

## CASE REPORT

# Butterfly lesion on MRI: Cryptococcus meningoencephalitis with unusual imaging in a patient with AIDS

Mary Henary<sup>1</sup> | Jennifer Oster<sup>2</sup>  | Antonio Liu<sup>2</sup><sup>1</sup>Ross School of Medicine, Miramar, FL, USA<sup>2</sup>Department of Neurology, Adventist Health White Memorial, Los Angeles, CA, USA**Correspondence**Mary Henary, Ross School of Medicine, Ross University School of Medicine, 33027-4150 Miramar, FL, USA.  
Email: maryhenary050@gmail.com**Abstract**

In immunocompromised patients, including patients with AIDS, with neurologic complaints, we propose including Cryptococcus meningoencephalitis in the differential diagnoses when the butterfly pattern is encountered on MRI.

**KEY WORDS**

AIDS, butterfly lesion, cryptococcus, meningoencephalitis, neurology

## 1 | INTRODUCTION

On magnetic resonance imaging (MRI), a butterfly lesion is most commonly described in glioblastoma multiforme (GBM); however, we report an unusual case of Cryptococcus Meningoencephalitis with the butterfly lesion on MRI. This infection is generally diagnosed via lumbar puncture; however, MRI may reveal perivascular space involvement, dilation, and leptomeningeal enhancement.

Cryptococcus neoformans is a saprophytic fungus that is isolated from soil contaminated with pigeon extracts and is the third most common cause of central nervous system (CNS) infections in immunocompromised patients including Cryptococcus Meningoencephalitis. As the fungal infection enters the human body by way of inhalation, the respiratory tract is the primary site of infection. The fungi spread hematogenously from the respiratory tract to the CNS. Once in the CNS, the fungus travels to the Virchow-Robin spaces, known as the perivascular space, which subsequently become dilated due to the activation of inflammatory markers. Once in the Virchow-Robin space, the fungus can cross the blood-brain barrier, where it multiplies and causes neurological symptoms. Classical symptoms noted with Cryptococcus Meningoencephalitis include headache, fever, encephalitis, seizures, and focal neurological deficits, stroke, increased

intracranial pressure, coma, and death. This infection is generally diagnosed via lumbar puncture; however, if MRI is obtained, it may reveal perivascular space involvement and dilation in addition to leptomeningeal enhancement. The butterfly pattern is more commonly associated with primary CNS lymphoma, GBM, inflammatory diseases, and infectious etiologies such as toxoplasmosis.<sup>1</sup> However, we present a case of a 37-year-old Hispanic man with AIDS and MRI demonstrating this pattern. His only symptoms at presentation included a moderate 5/10 headache and increased seizure activities. Upon further evaluation, spinal fluid analysis revealed Cryptococcus, with the MRI findings as shown below. As noted in worldwide literature, Cryptococcus meningoencephalitis usually causes dilated Virchow-Robin space,<sup>2</sup> lesions in basal ganglia, and/or hydrocephalus.<sup>3</sup> The case discussed here demonstrates a “butterfly” lesion originating from the bilateral medial temporal areas, crossing the midline via the corpus callosum, which has rarely been previously reported.

## 2 | CASE

A 37-year-old right-handed man presented to our emergency room with new-onset progressively worsening seizures.

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2021 The Authors. *Clinical Case Reports* published by John Wiley & Sons Ltd.

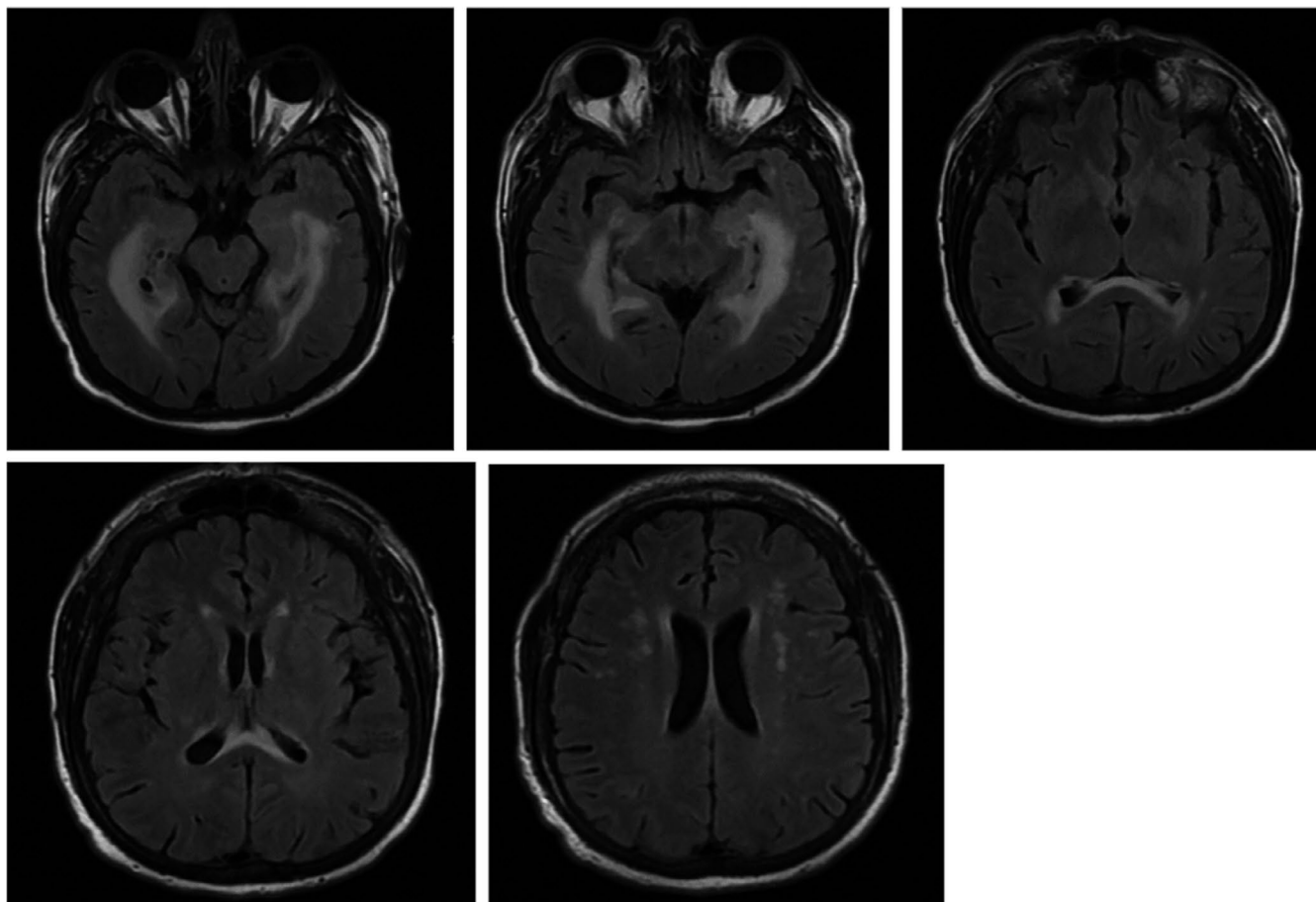
His past medical history included congestive heart failure, hypertension, AIDS (untreated), and end-stage kidney disease (ESKD) on hemodialysis three days weekly for the past 10 years. The patient had 2 episodes of seizures within 1 week in the days leading up to admission into the hospital. He also complained of acute on chronic 4/10 generalized headache. The patient had not been taking medication and had inconsistent follow-up. CD4 count was unknown on admission.

Vital signs revealed a temperature 38 degrees Celsius, heart rate of 119 beats per minute, respiratory rate of 18 breaths per minute, and blood pressure of 126/82. Physical examination revealed a thin male with normal mentation. He was alert and oriented x 4, coherent, and free of psychosis. His neck was supple; cranial nerves II–XII were intact bilaterally. Motor examination revealed 5/5 strength in bilateral upper and lower extremities without tremor, myoclonus, asterixis, abnormal tone nor dystonia. Sensation to light touch was intact, and deep tendon reflexes were 2/4 throughout. Finger-nose-finger was intact with no dysmetria nor dysdiadochokinesia. While observed frequently pacing in hallways, the patient had normal gait.

Serum studies revealed a WBC count of  $7.4 \times 10^9$  cells/L and lactic acid of 0.7 mmol/L while liver and kidney function

tests were within normal ranges. The initial noncontrast head CT demonstrated increased white matter in the bilateral temporal lobes. Cerebrospinal fluid (CSF) examination was intended to further delineate findings on CT. Lumbar puncture was therefore performed with an opening pressure of 42 cm CSF. Fluid color was pale-yellow, and clarity was slightly hazy. There was an RBC count of 330 per  $\text{mm}^3$ , WBC count was 60 per  $\text{mm}^3$  (with cell differential count showing 30 segmented neutrophils per  $\text{mm}^3$  and 70 lymphocytes per  $\text{mm}^3$ ), glucose was found to be 3 mg/dL, and protein was 406 g/dL. Microscopic examination revealed 3+ yeast/high powered field. CSF Cryptococcus titer resulted as 1:2560. CSF was negative for Coccidioidomycosis, HSV, and West Nile. MRI brain on hospital day 2 (Figure 1) revealed no DWI abnormality. However, on FLAIR sequence, there were symmetric confluent signal densities involving the medial temporal lobes, hippocampal bodies, parahippocampal gyri extending upward, and joining at the splenium of the corpus callosum and crossing the midline.

An Infectious Disease specialist was consulted who restarted highly active antiretroviral therapy (HAART), and immediately placed the patient on Amphotericin B and flucytosine. The patient was also started on Levetiracetam 500 mg per oral twice daily. Patient did not have witnessed seizures while inpatient. Unfortunately, the patient signed out against



**FIGURE 1** Fluid-attenuated inversion recovery (FLAIR) sequence of MRI showing “butterfly lesion” crossing over via Corpus Callosum

medical advice and left the hospital on hospital day 3. Per Patient's nephrologist, patient presented sporadically for dialysis with intermittent ED visits in a neighboring hospital in the months to follow. Eventually, the patient was unfortunately lost to follow-up.

### 3 | DISCUSSION

We report a case of a 37-year-old Hispanic man with a significant past medical history of ESKD, CHF, and AIDS who presents with new-onset, worsening seizure activity, and a moderate headache. Initially, our leading etiology was infectious including toxoplasmosis and cryptococcus; however, we also considered malignancies such as primary central nervous system (CNS) lymphoma and GBM. Upon testing, CSF fluid analysis demonstrated findings that correlated with Cryptococcus Meningoencephalitis and cytology was negative for lymphoma or other malignancy. Interestingly, the MRI of this patient formed the so-called butterfly pattern. Based on prior published literature, Cryptococcus Meningoencephalitis on imaging may demonstrate dilation of Virchow-Robin space while others have described bilateral Basal Ganglia lesions<sup>3</sup> and only few reports demonstrate the type of FLAIR sequence abnormality we see in this untreated patient who has AIDS.<sup>4</sup> As it is well-described in the literature that the butterfly lesion may have a broad differential, the patient's MRI pattern may lead to initial consideration for lesions such as glioma or lymphoma.<sup>1</sup> However, in immunocompromised patients, including patients with AIDS, with neurologic complaints, we propose including cryptococcus meningoencephalitis in the differential diagnoses when the butterfly pattern is encountered on MRI.

### 4 | CONCLUSION

Based on prior published literature, Cryptococcus Meningoencephalitis demonstrates dilation of Virchow-Robin space<sup>1</sup> or bilateral Basal Ganglia lesions.<sup>2</sup> Few reports demonstrate the type of FLAIR sequence abnormality we see in this patient who has AIDS. Our patient's MRI demonstrated hyperintensity in FLAIR sequence in the form of the butterfly pattern. This case shows an unusual appearance of Cryptococcus meningoencephalitis as a butterfly lesion on MRI.

### ACKNOWLEDGMENTS

We would like to thank Adventist Health White Memorial for their continued support.

### CONFLICT OF INTEREST

None of the authors have any conflict of interest.

### AUTHOR CONTRIBUTIONS

MH: performed background research on condition and began drafting manuscript. JO: performed additional background and revised critically for content. AL: is a primary neurologist and attending providing care for patient, prepared manuscript, and provided images.

### ETHICAL APPROVAL

We have a full written contents and IRB exemption letter for this observational activity.

### DATA AVAILABILITY STATEMENT

The data supporting the findings in this case are available within the article and its supplementary materials.

### ORCID

Jennifer Oster  <https://orcid.org/0000-0002-1708-4269>

### REFERENCES

1. Menon R, Thomas B, Easwer HV, Nair SSA, Nair M. A clinically isolated syndrome: butterfly glioma mimic. *Neuroimmunol Neuroinflammation*. 2015;2:174-178. <https://doi.org/10.4103/2347-8659.154435>
2. Kastrup O, Wanke I, Maschke M. Neuroimaging of infections. *NeuroRx*. 2005;2(2):324-332. <https://doi.org/10.1602/neurorx.2.2.324>
3. Xia S, Li X, Li H. Imaging characterization of cryptococcal meningoencephalitis. *Radiol Infect Dis*. 2016;3:187-191. <https://doi.org/10.1016/j.jrid.2016.05.003>
4. Chaudhari VV, Yim CM, Hathout H, Lai A, Donovan SM. Atypical imaging appearance of toxoplasmosis in an HIV patient as a butterfly lesion. *J Magn Reson Imaging*. 2009;30:873-875.

**How to cite this article:** Henary M, Oster J, Liu A. Butterfly lesion on MRI: Cryptococcus meningoencephalitis with unusual imaging in a patient with AIDS. *Clin Case Rep*. 2021;9:e03952. <https://doi.org/10.1002/ccr3.3952>