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INTRACRANIAL NOCARDIOSIS – A RARE BUT SERIOUS THREAT

Neurosurgery

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ABSTRACT

Nocardia account for only about 2% of all brain abscesses .The difficulties in identifying the bacterium and the frequent delay in initiating adequate therapy often influence the prognosis of patients. Here , we report a rare case of brain abscess caused by nocardia presented with acute complaints of headache, vomiting, altered sensorium and difficulty in hearing. The patient underwent contrast enhanced MRI brain and diagnosed with a left temporal space-occupying lesion (SOL) showing features of mass effect with possible differential diagnosis of metastasis, tuberculoma and brain abscess. He was started on seizure prophylaxis and steroids. A fronto-temporal craniotomy with excision and biopsy of the SOL was performed. Tissue and pus was sent for biopsy and culture sensitivity. Microbiological evaluation with modified Ziehl-Neelsen staining showed acid-fast, slender, branching filamentous organisms resembling Nocardia, confirming nocardial brain abscess. When the brain abscess cultures showed Nocardia species, he was started on oral trimethoprim-sulfamethoxazole (TMP-SMX), intravenous linezolid and metronidazole. Post operative went uneventful with no neurological deficit on POD 13th . Early diagnosis, reasonable surgical intervention, and targeted antibiotic treatment are critical for Nocardia brain abscess treatment.

KEYWORDS

Intracranial nocardiosis, Brain abscess, trimethoprim-sulfamethoxazole

INTRODUCTION

Brain abscesses due to infections are serious intracranial conditions and were historically linked to high rates of illness, disability, and death due to limited diagnostic tools and ineffective treatments. However, with recent progress in imaging techniques, the outcomes of brain abscesses have improved significantly, leading to reduced morbidity and mortality. Nocardial brain abscesses are uncommon and are generally observed in individuals with weakened immune systems. Nocardia are aerobic, gram-positive bacteria, filamentous and branching in structure.[1]

Although Nocardia account for only about 2% of all brain abscesses, they are associated with a higher mortality rate (around 31%) compared to other bacterial infections, which have mortality rates below 10%.[2] Most nocardial brain abscesses (over 80%) are caused by Nocardia farcinica, while infections due to Nocardia brasiliensis are extremely rare. Here, we are describing an interesting case of brain abscess by Nocardia. brasiliensis in a patient with no identified immune deficiency.

Case Report

50-year-old male, admitted to the Department of Neurosurgery at Shri Mahant Indiresh Hospital, Dehradun, in April 2024 with acute complaints of headache, vomiting, altered sensorium and difficulty in hearing.

The patient had history of hypertension. There was no significant, tuberculosis and surgical history, and no known drug allergies. The patient had no history of any recent trauma, meningeal signs of infection (fever, chills, night sweats, neck pain, and weight loss), cough, shortness of breath, abdominal pain, or other systemic signs of infection. The patient underwent contrast enhanced MRI brain (figure1,2) and diagnosed with a ring enhancing left temporal space-occupying lesion (SOL) showing features of mass effect with differentials of metastasis, tuberculoma and brain abscess .

The patient was admitted by neurosurgery department and workup for suspected malignancy or an intracranial abscess was initiated. He was started on seizure prophylaxis and steroids for the cerebral edema and mass effect. No occult malignancy was identified on the imaging studies of the chest, abdomen, and pelvis (fig 3) . A fronto-temporal craniotomy with excision and biopsy of the SOL was performed under general anaesthesia on 3rd day of admission. Intraoperative findings reveals cavitatory lesion with solid and cystic component with purulent material inside and excised tissue and pus sent for biopsy and culture & sensitivity.

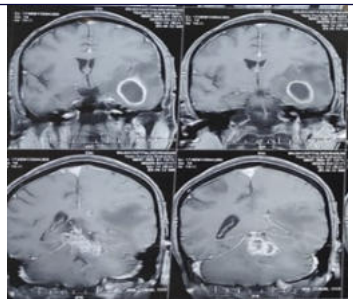


Fig 1 – Mri brain contrast T1 coronal image showing hypointense ring enhancing lesion in the left temporal lobe with multiloculated homogenous enhancement in the left cerebellum and vermis

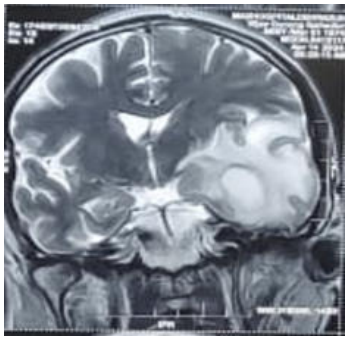


Fig 2 - MRI Brain Coronal section T2 hyperintense lesions with t2 hypointense rim in left temporal lobe and left cerebellum and vermis With disproportionate surrounding edema , Mass effect seen in the form of effacement of adjcent sulcal spaces, cerebellar folia, Left lateral and 4th ventricles

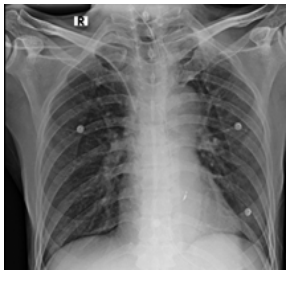


Fig 3 : Chest xray showing prominent bronchovascular markings are noted in bilateral lung fields. No evidence of malignancy

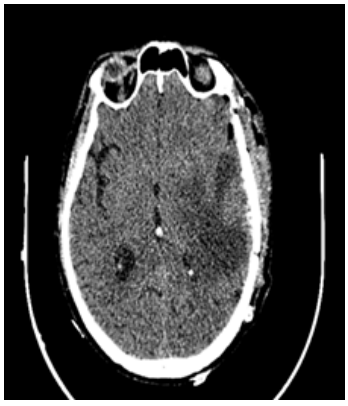
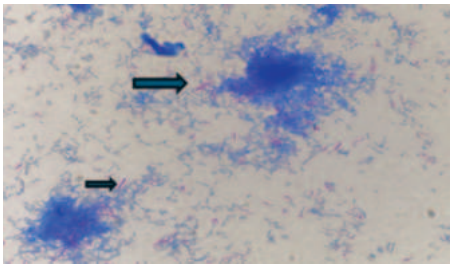


Fig 4 : Post op NCCT BRAIN showing Craniotomy defect with bony flap is seen in left fronto-parieto-temporal region with associated overlying and underlying postoperative changes

The post-operative CT head showed improving left fronto temporal edema with residual postoperative changes (fig 4). Histopathological examination of the excised lesion was suggestive of a brain abscess. Microbiological evaluation with modified Ziehl-Neelsen staining showed acid-fast, slender, branching filamentous organisms resembling Nocardia, confirming nocardial brain abscess (fig 5)



He was tested for HIV and QuantiFERON, which were negative. The patient gave no intake of recent or chronic use of steroids and unpasteurized foods. Post operative, the patient was managed with broad spectrum antibioties, dual antiepilepties such as Epsolin and Levipil, and corticosteroids like Medrol. When the brain abscess cultures showed Nocardia species, the patient was started on oral trimethoprim-sulfamethoxazole (TMP-SMX) through ryle's tube, intravenous linezolid and metronidazole for 4-6 weeks. The patient was managed by supportive care and treatment. The patient remained in the hospital for 13 days. The patient's condition improved with stable vitals and GCS of E4V5M6 at discharge with no neurological deficits for regular follow-up after 21 days to assess for any residual or recurrent neurological deficits.

DISCUSSION

Nocardia species are a diverse group of filamentous gram-positive bacteria that are ubiquitous in the environment. They are commonly found in soil, water (both saltwater and freshwater), and decaying organic matter. These are classically known for opportunistic infections ranging from skin and lymphocutaneous infections to severe diseases involving the pulmonary system and dissemination (brain abscesses)[1,2] The risk factors for acquiring Nocardia infection include immunocompromised states such as HIV, malignancy, renal failure, alcoholism, corticosteroid usage, solid-organ transplant, and chronic lung diseases (such as pulmonary alveolar proteinosis).[3] Clinical features of CNS nocardiosis usually result from local effects of granulomas or abscesses in the brain, less commonly in the spinal cord or meninges.[4,5] The abscess usually can be identified by CT scan or MRI as a ring enhancement at the capsular phase [6], but needs to be distinguished from tumor, cystic or necrotic foci.[7] In our case, after the patient developed symptom of headache, brain abscess was found by MRI examination. Patient underwent surgery for intracranial abscess puncture and suction of pus , smear staining and bacterial culture were performed on the drainage fluid. Nocardia identification can be difficult because of the slowly growing pattern of the germ and low positive rate (colonies usually require at least 48 h of incubation although more commonly 3 to 5 days and up to 14 to 21 days), preferably in selective media [8]. In routine culture media, Nocardia spp. appears as bacilli with ramifications and sub-ramifications at right angles that may form coccus in thioglycolate medium after prolonged incubation.[9] Empiric treatment of cerebral nocardiosis is well established with the use of parenteral TMP/SMX, amikacin, and imipenem–cilastatin.[10,11] Recently, extended-spectrum fluoroquinolones such as moxifloxacin have been used successfully against N. farcinicacerebral abscess.[12] Because of its ability to cross the blood–brain barrier, TMP/SMX is the treatment of choice and may be effective even when in vitro studies show resistance .

CONCLUSION

Nocardia brasiliensis-induced brain abscesses are rare in immunocompetent individuals. Additionally, monitoring patients' immune status and preventing co-infections, particularly fungal infections, is crucial in managing NocaNocardiatients' immune status and preventing co-infections, particularly fungal infections, is crucial in managing Nocardiain abscess.

Declaration Of Patient Consent

We have obtained all appropriate consent forms . In the form the patient has given his consent for his images and other clinical information to be reported in the journal .The patient understand that his name and initials will not be published and due efforts will be made to conceal his identity , but anonymity cannot be guaranteed.

Conflicts Of Interest

There are no conflicts of interest

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