



Cryptococcosis

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Cryptococcus neoformans is a common organism found in the soil and the most common fungal infection of the central nervous system. It is encapsulated with a hydrophilic polysaccharide that takes up India Ink stain. It is the second most common opportunistic infection in HIV/AIDS patients (second to the parasite toxoplasmosis).

Patients with CD4+ count less than 100 cells/mL are at greatest risk for contracting cryptococcosis, particularly in endemic areas. Clinical presentation is nonspecific, including headache, neck stiffness, nausea, seizure, and possibly without localizing neurologic deficits.

Imaging Features

There are three predominant forms of pathology of cryptococcus infection in the brain: meningitis, parenchymal cryptococcoma, and gelatinous pseudocysts associated with the perivascular spaces in the basal ganglia. These pathologic findings may produce minimal changes on imaging and in many cases one must have an elevated level of suspicion in the appropriate clinical setting to diagnose this disease.

- CT:
 - Usually normal.
 - Nonspecific findings include hydrocephalus, atrophy, edema, and hypodense parenchymal lesions corresponding to cryptococcomas or pseudocysts.
- MR:

- Leptomeningeal thickening – best seen on T1 post-contrast.
- Encephalitis appears as ill – defined or patchy parenchymal enhancement with surrounding edema seen as high T2/FLAIR signal.
- Intraparenchymal enhancing nodule(s) (cryptococcomas) in the basal ganglia, thalami, and cerebellum – best seen on T1 post-contrast. T2/FLAIR show high signal reflecting the lesion and surrounding edema.
- Dilated perivascular spaces (Virchow-Robin spaces) with “soap bubble” morphology – T1 intermediate signal (unlike CSF, which is black on T1 sequences), T2 hyperintense, FLAIR hyperintensity (incompletely suppressed compared to CSF), and variable degree of enhancement (greater degree in immunocompetent patients).
- Extra-axial pseudocysts in the skull base have been described, these also show intermediate T1 signal.
- Intraventricular pseudocysts have been described. These expand the ventricles, creating a scalloped appearance and have low-to-intermediate T1 signal.
- Complications:
 - Hydrocephalus
 - Infarct

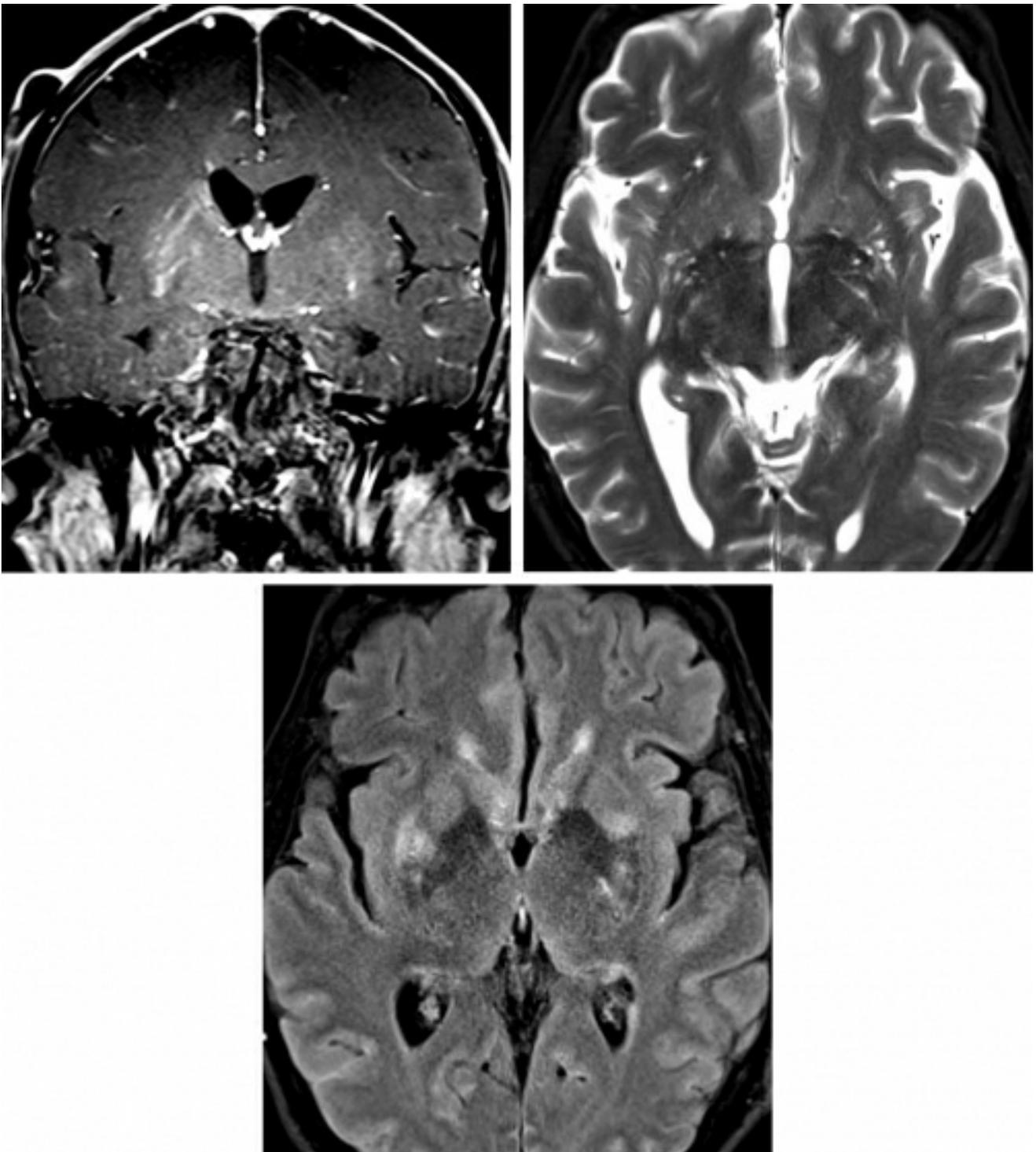


Figure 1: Cryptococcal Meningitis with Virchow-Robin space involvement. Coronal T1+C (top row left): Abnormal enhancement along the expected course of the perivascular spaces in the lentiform nuclei, greater on the right. Axial T2 (top row right): The appearance of the perivascular space involvement by cryptococcus can look similar to physiologic dilatation of these spaces. Axial FLAIR (bottom row): However, FLAIR hyperintensity in and around these perivascular should raise suspicion for cryptococcus in the appropriate clinical

context.

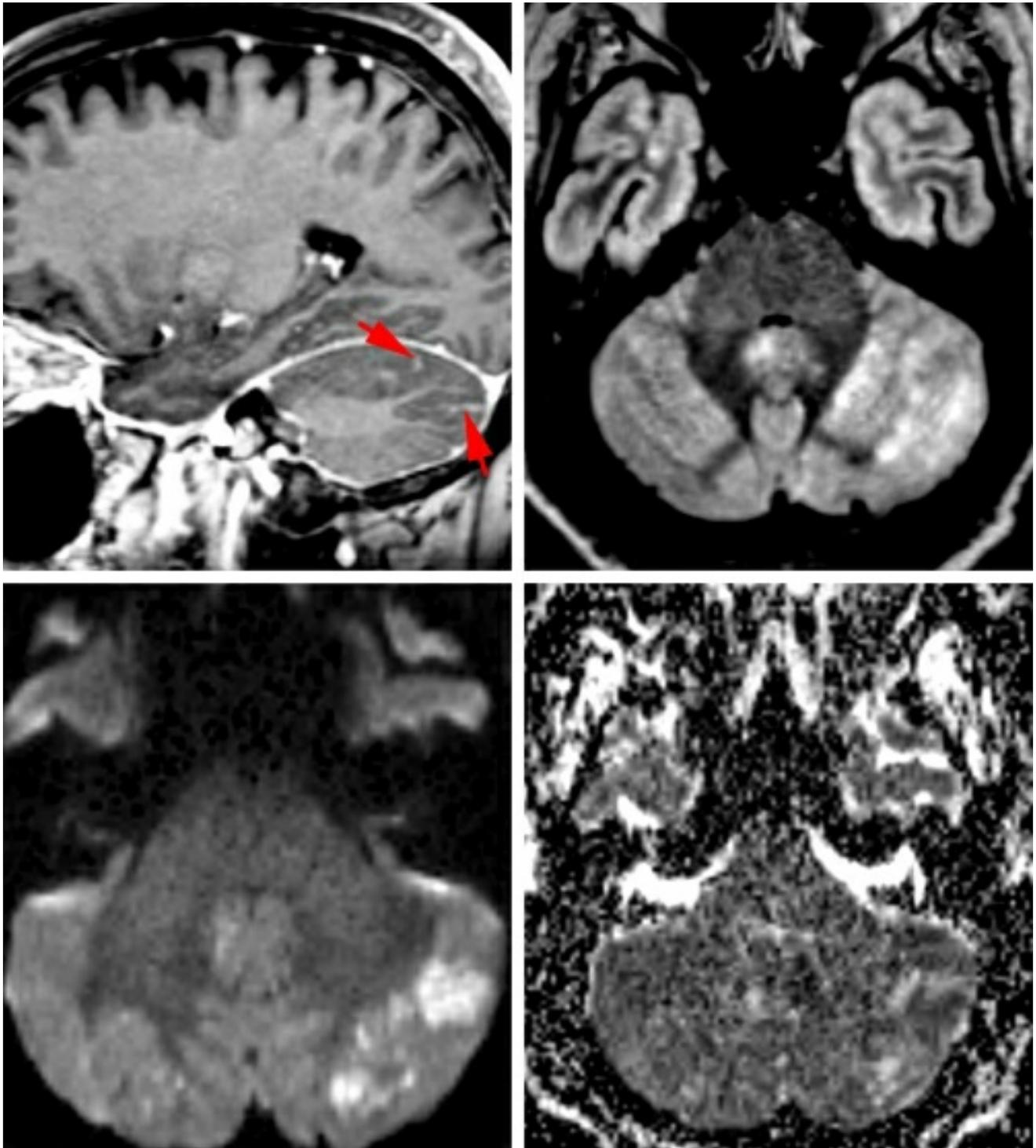


Figure 2: Meningoencephalitis. Sagittal T1+C (top row left): Small amount of nodular enhancement within the cerebellar sulci representing leptomeningeal cryptococcal involvement (arrows). FLAIR (top row right): asymmetrically increased signal in the left cerebellar hemisphere representing edema. DWI hyperintensity (bottom row left) and corresponding low ADC signal intensity

(bottom row right) indicate restricted diffusion of acute infarct as a complication of the meningitis.

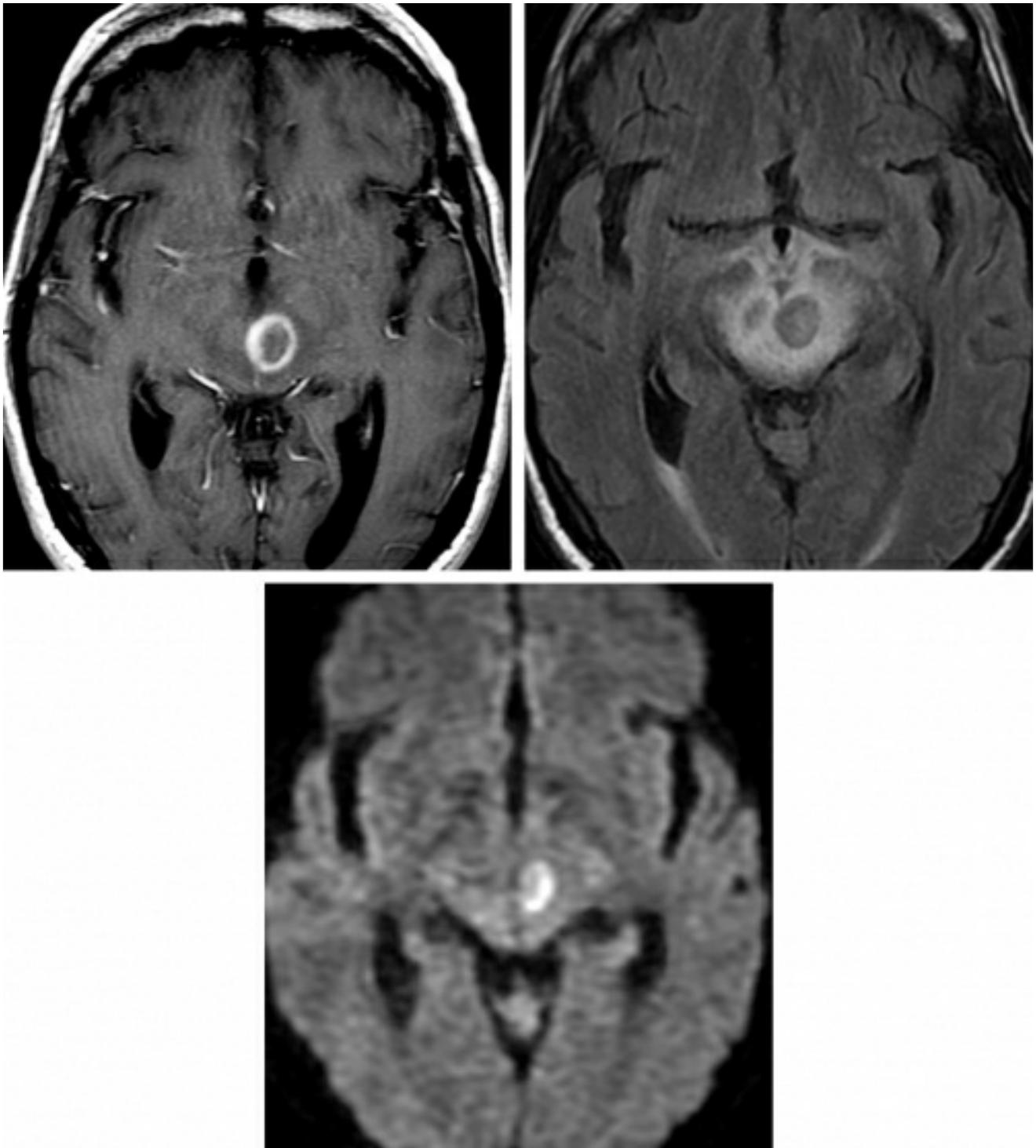


Figure 3: Cryptococcoma. Axial T1+C (top row left): Peripherally enhancing mass in the midbrain most accurately reflects the size of the cryptococcoma. **Axial FLAIR (top row right):** Moderate amount of surrounding hyperintense vasogenic edema. **Axial DWI (bottom row):** bright restricted diffusion is in the center of

the lesion, indicating necrotic products.

Differential Diagnosis

- CNS Toxoplasmosis
- CNS Tuberculosis
- Pyogenic abscesses
- Prominent perivascular (Virchow-Robin) spaces
- CNS lymphoma

For more information, please see the corresponding chapter in [Radiopaedia](#) and the [Cryptococcus tumor mimic chapter](#) in the Neurosurgical Atlas.

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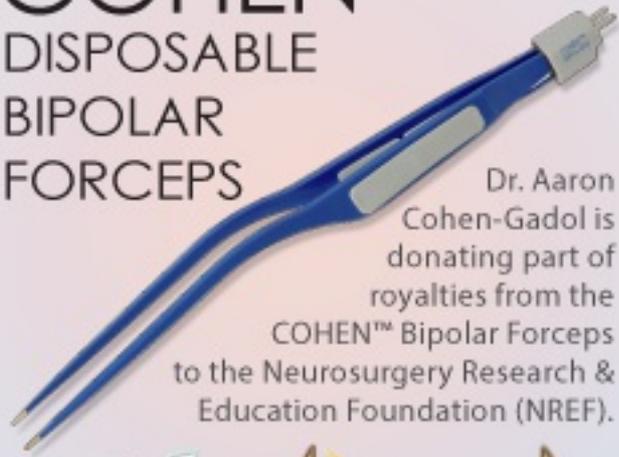
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