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A study of clinical profile of HIV positive patients with neurological manifestations

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ABSTRACT

Background: Central nervous system (CNS) is among the most frequent and serious target of HIV infection in patients with profound immunosuppression. CNS problems occur mainly due to either primary pathologic process of HIV or secondary to opportunistic infection and neoplasm.
Aims and objectives: To study the clinical and investigation profile in diagnosis of HIV patients with CNS manifestation. To correlate CD_4 levels with CNS opportunistic infections.
Materials and methods: A prospective observational non-randomized clinical study of 50 HIV infected patients, showing clinical evidence of CNS involvement, admitted in tertiary care centre was done. Detail clinical history and CNS examination was carried out. CD_4 count was measured using standard flowcytometry. Investigations like MRI brain/electromyography-nerve conduction studies/cerebrospinal fluid (CSF) examination were done as and when required for diagnosis.
Results: HIV induced primary CNS illness was present in 30% while 70% cases were due to secondary CNS manifestation mainly due to opportunistic infection. Most common primary illness was distal symmetric polyneuropathy (DSPN) (22%), followed by Aids dementia complex (ADC) (4%) and acute inflammatory demyelinating polyneuropathy (AIDP)(4%). tuberculous meningitis (TBM) was the most common presentation as secondary CNS illness (34%), followed by cryptococcal meningitis (14%), toxoplasmosis (10%), progressive multifocal leucoencephalopathy (PML) (8%) and neurosyphilis (4%). Meningitis was presenting CNS manifestation in majority of patients. The commonest presentation of TBM was fever (64%), while headache for cryptococcal meningitis (71%) and seizures was that of toxoplasmosis (80%). Mean CD_4 count was 170 ± 80.1 in patients of DSPN, 131 ± 85.75 for TBM, 47.5 ± 36.8 for cryptococcal, 160 ± 77.4 for toxoplasmosis and 93 ± 65 for ADC.
Conclusion: High degree of clinical suspicion of nervous involvement in HIV patients at all stages help in early diagnosis and institution of specific therapeutic measures which in turn decrease mortality and morbidity.

1. Introduction

With an estimated 2.5 million people living with HIV (PLHIV), India has the third highest HIV burden in the world, after South Africa and Nigeria [1]. The total number of people living with HIV/AIDS in India was estimated at 2.4 million (19.3 –30.4) in 2009. Children (less than 15 years) account for 3.5% of all infections, while 83% are the in age group 15–49 years. The estimated adult HIV prevalence in India was 0.31% (0.25–0.39%) in 2009. The adult prevalence was 0.25% among women and 0.36% among men in 2009 [2]. It is estimated that India had approximately 0.12 million new HIV infections in 2009 [2].

The nervous system is among the most frequent and serious target of HIV infection, occurring in patients with profound immunosuppression. CSF findings are abnormal in about 90% of patients, even during asymptomatic phase of HIV infection [3].

Abbreviations: ADC, Aids dementia complex; ATT, anti-tuberculous therapy; AKD, Alka K. Deshpande; ART, anti-retroviral therapy; AIDS, acquired immunodeficiency syndrome; AIDP, acute inflammatory demyelinating neuropathy; CCM, cryptococcal meningitis; CSF, cerebrospinal fluid; CNS, central nervous system; DSPN, distal symmetrical polyneuropathy; DOTS, directly observed therapy-short course; EMG-NCS, electromyography-nerve conduction studies; IL, Interleukin; HIV, human immunodeficiency virus; HNCI, HIV associated neurocognitive impairment; NCCT, non-contrast computerized tomography; NACO, National AIDS Control Organization; NIMS, Nizam Institute Medical Sciences; MRI, magnetic resonance imaging; MMSE, mini mental status examination; OSA, Ogun Shamsideen Abayomi; PML, progressive multifocal leucoencephalopathy; PPC, Paulo Pereira Christo; TBM, tuberculous meningitis; TNF, tumour necrosis factor; VDRL, Venereal Disease Research Laboratory.

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Table 1
Primary and secondary neurological illness observed in HIV positive patients.

Neurological illness	Types	Number (%) ($n = 50$)
Primary	Distal symmetric polyneuropathy	11 (22)
	Aids dementia complex	2 (4)
	Acute inflammatory demyelinating polyneuropathy	2 (4)
Secondary	Tuberculous bacterial meningitis	17 (34)
	Cryptococcal meningitis	7 (14)
	Toxoplasmosis	5 (10)
	Progressive multifocal leucoencephalopathy	4 (8)
	Neurosyphilis	2 (4)

Table 2
Clinical presentation in secondary neurological illness in HIV positive patients.

Clinical presentation	Neurological illness ($n = 29$)		
	Tuberculous bacterial meningitis	Cryptococcal meningitis	Toxoplasmosis
Fever	88%	57%	40%
Altered consciousness	64%	71%	33%
Headache	82%	71%	42%
Convulsion	35%	43%	60%
Focal neurological deficit	18%	–	49%
Signs of meningeal irritation	76%	57%	0%

Neurological disease is the first manifestation of symptomatic HIV infection in 10–20% of patients [4]. Approximately 40–70% persons with HIV have clinically evident neurologic disorders. Neurological problems that occur in HIV infected individual may be either primary to pathological process of HIV infection or secondary to opportunistic infections or neoplasms. It may be inflammatory, demyelinating or degenerative in nature. India appears to be fertile soil for HIV infection due to poverty, illiteracy and lack of sex education.

Although extensive studies on HIV and AIDS have been done in west, there is pressing need for elaborate studies in India owing to differences in social, economic, cultural and educational background.

This study has been conducted at one of the largest tertiary care centre and referral hospital in India. The institute is associated with an ART (anti-retroviral therapy)-centre which is one of the 120 ART centres established by National Aids Control Organization (NACO) in India. NACO is the central governing body for the control and management of HIV/AIDS in India. By the end of December 2010, a total of 14,311 PLHIV have been registered at this ART centre.

2. Aims and objectives

This study was carried out with the following aims and objectives:

- To study the clinical and investigation profile in diagnosis of HIV patients with CNS manifestation.
- To correlate CD_4 levels with opportunistic infections of the central nervous system.

3. Materials and methods

This was a prospective observational non-randomised clinical study conducted from 2008 to 2010 in 50 patients.

3.1. Inclusion criteria

Newly diagnosed cases of HIV infection presenting with manifestations of neurological disease in the age group of 18–49 years were included in this study.

Table 3
Mean CD4 count in neurological illness in HIV positive patients.

Neurological illness	Mean CD4 count ± standard deviation (SD)
Tuberculous bacterial meningitis	131.5 ± 85.75
Cryptococcal meningitis	47.5 ± 36.8
Toxoplasmosis	160 ± 77.4
Progressive multifocal leucoencephalopathy	157 ± 76.8
Neurosyphilis	105 ± 31.8
Aids dementia complex	93 ± 65
Distal symmetric polyneuropathy	170 ± 80.1
Acute inflammatory demyelinating polyneuropathy	281 ± 74.3

3.2. Exclusion criteria

Patients with history of neurological diseases like cerebrovascular accidents, epilepsy, parkinsonism etc., diabetes, alcohol and other drug abuses like narcotics, sedatives and hypnotics were excluded from the study (Tables 1–4).

None of the patients were on anti-retroviral therapy (ART) as these patients were newly diagnosed cases of HIV infection.

Detailed clinical history with special emphasis on consciousness, convulsions and headache was taken. Thorough clinical examination included mental status examination including MMSE, sensory, motor and cranial nerves examination.

Apart from routine investigations, CD_4 count was measured using standard flowcytometry. Diagnostic investigations like MRI brain with contrast, cerebrospinal fluid (CSF) examination and electromyography-nerve conduction study (EMG-NCS) were done as and when required. Final outcome was measured.

Table 4
Outcome of secondary neurological illness in HIV positive patients.

Neurological illness	Outcome (%) ($n = 29$)	
	Improved	Fatal outcome
Tuberculous bacterial meningitis	90.90	09.10
Cryptococcal meningitis	67.14	32.86
Toxoplasmosis	85.71	14.29