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Original research article

A Study On Neurological Manifestations In HIV Patients

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Abstract

Background and Objective: The human immunodeficiency virus (HIV) infection significantly impacts the neurological system, which is a key region of the body impacted by the virus. Even though individuals infected with HIV get adequate antiretroviral medication (ART), they nevertheless experience neurological problems. To clarify the many neurological symptoms observed in patients with HIV infection.
Method: A total of 80 HIV seropositive patients, both male and female, aged over 18 years, who were attending the ART centre, medicine OPD, or admitted in the medicine ward with neurological symptoms included in the study. The study focused on evaluating clinical parameters and laboratory investigations.
Result: The study included a cohort of 80 individuals who were admitted with HIV infection. Among them, 34 patients (42%) exhibited neurological symptoms. The age group most commonly afflicted was 31 to 40 years, with 35.4% of cases falling within this range. Males were more impacted than females, accounting for 51.6% of male patients and 35.3% of female patients.. The most prevalent neurological complaint in 20 patients (50%) was headache, followed by altered sensorium in 13 patients (46%) and focal neurological deficiency in 11 patients (33.09%).
Conclusion: In this particular context, we observed a significant occurrence of neurological symptoms in individuals who tested positive for HIV (44%). Tubercular meningitis was the predominant secondary infection observed in individuals with HIV, with Cryptococcal meningitis being the subsequent most frequent. Neurological problems in HIV patients should be met with a strong suspicion for neurological manifestations, as the majority of these opportunistic infections can be effectively treated.
Keywords: Nervous system, HIV, OPIs, nonOPIs cryptococcal meningitis.

Introduction

India ranks third globally in terms of the magnitude of its HIV (human immunodeficiency virus) epidemic.

Despite the proper administration of anti-retroviral therapy (ART), patients infected with HIV still encounter neurological complications. There are several factors that contribute to it, such as insufficient control of HIV replication in the brain, the production of harmful HIV proteins in the brain, a low level of CD4+ T cells at its lowest point, ongoing immune system activation, the presence of other conditions like drug misuse, and the potential harmful effects of certain antiretroviral medications on the brain. HIV has been detected in the brain and cerebrospinal fluid (CSF) of individuals who are infected, regardless of whether they have neurological symptoms. The exact methods by which HIV enters the brain are not fully understood, although it is believed that they are related, at least partially, to the virus's presence in infected cells and its activation of the immune system.

When HIV penetrates the brain as a result of specific local conditions, it experiences evolutionary changes that lead to the development of unique sequences in the env, tat, and TLR genes [1-4].

Neurological difficulties can arise during any phase of HIV infection, regardless of whether it is in the early or severe stages, and can impact any component of the neurological system. People infected with HIV suffer from severe disease and mortality as a result of neurological consequences. The neurological symptoms vary according on the extent of immune system dysfunction. During the initial phases of immunological dysfunction, common symptoms include Bell's palsy and Guillain-Barre syndrome. Commencing highly active antiretroviral therapy (HAART) leads to enhanced immune function, which in turn causes the emergence of a set of new disorders known as immune reconstitution syndromes. Neurologic immune reconstitution inflammatory syndrome (NeuroIRIS) is a recently identified complication that can occur as a result of taking a combination of antiretroviral drugs [5, 6].

Material and Methods

The study encompassed HIV positive individuals who were receiving treatment at the ART Centre medicine OPD and were admitted to the general medicine ward due to neurological problems at Raja Rajeshwari Medical College, Kambipura, Karnataka, India from January 2009 to December 2009.

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Inclusion Criteria

1. All patients who are HIV positive and are admitted in the medicine department, as well as patients who visit the ART Centre and exhibit neurological symptoms and/or signs.
2. Patients are required to provide written consent in order to be included in the study.
3. Age must be greater than 18 years.

Exclusion Criteria

1. Patients who have previously had neurological conditions such as Cerebrovascular accidents and epilepsy before being diagnosed with HIV.
2. Individuals afflicted with diabetes mellitus.
3. The patient has a history of drug misuse involving narcotics, sedatives, and hypnotics.

Results

Table 1: Brain MRI (n=16)

Abnormality	No. of Patients	Percentage
Ring Enhancing	4	25
Lesions Infarcts	6	37.5
SOLs	3	18.75
Meningeal	3	18.75
Enhancement Multiple	1	4.76
Haemorrages Total	21	100.00

Table 2: MRI Spine findings (n=2)

MRI Abnormality	No. of Patients	Percentage
HIV myelopathy	1	50
Sub-acute combined degeneration of Spinal cord	1	50
Total	2	100.0

Table 3: CSF Profile (n=22)

CSF Findings	No. of Patients	Percentage
Tubercular meningitis	13	59.09
Cryptococcal meningitis	5	22.72
Normal	4	18.18
Total	22	100

Table 4: Opportunistic neurological infections (n=25)

Diagnosis	No. of Patients	Percentage
TBM	14	56
Cryptococcal meningitis	5	20
Toxoplasmosis	6	24
Total	27	100.00

Table 5: Non-opportunistic infections related neurological manifestations (n=15)

Neurological diagnosis	No. of Patients	Percentage
Cerebral Infarcts	6	54.70
HIV myelopathy	1	2.67
Sub-acute degeneration of spinal cord	2	4.86
Peripheral Neuropathy	2	4.86
Sensory Ataxia	2	4.86
CNS Lymphoma	2	4.86
Total	15	100.00

Discussion

Neurological symptoms arise in a minimum of 40% of people who are infected with HIV over the course of their illness. HIV infection is the cause of numerous non-opportunistic neurological symptoms that can arise across a wide range of immunological conditions. In the initial stages of the disease, the virus causes an increase in the production of multiple types of antibodies, known as polyclonal hypergammaglobulinemia. As the HIV infection advances, the virus itself starts to directly harm the CNS and PNS, causing observable symptoms.

The neurological issues in individuals infected with HIV can arise either as a direct result of the HIV infection itself or as a result of opportunistic infections or tumors. The current investigation found that

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the highest occurrence of neurological involvement was observed in individuals aged 31-40 years. In the current investigation, the predominant symptoms observed were fever, with a prevalence of 59% [7].
The predominant neurological symptom observed in the study was headache, reported by 22 patients (50%). Altered sensorium was observed in 46% of patients, while seizures occurred in 8% of patients. The predominant symptom reported by 70% of patients was headache, which was believed to be caused by increased intracranial pressure. Altered mental state was noted in 46% of patients, seizures in 8% of patients, and neck stiffness in 30% of patients. An examination of these clinical symptoms indicated that tuberculous meningitis was the primary cause of headache and altered sensorium, accounting for 61% of cases. This was followed by cryptococcal meningitis at 29% and toxoplasmosis at 14%. These findings align with a study conducted by Attili SV *et al*., which similarly identified tuberculous meningitis as the most prevalent cause of headache [8].
Our investigation found that 16 cases (36%) exhibited primary neurological illness created by HIV, while 27 cases (61%) showed secondary neurological illness caused by opportunistic infections. These findings were similar to those reported in the investigations conducted by Solu MD *et al*., and Mansuri ZH *et al*., Opportunistic infections continue to be the primary cause of neurological symptoms in individuals with HIV. Tubercular meningitis was the most prevalent form among the other types of meningitis, accounting for 70.0% of cases. Cryptococcal meningitis was the second most common type, occurring in 23.3% of cases. While neuropathy is the most common non-opportunistic complication, our investigation found that HIV-related non-hemorrhagic infarcts occurred in 9 (205%) instances. This could be attributed to the limited sample size and the majority of patients not receiving antiretroviral therapy (ART). A study conducted in a hospital in KwaZulu-Natal, South Africa, found that the rate of HIV infection among patients under the age of 50 who had experienced a stroke was 16%. This rate is comparable to the prevalence of HIV in the general population of a similar age. The prevalence in our study was slightly greater, maybe due to the limited sample size [9].
The space-occupying lesions might present with convulsions or localized impairments. Our study included four patients, which accounted for 19.05% of the total sample, who had SOLs. There were 2 individuals diagnosed with primary lymphoma and 2 patients diagnosed with toxoplasmosis. No instances of progressive multifocal leukoencephalopathy (PML) were identified, as its occurrence is infrequent in our specific environment. PML, also known as progressive multifocal leukoencephalopathy, is caused by the JC virus, a kind of human polyoma virus. This condition occurs in approximately 4% of individuals who have AIDS [9].

Conclusion

The study found that a considerable fraction of individuals with HIV/AIDS who came to our facility exhibited a diverse range of neurological symptoms. In our study, we found that neurological manifestations were more prevalent among young individuals, particularly guys who were drivers. Additionally, we observed that sexual transmission was the most frequent mechanism of HIV transmission. Neurological symptoms such as headache and changes in mental awareness were frequently seen. The most prevalent opportunistic neurological infections were tubercular meningitis, followed by cryptococcal meningitis. The predominant neurological manifestations that were not opportunistic in nature included cerebral infarcts and HIV myelopathy. Both computed tomography (CT) and magnetic resonance imaging (MRI) were effective in accurately identifying and characterizing the neurological abnormalities. The CSF analysis confirmed the presence of both tubercular meningitis and cryptococcal meningitis. The CD4 count is highly associated with the occurrence of central nervous system (CNS) symptoms. Neurological symptoms, such as headache and altered sensorium, in HIV patients should be met with a strong suspicion of neurological manifestations. It is important to be aware that many of these opportunistic infections can be treated, leading to a decrease in both illness severity and death rates.

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