Section: Radiodiagnosis

Case Report

A RARE CASE OF CRYPTOCOCCUS SHOWING DIFFUSION RESTRICTION IN BILATERAL CAPSULOGANLIONIC REGION AND FRONTAL WHITE MATTER ON MRI: A RADIOLOGICAL PERSPECTIVE

Anshuman Kumar[1], Prasad Hegde[2], Avinash Munshi[3], Govind Grewal[4], Rohan Jayant[5]

[1]*Junior resident, Department of Radiodiagnosis, NIMS Medical College, Jaipur, Rajasthan, India.*
[2]*Professor and Head, Department of Radiodiagnosis, NIMS Medical College, Jaipur, Rajasthan, India.*
[3]*Professor, Department of Radiodiagnosis, NIMS Medical College, Jaipur, Rajasthan, India.*
[4]*Junior resident, Department of Radiodiagnosis, NIMS Medical College, Jaipur, Rajasthan, India.*
[5]*Junior resident, Department of Radiodiagnosis, NIMS Medical College, Jaipur, Rajasthan, India.*

Received *: 04/03/2025*
Received in revised form *: 02/05/2025*
Accepted *: 19/05/2025*

Corresponding Author:
Dr. Avinash Munshi,
Professor, Department of Radiodiagnosis, NIMS Medical College, Jaipur, Rajasthan, India.
Email: create.avinash@gmail.com

DOI: 10.70034/ijmedph.2025.2.395

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2025; 15 (2); 2195-2197

ABSTRACT

Background: Cryptococcosis, caused by Cryptococcus neoformans and Cryptococcus gattii, is a common fungal infection in immunocompromised individuals, particularly those with HIV/AIDS. Central nervous system (CNS) involvement by Cryptococcus presents with characteristic MRI findings, including bilateral lesions in the basal ganglia, thalamus, cerebellum, and occasionally the frontal white matter. These lesions are typically hypointense on T1-weighted images and hyperintense on T2-weighted images. Leptomeningeal enhancement, perivascular space dilatation, and mucoid material accumulation are also common features. However, diffusion restriction on Diffusion-Weighted Imaging (DWI) is a rare presentation. This article discusses a case of CNS cryptococcosis in an HIV-infected patient, showing diffusion restriction not only in the capsuloganlionic areas but also in the frontal white matter, highlighting the importance of recognizing atypical MRI findings for accurate diagnosis and treatment.

Learning Objectives

Upon reading this article, radiologists will be able to:

1. Correlate MRI findings with the clinical presentation of CNS cryptococcosis in HIV-infected patients.
2. Recognize both typical and atypical radiological features of cryptococcal infection, including the rare occurrence of diffusion restriction on DWI in areas such as the basal ganglia, thalamus, and frontal white matter.
3. Enhance diagnostic accuracy by considering diffusion restriction in the differential diagnosis of CNS infections in immunocompromised patients.

Keywords: Cryptococcus, Bilateral Capsuloganlionic Region, MRI.

INTRODUCTION

Cryptococcosis, caused by the encapsulated yeasts Cryptococcus neoformans and Cryptococcus gattii, is a frequent cause of central nervous system (CNS) infections in immunocompromised patients, particularly those with HIV/AIDS. The infection most commonly originates from the lungs and spreads hematogenously to the CNS. Although cryptococcosis can present with a wide array of clinical symptoms, neuroimaging plays a crucial role in diagnosis and management.

On MRI, typical findings of CNS cryptococcosis include bilateral, round or oval lesions in the basal ganglia, thalamus, and cerebellum, which demonstrate low signal intensity on T1-weighted images and high signal intensity on T2-weighted images. Additional findings often include leptomeningeal enhancement, perivascular space dilatation, and the presence of mucoid material. Diffusion restriction on Diffusion-Weighted Imaging (DWI) is a rare and atypical finding. This article

presents a case where DWI showed diffusion restriction not only in the capsuloganlionic regions but also in the frontal white matter, emphasizing the need for radiologists to consider cryptococcosis even in the presence of unusual imaging patterns.

Case Report

A 34-year-old male with advanced HIV/AIDS (CD4+ count of 45 cells/µL) presented with a three-week history of progressive headache, fever, confusion, and altered mental status. The patient had a history of recurrent opportunistic infections, including pneumocystis pneumonia. Neurological examination revealed signs of meningeal irritation and cognitive impairment.

An initial MRI of the brain was performed, which showed the following findings:

* **Multiple Bilateral Lesions:** Several round lesions were observed in the basal ganglia, thalamus, cerebellum, and frontal white matter. On T1-weighted images, these lesions were hypointense, while on T2-weighted images, they demonstrated hyperintensity. The lesions in the basal ganglia, thalamus, and cerebellum were consistent with typical findings of CNS cryptococcosis. The frontal white matter also exhibited similar features, with hyperintensity on T2-weighted images, which is less commonly seen in fungal infections.

* **Diffusion Restriction:** Diffusion-Weighted Imaging (DWI) revealed diffusion restriction in the bilateral capsuloganlionic areas along with frontal white matter. The apparent diffusion coefficient (ADC) maps showed reduced ADC values in these regions, indicating a restriction in the movement of water molecules. This finding was unusual for a cryptococcal infection, as DWI typically does not demonstrate significant restriction in such cases.

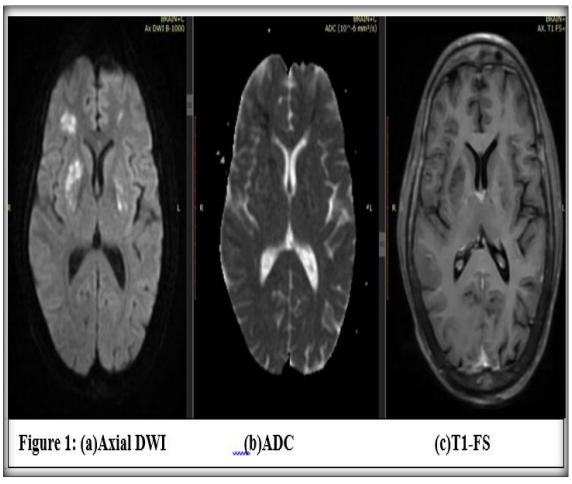

Figure 1: (a)Axial DWI (b)ADC (c)T1-FS

* **No Significant Contrast Enhancement:** Post-contrast T1-weighted imaging with gadolinium showed minimal to no enhancement, a characteristic finding in cryptococcal CNS infection, as cryptococcal lesions rarely demonstrate significant contrast enhancement unless there is an associated abscess or meningeal thickening.

* **Cerebrospinal Fluid (CSF) Analysis:** CSF culture confirmed the presence of Cryptococcus neoformans, thereby establishing the diagnosis of cryptococcal meningitis with parenchymal involvement.

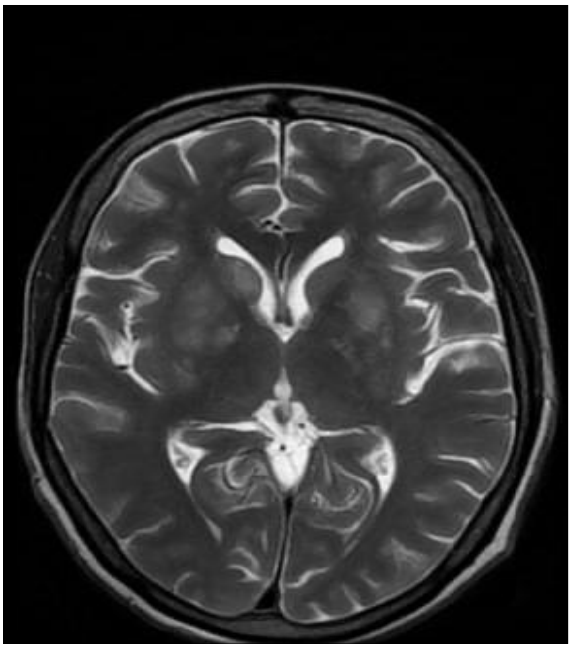

Figure 2: T1

- **Several round lesions were observed in the basal ganglia, thalamus, cerebellum, and frontal white matter.**
- **On T1-weighted images, these lesions were hypointense, while on T2-weighted images, they demonstrated hyperintensity. The frontal white matter also exhibited similar features, with hyperintensity on T2-weighted images**
- **DWI revealed diffusion restriction in the bilateral capsuloganlionic areas along with frontal white matter. ADC maps showed reduced ADC values in these regions, indicating a restriction in the movement of water molecules.**

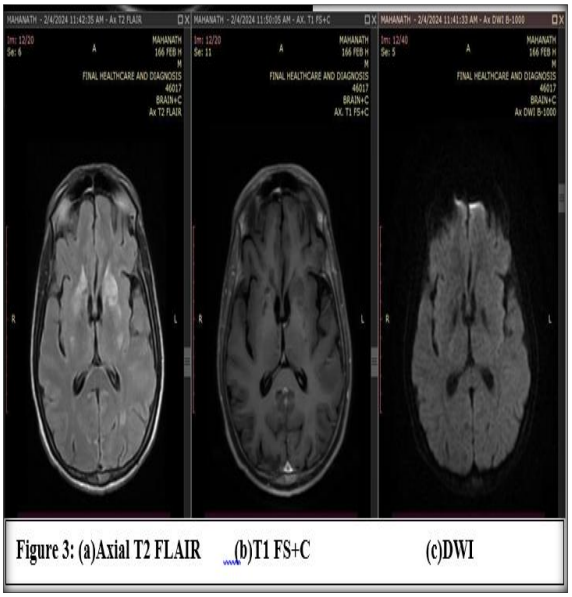

Figure 3: (a)Axial T2 FLAIR (b)T1 FS+C (c)DWI

Radiological Discussion

CNS cryptococcosis typically presents on MRI with the following features:

1. Lesion Location and Appearance: The infection most commonly affects the basal ganglia, thalamus, cerebellum, and occasionally the frontal white matter. On T1-weighted images, the lesions are hypointense, while on T2-weighted images, they are hyperintense. These lesions represent areas of fungal infiltration and inflammatory response.

2. Leptomeningeal Enhancement: Post-contrast images may show leptomeningeal enhancement due to the inflammatory response in the meninges. However, in this case, enhancement was minimal, which is not uncommon in cryptococcal infections.

3. Perivascular Space Dilatation and Mucoid Material: Dilation of perivascular spaces with mucoid material is a characteristic feature of cryptococcal infections, often seen on T2-weighted and FLAIR images. These changes reflect the spread of the yeast along the perivascular spaces and the accumulation of gelatinous exudate.

4. Diffusion Restriction: While diffusion restriction on DWI is a rare finding in CNS cryptococcosis, it can occur, as demonstrated in this case. Diffusion restriction typically indicates areas of increased cellularity, such as those seen in abscesses, tumors, or lymphomas. In cryptococcal infection, this could result from inflammatory edema, hypercellularity, or the presence of mucoid material. The observed diffusion restriction in the capsuloganlionic regions, thalamus, and frontal white matter is atypical but may reflect an aggressive inflammatory response or edema surrounding the cryptococcal lesions.

5. Frontal White Matter Involvement: Although the frontal white matter is less commonly affected in cryptococcal infections, it was involved in this case. This highlights the variability in the spread of infection and the need for radiologists to carefully assess all regions of the brain for evidence of fungal involvement.

Clinical and Radiological Correlation

In HIV-infected patients with advanced immunosuppression, the typical MRI findings of CNS cryptococcosis, such as bilateral lesions in the basal ganglia, thalamus, cerebellum, and occasionally the frontal white matter, should raise suspicion for this infection. Although diffusion restriction is uncommon in cryptococcal infection, its presence should prompt consideration of a broader differential diagnosis, which may include fungal infections, abscesses, lymphoma, or other CNS pathologies. This case underscores the importance of recognizing atypical MRI findings in immunocompromised patients and considering cryptococcosis as part of the differential diagnosis

CONCLUSION

This case demonstrates a rare radiological manifestation of CNS cryptococcosis with diffusion restriction observed in the capsuloganlionic regions, thalamus, and frontal white matter. While diffusion restriction is not a typical feature of cryptococcal infection, its presence should not rule out cryptococcosis, particularly in HIV-infected patients with characteristic clinical and radiological findings. Radiologists should be aware of the potential for unusual MRI features, which can aid in the timely diagnosis and management of this life-threatening condition. As this case illustrates, an atypical presentation of cryptococcosis may still respond well to appropriate antifungal therapy, and early recognition is key to improving patient outcomes.

REFERENCES

1. Shankar, A. et al. "MRI Findings in CNS Cryptococcosis: A Review of 100 Cases." Journal of Neuroimaging, 2018.
2. Rajasingham, R. et al. "Cryptococcosis in HIV/AIDS: Epidemiology, Diagnosis, and Treatment." Clinical Infectious Diseases, 2020.
3. Smith, K.D. et al. "Cryptococcus and the Central Nervous System: Imaging Features." Neuroradiology, 2017.
4. Korman, T.M. et al. "Fungal Infections of the Central Nervous System." Infectious Disease Clinics of North America, 2015.