Brain abscess magnetic resonance imaging

- Secondary Pituitary Abscess Inside a Macroadenoma Complicated by Postoperative Hemorrhage and Reinfection: A Case Report
- Silent Fungal Invasion: A Case of Aspergillus Brain Abscesses in an Immunocompetent Older Adult Patient
- Otogenic Lateral and Transverse Sinovenous Thrombosis in a Child: A Case Report
- Brain Abscess Mimicking Brain Tumors: A Systematic Review of Individual Patient's Data
- Disseminated and migratory sparganosis in the central nervous system: A case report and literature review of combined spinal and intracranial involvement
- A rare case of multiple brain abscesses caused by Nocardia abscessus co-infection with tuberculous meningitis in an immunocompetent patient
- Brain abscess mimicking a brain tumor only realized during surgery: A case report in a resource strained environment
- A case report of disseminated aspergillosis in an immunocompetent patient proven by choroid plexus biopsy

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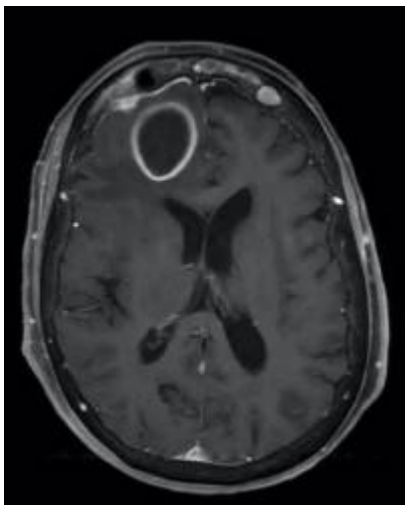
Fortunately, magnetic resonance imaging is usually able to convincingly make the brain abscess diagnosis, distinguishing abscesses from other ring-enhancing lesions.

MRI is more sensitive than CT. Although peripherally-enhancing lesions may be non-specific by imaging, Diffusion-weighted magnetic resonance imagings (less commonly MR spectroscopy) showing central restricted diffusion is critical for suggesting the diagnosis of a brain abscess. [1)]

T1



central low intensity (hyperintense to CSF)

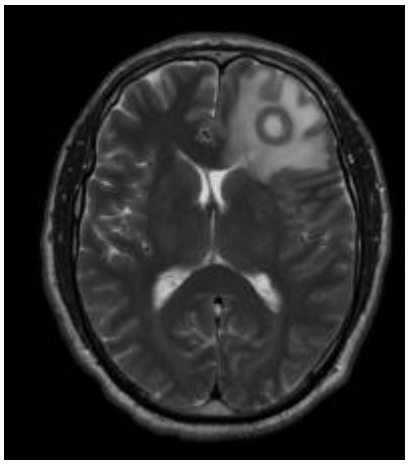
peripheral low intensity (vasogenic edema)

ring enhancement

ventriculitis may be present, in which case hydrocephalus will commonly also be seen

T2-weighted magnetic resonance imaging sequence

On T2-weighted magnetic resonance imaging sequence, the brain abscess is hyperintense and the surrounding capsule is hypointense. There is extensive surrounding edema in most cases. The finding of a capsule that is hypointense on a T2-weighted image and mildly hyperintense on a T1-weighted image is suggestive of an abscess capsule.



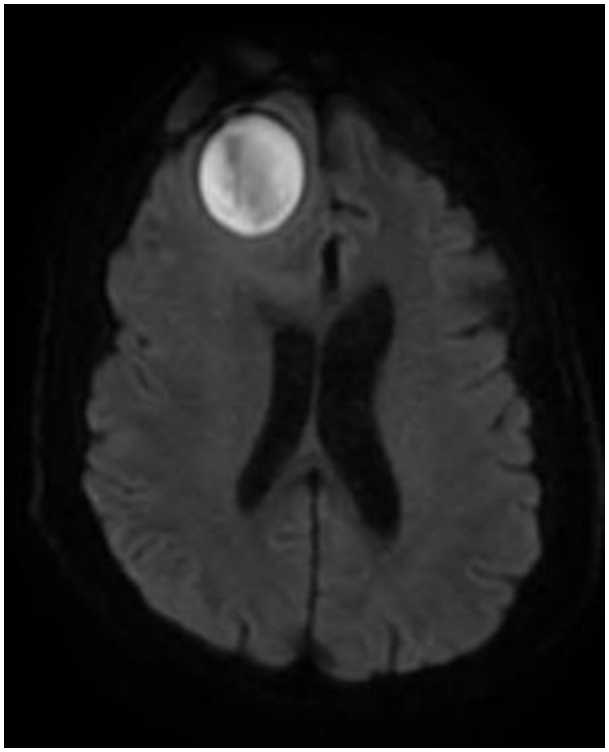
DWI/ADC

high DWI signal is usually present centrally

represents true restricted diffusion.

peripheral or patchy restricted diffusion may also be seen; this finding is however not as constant as one may think, with up to half of the rim-enhancing lesions demonstrating some restriction not proving to be abscesses.

in some immunocompromised states, central content may not diffusion restrict



The DWI shows often hyperintensity (restriction), (not reliable).

Diffusion-weighted imaging (DWI) is widely appreciated as an indispensable tool in the examination of the central nervous system. It is considered useful not only for the detection of acute ischemic stroke but also for the characterization and differentiation of brain tumors and brain abscess.

T2-FLAIR magnetic resonance imaging sequence

T2-FLAIR magnetic resonance imaging sequence for brain abscess

SWI

low-intensity rim

complete in 75%

smooth in 90%

mostly overlaps with contrast-enhancing rim

dual rim sign: a hyperintense line located inside the low-intensity rim

MR perfusion

rCBV is reduced in the surrounding edema cf. to both normal white matter and tumor edema seen in high-grade gliomas.

Proton magnetic resonance spectroscopic imaging

Elevated peaks are seen corresponding to lipids/lactate, succinate, acetate, and amino acids (alanine, valine, leucine, and isoleucine).

Proton magnetic resonance spectroscopic imaging (PMRS) has high sensitivity and specificity for the detection of pyogenic brain abscess and the categorization of bacteria. But the metabolite patterns failed to evaluate the etiology of disease when the culture results are sterile.

Based on metabolite resonances, PMRS can detect slow growing and fastidious organisms and classify them into aerobic and anaerobic bacteria which are difficult to culture by conventional method. It can categorize microorganisms even in culture sterile samples with rational sensitivity and specificity which may allow early choice of targeted therapy [2].

1)
https://radiopaedia.org/articles/brain-abscess-1#:~:text=A%20brain%20abscess%20is%20a,radiological%20identification%20and%20rapid%20treatment.

2)
Bajpai A, Prasad KN, Mishra P, Gupta RK, Singh AK, Ojha BK. Multimodal approach for diagnosis of bacterial etiology in brain abscess. Magn Reson Imaging. 2014 Feb 18. pii: S0730-725X(14)00058-7. doi: 10.1016/j.mri.2014.02.015. [Epub ahead of print] PubMed PMID: 24661636.