

Original Research Article

Neurological manifestations in HIV positive patients attending tertiary care teaching hospital in Western India

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Received: 18 September 2016

Accepted: 06 October 2016

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ABSTRACT

Background: Neurologic manifestations affecting the nervous system at all levels and stages of HIV infection are common and increasing with the extended survival of HIV-positive persons. Neurological manifestations occur due to either primary pathologic process of HIV or secondary to opportunistic infection. The neurological manifestations of HIV disease are likely to be different in Indian patients because of prevailing endemic infections, malnutrition, poverty and illiteracy. The present study was conducted to study various neurological manifestations in HIV positive patients presenting to tertiary care teaching institute.

Methods: This was observational study of 100 HIV infected patients with clinical evidence of CNS involvement. A detailed clinical history and CNS examination was carried out. CD4 counts were measured and magnetic resonance imaging (MRI), brain/electromyography, nerve conduction studies and cerebrospinal fluid (CSF) examination were done as required for diagnosis. Results were analysed by using percentage and proportions whenever necessary.

Results: HIV induced primary illness was present in about 27% cases, while 73% associated with secondary CNS manifestations were mainly due to opportunistic infection. The most common primary illness was distal symmetrical polyneuropathy (17%) followed by myopathy (6%). On the other hand, the most common secondary CNS infection was tuberculous meningitis (TBM; 30%), followed by cryptococcal meningitis (7%), and cerebral toxoplasmosis (4%). The commonest neurological presenting symptoms were headache (38%) whereas the commonest abnormal neurological finding was presence of signs of meningeal irritation (46.5%). The commonest abnormality found on neuroimaging was meningeal enhancement (32%).

Conclusions: High index of suspicion of neurological involvement in HIV patients in all stages helps in early diagnosis and timely institution of specific therapeutic treatment which in turn may considerably reduce the morbidity and mortality due to the disease.

Keywords: HIV positive patients, Neurological manifestations, Tertiary care teaching hospital

INTRODUCTION

The current CDC (centers for disease control and prevention) classification system for HIV infected adolescents and adults' categories persons based on the clinical conditions associated with HIV and CD4 (cluster differentiation) counts.^{1,2} The pandemic caused by HIV is

one of the greatest public health threats in the world today. Globally 34.0 million (31.4 million - 35.9 million) people were living with HIV at the end of 2011. An estimated 0.8% of adults aged 15-49 years worldwide are living with HIV, although the burden of the epidemic continues to vary considerably between countries and regions' Sub-Saharan Africa remains most severely

affected. Although the regional prevalence of HIV infection is nearly 25 times higher in Sub-Saharan Africa than in Asia, almost 5 million people are living with HIV in South, South-East and East Asia combined.^{3,4}

Millions of HIV infected people have now become a HIV major policy target among national and international organizations across the world. The hallmark of HIV disease is profound immunodeficiency resulting primarily from a progressive qualitative and quantitative deficiency of a subset of T lymphocytes referred to a helper T cells or inducer T cells. This subset of T cells is defined phenotypic ally by the presence on its surface of CD4 Molecule which serves as a primary cellular receptor for HIV. The diagnosis of HIV infection depends on the demonstration of antibodies to HIV and /or the direct determination of HIV or one of its components.^{5,6} The standard screening test for HIV infection is ELISA and the most common confirmatory test is the Western Blot.⁷ Hence the present study was carried out to study various neurological manifestations in HIV positive patients presenting to tertiary care teaching hospital in Western India.

METHODS

A cross sectional study was carried out in the department of medicine of Government medical college and Sir Takhtsinhji Hospital, Bhavnagar, Gujarat, India during the period of February 2012 to December 2012. A total of 100 HIV positive patients with clinical evidence of neurological manifestations attending ART centre OPD or indoor admitted patient were enrolled for the study by purposive sampling. Detailed clinical and physical examination was carried out in each patient with complete history of past illness with relevant drug history, personal history and family history. Routine hematological, biochemical, CD4 count, radiological investigation was done in each patient. Fundus examination was done in indicated patient. Investigation like CT and MRI brain/ spine, CSF examination was done in indicated patient.

Inclusion criteria

HIV reactive patient, above 20 years of age giving written and informed consent

Exclusion criteria

Patient not giving consent for study and 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. Results were analyzed by using percentage and proportions whenever necessary.

RESULTS

As Table 1 shows that the 58% patients were in the age group 21 to 40 years. This is sexually active group and hence increased prevalence of HIV and neurological manifestation. This age group is a social danger as this is the most productive group of society that is going to affect the growth of nation and the future generations also. There are 77 male and 23 female were affected in present study and Male to Female ratio was 3.3:1.

Table 1: Age and gender wise distribution of study population.

Particulars	Patients (n = 100)
Age	
21 - 30 years	18
31 - 40 years	40
40 - 50 years	29
above 50 years	13
Gender	
Male	77
Female	23

Data indicates both number and percentage

Table 2: Presenting complaints amongst study population

Presenting complaints	No. of Cases*
Fever	46
Headache	38
Convulsion	32
Tingling- numbness	21
Altered sensorium	19
Focal neurological deficit	19
Vomiting	21

*Multiple responses

Table 3: Neuroimaging finding (CT/MRI) amongst study population.

Neuroimaging finding	No. of cases (n = 53)	Percentage
Meningeal enhancement	17	32.07
Infarction	09	16.98
Normal	09	16.98
Ring enhancing lesion	06	11.32
Tuberculoma and infarct	05	9.43
Cerebral atrophy	04	7.5
Hydrocephalous	02	3.7
Encephalitis	01	1.88

It was seen from Table 2 that out of 100 patients with neurological manifestation, 46 patients (46%) presented with history of fever. 32 (32%) patients presented with history of convulsion. 38 patients (38%) presented with history of headache. 19 patients (19%) presented with altered sensorium, Vomiting was found in 21 patients

(21%). Tingling and numbness was found in 21 patients (21%). 19% of patients presented with focal deficits.

As Table 3 shows that neuroimaging was done in 53 patients out of 100 patients. Most common finding on neuroimaging was meningeal enhancement (meningitis) in 32% of patients. Cerebral infarction was seen in 17% of patients, ring enhancing lesion in 11% and tuberculoma in 10% and cerebral atrophy in 7%.

Table 4: Causes of headache, convulsion and altered sensorium among study population.

	Number (%)
Causes of headache (n = 40)	
Tuberculous meningitis (TBM)	20 (50%)
Cryptococcal meningitis	07 (17.5%)
Toxoplasmosis	04 (10%)
Others (CNS lymphoma etc.)	09 (22.5%)
Causes of convulsion (n = 31)	
Tuberculous meningitis (TBM)	14 (45.15%)
Cryptococcal meningitis	04 (12.90%)
Toxoplasmosis	03 (9.67%)
CNS lymphoma	02 (6.45%)
Others	08 (25.80%)
Causes of altered sensorium	
Tuberculous meningitis (TBM)	09/29 (31%)
Cryptococcal meningitis	06/07 (85%)
Toxoplasmosis	01/04 (25%)

Table 5: Primary neurological illnesses amongst study population.

Primary neurological illness	No. of cases (n = 27)
Distal symmetric polyneuropathy (DSPN)	17%
Myopathy	6%
AIDS dementia complex (ADC)	2%
HIV encephalitis	1%
Transverse myelitis	1%

It was seen from Table 4 that the 40 patients presented with headache and most common cause of headache was TBM (50%) followed by cryptococcal meningitis (17.5%). Convulsion may be a presenting manifestation of HIV infection. Out of 31 patients with convulsion (45.15%) had TBM, followed by (12.9%) cryptococcal meningitis and (9.67%) toxoplasmosis.

Out of 29 patients with TBM, 9 patients had altered sensorium and in case of cryptococcal meningitis 6 patients had altered sensorium out of 7 and 1 patient out of 4 in case of toxoplasmosis had altered sensorium. As Table 5 shows that distal symmetric polyneuropathy was most common primary neurological illness followed by myopathy in 6% patients and ADC in 2% patients. Primary neurological illnesses are caused due to HIV itself.

Table 6: Secondary neurological illness amongst study population.

Secondary neurological illness	No. of cases (n = 73)
Tuberculous meningitis (TBM)	30%
Cryptococcal meningitis	7%
Toxoplasmosis	4%
CNS lymphoma	2%
Herpes simplex/zoster	3%
Others (e.g. CNS lymphoma etc)	27%

As Table 6 shows that tuberculous meningitis (30%) was most common secondary neurological illness followed by cryptococcal meningitis in 7% and toxoplasmosis in 4% of patients. Secondary neurological illnesses are due to opportunistic infection.

DISCUSSION

The neurological problem that occurs in HIV infected individual may be either primary to pathological process of HIV infection or secondary to opportunistic infection or neoplasm. Neurologic complications of HIV infection often go unrecognized. Infections can be treated with antibiotics, but radiation therapy may be needed to treat AIDS-related cancers present in the brain or spinal cord.

In present study, the incidence of neurological involvement was found to be maximum in the age group of 21-40 years which correlates with a study done by Sircar AR et al in which maximum incidence was (77.9%).⁸ This is the sexually active age group and hence increased prevalence of HIV and its neurological manifestation were found in this age group. This is a social danger as it is the most productive group of society. Male to Female ratio in patients with neurological involvement was found to be 3.3:1 which is comparable to that revealed in study done by Solu MD et al and Sircar AR et al which were 2.9:1 and 3.1:1 respectively.^{8,9} This is in coherence with the fact that in India, the incidence of HIV is more in males than in females. In present study, the most common presenting symptoms were fever (46%), followed by headache (38%), convulsion (32%) and altered consciousness (19%). Similarly studies done by Sircar AR et al and Mansuri ZH et al showed that the most common presenting symptoms were fever (64%) followed by headache (48%).^{8,10} In the present study, most common neurological sign was signs of meningeal irritation (46%), followed by altered consciousness (26%) and hemiparesis (12%). Similarly a study done by Mansuri ZH et al revealed that the most common neurological sign was meningeal irritation (50%).¹⁰ The most common abnormal finding on neuroimaging in patients presenting with neurological manifestation with HIV was meningeal enhancement found in 33% of the patients. Similarly, a study done by Rana HM et al the most common abnormal finding on neuroimaging in patients presenting with

neurological manifestation with HIV was meningeal enhancement found in 46% of the patients.¹¹ Headache, convulsion and altered sensorium were the common neurological symptoms seen in our study. Analysis of these clinical symptoms revealed that the most common cause of headache was tuberculous meningitis (50%) followed by cryptococcal meningitis (35%) which was comparable to a study done by Attili SV et al which also found the most common cause of headache to be tuberculous meningitis.¹²

Most common cause of convulsions was tuberculous meningitis (45%) followed by cryptococcal meningitis (13%), whereas similar study done by Attili SV et al found the most common cause of convulsions to be cryptococcal meningitis (31%) followed by tuberculous meningitis.¹² Commonest cause of altered consciousness was tuberculous meningitis (47%), followed by cryptococcal meningitis (31%) and toxoplasmosis (5%), whereas the commonest cause of altered consciousness in a study done by Mansuri ZH et al was also tuberculous meningitis (67%).¹⁰ HIV induced primary neurological illness was present in 27% cases, while secondary neurological illness was present in 73% cases. This was comparable to the results revealed in the studies done by Solu MD et al and Mansuri ZH et al So, the opportunistic infections remain the leading cause of neurological manifestations in HIV.¹⁰ In this study, most common HIV related primary neurological illness was DSPN which is present in 17% of HIV positive patients presenting with neurological manifestation, followed by myopathy in (6%), AIDP in (4%), and ADC in (4%). Similarly a study done by Solu MD et al revealed the most common HIV related primary neurological illness was DSPN which is present in 22%.⁹ In present study, most common secondary neurological illness in HIV was TBM which is present in 30% HIV positive patients presenting with neurological manifestation, followed by cryptococcal meningitis (7%) and toxoplasmosis (4%). Similarly a study done by Solu MD et al also revealed the most common HIV related secondary neurological illness to be TBM which is present in 34%.⁹

CONCLUSION

Neurological manifestations have been reported at all stages of HIV infection but detected especially in advanced HIV disease. The opportunistic infections remain the leading cause of neurological manifestations in HIV. Prevalence of neurological manifestation was highest in the young adult i.e. in economically productive age group with high male preponderance. Most common presenting symptom on admission was fever whereas headache was a significant predictor of the occurrence of neurological complications and most common abnormal neurological finding was meningeal irritation while most common finding on neuroimaging was meningeal

enhancement. Most common cause of convulsion, headache and altered sensorium was tubercular meningitis. Neuroimaging studies and CSF analysis are useful in diagnosing in opportunistic infections of the nervous system. High index of suspicion of neurological involvement in HIV patients in all stages helps in early diagnosis and timely institution of specific therapeutic treatment which in turn may considerably reduce the morbidity and mortality due to the disease.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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Cite this article as: Kausadikar SR, Chandak A, Jha P. Neurological manifestations in HIV positive patients attending tertiary care teaching hospital in Western India. *Int J Adv Med* 2016;3:1055-8.