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Atypical Imaging Findings in a Case of Tuberculous Meningitis

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Description

Tuberculous Meningitis (TBM) is a severe form of tuberculosis affecting the central nervous system. It typically presents with characteristic imaging findings. We report a case of TBM with atypical radiological features, including absence of hydrocephalus and focal brain lesions. This case highlights the importance of recognizing uncommon imaging patterns to facilitate early diagnosis and treatment.

Tuberculous Meningitis (TBM) is a life-threatening form of tuberculosis that affects the meninges and central nervous system. It is characterized by classical clinical features, such as fever, headache, neck stiffness, and altered mental status. Radiological imaging, including Computed Tomography (CT) and Magnetic Resonance Imaging (MRI), often reveals specific findings, such as basal meningeal enhancement and hydrocephalus. Atypical imaging presentations of TBM are rare but pose a diagnostic challenge.

A 34-year-old male with no known medical history presented to our hospital with complaints of persistent headache and fever for the past three weeks. The patient had no history of tuberculosis exposure or prior infection. On clinical examination, he exhibited signs of meningeal irritation, including neck stiffness.

Initial laboratory tests revealed elevated Cerebrospinal Fluid (CSF) white blood cell count (500 cells/μL), increased protein concentration (180 mg/dL), and low glucose levels (40 mg/dL). Ziehl-Neelsen staining of the CSF was negative for acid-fast bacilli.

Contrast-enhanced brain MRI was performed, which surprisingly showed no evidence of hydrocephalus or basal meningeal enhancement, both of which are typical findings in TBM. Instead, the MRI displayed multiple small enhancing nodules scattered throughout the brain parenchyma.

To further evaluate these atypical imaging findings, a brain biopsy was performed. Histopathological examination of brain tissue revealed caseating granulomas consistent with mycobacterial infection. Mycobacterium tuberculosis DNA was detected in the biopsy specimen through Polymerase Chain Reaction (PCR), confirming the diagnosis of TBM.

The patient was initiated on a standard anti-tubercular regimen, including isoniazid, rifampicin, pyrazinamide, and ethambutol, in addition to corticosteroids for adjunctive therapy. The patient demonstrated clinical improvement, with resolution of the fever and headache during the subsequent weeks.

Discussion

Atypical radiological findings in TBM are rare but should be considered in the differential diagnosis of patients with clinical features suggestive of TBM. The classical imaging findings include basal meningeal enhancement, hydrocephalus, and cerebral infarcts. However, as in our case, TBM can present with unique radiological features, such as the absence of hydrocephalus and the presence of focal brain lesions.

These atypical imaging patterns may result from variations in the host immune response and mycobacterial virulence factors, leading to different pathological processes. Nodular brain lesions in TBM may represent tuberculomas, which can be more commonly observed in extrapulmonary tuberculosis.

The diagnosis of TBM remains challenging, especially in cases with unusual imaging features. The definitive diagnosis often relies on the demonstration of mycobacterial DNA or the presence of acid-fast bacilli in CSF or tissue specimens. Empirical treatment with anti-tubercular drugs and corticosteroids should be considered when clinical suspicion is high, even in the absence of typical imaging findings.

Conclusion

This case highlights the importance of recognizing atypical imaging findings in TBM to facilitate early diagnosis and treatment. Clinicians and radiologists should be aware that TBM can present with unique radiological features, and a high index of suspicion is crucial in cases with clinical symptoms suggestive of TBM but without typical imaging findings.

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