

## INTRAVENTRICULAR RUPTURE OF BRAIN ABSCESS: CASE REPORT

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### ABSTRACT

Intraventricular rupture of brain abscess is a life-threatening complication of purulent brain abscess and is associated with very high mortality. We present a case of a 59 years-old patient presenting a frontal brain abscess ruptured in the lateral ventricle.

**KEYWORDS:** Brain abscess, Intraventricular rupture of brain abscess, Brain abscess rupture.

### INTRODUCTION

Brain abscess is a severe intracranial infectious disease, associated with high disability and mortality rates. Early diagnoses with the help of imaging technologies and treatment have reduced the mortality rate.

### CASE PRESENTATION

A 59-years old patient with a past medical history of diabetes and hypertension was admitted to the emergency department for severe headaches and confusion associated with high-grade fever complicated with left hemiparesis. Brain MRI was performed revealing a frontal lesion with central restricted diffusion, ring peripheral enhancement, and surrounding

edema. The content of the left lateral ventricle showed restricted diffusion and mild enhancement along the ependymal lining suggestive of ventriculitis secondary to abscess rupture into the ventricular system. Decompressive craniotomy with intraventricular drainage and excision of the abscess was performed.

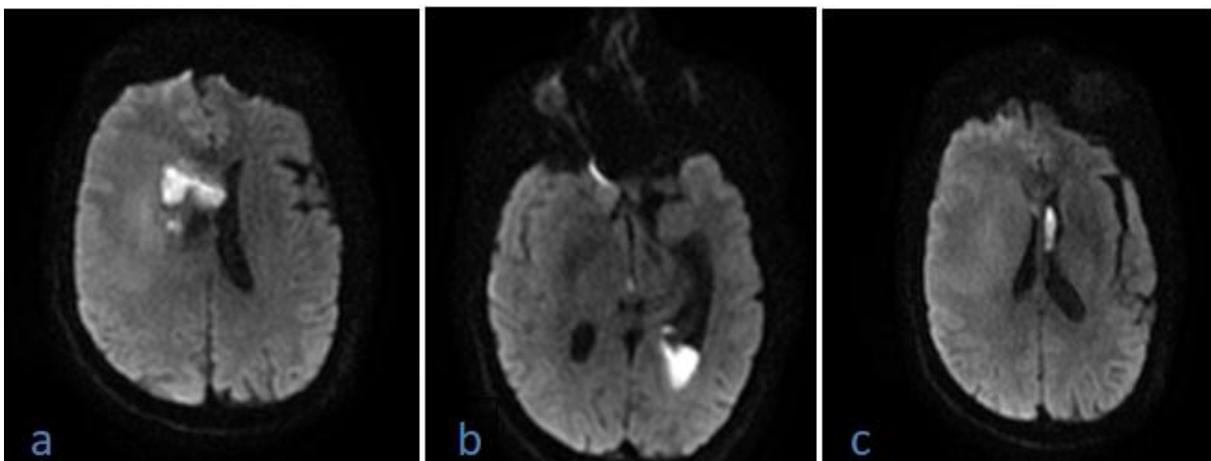
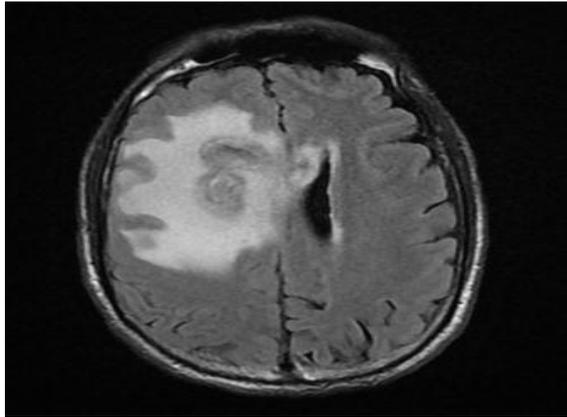
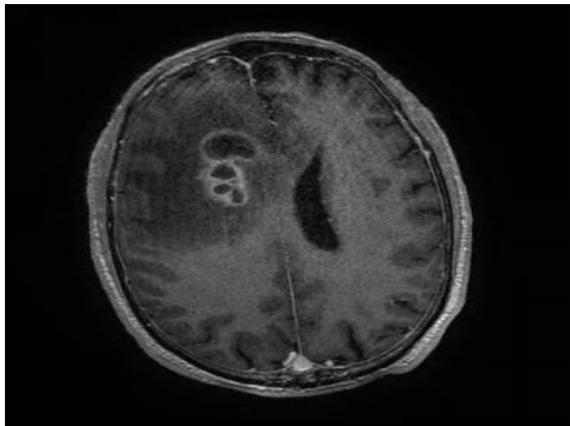


Figure 1: Axial diffusion-weighted images revealing restriction of the lesional process (a), and the contents of the left lateral ventricle (b, c).



**Figure 2: Axial T2 Flair showing a right frontal lesional process with perilesional edema.**



**Figure 3: Axial T1 C+ showing peripheral enhancement of the lesional process.**

## DISCUSSION

Brain abscess is a life-threatening infection. Its most clinical manifestations include headache, changes in mental status, fever, focal neurologic deficit, and seizures. The location of the abscess also determines the clinical presentation. It results from either bacteremia with seeding of the brain, direct spread from a local infection (dental, sinuses, ears, etc.), or secondary to trauma. The most common pathogens are *Streptococcus*, *Staphylococcus*, and anaerobes.<sup>[1],[2]</sup>

Intraventricular rupture of brain abscess is a catastrophic and rare complication of pyogenic brain abscess. Its incidence range from 1% to 31%. Pyogenic brain abscesses tend to rupture into the ventricle as capsule formation is more complete on the cortical side than on the ventricular side.<sup>[3]</sup>

According to Takeshita et al. signs of meningeal irritation and localized enhancement of the ventricular wall adjacent to the abscess are events preceding the intraventricular rupture of a brain abscess. Lee et al. concluded that the morphology of the abscess and the distance between abscesses and the ventricle walls, rather than the size of the abscess, are predictors of intraventricular rupture.<sup>[3]</sup>

On MRI, brain abscess shows ring enhancement and perifocal edema. These manifestations are similar to neoplastic process (brain gliomas and metastases). Advanced MRI techniques play an important role in the differential diagnosis between these two entities.<sup>[2],[4]</sup>

On magnetic resonance spectroscopy (MRS), the necrotic center lacks normal brain metabolites (N-acetylaspartic acid, choline, and cholic acid) but has elevated levels of cytoplasmic amino acids and lactic acid. Lactic acid and lipid signals can be detected in cases of brain abscess and brain tumor, but valine, leucine, and isoleucine are the key markers for diagnosing brain abscess.

On diffusion-weighted imaging (DWI) brain abscess manifests a hyperintense signal on DWI and hypointense in ADC depending on the stage of the abscess, the high cellularity, and viscosity of the pus in the abscess cavity (higher ADC values are found in fungal abscesses than in bacterial abscesses). In contrast, a necrotic, cystic degeneration area of brain tumor demonstrates high diffusivity, that is, hypointense in DWI with an increased ADC value.

The susceptibility-weighted imaging (SWI) helps detect blood products. The random deposition of hemorrhagic products in glioblastoma causes the presence of a hypointense rim surrounding the necrotic center, which is usually irregular and incomplete, unlike the hypointense rim present in the brain abscess, which is usually smooth and complete. The characteristic appearance of a pyogenic brain abscess is a concentric hypointense rim surrounding a hyperintense rim creating the “dual rim sign” and is found in the SWI due to its sensitivity to both paramagnetic and diamagnetic substances. The dual rim sign has been reported to be the most specific feature in differentiating brain abscess from glioblastoma on SWI.<sup>[2],[4]</sup>

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