

HIV Infection's Neurological Effects

Linda Beyer *

The Desmond Tutu HIV Centre, University of Cape Town, Cape Town, South Africa

Perspective

The Human Immunodeficiency Virus (HIV) affects around 40 million people worldwide (HIV). Despite breakthroughs in anti-retroviral therapy, the neurological symptoms of HIV contribute to significant morbidity and mortality (ART). This article discusses a method for classifying HIV-related neurological problems, distinguishing between diseases caused by the virus and those caused by opportunistic infection. Antiretroviral therapy's side effects are also highlighted. The focus is on the developing world, where advanced HIV consequences and illnesses including Tuberculosis (TB), toxoplasmosis, and cryptococcal meningitis are still common. During the early stages of infection, HIV infiltrates the nerve system. This is hypothesised to happen by a Trojan horse method, in which the virus penetrates the CNS through infected blood-derived macrophages during regular immunosurveillance. HIV virions, on the other hand, can pass a damaged Blood-Brain Barrier (BBB) in the presence of a high viral load. Low-level viral replication happens intracellularly once within the CNS, and other microglia are infected as well. Astrocytes can be infected as well, albeit the virus is usually inactive in these cells. This activates the immune system and causes an inflammatory reaction, which results in the release of neurotoxins, causing damage to other cells and white matter, as well as the pathological alterations associated with HIV encephalitis.

HIV can impact any section of the neural axis on its own or in combination with other aetiologies. Early-stage diseases are more likely to be immune-mediated, whereas opportunistic infections become more common as immunosuppression progresses. Increased access to Antiretroviral Therapy (ART) and an ageing HIV population have resulted in a shift in the range of disease manifestations, including new neurological problems related to ART's neurotoxic effects. This article focuses on HIV infection's neurological manifestations, which are still frequent in underdeveloped nations. Diseases caused by HIV and those caused by opportunistic infections can be divided into two categories (OI). It will also be briefly explained how ART affects neurological symptoms. HIV has been linked to disease manifestation either directly or indirectly through immunological dysregulation. Neuro-cognitive abnormalities, vacuolar myelopathy, vasculopathy, and peripheral neuropathy have all been linked to the virus. Immune dysregulation disorders are characterised by a wide range of symptoms.

Since the earliest reports in the early years of the epidemic, HIV-associated dementia (HAD) has gotten a lot of attention, owing to the fact that its manifestations were fairly devastating and diagnosis at the time transmitted

a very dismal prognosis. While things aren't as bad as they were, there are still a lot of questions that need to be answered. The actual pathophysiology is unknown, clinical manifestations vary, accurate biomarkers are elusive, and the best treatment is yet unknown. Prior to the introduction of antiretroviral medication, dementia was the most prevalent neurological consequence in affluent nations, affecting 20–30% of PLH. The advent of antiretroviral medication (ART) has resulted in a 5% decrease in the incidence of HIV dementia, as well as an increase in survival. This combined with the fact that individuals on ART have milder types of cognitive impairment, has resulted in a paradoxical increase in the prevalence of people with milder forms of HIV-related neurocognitive illness. The main symptoms were significant motor skill impairments and psychomotor slowness. The pre-ART hallmarks of Acquired Immune Deficiency Syndrome (AIDS) dementia complex are memory impairment and executive dysfunction, whereas the more prevalent features of HAND in patients on ART are memory impairment and executive dysfunction. The diagnostic criteria rely on specialist neuropsychological testing, which is difficult to come by in resource-constrained environments. However, the criteria provide for this by allowing for the demonstration of cognitive deficits using more straightforward clinical procedures such as the Mini Mental Status Examination (MMSE) and the International HIV Dementia Scale (IHDS).

In a patient with severe immunosuppression, the clinical picture is a gradually progressing spastic paraparesis. If sensory engagement is present, it usually does not show up as a sharp sensory level. While bladder incontinence is common, upper limb involvement is uncommon. Patients may develop HIV-related neurocognitive dysfunction or HIV-related peripheral neuropathy at the same time. T2 weighted hyperintense signal affecting the posterolateral columns is indicative of cervical and thoracic cord atrophy on MRI of the spine. It's an exclusionary diagnosis, especially in underdeveloped nations, where opportunistic infections like tuberculosis are a much more common cause of myelopathy in PLH.

In industrialised countries, the introduction of Antiretroviral Therapy (ART) has had a substantial influence on HIV infection morbidity and death. Patients are living longer lives, and this ageing population is exhibiting symptoms of common degenerative diseases. Diagnostic capabilities and ART availability continue to be important difficulties in resource-poor nations. Opportunistic infections are still widespread, and they should be considered in the differential diagnosis of individuals with neurological symptoms. The impact of emerging infections in HIV + people, such as the severe acute respiratory syndrome corona virus 2, has yet to be determined.

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***Address for Correspondence:** Linda Beyer, The Desmond Tutu HIV Centre, University of Cape Town, Cape Town, South Africa, E-mail: beyer.linda@gmail.com

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