown in Table- 4.

Table 4: Distribution of tubercular manifestations among cases of TB.

Tubercular manifestations (n=44)	Number of cases	Percentage of cases %
Pleural Effusion	23	52.2
Pulmonary TB including Miliary TB	18 (1case of military TB)	41.0
TB lymphadenitis	7	16.0
TB meningitis	4	9.0
TB peritonitis	2	4.5
TB spine	1	2.3
Disseminated TB	2	4.5

Among the 37 cases (43%) patients suffering from Candidiasis, Oral Candidiasis was noted to be the most common type seen in 31cases(83.3%), followed by Oropharyngeal Candidiasis seen in 4 cases (10.8%), and Vulvovaginal Candidiasis in 2 cases (5.4%).

The distribution of median CD4 count in various OIs are shown in Table- 5. In case of tuberculosis median CD4 count was 218/ μ l, which is lower than that of candidiasis i.e., 272/ μ l.

Table 5: Median CD4 count for different OIs in study population.

OIs	Number of cases (%) (n=86)	Median CD4 count (μ l) in descending order
Candidiasis	37 (43%)	272
Tuberculosis	44 (51%)	218
Cryptosporidiasis	8 (9.3%)	142
PCP*	5(5.8%)	123
Herpes simplex infection	4 (4.6%)	103
Cryptococcal meningitis	2 (2.3%)	92
CNS Toxoplasmosis	6 (6.9%)	76
Molluscum contagiosum	1 (1.1%)	35
PML**	1 (1.1%)	28

* Pneumocystis jiroveci pneumonia (formerly known as pneumocystis carinii pneumonia).

**Progressive multifocal leukoencephalopathy.

Discussion

During 26 months study and among 86 hospitalised patients 72% were male and 28% female which is comparable with other studies conducted by Chakravarty J. *et al.* [13] (80.8% male) and Kumarasamy N. *et al.* [16] (68% male). Most of the patient belonged to the age group 31-45 (52.3%) as compared to Chakraborty N. *et al.* [17] (55% were in 31-40 yr) and Singh A. *et al.* [18] (54% were in 31-40 yr). Majority of the studied population were labourer (Table-1) which is comparable to that reported by Chakravarty J. *et al.* [13] (majority were migrant worker). This could be due to illiteracy and low level of awareness about transmission of HIV amongst them. The distribution of male patients was noted to be almost homogenous amongst labourers, drivers and farmers, whereas almost half of female patients are daily labourers by occupation. Most of the male patients were drivers by occupation (30.7%) and had a past history of emigration to nearby states like Andhra Pradesh, Chhattisgarh and West Bengal. The commonest mode of transmission, as depicted by this study (Table-2) as well as other studies of national (including NACO) [7] and international cadre (including WHO) [6] is the heterosexual mode of transmission, (73.3% in this study) like Chakravarty J. *et al.* [13] (80.4%), Kumarasamy N. *et al.* [16] (90%), Chakraborty N. *et al.* [17] (80%). Mode of transmission could not be ascertained in a significant number of cases (22%) like that reported by Chakravarty J. *et al.* [13] in which risk factor for HIV transmission could not be elicited in 14.1%. This could be ascribed to various reasons like insufficient history and embarrassment or unwillingness of the patient to come clear about their sexual behaviour. At the time of hospitalization majority of patients were presented with more than one symptom like fever, weight loss and anorexia seen in more than 73% (Figure-1)

which is similar to study done by Sharma SK *et al.* [15] that most common presentation was fever (71%) and weight loss (65%). But study done by Chakravarty J. *et al.* [13] is different in which majority patient were presented with fever (70.6%), weight loss (53.3%), chronic diarrhea (43.9%) & cough (40.3%).

A significant number of cases (42%) belonged to the CD4+ Tcell count range of 101-200/ μ l, with a median CD4 count of 183/ μ l (Figure-2). But the study by Chakraborty N. *et al.* [17] shows 36.8% belonged to CD4 range of 101-200/ μ l, with lower median CD4 count i.e., 120/ μ l. The study by Chakravarty J. *et al.* [13] shows a different scenario, in which the mean CD4 count in male was $179 \pm 9.3/\mu$ l where as CD4 count in female was $323 \pm 28.26/\mu$ l. In another study by Sharma SK *et al.* [15] it was observed that 82.6% had CD4 count <200/ μ l from which 46% had CD4 count <50/ μ l.

The opportunistic infections may be found singly or in combinations. In our study single OI was found in 66% cases and multiple OIs in 34% of cases (Table-3).

The most common OI was tuberculosis (51%) with pleural effusion as its commonest manifestation. The second most common OI was candidiasis (43%) with most cases suffering from oral candidiasis which was seen to occur at higher CD4 counts than tuberculosis. The other OIs found in descending order of their prevalence were cryptosporidiasis, CNS toxoplasmosis, Pneumocystis jiroveci pneumonia, Mucocutaneous herpes simplex infection, Cryptococcal meningitis, Molluscum contagiosum and Progressive multifocal leukoencephalopathy due to JC virus infection (Table-4). The prevalence of different OIs varies in different studies. Table-6 shows a comparative analysis of prevalence of OIs in different Indian studies including the present study [19, 20].

Table 6: Comparison of prevalence of OIs in different studies.

Different OIs	Chakraborti N. <i>et al.</i> [17] (2006-07), ICMR, Kolkata	Sharma SK <i>et al.</i> [15] (2004), AIIMS, New Delhi	Chakravarty J. <i>et al.</i> [13] (1999-2004) BHU, Varanasi	Vajpayee M. <i>et al.</i> [14] (2003), AIIMS, New Delhi	Singh A. <i>et al.</i> [18] (1999-2001) KMC, Manipal	Present study VSSMC, Burla
Tuberculosis	57%	71%	38.8%	47%	56%	51%
Candidiasis	88%	39.3%	20.3%	25.2%	59%	43%
Cryptosporidiasis	43%	-	12.7%	43.5%	43%	9.3%
CNS toxoplasmosis	-	3.7%	0.7%	-	4%	6.9%
PCP	-	7.4%	3.2%	-	7%	5.8%
Herpes simplex infection	7.2%	-	1.6%	-	-	4.6%
Cryptococcal meningitis	-	3.7%	1.4%	-	7%	2.3%
Molluscum contagiosum	-	-	1.8%	-	-	1.1%
PML	-	-	-	-	-	1.1%

CMV retinitis	45%	-	-	-	-	-
Vibrio cholerae (<i>enteric bacteria</i>)	47%	-	-	-	-	-
Herpes zoster	-	-	3.8%	-	-	-
Visceral leishmaniasis	-	-	1.1%	-	-	-

The relatively low prevalence of candidiasis in present study could be due to exclusion of HIV infected persons who are not hospitalized.

The median CD4 count for different OIs in this study was observed to be 272/ μ l for candidiasis, 218/ μ l for tuberculosis and 142/ μ l for cryptosporidiosis. But this observation was different than the study conducted by Vajpayee M. *et al* that median CD4 count for candidiasis was 189/ μ l, tuberculosis was also 189/ μ l and for cryptosporidiosis was 227/ μ l [14]. In the present study the CD4 count is found to be below 100/ μ l in cases of Cryptococcal meningitis and CNS toxoplasmosis where as it is below 50/ μ l in each case of Molluscum contagiosum and Progressive multifocal leucoencephalopathy.

Conclusion

The spectrum of OIs in the present study in descending order of frequency are Tuberculosis, Candidiasis, Cryptosporidiosis, CNS toxoplasmosis, Pneumocystis jiroveci pneumonia, Herpes simplex infection, Cryptococcal meningitis, Molluscum contagiosum and Progressive multifocal leucoencephalopathy, with a median CD4 count of 183/ μ l, i.e., < 200/ μ l. So there is increased chance of hospitalization in patients having CD4 count below 200/ μ l. The study is limited by the fact that many cases of OIs treated outpatients might not have been represented.

References

1. WHO/UNAIDS/UNICEF. Global HIV/AIDS Response: Epidemic update and health sector progress towards Universal Access, 2011.
2. UNAIDS. UNAIDS report on the global aids epidemic, 2010.
3. Patton G *et al.* (12th September), Global patterns of mortality in young people: a systematic analysis of population health data *The Lancet* 374(9693), 2009.
4. National AIDS Control Organization (NACO). HIV Sentinel Surveillance and HIV Estimation: A Technical Brief, 2007, 2008-09, at <http://www.nacoonline.org>
5. Fauci AS, Lane HC. Human Immunodeficiency Virus Disease; AIDS and Related Disorder, In Longo DL, Kasper DL, Jameson JL, Fauci AS, Hauser SL, Loscalzo J (editors): *Harrison's Principle of Internal Medicine*, 18th edition. Mc Graw Hill Medical companies, 2012, 1542-1564.
6. WHO Case definitions of HIV for Surveillance and Revised Clinical Staging and Immunological Classification of HIV Related Disease In Adults Aged 15 years or older. WHO Regional Office for South-East Asia, 2007.
7. Guidelines for the prevention and management of common opportunistic infections/malignancies among HIV infected adults and adolescents. NACO. Ministry Of Health and Family Welfare, 2007.
8. Pulmonary complications of HIV infection Study Group; Design of a prospective study. *J Clin. Epidemiol.* 1993; 46:497.
9. Luft BJ, Remington JS. Toxoplasmic encephalitis in AIDS, *Clin. Infect. Dis.* 1992; 15:211-222.
10. Rogelio HC, Chua MD, Dennis T, Villareal MD, Josephine Baisac MD. Diagnostic and Therapeutic Problems in Cryptococcus Meningitis, *Phil J Microbiol Infect Dis.* 1987; 16(1):10-17.
11. Kulkarni SV, Kairon R, Sane SS, Padmawar PS, Kale VA, Thakar MR *et al.* Opportunistic parasitic infections in HIV/AIDS patients presenting with diarrhea by the level of immune suppression. *Indian Journal of Medical Research.* 2009; 130:63-66.
12. Sharma SK, Aggarwal G, Seth P, Saha PK. Increasing HIV sero-positivity among adult tuberculosis patients in Delhi. *Indian J Med Res.* 2003; 117:239-42.
13. Chakravarty J, Mehta H, Parekh A, Attili SVS, Agrawal NR, Singh SP *et al.* Study on Clinico-epidemiological Profile of HIV Patients in Eastern India. *Journal Asso Physician India.* 2006, 54.
14. Vaipayee M, Kanswal S, Seth P, Wig N. Spectrum of opportunistic infections and profile of CD4+ counts among AIDS patients in North India. *Infection.* 2003; 31:336-40.
15. Sharma SK, Kadiravan T, Banga A, Goyal T, Bhatia I, Saha PK. Spectrum of clinical disease in a series of 135 hospitalized HIV- infected patients from North India. *BMC infectious Diseases.* 2004; 4:52.
16. Kumarasamy N, Vallabhaneri S, Timothy Flannagan P, Kenneth Mayer H, Suriti Solomon *et al.* Spectrum of Opportunistic Infections Among AIDS Patients. *Ind Journal of Med Research.* 2005; 121:377-394.
17. Chakraborty N, Mukherjee A, Santra S, Sarkar RN *et al.* Current trends of OIs among HIV infected patients from eastern India, *Jpn. J Infect. Dis.* 2008; 61:49-53.
18. Singh A, Bairy I, Shivananda PG, Spectrum of opportunistic infections in AIDS cases. *NEJM.* 2003; 57(1):16-21.
19. Sircar AR, Tripathi AK, Choudhary SK, Mishra R. Clinical profile of AIDS: a study at a referral hospital. *J Assoc Physicians India.* 1998; 46:775-8.
20. Chacko S, John TJ, Babu PG, Jacob M, Kaur A, Mathai D. Clinical Profile of AIDS in India: A review of 61 cases. *J Assoc Physicians India.* 1995; 43:535-8.