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An Inflammatory Lesion Presenting as Tumor: A Case Report

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ABSTRACT

INTRODUCTION: Brain parenchymal infection with pyogenic bacteria is often responsible for the development of brain abscesses. Brain abscess begins as a localized area of cerebritis followed by purulent lesion surrounded by a fibrotic capsule. Several pathogens that are involved in its development includes Streptococcus spp., Staphylococci, Bacteroides, Enterobacteriaceae, Fusobacterium spp. and etc.

CASE REPORT: We are presenting a case of right frontal lobe abscess of brain mimicking brain tumor in a 25-year-old male patient. He presented with chief complaints of fever associated with headache for 7 days and seizure for 2 days. He also gave history of intermittent headaches for 1 month. Imaging studies revealed the presence of right frontal space occupying lesion exerting mass effect. He finally underwent right frontal craniectomy with excision of the lesion. Histopathological examination (HPE) confirmed the diagnosis of right frontal abscess and excluded neoplastic etiology. Gram stain showed presence of Gram-positive cocci and confirmed infective etiology.

CONCLUSION: Numerous non-neoplastic lesions can mimic brain tumors and brain abscess is one of them. A systematic approach and assessment of patient's history help to provide clue to narrow the differential.

Keywords: Brain abscess, cerebritis, craniotomy, craniectomy, Computed Tomography, histopathological examination, Magnetic Resonance Imaging, pyogenic bacteria

INTRODUCTION

Brain parenchymal infection with pyogenic bacteria is often responsible for the development of brain abscesses. Brain abscess begins as a localized area of cerebritis followed by purulent lesion surrounded by a fibrotic capsule. Several pathogens that are involved in its development includes Streptococcus spp., Staphylococci, Bacteroides, Enterobacteriaceae, Fusobacterium spp. [1]. The differential diagnosis of a brain lesion that reveals a ring-like enhancement pattern on computed tomography (CT) and

magnetic resonance imaging (MRI), is tough and typically includes necrotic tumor and pyogenic brain abscess [1]. A multidisciplinary approach and assessment of patient's history may help to differentiate between them.

CASE REPORT

A 25-year-old man presented with chief complaints of fever associated with severe headache for 7 days. He also had two episodes of seizure for 2 days. He was having intermittent unilateral headache for one month for which he was on medication as prescribed by a local Psychiatrist. However, his headache got intensified. This time the headache was associated with fever and he developed 2 episodes of seizures in the next 2 days. He was admitted to the hospital when the third episode of seizure developed. After admission the seizure was controlled.

The Full blood count showed leucocytosis with increased neutrophil count. Other investigations, Blood sugar, urea, creatinine, Liver Function tests were within normal limits

The CT-scan of brain was done which revealed an ill-defined hypodense lesion in the right high frontal region measuring (3.6 x 2.8 cm) with peripheral vasogenic oedema involving genu of corpus callosum, right frontal region (Fig.1). There was a midline shift of approx. 11 mm towards left side with effacement of adjacent right lateral ventricle. But the CT scan could not differentiate between infective and neoplastic etiology. The patient's general condition was deteriorating and CT-scan brain failed to give a definitive diagnosis. So he was advised to undergo MRI brain-plain and contrast with spectroscopy. The MRI revealed a 5.2 x 2.8 cm irregular smooth walled lesion. It was peripherally enhancing T2/FLAIR hyperintense with altered signal intensity (Fig.2). There was central diffusion restriction in right frontal lobe involving corpus callosum with adjacent edema causing mid line shift of 10 mm towards left. MR spectroscopy showed elevated negative lactate peak, decreased NAA peak, decreased choline: creatinine ratio (Fig.3).

Lumber puncture was done. The cerebrospinal fluid (CSF) showed glucose 124 mg%, protein 145 mg%. Gram stain of the centrifuged deposit of CSF showed 5-6 pus cells/ oil immersion field and occasional RBC.

Overall findings were suggestive of infective etiology.

He then underwent right frontal craniectomy with excision of the abscess wall with abscess discharge. Gram stain of abscess showed presence of gram-positive cocci. HPE of the excised tissue showed central core of necrotic debris with neutrophilic infiltration surrounded by variable amount of granulation tissue, mixed inflammatory infiltrates, activated histiocytes, reactive astrocytes were seen in the adjacent oedematous brain tissue (Fig.4-6). The HPE reort was in keeping with the diagnosis of frontal abscess.

In the post operative period the patient was well without any further complications and was discharged on the 10th post operative day.

He came for follow up after six months and he was perfectly well.

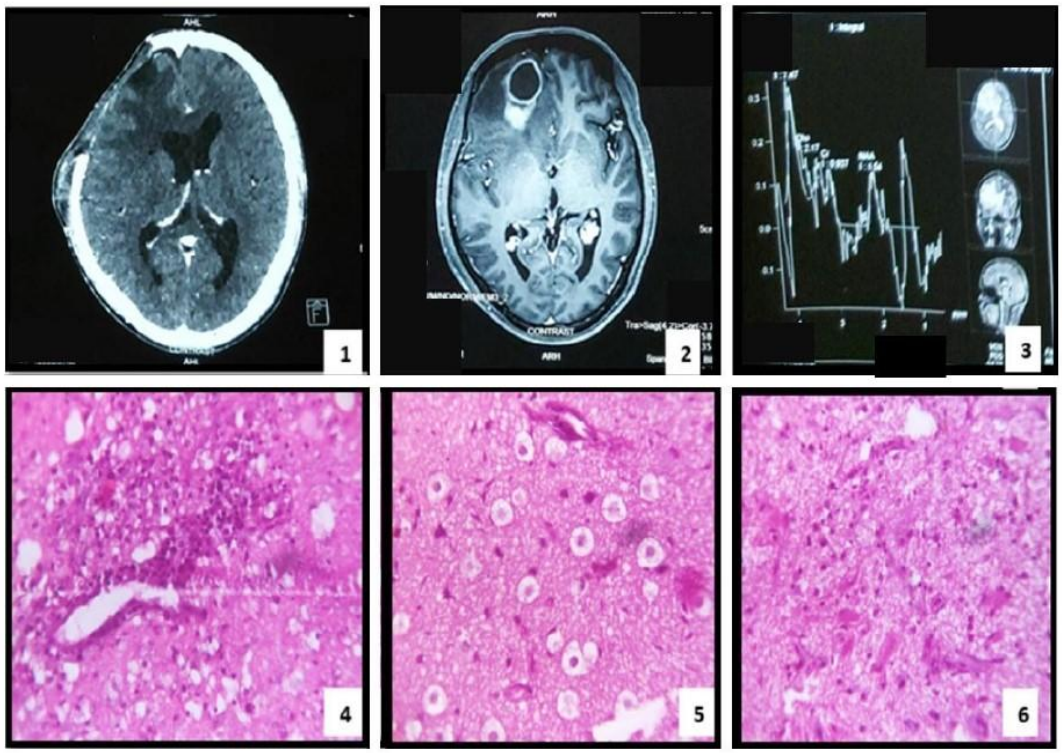

Figure 1: CT-scan brain showing ill defined hypodense lesion in the right high frontal region with peripheral vasogenic oedema involving genu of corpus callosum, right frontal region causing midline shift towards left with effacement of adjacent right lateral ventricle.

Figure 2: MRI brain showing irregular smooth walled peripherally enhancing T2/FLAIR hyperintense altered signal intensity lesion with central diffusion restriction in the right frontal lobe with involvement of corpus callosum and adjacent oedema causing midline shift towards left.

Figure 3: MR spectroscopy showing elevated negative lactate peak, decreased NAA peak, decreased choline : creatinine ratio.

Figure 4: H&E (400X) of brain tissue showing necrotic debris with neutrophilic infiltration.

Figure 5: H&E (400X) of brain tissue showing reactive astrocytes with adjacent oedematous brain tissue.

Figure 6: H&E (400X) of brain tissue showing variable amounts of granulation tissue with mixed inflammatory cells and activated histiocytes.

DISCUSSION

The approach to establish the cause of brain lesions should begin with careful consideration of radio-logical imaging, laboratory test results, patient history and overall clinical presentation [2,3,4]. There are several non-neoplastic disease processes like multiple sclerosis, stroke, pyogenic abscess, toxoplasmosis, tuberculosis, cysticercosis, fungal infections, syphilis,

sarcoidosis, Behçet disease, radiation necrosis, venous thrombosis may imitate brain tumors. The brain abscesses also mimic vasculitides and demyelinating lesions. There are studies of brain abscesses caused by non- Streptococcus species, polyangitis are initially mistaken for malignant brain tumors[5,6,7]. Our case of right frontal brain abscess in a young male patient was initially thought to be a brain tumor.

Brain tissue reacts to the pathogen leading to local cerebritis and subsequently an encapsulated brain abscess is formed within 10-14 days. Most common symptoms are headache, fever which is found only in 50% of the patients [8]. Similar findings were present in our case. The episodes of seizures were associated with it.

Imaging modalities (CT, MRI) cannot always differentiate between abscess and neoplastic lesion which shows peripheral ring-like contrast enhancement. Diffusion-weighted imaging (DWI) and apparent diffusion coefficient (ADC) is used to differentiate brain abscesses from cystic or necrotic brain tumors [9]. Additionally, magnetic resonance spectroscopy may help in obtaining the correct preoperative diagnosis when combined with DWI [10]. In our case CT-scan brain as well as MRI-Plain and contrast with spectroscopy was done. Microbiological diagnosis is determined by Gram's stain and culture of abscess material, however in our case only Gram stain of abscess material was done which revealed the presence of gram-positive cocci. Complete excision of brain abscess via craniotomy or craniectomy is usually reserved for multiloculated abscesses. But our patient underwent right frontal craniectomy with excision of the abscess wall with abscess discharge.

CONCLUSION

Numerous non-neoplastic lesions can mimic brain tumors; brain abscess is one of them. Strong clinical suspicion, systematic approach and assessment of patient's history help to provide a clue to narrow the differential. Discrimination between brain abscess and brain tumor is of paramount importance as they require completely different therapeutic approaches and they carry diverse prognosis and improper treatments can cause significant harm to the patient.

Declaration by Authors

Consent: Written informed consent was obtained from the patient for publication of this case report and accompanying images.

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Conflict of Interest: The authors declare no conflict of interest.

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