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MRI-Guided Stereotactic Craniotomy to Set the Diagnosis of CNS Cryptococcosis. Case Report and Review of the International Literature

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1. Abstract

Cryptococcosis - a fungal infection - mainly caused by Cryptococcus Neoformans and Cryptococcus Gattii, may affect human central neural system (CNS) with various clinical manifestations. Diagnosisisusuallyconfirmedbydirect CSF microscopic examination for encapsulated yeasts by India ink preparation. However, sometimes laboratory tests may not be indicative and brain imaging with biopsy is necessary to reveal the cause in order to offer the adequate beneficial treatment to patients. We present a case of Cryptococcosis diagnosed by our department while reviewing the international literature.

2. Introduction

Cryptococcosis is considered an invasive fungal infection that is caused by Cryptococcus species. Although no human-to-human transmission has been observed, recently cryptococci have been identified to infect and potentially eliminate their human hosts [1,2]. Currently there are two species that commonly cause disease in humans, C. Neoformans and C. Gattii, mainly affecting immunocompromised patients or patients with pre-existing medical conditions [3].

The aim of this article is to present a case of cryptococcosis diagnosed by our department while reviewing the international literature.

3. MaterialsandMethods

A previously healthy 44 year old female patient presented with an episode of sudden loss of consciousness. No previous medical history has been reported, including no history of recurrent infections, no travel history outside the state, and was not taking any medications before her admission to the hospital. Her family was healthy. The episode was repeated for additional three times within the first 24 hours from the onset of the symptoms. Patient was admitted in the hospital and the initial assessment correlated the episodes with generalized tonic-clonic seizures. These seizures were associated with postictus urinary loss. On the fifth day of the hospitalization the patient mild temperature elevation (37,5 °C) was added to the symptoms.

The initial neurological assessment did not revealed any significant deficit with the exception of increased right side reflexes. The cognitive evaluation, the cranial nerve function, the motor function and the cerebellar tests were within normal range.

The laboratory analysis, including biochemical results were normal (Table 1), while the infection laboratory panel tests were negative as well (Table 2).

The patient underwent a brain imaging testing. The CT scan that revealed a minor non-enhancing hypodense lesion on the left temporal area, with associated perifocal edema (Figure 1). In addition to that the head MRI showed a focal lesion of the left temporal

lobewithlowsignalonT1-weightedsequenceandhighsignalon T2-weighted sequence (Figure 2). The differential diagnosis of the lesion presented in the brain imaging included metastasis and brain abscess.

PatientunderwentaCT-guidedstereotacticminorcraniotomyand removalofthelesionofthelefttemporallobewithinnormalmar- gins. The postoperative recovery of the patient was uneventful.

Table1: Laboratorytests

Laboratory tests:	Results:
Hct	37,3%
WBC (Neu:80%)	6190
PLT	306000
Erythrocyte Sedimentation Rate (ESR)	10mm/hour
Sodium	138,2mmol/L
Potassium	3,98mmol/L
BUN	23mg/dL
Serum Creatinine	0,7mg/dL
GGT	19
SGOT	16
SGPT	14

Table2: Inflammatorybiomarkers

Inflammatorybiomarkers:	Results:
CRP	(-)
Widal	(-)
Wright	(-)
Borrelia	(-)
ASTO	(-)
Toxo-IgM	(-)
Toxo-IgG	(-)
ANA	(-)
HIV	(-)

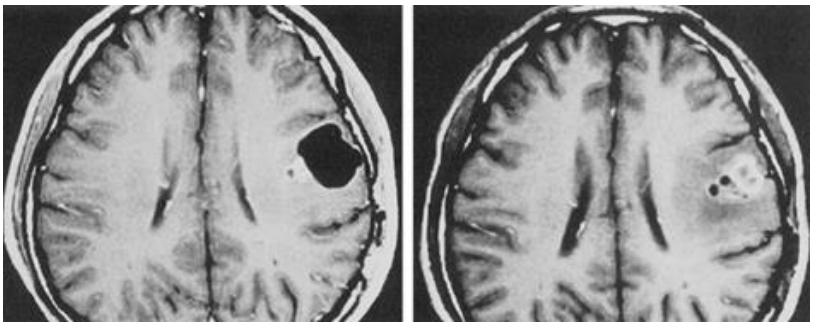

Figure1:CT-brain

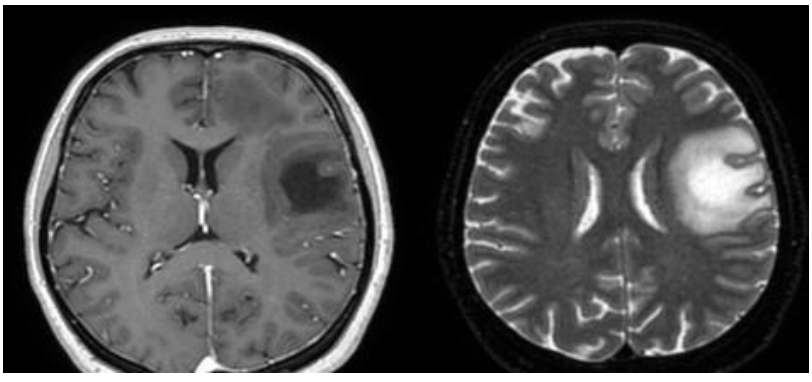

Figure2:MRIbrain(T1-weighted,T2-weighted)

4. Results

Pathology on the surgical specimen revealed 3 minor tissue samples, of various sizes ranging from 6mm to 10mm. Microscopic analysis revealed brain grey matter with parts of granulomatous necrotic inflammation, while Cryptococcus fungi were observed within the specimen. The conclusive result of pathology report was Cryptococcus encephalitis. Patient was referred to Infectious Disease Department for further treatment and was eventually discharged home after the adequate treatment.

5. Discussion

ThemajorityofCryptococcusinfectionsinhumansarecausedby C.Neoformans (99%), while the minor remaining 1% is causedbytheC.Gattiispecies[4,5],withendemicvarietyinAustral- ia and New Zealand [3,6]. CNS clinical manifestations vary and might range from headache, increased temperature, seizures, loss or altered level of consciousness, neurological deficits from cranialnervesandupperorlowerextremitiesandsignsofmeningitis [3,7–9].Thetimeintervalfromtheonsetoftheinfectionuntilthe development of the clinical manifestations usually includes several weeks, whereas there cases with sudden onset, and lack of symptomsandsignshavebeenreportedaswell[10].Thediagnosisisusuallybasedondirect CSF microscopic examination for encapsulated yeasts by India ink preparation. Histopathology in cases of severe CNS infection icludes substantial thickening of meninges, diffuse infiltration of Cryptococci spp in the parenchyma, andassociatedinflammationandoedema[11].Thebrainimaging testing in our case, including brain CT and MRI were consistent with the findings reported in the international literature including the low-density on T1-weighted and high-density lesions on T2-weighted MRI images of the cryptococcomas [12,13]. While the majority of the cases are being diagnosed by blood and CSF laboratory analysis, in our case that the initial results were within normal range, and there was a high indication of CNS infection from the brain MRI findings, the diagnosis was set by surgically removal of the lesion and subsequent histopathology [14,15].

6. Conclusion

Cryptococcosis is a worldwide high recognizable opportunistic fungal infection that may disseminate to the CNS causing meningoencephalitis with possible fatal consequences. Primary diagnosis elaborates the adequate beneficial treatment of the disease that is required for satisfactory outcome. Although the diagnosis is usually set by laboratory blood and CSF test, when these donot prove to be conclusive and the brain imaging testing indicate the possibility of a surgically removable lesion, a navigated craniotomy and removal of the lesion should be performed and the subsequenthistopathologicalexaminationcouldpossiblyestablish the diagnosis of Cryptococcus CNS infection.

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