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Neurosyphilis in HIV-Infected Patients: A Study of 15 Cases

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Abstract **Original Research Article**

Introduction: Neurosyphilis is a rare but serious complication of syphilis, especially in HIV-co-infected patients. This study examines the clinical and evolutionary characteristics of neurosyphilis in this population. ***Materials and Methods:*** A retrospective study conducted in the infectious diseases department from January 2012 to August 2024, including all HIV-positive patients who developed neurosyphilis. ***Results:*** Among 15 patients, the average age was 44.14 years, with a male predominance (sex ratio=2). Behavioral disturbances were the most frequent clinical manifestations (33.33%). The syphilitic serology in the cerebrospinal fluid (CSF) was positive in 26% of cases. ***Conclusion:*** Neurosyphilis in HIV-positive patients remains a diagnostic challenge. Early management with penicillin G treatment allows for favorable outcomes in most cases.

Keywords: Neurosyphilis, HIV, syphilis, behavioral disturbances, penicillin G.

INTRODUCTION

Neurosyphilis, a rare but serious manifestation of syphilitic infection, poses a significant diagnostic challenge, especially in HIV-co-infected patients. This group of patients exhibits highly varied and often atypical clinical forms of neurosyphilis, complicating early diagnosis and appropriate treatment. The progression of syphilis in HIV-infected individuals is typically more rapid and aggressive due to the immunosuppression associated with HIV, which promotes the spread of the infection to the central nervous system (CNS) [1]. In co-infected patients, syphilis can quickly evolve into neurosyphilis without obvious clinical signs, and symptoms may be confused with other neurological conditions [2]. This study aims to explore the epidemiological, clinical, paraclinical, and evolutionary aspects of neurosyphilis in HIV-infected patients within our population.

MATERIALS AND METHODS

This is a retrospective study conducted in the infectious diseases department from January 1, 2012, to August 31, 2024. All HIV-positive patients who presented with neurosyphilis were included.

RESULTS

15 cases of syphilis were reported, with a mean age of 44.14 years (range 25-69) and a male predominance (sex ratio=2). 70% were heterosexual. 53.33% were at stage C, 33.33% at stage B, and 13.33% at stage A. 46.66% had a history of syphilis. 57.14% had primary syphilis, and 42.85% had secondary syphilis. Clinical manifestations included primarily behavioral disturbances (33.33%), intracranial hypertension syndrome (20%) associated with ocular involvement, motor deficits (13.33%), meningitic syndrome in two patients, one with peripheral facial paralysis, another with central facial paralysis, and one patient with a third cranial nerve involvement. Brain imaging was normal for all patients. Lumbar puncture revealed lymphocytic meningitis in 46.66% of cases. Syphilitic serology in the CSF was positive in 26% of cases. The eye examination identified one case of bilateral keratitis and optic neuritis and one case of left unilateral hyalitis. The mean CD4 count was 328.2 cells/mm3, and syphilitic serology in blood was positive for all patients. 11 patients were treated with penicillin G, and 4 patients received third-generation cephalosporins. The outcome was favorable in 86.66% of cases, with two deaths.

DISCUSSION

Although relatively rare, neurosyphilis remains a serious complication of Treponema pallidum infection, causing severe neurological damage. In HIV-infected patients, neurosyphilis presents specific diagnostic and therapeutic challenges, mainly due to the variation in clinical manifestations and issues related to the compromised immune system. This discussion

highlights several key scientific aspects regarding neurosyphilis in HIV-co-infected patients.

Pathophysiology and Characteristics of Neurosyphilis:

Neurosyphilis results from the invasion of the central nervous system (CNS) by Treponema pallidum, usually via the bloodstream. In immunocompromised patients, such as those infected with HIV, the risk of systemic spread of the infection is significantly increased. HIV, by suppressing the immune system, alters the body's response to opportunistic infections like syphilis. It is well-documented that severe immunosuppression, especially when CD4 counts are low, leads to more rapid progression of neurosyphilis, with more severe symptoms and a less favorable prognosis [1, 2]. T. pallidum can invade the meninges, cerebral vessels, neurons, and other CNS structures, leading to chronic inflammation that may cause irreversible damage, particularly in the temporal lobes and cortical areas associated with cognition and behavioral functions. Cerebrovascular disturbances can manifest as strokes, encephalopathy, and behavioral disturbances, as confirmed by the findings in our study [3].

Clinical Manifestations:

The clinical signs of neurosyphilis are often polymorphic and can easily be confused with other infections or neurological conditions. In our study, behavioral disturbances were the most frequently observed clinical manifestation (33.33%), which aligns with other reports indicating that behavioral changes are the most common symptoms in neurosyphilis, due to involvement of the frontal and temporal lobes in cognitive and emotional processes [4]. These signs are often misinterpreted, particularly in HIV-co-infected patients, where confusion may also result from HIV-associated neuropathy or psychiatric disorders [5].

The intracranial hypertension syndrome associated with ocular involvement, observed in 20% of cases, reflects the involvement of internal cranial structures in the infection. Optic neuritis and keratitis are classic signs of ocular syphilis, often underdiagnosed in neurosyphilis forms. This damage can result from the formation of inflammatory granulomas around the optic vessels, leading to vision loss [6]. These observations reinforce the need for a thorough ophthalmological examination in any suspected case of neurosyphilis. Motor deficits, though less frequent (13.33% of cases), suggest damage to the pyramidal pathways or spinal cord. This type of presentation is more common in late forms of neurosyphilis. Facial paralysis, whether peripheral or central, is also characteristic of neurosyphilis due to the involvement of cranial nerves in inflammation [7].

DIAGNOSIS

The diagnosis of neurosyphilis relies primarily on clinical, paraclinical, and serological criteria. Lumbar puncture is essential for diagnosing neurosyphilis. In our study, 46.66% of patients presented with lymphocytic meningitis, a key diagnostic criterion. The presence of a lymphocytic response in the cerebrospinal fluid (CSF) is often observed in neurosyphilis and is an important indicator of meningeal inflammation caused by T. pallidum [8]. However, it is important to note that serology in the CSF is often negative in severely immunocompromised patients due to the lack of a specific or altered immune response [9], as observed in our study. The isolation of Treponema pallidum in the CSF remains rare. In our study, syphilitic serology in the CSF was positive in only 26% of cases, a result consistent with the literature, where the sensitivity of serological tests in the CSF is often low, particularly in HIV-co-infected patients [10]. The absence of radiological lesions on brain imaging in all patients also highlights the limitations of imaging in the early diagnosis of neurosyphilis. This finding can be explained by the slow nature of the inflammation caused by the infection and the fact that conventional imaging often cannot detect the specific lesions associated with neurosyphilis.

Treatment:

The treatment of neurosyphilis in HIV-infected patients relies on the use of highly effective antibiotics, primarily penicillin G, which remains the treatment of choice [11]. In our study, 11 patients were treated with penicillin G, and 4 others with third-generation cephalosporins. Penicillin G is effective against T. pallidum and penetrates well into the CSF, allowing for effective treatment of neurosyphilis. Although cephalosporins are often used due to their broad spectrum, they are not as effective as penicillin in treating syphilis [12]. It is crucial to adjust treatments based on microbiological test results, especially considering the risks of antibiotic resistance in certain contexts, particularly in areas with high prevalence of resistant Treponema pallidum. Combined therapy with cephalosporins and penicillin may be considered in complex or refractory cases, as demonstrated by other studies on the management of HIV-syphilis co-infections [13].

Prognosis and Evolution:

The prognosis of neurosyphilis in HIV-infected patients is guarded. In our study, the outcome was favorable in 86.66% of cases, which aligns with other series, but it should be noted that two deaths were recorded, highlighting the high risk of severe complications in this population [14]. Prognostic factors include the timeliness of treatment, immune status (particularly CD4 count), and the presence of other comorbidities such as tuberculosis or opportunistic infections [15]. Indeed, in immunocompromised patients, the infection can progress rapidly, and

irreversible neurological damage may develop even with appropriate antibiotic treatment.

CONCLUSION

Neurosyphilis is a severe complication of syphilis, particularly in HIV-co-infected patients. Diagnosis remains complex due to the varied clinical manifestations and difficulty in obtaining reliable serological results in an immunocompromised context. Early management and appropriate antibiotic treatment remain essential to improving patient prognosis. However, despite adequate treatment, complete recovery is sometimes difficult, and long-term follow-up is necessary to prevent residual neurological complications.

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