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Nocardia Brain Abscess In A Patient With Advanced HIV-AIDS: Case Report

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Abstract

Nocardia is a gram-positive bacterium that causes localised and disseminated infections in immunosuppressed patients. Due to a long incubation period, it can go undiagnosed. Nocardiosis usually presents with pulmonary symptoms but can also spread to the Central Nervous System where it has been reported to show varying radiological presentations. Being aware that individuals infected with HIV are more susceptible to Nocardiosis is important as co-infection changes the management required to achieve better health outcomes. A rare case of Nocardia infection in an immunocompromised individual is presented. Our patient, a male, 44 years of age, who was HIV positive and on antiretroviral therapy, presented with an episode of generalized tonic-clonic fits along with left-sided weakness. MRI Imaging revealed a space-occupying lesion. Burr hole aspiration was performed and bacterial culture of the brain abscess showed growth of Nocardia. Treatment with co-trimoxazole and amikacin was started which showed positive results. If left untreated, Nocardiosis can lead to focal neurological deficits. Therefore clinicians need to consider a differential of Nocardiosis when they encounter a solitary space occupying a lesion in the brain of an immunocompromised individual.

Keywords: Nocardiosis, Human immunodeficiency Virus, Anti-retroviral therapy, Tuberculosis, Brain Abscess.

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1. Introduction

Nocardia are beaded, weakly staining gram-positive bacteria that cause opportunistic infection in immunosuppressed patients. They cause infection of the skin and Central Nervous System that usually appears concomitantly with pulmonary disease or as a part of disseminated infection, which usually remains undiagnosed. (1) However, isolated brain infection in the form of abscess can also happen. Patients taking immunosuppressants after solid organ transplantation or those infected with Human Immunodeficiency Virus (HIV) are more susceptible to infection. Nocardiosis has an incidence rate of 500 to 1000 per year in the USA. (2) According to a study conducted in Pakistan, many cases of Nocardiosis infection remain undiagnosed locally. (3) Another study from Pakistan indicates that males are affected more by Nocardiosis at (68%), than females at (32%). (4) Incidence of Nocardiosis in HIV-infected individuals is rare but its co-infection drastically changes the outcome and management of the disease. Presented here is a case an of HIV-infected individual diagnosed with Cerebral Nocardiosis. Informed consent was taken from the patient to present findings in this case report.

2. Case Presentation

A 44-year-old male patient presented at the Emergency Department of Pakistan Institute of Medical Sciences, Islamabad, within 2 hours of an episode of generalized tonic-clonic fits and reported left-sided weakness along with urinary incontinence and tongue bite. The patient had been diagnosed with HIV 6 months previously (stage IV AIDS with CD4 count=18). He had been prescribed anti-retroviral therapy consisting of Tenofovir, Disoproxil Fumarate, Lamivudine and Dolutegravir, but was non-compliant with treatment. The patient also reported habitual usage of alcohol, opioids, and cannabis long before his current diagnosis. No previous history of diabetes or hypertension was present. On arrival at the hospital, the patient had a blood pressure of 130/80 mm Hg, pulse of 112 beats per minute, respiratory rate of 23 breaths/min, and Oxygen saturation of 96%. Differential diagnosis of pyogenic brain abscess, seizure, cerebral toxoplasmosis, tuberculous brain abscess, illicit drug withdrawal, and metastatic brain lesion was made. His initial cerebral imaging showed a contrast-enhancing space occupying the lesion. Chest imaging was normal. Physical examination of the patient revealed an altered mental status with GCS of 10/15, left-sided weakness with power of 3/5 in both upper and lower limbs with Babinski's sign present. Muscle strength on the right

side was 5/5 for both upper and lower limbs. The sensation was intact bilaterally to pain and light touch. Gait was unsteady.

The rest of the systemic examination was unremarkable. CT Brain and MRI Brain with contrast were ordered.

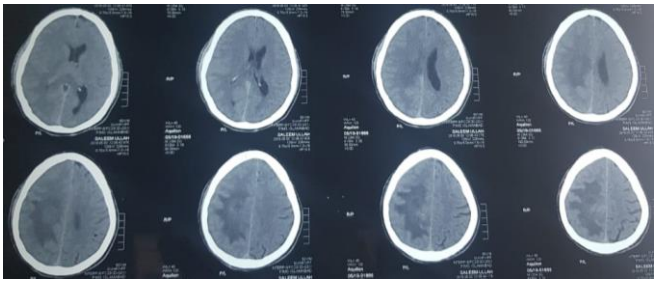

Figure-1 CT brain - Right parietal space-occupying lesion hypodense extending into lateral ventricle with central deviation to the left side

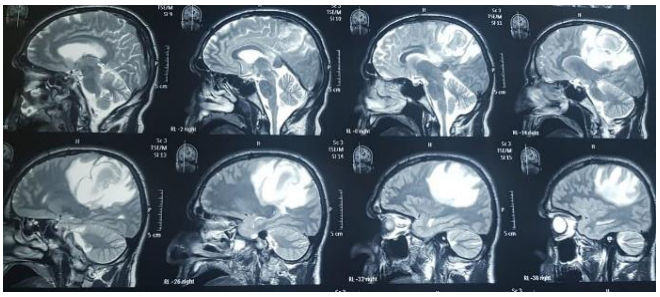

Figure-2 MRI brain - T2 sequence imaging showing hyperintense lesion in parietal lobe extending into the right lateral ventricle and central deviation to the opposite side Informed consent was taken from the patient to publish his case experiences in a case report. He was admitted and provided care in the Infectious Diseases Department of the Pakistan Institute of Medical Sciences, Islamabad, Pakistan, from January 2020 – February 2020. The patient underwent burr hole aspiration of the lesion in the neurosurgical department. Frank's pus was aspirated and sent for microbiological diagnosis. A specimen was also sent for gene xpert for MTB/RIF AFB culture and fungal culture. Bacterial culture came back showing growth of Nocardia spp, which was sensitive to amikacin, trimethoprim, linezolid, ciprofloxacin and moxifloxacin, and resistant to imipenem, ceftriaxone, tobramycin, clarithromycin, amoxicillin-clavulanic acid while being intermediately sensitive to minocycline. Gene X-pert for MTB/RIF did not detect tuberculosis. Fungal culture was also negative. The patient was treated with oral co-trimoxazole 15 mg/kg/day TMP and 75 mg/kg/day SMX in 4 divided doses via nasogastric tube (IV cotrimoxazole is not available in Pakistan).

Linezolid Injection 600 mg IV BD was given along with Amikacin Injection 7.5 mg/kg q12h. Fits were controlled with Leviteracetam 500 mg IV q12h.

While on treatment with linezolid for two weeks, the patient developed thrombocytopenia which resulted in early discontinuation of linezolid. Thrombocytopenia reversed on discontinuation of linezolid.

The patient's GCS gradually improved to 15/15 while his left-sided limb weakness persisted. He was treated with Sulphamethaxazole/Trimethoprim and Amikacin for 6 weeks followed by oral Co-trimoxazole in the continuation phase. Antiretroviral therapy was re-introduced. Patient follow-up is awaited.

3. Discussion

Usually, Nocardiosis presents as lung disease in the form of cavitating pneumonia, with productive or nonproductive cough, dyspnea, hemoptysis, fever, and other systemic symptoms. Skin infections in the form of cellulitis, pyogenic abscesses, or nodular skin lesions are also seen along with spread to the Central Nervous System (CNS). CNS involvement is seen in about 44% of Nocardiosis cases in the form of brain abscess, meningitis or ventriculitis. [(5)] However isolated CNS lesions also occur, and their presentation can be insidious. The radiological presentation can vary from simple brain parenchymal inflammation to complex abscess formation. [(5)] Among HIV-positive individuals, Nocardiosis usually presents with concomitant pulmonary infection or disseminated disease. However, Nocardiosis presenting as an isolated cerebral abscess in a patient with HIV is a rare phenomenon. In such a situation, a high index of suspicion and early diagnosis can greatly improve a patient's health outcomes. The diagnosis of Nocardia is usually made by radiological assessment or by isolation of the organism via cultures or gram staining. [(6)] Gram staining shows gram-positive, beaded, branching rods or filaments. They are characteristically acid-fast by methods such as the modified Kinyoun technique. Growth of Nocardia spp. on solid media takes 48 hours to 14 days and typical colonies are usually seen after 3 to 5 days. Prolonged incubation (up to 2 weeks) and subcultures may be required for their detection. Colonies appear dry, and chalky-white if aerial hyphae are produced. According to an antimicrobial susceptibility study at a tertiary centre diagnostic laboratory in Pakistan, the top 3 drugs Nocardia was most susceptible to are (in order):

Linezolid, Amikacin, and trimethoprim-sulfamethoxazole. [7] Therefore, the suggested first line of treatment in case of Nocardia brain abscess is IV or PO TMP-SMX (co-trimoxazole) along with Imipenem-Cilastatin. In the case of multi-organ involvement, Amikacin should be added to the regimen. Alternative regimens include IV Linezolid plus Meropenem. Initial treatment is IV for 6 weeks in immunocompromised individuals followed by PO treatment for at least one year. Resistance to co-trimoxazole has been seen in 42% of Nocardia isolates in a study from the US. (8) Anti-retroviral therapy for HIV has to be started along with treatment for Nocardiosis [9],[10]. A multidisciplinary approach to treatment can significantly reduce mortality among patients of Nocardiosis which includes counselling on drug adherence, and psycho-social support and involves radiological, microbiological, and neurosurgical departments that also play a part in community outreach to prevent the spread of HIV in the community.

5. Conclusion

A Nocardia brain abscess, if left untreated, can not only lead to focal neurological deficits and seizures but can even prove to be fatal.

Nocardiosis should be considered in the differential diagnosis of a solitary space-occupying lesion in immunocompromised individuals.

CONFLICTS OF INTEREST- None

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Contributions:

M.U, V.B.M, N.A - Conception of study
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M.U, V.B.M, N.A, M.A.M - Analysis/Interpretation/Discussion
M.U, V.B.M, M.A.M - Manuscript Writing
V.B.M, N.A - Critical Review
M.U, V.B.M, N.A, M.A.M - Facilitation and Material analysis

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