

# Role of MRI in the Diagnosis and Monitoring of Progressive Multifocal Leukoencephalopathy in HIV-Positive Patients

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## Abstract

Progressive multifocal leukoencephalopathy (PML) is a demyelinating condition secondary to lytic infection of oligodendrocytes by JC papovavirus occurring in the context of immunodeficiency. Its aggravation after initiation of antiretroviral therapy is part of the immune restoration syndrome (IRS), often fatal if not adequately managed. We report a clinical observation highlighting the dual role of MRI on the one hand in the diagnosis of PML; allowing the discovery of an HIV infection in our case; and other parts in the follow-up of this pathology which can be complicated by a life-threatening IRS. Cerebral MRI is the main imaging medium for the presumptive diagnosis of PML. In MRI, MRI can be used to assess worsening of lesions by increasing their size as well as by the presence of a contrast enhancement after gadolinium injection indicating inflammation. Thus the use of cerebral MRI in a fragile field such as HIV should be performed periodically even in the absence of suggestive clinical signs, to ensure early diagnosis and adequate management and therefore a better prognosis.

**Keywords:** Progressive multifocal leukoencephalopathy (PML), immune restoration syndrome (IRS), MRI.

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## INTRODUCTION

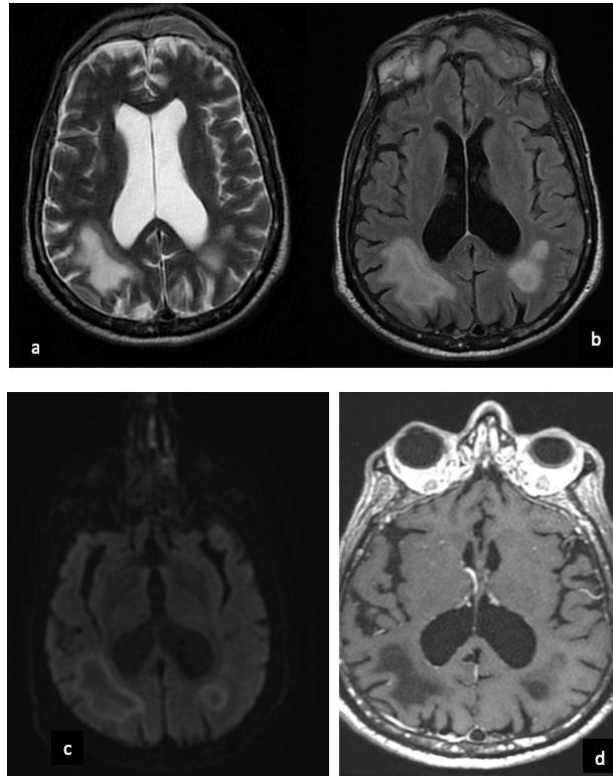
Progressive multifocal leukoencephalopathy (PML) is a demyelinating condition secondary to lytic infection of oligodendrocytes by JC papovavirus occurring in the context of immunodeficiency [1]. His diagnosis is based on clinical evidence, radiological findings, and microbiological identification, which is not common practice in third world countries. The occurrence of PML in HIV-positive people is known and reported in the literature. Its aggravation after initiation of antiretroviral therapy is part of the immune restoration syndrome (IRS), often fatal if not adequately managed.

We report a clinical observation highlighting the dual role of MRI on the one hand in the diagnosis of PML; allowing the discovery of an HIV infection in our case; and other parts in the follow-up of this pathology which can be complicated by a life-threatening IRS.

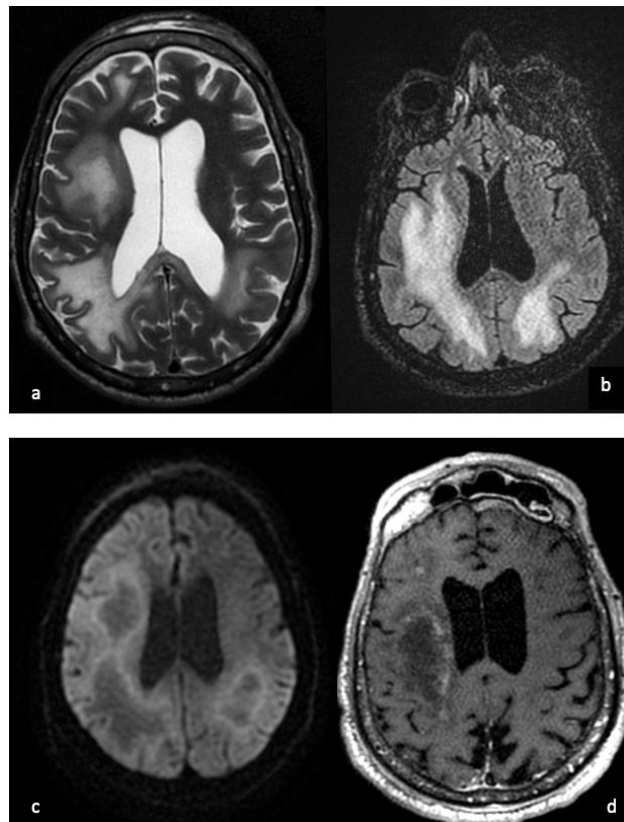
### Observation

A 53-year-old patient, with no notable pathological antecedents, presented to the emergency department in a picture of confusion and fever that had been evolving for several days in a context of profound deterioration of the general condition. The clinical examination revealed a confusional syndrome and

agitation, a fever at 38 ° C without meningeal syndrome or sign of focus. The lumbar puncture eliminated meningitis. MRI performed showed white matter-limited bilateral temporo-occipital ranges (Fig-1) with T1 hyposignal, T2 hypersignal (a), FLAIR hypersignal (b), hyposignal diffusion (c) and no enhancement after gadolinium injection (d) evoking an LEMP. PCR research for JC virus was unavailable. HIV infection was confirmed with a viral load of 5670000 copies / ml and a CD4 count of 8 elements / ml. Triple antiretroviral therapy has been started, combined with antibiotic prophylaxis, with good tolerance and good clinical and biological progress. After 5 months of treatment, the patient is readmitted for confusion and intracranial hypertension syndrome. An emergency MRI showed an increase in the size of bilateral temporo-occipital trabeculae limited to the white matter (Figure-2) with T1 hyposignal, T2 hypersignal (a), FLAIR hypersignal (b), hyposignal diffusion (c) with peripheral enhancement. nodular after gadolinium injection (d), Biological investigations noted an isolated inflammatory syndrome with a negation of HIV viral load and a rise in CD4 levels to 113 elements / ml. IRS is then evoked and parenteral corticosteroids are administered in combination with mannitol with good clinical progress in the following days.



**Fig-1: Brain MRI, Axial sections showing bilateral temporo-occipital patches limited to white matter hyperintensity T2 (a), hypersignal FLAIR (b), hyposignal diffusion (c) and without enhancement after Gadolinium injection (d) evoking PML**



**Fig-2: Brain MRI, Axial sections, showing an increase in the size of the bilateral temporo-occipital trabeculae limited to white matter with hypersignal T2 (a), hypersignal FLAIR (b), hyposignal diffusion (c) and nodular peripheral enhancement after gadolinium injection (d)**

## DISCUSSION

Our observation is a reminder of the important role that MRI plays in the management of HIV-positive patients, presenting a PML picture that can be complicated by IRS. MRI remains a trivial, fast, available, inexpensive, risk-free and invaluable aid for the practitioner.

Indeed, brain MRI is the main imaging medium for the presumptive diagnosis of PML. Lesions are always correlated with clinical symptomatology [1]. they are often multiple, bilateral and asymmetrical, localized in the subcortical regions, do not respect the juxta-cortical arch fibers and respect the gray matter and the marrow, parieto-occipital, frontal, infra-tentorial topography. Morphologically they are in T1 hyposignal (demyelination), T2 hypersignal, without mass effect and classically without enhancement after gadolinium injection [2].

In IRS, MRI found hyperintense FLAIR lesions of the periventricular white matter, punctiform, bilateral, which are differentiated from PML lesions by their much more diffuse, nodular character and by a more intense and diffuse contrast enhancement due to rupture of the blood-brain barrier. IRS lesions are often found on the periphery of existing demyelination sites before treatment [3]. The contrast enhancement of the lesions is an early and simultaneous transient phenomenon with clinical symptomatology and may not be found on the control examinations [4]. These signs may be accompanied by diffuse cerebral edema that may be responsible for intracranial hypertension, a cerebral engagement that is life-threatening [3].

This radiological appearance corresponds histologically to perivascular lympho-plasmocytic infiltrates, synonymous with IRS [1].

Thus, the diagnosis of PML could be made quickly in front of an evocative clinical picture and a specific MRI appearance without resorting to uncomfortable explorations such as cerebral biopsy and the search for the JC virus. Also, clinical and radiological MRI surveillance should be the norm in any HIV-positive patient with PML and on antiretrovirals, to detect early IRS, thus significantly modifying the prognosis.

## CONCLUSION

MRI remains a benign, fast, available, inexpensive, risk-free examination that plays a pivotal role in the diagnosis and follow-up of HIV-positive patients with PML and complicating IRS. Its use on a fragile field such as HIV should not be limited to a pre-established symptomatology, but should be carried out periodically even in the absence of suggestive clinical signs, in order to guarantee an early diagnosis and an adequate management and therefore a better prognosis.

**Conflits d'intérêt:** Aucun.

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