

Imaging Features of Central Nervous System in Patients with HIV/AIDS - Scenario in a Developing Country

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INTRODUCTION

It is well documented that central nervous system (CNS) infections are associated with Human immunodeficiency virus (HIV) infections. In developed countries, its incidence has decreased since the advent of Anti-retroviral therapy.¹ In Indian patients, neurological manifestations and outcomes are different due to various endemic infections prevailing because of poverty, malnutrition and illiteracy. Approximately 40-90% of patients suffering from AIDS develop CNS complaints in their life.^{2,4} Neuroimaging plays a vital role in treatment of AIDS.⁵ Patients develop a variety of lesions. They are divided into four categories: focal lesions with mass effect; diffuse global CNS abnormalities; focal lesions without significant mass effect; and ventriculitis, meningitis and infarcts.⁶ Patients may have CNS lesions due to various pathological processes that occur simultaneously or sequentially. There can be more than one pathological condition responsible for it.^{2,7,8} Patients who develop Acquired Immuno Deficiency Syndrome (AIDS) due to intravenous drug abuse are more prone for CNS infections later in life. Clinical presentation of all the etiology is more or less the same. Imaging shows the anatomical location of the lesion and thus helps in making the diagnosis. The aim of this study is to look at the incidence of various neurological manifestation in HIV infected patients by doing radiological investigations.

MATERIALS AND METHODS

This was a hospital based, cross-sectional study done in two years from 2013 to 2015 at a tertiary care hospital in Nagpur, Maharashtra. All human immunodeficiency virus (HIV) positive patients with neurological signs and symptoms were included in this study. Total of 101 patients were included. Patients who refused to give written consent were excluded from this study. Ethical clearance was taken from the institute.

A detailed history of patients like age, sex, address, family history, mode of transmission, treatment history and history of coexisting illness were taken and entered in proforma.

HIV was diagnosed by fourth generation ELISA kit (J. Mitra with a sensitivity of 100% and specificity of 99.95%). Every patient of Neuro-AIDS had undergone CT/MRI investigation as requested by the physician. Patients having features suggestive of toxoplasmosis, cerebral oedema or cerebral atrophy were diagnosed on the basis of their findings.

RESULT

In the present study 73 cases (72.27%) belonged to age group 30-49 years. This was followed by 15-29 years of age group which had the 2nd highest

number of cases. (table 1). 81 cases (80.19%) were males and 20 cases (19.80%) were females (table 2). Male: female ratio was 4:1.

84 cases (83.16%) were married, 7 were unmarried and 10 cases (9.90%) were widowed (table 3). 47 cases (46.53%) were on treatment, 35 cases (34.65%) were not on treatment and 19 cases (18.81%) were on interrupted treatment (table 4).

Table 1: Distribution of patients according to age.

Age	No of patient (n-101)	Percentage (%)
0-14 YEARS	0	0%
15-29 YEARS	19	18.81%
30-49 YEARS	73	72.27%
50 AND ABOVE	9	8.91%
TOTAL	101	100%

Table 2: Distribution of patients according to gender.

Gender	No of patients (n-101)	Percentage (%)
Males	81	80.19%
Females	20	19.80%
Total	101	100%

Table 3: Distribution of patients according to marital status.

Marital status	No of patients (n-101)	Percentage (%)
Married	84	83.16%
Unmarried	7	6.93%
Widow	10	9.90%
Total	101	100%

Table 4: Distribution of cases according to treatment.

Treatment	No of patients(n-101)	Percentage (%)
Taking treatment	47	46.53%
Not taking treatment	35	34.65%
Interrupted treatment	19	18.81%
Total	101	100%

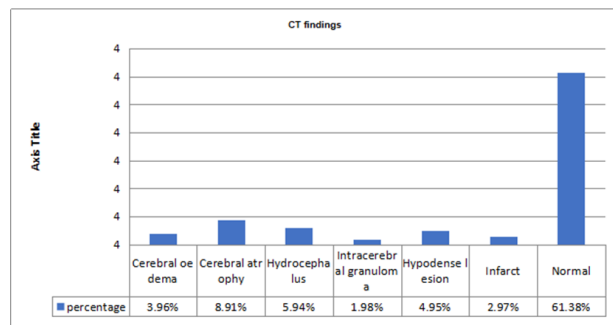
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Figure1: Percentage of various CT findings in patients.

In this study 39 CTs show positive findings (38.61%). Most common encountered lesion found was cerebral atrophy (8.91%), followed by hydrocephalus (5.94%), hypodense lesion (4.95%) and cerebral oedema (3.96%) as shown in figure 1.

DISCUSSION

In the present study 80.19% of patients were male and 19.80% females. 72.27% of patients belonged to 30-49yrs of age group, as this age group is sexually more active while 18.81% were between 15-29yrs of age. This is in concordance with the study done by Teja et al⁹ in which 36 years was the median age group and most of the patients belonged to 30-40 years of age group. A study conducted by Devi SB et al¹⁰ in 2005, who found that highest number of patients (63%) were in the age group of 21-30 years with majority of patients were male (94%). Another study done by Sircar et al¹¹ showed the mean age of 34.9±12 years which is comparable to our study.

In the present study Male: female ratio was 4:1. A study done by Teja et al⁹ found M:F ratio as 3.9:1, another study reported the ratio of 3:1 which are comparable to our study.¹⁰ Study done by Ghate et al¹² also showed higher incidence of CNS manifestations in males as compared to females.

80% of the patients had heterosexual contact as the commonest mode of transmission, followed by unknown mode of transmission in 11% cases. This correlates well with other studies. 87.1% transmission was reported by NACO (National AIDS control organization) and 95% by Rangnathan et al.^{13,14} Females mostly contract this disease from their husbands.¹⁵ This is in contrast to the western studies where homosexual transmission is more common (Levy RM et al⁴, Mc Arthur Jc¹⁶). The disparity between the studies reported in the western literature and Indian studies can be explained by the different cultures and pattern of sexual activity in respective society.

This study also found that a small proportion of transmission attributed to blood transfusion/needle prick as observed in other studies.^{17,18,19}

In our study we found cerebral atrophy as most common finding but a study done by Eze et al²⁰ showed cerebral infarct (38.9%), followed by multiple ring enhancing hypodense lesion as common finding. Hypodense lesions can be found in variety of lesions like toxoplasmosis, lymphoma, bacterial meningitis, cerebral abscess, progressive multifocal leucoencephalopathy, tuberculosis, fungal infections and cytomegalovirus infestation.

Cerebral infarct like lesion, presents clinically as stroke, is recognized as common finding in computed tomography (CT) in various studies.^{21,22,23,24,25,26,27} Other studies were done which showed stroke, tuberculosis, toxoplasmosis and lymphoma as a diagnosis for ring enhancing hypodense lesion appearance on computed tomography.^{28,29,30,31,32}

The importance of this study is that brain mass lesions in HIV patients often presents as oedema of the CNS due to vertebral brain abscess, tuberculosis, toxoplasmosis or other granulomatous lesions. Our study showed that 3.96 % of patients had oedema but in another study it was found in 11.1% of cases.²⁰ Other studies showed brain mass lesion in 10% of cases.^{28,26,27,31,33} Condition of the patient could be improved by the relieve of this oedema with appropriate treatment of the cause. For example, few patients with toxoplasmosis improved with correct treatment for the condition in this study.

CONCLUSION

With the advent of ART in the India, incidences of CNS manifestations has decreased. It is important to recognize the possibility of HIV infection in these types of CNS manifestations and should be treated aggressively. Patients presented with neurological manifestations, when underwent CT investigations, found to have serious brain abnormalities. Even though CT scan is an expensive investigations, but those who can afford to pay then it should be done for early diagnosis and proper treatment of this treatable brain lesion. Advocate healthy lifestyle, adherence to one life partner, fidelity and use of condom remains as a key for the prevention of HIV

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