

Neurological Manifestation of HIV Infection in North-Eastern Part of India

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ABSTRACT

Background: The nervous system is among the most frequent and serious target of HIV infection, occurring in patients with profound immunosuppression even some time neurological disease is the first manifestation of symptomatic HIV infection in 10–20% of patients.

Aims & Objective: (1) To study the clinical, investigation profile and various neurological disorders in HIV positive patients; (2) To correlate neurological manifestations in HIV patients with CD4 Counts.

Materials and Methods: 40 HIV positive patients with neurological manifestations were enrolled. Apart from routine investigations, CD4 cell count, MRI brain, CSF, electromyography and nerve conduction study were done whereas required.

Results: Meningitis was the commonest diagnosis (52.5%) followed Peripheral neuropathy (20%). Cerebrovascular accident was present in 3 cases. Intracranial space occupying lesion was found in 3 cases. Headache was the commonest neurological symptom seen in 25(62.5%) patients. Altered sensorium was found in 55%. Cranial nerve involvement was seen in 7 (17.5%) patients. Convulsion was reported in 10 (25%) of the patients. Choreoathetoid movement was present in one patient. CD4 Count was done in 37 patients. In 13 patients it was between 200-500/ μ l & <200/ μ l in 24 Patients. CD4 count was <200/ μ l in most of the patients having TBM (73%), < 200/ μ l in 75% of cryptococcal meningitis.

Conclusion: Most of the neurological sign symptoms are due to secondary causes which vary according to the geographical areas. So the knowledge of epidemiology of neurological presentation may help in early diagnosis and treatment of patients.

Key Words: Neurologic Manifestation; HIV; India

INTRODUCTION

It is estimated that India had approximately 0.12 million new HIV infections in 2009.^[1] The nervous system is among the most frequent and serious target of HIV infection, occurring in patients with profound immunosuppression even some time neurological disease is the first manifestation of symptomatic HIV infection in 10–20% of patients.^[2-4] The true prevalence of HIV related neuroinfections and pathology is not available due to inadequate medical facilities, social stigma and ignorance that lead to underdiagnosis.^[5] Published reports of Neurological manifestations of HIV infection specially from this part of country are limited where some opportunistic infections are more common. So in this study we planned to study the clinical, investigation profile and various neurological disorders in HIV positive patients and to correlate neurological manifestations in HIV patients with CD4 Counts.

MATERIALS AND METHODS

40 HIV positive patients with neurological manifestations were enrolled in this study (10.10%) from department of medicine, SRN hospital Allahabad (UP), India between August 2009 and July 2010.

Inclusion Criteria: HIV Patients presenting with neurological manifestations.

Exclusion Criteria: Patients with pre-existing neurological disease (cerebrovascular accidents, epilepsy, parkinsonism, drug abuses) were excluded from the study group.

A detailed history, physical findings with thorough neurological examination were done. Apart from routine investigations, CD4 cell count was measured by standard flowcytometry. Other diagnostic investigations like MRI brain, CSF (cerebrospinal fluid) examination, electromyography (EMG) and nerve conduction study (NCS) were also done whereas required. Final outcome was measured. Study was approved by local ethical committee.

RESULTS

90% Patients were between the age group of 21-50 Years and Male: Female ratio was 7:1. Meningitis was the commonest diagnosis (52.5%), comprising 15 cases of tuberculous meningitis, 4 cases of cryptococcal meningitis & 2 patients of septic meningitis. Peripheral neuropathy was the second most common neurological manifestation seen in 20%. Cerebrovascular accident (CVA) was present in 3 cases. Three patients were diagnosed to have encephalomyelitis. Intracranial space occupying lesion was found in 3 cases (one each of neurocysticercosis, primary CNS lymphoma & tuberculoma). No apparent cause of seizure was found in one case & was diagnosed as epilepsy. 1 patient presented with choreoathetoid movement (Table-1).

Table-1: Distribution of Various Diagnoses in Study Population

| Various Diagnoses | No. | % |
|--------------------------------------|-----|-------|
| Tuberculous Meningitis | 15 | 37.5 |
| Peripheral Neuropathy | 8 | 20 |
| Cryptococcal Meningitis | 4 | 10 |
| Acute Disseminated Encephalomyelitis | 3 | 7.5 |
| Septic Meningitis | 2 | 5 |
| Epilepsy | 1 | 2.5 |
| CVA | 3 | 7.5 |
| Choreoathetoid movement | 1 | 2.5 |
| Primary CNS Lyphoma | 1 | 2.5 |
| Tuberculoma | 1 | 2.5 |
| Neurocysticercosis | 1 | 2.5 |
| Total | 40 | 100.0 |

Headache was the commonest neurological symptom seen in 25 (62.5%) patients, meningitis being the most important cause. Altered sensorium was found in 55%. Signs of meningeal irritation were present in 50% of the cases. 11 patients (27.5%) have motor weakness inform of hemiparesis. Cranial nerve involvement was seen in 7 (17.5%) patients, among them 7th cranial nerve was the most common seen in 6 patients. Convulsion was reported in 10 (25 %) of the patients. Ataxia was found in 4 patients (2 Cerebellaar ataxia, 2 Sensory ataxia). Dysthesia in form of tingling numbness & burning sensation was present in 7 out of 8 patients. Choreoathetoid movement was present in one patient. Amongst the non-specific symptoms fever was commonest presentation in 30 cases (75%) (Table-2).

Table-2: Neurological Manifestations

| Symptoms/Sign (Number of Patients) | Diagnosis (Number of Patients) | | | | | | | | |
|---------------------------------------|--------------------------------|---------|--------|--------|--------|---------|-----------|--------------|-----------------------|
| | TBM (15) | CCM (4) | PM (2) | EM (3) | PN (8) | CVA (3) | ICSOL (3) | Epilepsy (1) | Movement Disorder (1) |
| Fever (30) | 15 | 3 | 2 | 3 | 4 | 1 | 1 | 1 | 0 |
| Headache (25) | 14 | 4 | 2 | 2 | 0 | 1 | 3 | 0 | 0 |
| Cerebellar Sign (3) | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 |
| Meningial Sign(20) | 14 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 |
| Seizure (10) | 5 | 0 | 0 | 1 | 0 | 0 | 3 | 1 | 0 |
| Altered sensorium (22) | 13 | 3 | 2 | 2 | 0 | 0 | 2 | 0 | 0 |
| Cranial Nerve Involvement (7) | 2 | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 0 |
| Ataxia (2) | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| Papilloedema (3) | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dysthesia (7) | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 |
| Hemiparesis (7) | 2 | 0 | 0 | 2 | 0 | 2 | 1 | 0 | 0 |
| Paraparesis (1) | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Quadriparesis (3) | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 |
| Involuntary Movement (3) | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 |
| Mmse Normalities | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Table-3: Relation with CD4 Cell Count

| Diagnosis | <200/ μ l | 200-500/ μ l | Total | % |
|----------------|---------------|------------------|-------|-------|
| TBM | 10 | 4 | 14 | 37.83 |
| CCM | 3 | 1 | 4 | 10.81 |
| PM | 0 | 2 | 2 | 5.40 |
| PN | 2 | 5 | 7 | 18.91 |
| ADEM | 3 | 0 | 3 | 8.10 |
| ICSOL | 3 | 0 | 3 | 8.10 |
| CVA | 1 | 1 | 2 | 5.40 |
| Seizure dis. | 1 | 0 | 1 | 2.70 |
| Movt. Disorder | 1 | 0 | 1 | 2.70 |
| Total | 24 | 13 | 37 | 100 |

CD4 Count was done in 37 patients. In 13

patients it was between 200-500/ μ l & <200/ μ l in 24 Patients. CD4 count was <200/ μ l in most of the patients having TBM (73%), < 200/ μ l in 75% of cryptococcal meningitis (Table-3). Cranial CT was done in 28 patients, out of which 7 Patients had hydrocephalus (all TBM), 3 Patients had ring enhancing lesion, 2 patients had ICSOL (primary CNS Lymphoma) and one patient had diffuse cerebral atrophy. In 10 Patients CT Scan was normal. MRI showed features of disseminated encephalomyelitis in 3 Patients (Table-4).

Table-4: Imaging-CT & MRI Findings in Various Groups

| CT Scan Finding (Number of Patients) | Diagnosis (Number of Patients) | | | | | | | | |
|---|--------------------------------|---------|--------|--------|--------|---------|-----------|--------------|--------------------|
| | TBM (12) | CCM (4) | PM (2) | EM (3) | PN (8) | CVA (3) | ICSOL (3) | Epilepsy (1) | Movt. Disorder (1) |
| Normal (10) | 2 | 3 | 2 | 0 | 0 | 0 | 0 | 1 | 1 |
| Hydrocephalus (7) | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Infarct (5) | 2 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Ring Enhancing Lesion (2) | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| ICSOL (2) | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| Atrophy (1) | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Abnormal MRI (3) | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| Total (28) | 13 | 3 | 2 | 3 | 2 | 3 | 3 | 1 | 1 |

Table-5. Neurological Manifestations and Diagnosis

| Manifestations and Diagnosis | | This study | Levy et al ^[15] | Snider et al ^[10] | Mc Arthur ^[9] |
|-------------------------------|-------------------------|----------------------|----------------------------|------------------------------|--------------------------|
| No. of Patients | | 45 | 315 | 50 | 186 |
| Infections | Cryptococcal meningitis | 10 % | 13 % | 4 % | 6 % |
| | Tubercular meningitis | 35 % | <1 % | 0 | 1 % |
| | Meningoencephalitis | 7.5 % | 34 % | 36 % | 23 % |
| | Myelitis | 0 | 1 % | 0 | 4 % |
| | PML | 0 | 2 % | 4 % | 0 |
| Intracranial Mass Lesion | | 5 % tuberculoma/ PCL | 10 % lymphoma | 14 % lymphoma | 17 % |
| HIV encephalopathy | | 0 | 0 | 0 | 7.3 % |
| Primary Vascular complication | | 7.5 % infarct | 1.5 % infarct | 6 % heamorrhage | <1 % |
| Other | Cranial neuropathies | 17.5% | 3 % | - | 2.1% |
| | Toxoplasmosis | 0 | 32 % | 10 % | 8 % |
| | P. Neuropathy | 20% | 6 % | 16 % | 5 % |
| | Myopathy | 0 | <1 % | 0 | 0 |

DISCUSSION

The neurological manifestation that occur in HIV patients may be either due to primary pathological process of HIV infection or secondary to opportunistic infection or neoplasm.^[2,6] In our study, the incidence of neurological involvement was found to be maximum in age group of 21-50 years which correlates with other studies.^[4,7-12] Of the 40 patients 35 (87.5%) were males 5 (12.5%) were females. Male to female ratio was 7:1. This ratio is higher than few other studies.^[7,13]

Low figure of female infection rate is due to the admission pattern in most hospitals and social pattern (lifestyle) in our society where females are decreased to household activities and socialize less compared to males. Predominantly heterosexual transmission was observed, (95%). Multiple partners and contact with CSWs was the cause of heterosexual transmission, as it is found in other studies.^[13,14] This is in contrast to the western studies where homosexual transmission is more common.^[9,15]

The commonest neurological complication of HIV infection in this study was due to tubercular involvement of the CNS. It was seen in 16 patients (40%), out of them, 15 had tubercular meningitis, and 1 had intracranial tuberculomas. Tuberculosis is wide-spread and rampant in our country, due to poor hygiene and poor socio-economic states. 8 patients (20%) were found to have HIV associated peripheral neuropathy, among them 5 had painful distal symmetrical polyneuropathy (DSPN), 1 had chronic inflammatory demyelinating polyneuropathy, & 2 had ART induced neuropathy. Tingling & numbness & burning sensation were the most common clinical presentation (87.5%), 3 case presented with quadriparesis (37.5%). These findings are similar to a study by Snider et al and higher than some other studies.^[9,10,15] Mean CD4 value was 178/ μ l in these patients which indicate that peripheral neuropathy is commonly a late presentation in majority of cases. 4 (10%) patients were diagnosed to have Cryptococcal meningitis, which is very less than few other

studies^[16] (Table-5). Hence a number of patients with Cryptococcal meningitis may have been missed in our study.

Headache was the commonest neurological symptom seen in 25 patients (62.5%), meningitis being the most important cause i.e. in 50% of all cases. Headache most commonly relates to either meningitis or a poorly understood condition sometimes referred to as HIV headache.^[17] Altered sensorium was found in 55%, 14 cases of CNS Tuberculosis, 4 cases of Cryptococcal meningitis, & 2 cases of pyogenic meningitis. Signs of meningeal irritation were present in 50% of the cases, 45% are because of meningitis only, that included 3 cases of Cryptococcal Meningitis and 14 cases of CNS Tuberculosis, 2 cases of septic meningitis. 11 patients (27.5%) have motor weakness in form of hemiparesis in 7 patients. Hemiparesis was due to CVA (infarct) in 2 patients & due to complication of CNS tuberculosis in 2 patients, 1 patient of acute disseminated encephalomyelitis & due to ICSOL in 2 patients, Paraparesis (due to acute disseminated encephalomyelitis) in 1, and quadriparesis (peripheral neuropathy) in 3 patients. Cranial nerve involvement was seen in 7 patients (17.5%) among them 7th cranial nerve was the most commonly involved. This finding is higher than few other studies.^[9,15] In our study focal neurological deficit was found in 45% of cases which is slightly higher than the study by Millogo et al in which it was 35%.^[11] Convulsion was found in 10 (25%) of the patients among them 5 were TBM, 3 of ICSOL (neurocysticercosis, tuberculoma & primary CNS lymphoma 1 each) & 1 case of encephalomyelitis. Although there is no definite association has been mentioned between HIV infection & neurocysticercosis in the literatures. In one case no obvious cause could be found & he was diagnosed as a case of epilepsy due to direct effect of HIV. Amongst the non-specific symptoms fever was commonest presentation in 30 cases (75%), of which 50% are due to opportunistic CNS infection such as, 15 cases of TBM, 3 cases of cryptococcal meningitis, 2 cases of pyogenic meningitis (20 cases). Three patients (7.5%) were diagnosed to have CVA, one patient of them

had infarct in right basal ganglia and other two other two presented with cerebellar ataxia had infarct in cerebellum. The incidence of CVA in the present study is similar to some other studies.^[9,15] Sensory ataxia was present in 2 cases of peripheral neuropathy. Average CD4 count in Cryptococcal meningitis and TBM was 119/ μ l and 178.62 respectively. CSF abnormality was found in 26 patients (65%), which is similar to a another study.^[18] Cranial imaging was done in 28 patients. Out of which 18 (64.29) Patients had abnormal findings [Table-4]. These findings are somewhat similar with some studies.^[9,10,15,18-20] Involuntary choreoathetoid movement of right hand was present in one patient in this study.

CONCLUSION

Most of the neurological sign symptoms are due to secondary causes which vary according to the geographical areas. So the knowledge of epidemiology of neurological presentation may help in early diagnosis and treatment of patients.

REFERENCES

1. Ministry of Health and Family Welfare. HIV declining in India; new infections reduced by 50% from 2000–2009; sustained focus on prevention required. Press Information Bureau, Govt of India. 2010. Available from URL: <http://pib.nic.in/newsite/erelease.aspx?relid=67983>
2. Fauci AS, Lane HC. Harrison's Principles of Internal Medicine. 17th edition. vol. 1. New York: McGraw Hill; 2008. p. 1139, 1183.
3. National AIDS Control Organisation. HIV sentinel surveillance and HIV estimation in India 2007: a technical brief. Ministry Of Health And Family Welfare, Government Of India. 2008.
4. Rana HM, Doshi DA, Virpariya KM, Shah AN, Somani SS. A study of clinical profile of HIV positive patients with neurological manifestations. HIV & AIDS Review. 2011;10(3):76-9.
5. Shankar SK, Mahadevan A, Satishchandra P, Kumar RU, Yasha TC, Santosh V, et al. Neuropathology of HIV/AIDS with an overview of the Indian scene. Indian J Med Res 2005;121(4):468-88.
6. Meena LP, Rai M, Singh SK, Chakravarty J, Singh A, Goel R, et al. Endocrine Changes in Male HIV Patients. J Assoc Physicians India 2011;59:365-6.
7. Sircar AR, Tripathi AK, Choudhary SK, Misra R. Clinical profile of AIDS: a study at a referral hospital. J Assoc Physicians India. 1998;46(9):775-8.
8. National AIDS Control Organisation. HIV sentinel surveillance and HIV estimation in India 2007: a technical brief. Ministry Of Health And Family Welfare, Government Of India. 2008.
9. Mc Arthur JC. Neurologic manifestations of AIDS. Medicine (Baltimore) 1987;66:407-37.
10. Snider WD, Simpson DM, Nielsen S, Gold JW, Metroka CE, Posnel JB. Neurological complications of acquired immune deficiency syndrome: analysis of 50 patients. Ann Neurol. 1983;14(4):403-18.
11. Millogo A, Ki-Zerbo GA, Sawadogo AB, Ouedraogo I, Yameogo A, Tamini MM, et al. Neurologic manifestations associated with HIV infections at the Bobo-Dioulasso Hospital Center (Burkina Faso). Soc Pathol Exot. 1999;92(1):23-6.
12. Meena LP, Pandey SK, Rai M, Bharti A, Sunder S. Knowledge, Attitude, and Practices (KAP) study on HIV / AIDS among HIV patients, care givers and general population in north-eastern part of India. Int J Med Sci Public Health. 2013;2(1):36-42.
13. John TJ, Babu PG, Saraswathi NK, Jayakumari H, Selvaraj R, Kaur A, et al. The epidemiology of AIDS in the Vellore region, southern India. AIDS 1993;7(3):421-4.
14. Bollinger RC, Tripathy SP, Quinn TC. The human immunodeficiency virus epidemic in India. Current magnitude and future projections. Medicine (Baltimore) 1995;74(2):97-106.
15. Levy RM, Bredesen DE, Rosenblum ML. Neurological manifestations of the acquired immunodeficiency syndrome (AIDS): experience at UCSF and review of the literature. J neurosurg 1985;62(4):475-95.
16. Chuck SL, Sande MA. Infection with Cryptococcus neoformans in the AIDS. N Engl J Med 1989;321(12):794-799.
17. Brew BJ, Miller J. Human immunodeficiency virus-related headache. Neurology. 1993;43(6):1098-1100.
18. Jordan BD, Navia BA, Petito C, Cho ES, Price RW. Neurological syndromes complicating AIDS. Front Radiat Ther Oncol 1985;19:82-7.
19. Wadia RS, Pujari SN, Kothari S, Udhar M, Kulkarni S, Bhagat S, et al. Neurological manifestations of HIV Disease. JAPI 2001;49:343-8.
20. Puccioni M, favoreto AC, Andre C, Peixoto CA, Novis SA. Acquired immunodeficiency syndrome: analysis of neurologic complications in 44 cases. Arq Neuropsiquiatr. 1989;47(4):385-91.

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