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Review Article

Imaging Aspects of Cerebral Toxoplasmosis in Immunocompromised Patients

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Abstract: This is the first hypothesis to be raised, especially if the patient is not taking prophylactic treatment. Lesions are generally multiple, localized in the grey nuclei and cortico-subcortical regions (hematogenous dissemination), and may bleed spontaneously. The mass effect associated with peri lesional edema is often major, even if the lesion is small. Contrast is often annular, with the center of the lesion in hypersignal or T2 hyposignal, often remaining in diffusion hyposignal. After treatment, a scar in the form of a small, stable annular contrast pattern may persist for years.

Keywords: HIV serology positive, CT scan, MRI: T2, FLAIR, DWI/ADC, MR Spectroscopy.

INTRODUCTION

- Acquired toxoplasmosis: a worldwide parasitic disease,
- Parasitic agent: the protozoan Toxoplasma gondii.
- Inaugural manifestation of AIDS in 15-20% of cases.
- Main cause of opportunistic infection of the CNS.
- Late onset: CD4 count below 200/mm3.
- Extremely severe in immunocompromised individuals.
- Benign in immunocompetent patients.
- Encephalic form (fever, headache and confusion).
- Local form: deficit, comitiveness.
- Possibility of spinal cord injury.
- Lobar puncture: moderate lymphocytosis.

OBJECTIVE

The aim of this paper is to review the imaging aspect of cerebral toxoplasmosis in immunocompromised patients.

DISCUSSION

- Toxoplasmosis is an infection caused by a protozoan parasite (Toxoplasma gondii).
- Infection occurs when people unknowingly ingest toxoplasma cysts from cat feces, or eat contaminated meat.
- In immunocompromised people with HIV, toxoplasmosis can reactivate, usually affecting the brain.
- A reactivated infection can cause weakness, confusion, convulsions or coma, or spread throughout the body.
- Pregnant women can transmit the infection to the fetus (congenital infection), and infected babies can develop birth defects, vision loss, seizures, intellectual disability and other abnormalities.

In CT scanning: lesions are usually multifocal

Typical Cockade Appearance

- Central avascular necrotic zone.
- Hypervascular zone containing numerous parasites.
- Peripheral, poorly vascularized zone containing encysted parasites.
- Spontaneously iso or hypodense lesions surrounded by peripheral edema +/- mass effect.
- Centripetal annular contrast

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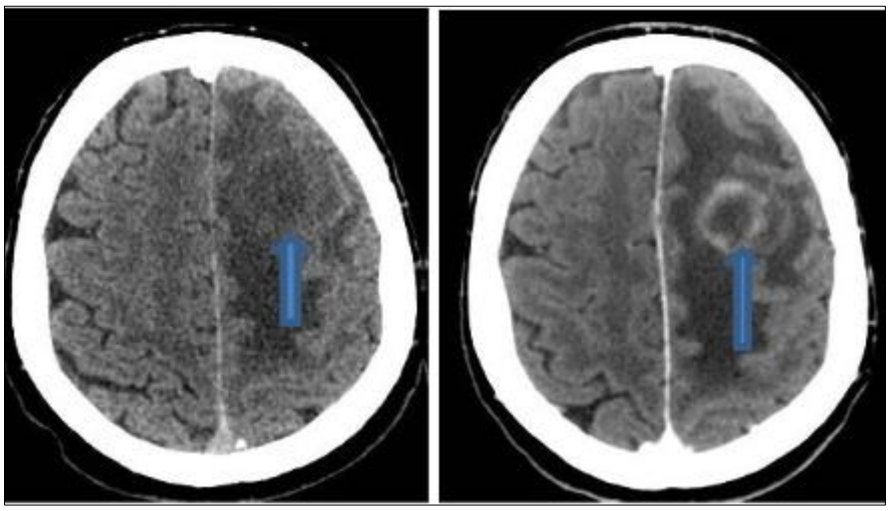
- Location Grey cores, grey-white substance junction
- Possible but rare involvement of the cerebellum and brainstem



R. Duprès *et al*., Imaging of CNS parasitoses

Axial CT Sections:

A (before injection) and B (after contrast injection, correspond to a spontaneously hypodense, annularly enhanced left parafalcoral lesion surrounded by edema.

Magnetic Resonance Imaging (MRI):

- Pseudoencephalic form: rare.
- Nodular pseudotumor form: most frequent.
- Elementary or multiple lesions scattered over the supratentorial and subtentorial levels.
- MRI more sensitive but not very specific.

Signal:

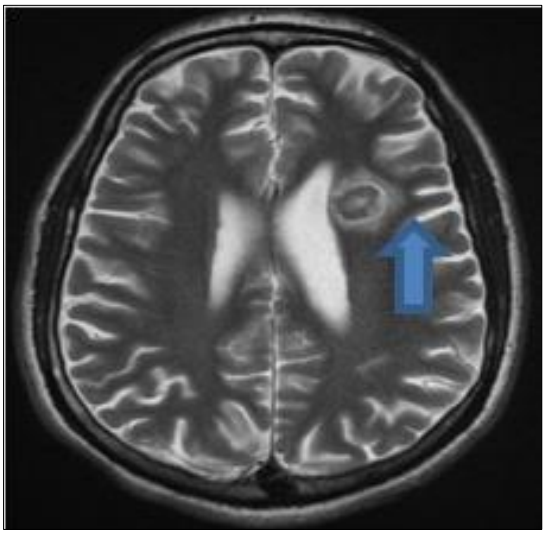
- **T1:** Isointense/hypointense
- **T2:**

Variable intensity:

- Hyperintense: necrotizing encephalitis
- Isointense: organized abscess
- Lesions are surrounded by peri-lesional edema.

After Gadolinium Injection:

- Annular or nodular contrast (excentric target sign)



T2

Image from the Radiology Department of the hospital August 20, 1953, CHU IBN Rochd, Casablanca **:** Cortico-subcortical lesion, opposite the frontal horn of the left lateral ventricle, roughly rounded, with heterogeneous T2 signal.

DWI/ADC: increased ADC at the center of the lesion.

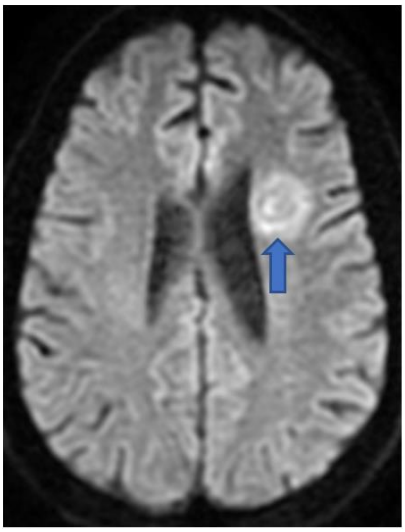


Image of the Hospital Radiology Department August 20, 1953, CHU IBN Rochd, Casablanca:

Cortico-subcortical lesion, opposite the frontal horn of the left lateral ventricle in hypersignal target diffusion with an intermediate layer in iso signal.

After Gadolinium Injection:

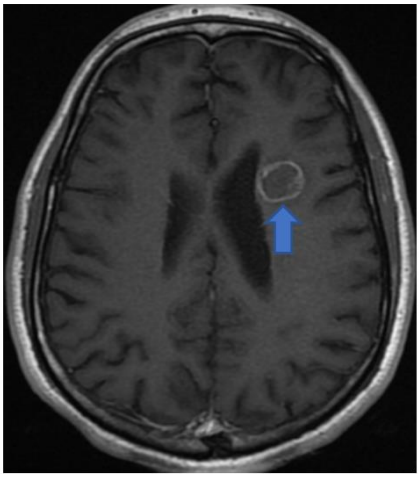


Image of the hospital radiology department August 20, 1953, CHU IBN Rochd, Casablanca: **Annular contrast after Gadolinium injection.**

MR Perfusion: reduction in cerebral blood volume.

MR Spectroscopy:

- Increased lactate.
- Increased lipids
- Decrease in choline, creatine and N-acetylaspertate.
- A lipid-lactate peak is characteristic, but a choline peak is possible.

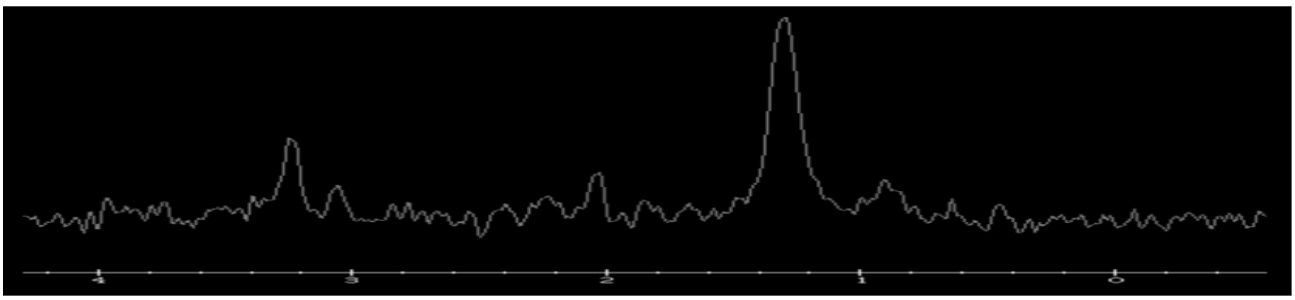


Image of the hospital radiology department August 20, 1953, CHU IBN Rochd, Casablanca

CONCLUSION

Toxoplasmosis is the most common opportunistic infection in HIV patients. MRI plays a very important role in positive diagnosis.

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