

IMAGES IN MEDICINE

Ring-enhancing brain lesions in a patient with advanced retroviral disease

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Case Report

The patient is a 30-year-old man who was recently diagnosed with advanced HIV disease (AHD) and has a CD4 count of 30 cells/mm³. He presented with a one-week history of intermittent fever and right-sided body weakness, and upon examination, was found to have right hemiparesis. There were no other features of opportunistic infections noted.

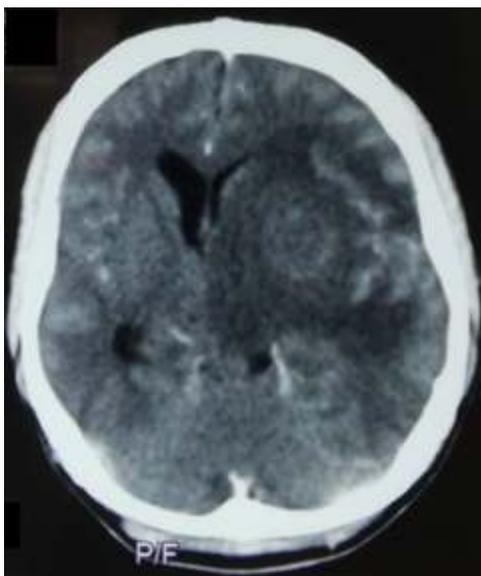


Figure 1 CT scan of the brain revealed a rim-enhancing lesion in the left basal ganglia, measuring 3 x 3 x 2.5 cm, with associated marked white matter oedema and 5 mm midline shift.

Post-contrast CT scan shows a 3 × 3 × 2.5 cm ring-enhancing lesion in the left basal ganglia with marked vasogenic oedema, 5 mm midline shift, effacement of the left lateral ventricle, and mild dilatation of the right temporal horn, consistent with mass effect (Figure 1).

The patient was started on treatment with pyrimethamine 50 mg once daily and clindamycin 600 mg four times a day, and antiretroviral medications were initiated two weeks later to reduce the risk of immune reconstitution inflammatory response while treating central nervous system opportunistic infection. Follow-up imaging one month later showed improvement in the previously identified lesions. His weakness has also improved significantly.

DISCUSSION

Given the patient's AHD with markedly low CD4 count, and favourable clinical response to therapy, cerebral toxoplasmosis is the most likely diagnosis. Cerebral toxoplasmosis is a common opportunistic infection in patients with AHD, particularly those

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with low CD4 counts. Imaging findings are often characteristic and can be used to differentiate cerebral toxoplasmosis from other causes of cerebral lesions in patients with AHD, such as progressive multifocal leukoencephalopathy (PML), cerebral abscesses, and lymphoma. A well-defined hypodense lesion with a rounded enhancing rim in the basal ganglia, along with smaller lesions in other areas of the brain, is suggestive of cerebral toxoplasmosis. Additionally, marked deep white matter oedema, effacement of the ventricles, and midline shift can be seen on brain imaging.¹ In contrast, PML typically presents with non-enhancing, irregularly shaped lesions in the subcortical white matter. Conversely, cerebral abscesses may present as solitary or multiple lesions, typically demonstrating variable degrees of contrast enhancement accompanied by surrounding peripheral oedema.² Lymphoma often presents with multiple enhancing lesions and significant perilesional oedema. Primary central nervous system lymphoma may present with either solitary or multiple lesions, exhibiting either homogeneous or ring-like enhancement on neuroimaging. Notably, prior corticosteroid exposure can alter the enhancement characteristics, potentially complicating radiologic interpretation.³ Another differential diagnosis was central nervous system cryptococcosis, a fungal infection caused by *Cryptococcus neoformans* or *Cryptococcus gattii*. Imaging findings typically show multiple nodular lesions with surrounding oedema, cryptococcomas, and the fungus can also cause hydrocephalus and meningoencephalitis.⁴⁻⁵ Tuberculomas should also be considered in the differential diagnosis in our setting, as they may demonstrate ring or solid enhancement on imaging, commonly involve the basal ganglia or posterior fossa, and can occasionally present as conglomerate lesions.⁶

Toxoplasma IgG seropositivity supports the diagnosis of cerebral toxoplasmosis in advanced HIV. MRI features such as the "**eccentric target**

sign" are suggestive. **Thallium-SPECT** and **FDG-PET** help differentiate toxoplasmosis (low uptake) from primary central nervous system lymphoma (high uptake). **Stereotactic biopsy** is indicated when the diagnosis remains uncertain or if there is no response after 10–14 days of appropriate therapy.

CONCLUSION

Red-flag signs include deteriorating Glasgow Coma Scale (GCS), refractory intracranial hypertension, impending herniation, or obstructive hydrocephalus. Accurate diagnosis and prompt treatment of cerebral toxoplasmosis are crucial in preventing further neurological damage and improving patient outcomes.

Teaching Points

- In AHD, **toxoplasmosis** is the leading cause of **ring-enhancing lesions** (often basal ganglia).
- **Response by 10–14 days** to targeted therapy supports the diagnosis; otherwise consider **biopsy**.
- Pay attention to **mass effect** and evolving **hydrocephalus**; escalate urgently if neurological status worsens.

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