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IMAGING HIGHLIGHTS

Progressive multifocal leukoencephalopathy limited to the posterior fossa

[1]Kartini Rahmat, [1]Shaleen Kaur, [1]Norlisah Mohd Ramli, [2]Patricia Ann Chandran, [2]Kum-Thong Wong, [3]Suhailah Abdullah, [3]Sharifah S Omar, [4]Dharmendra Ganesan, [3]Chong-Tin Tan

Departments of [1]Biomedical Imaging, [2]Pathology, [3]Medicine and [4]Surgery, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia

Progressive multifocal leukoencephalopathy (PML) is a rapidly progressive demyelinating disease caused by the reactivation of JC papova virus usually in immunocompromised hosts.[1] The disease is a chronic viral infection resulting in mortality within a year.[2] The condition characterized by white matter changes in multiple locations of the brain is caused by destruction of the oligodendrogliocytes.[2] We report a case of AIDS associated PML presenting with progressive cerebellar symptoms, with the unusual feature of imaging abnormalities limited to the posterior fossa.

CASE REPORT

A 41 year old ethnic Chinese male with past history of Hepatitis B and liver cirrhosis of 5 years, presented with progressive ataxic gait, motor incoordination, dysarthria and tremor for 2 months. Clinical examination revealed dysarthria, horizontal nystagmus, bilateral dysdiodokynesis and dysmetria, with normal muscle power and bilateral flexor plantar response. There was marked gait ataxia with patient confined to bed. He was diagnosed to have HIV/AIDS with a CD4 count of 29 copies/uL and viral load of 106 copies/mL.

The initial MRI Brain (Figure 1) revealed lesions in the right cerebellar hemisphere extending to the right cerebellar peduncle and pons. These lesions were hypointense on the T1WI and hyperintense on the T2W/FLAIR images. There was no associated mass effect or enhancement. Highly active antiretroviral therapy (HAART) comprising of tenofovir 300 mg od, Combivir (lamivudine/zidovudine 150mg/30mg) one tablet bd and efavirenz 600 mg od was given.

Despite being on the antiretroviral therapy for five weeks, his condition worsened with

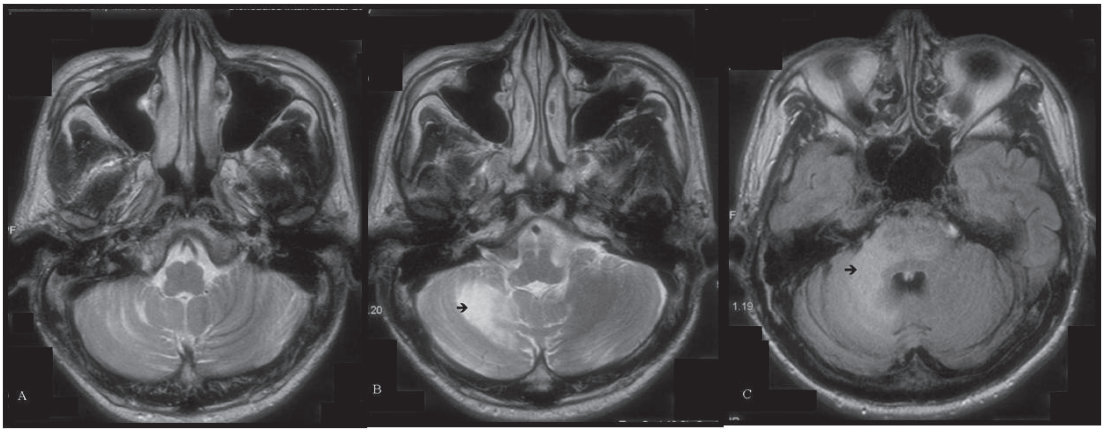

Figure 1: MRI (1.5 Tesla) examination at onset of symptoms prior to HAART. Axial T2-weighted images (TR/TE 832ms/25ms) and FLAIR, (A) & (B) at the level of medulla, and (C) at pons. Arrows pointing to the high signal intensity lesions at the right side of cerebellum and right middle cerebellar peduncle and with absent mass effect. These lesions do not enhance on post contrast images.

Address correspondence to: Dr. Kartini R, Department of Biomedical Imaging, University Malaya Medical Centre, 59100 Kuala Lumpur, Malaysia. Email: katt_xr2000@yahoo.com

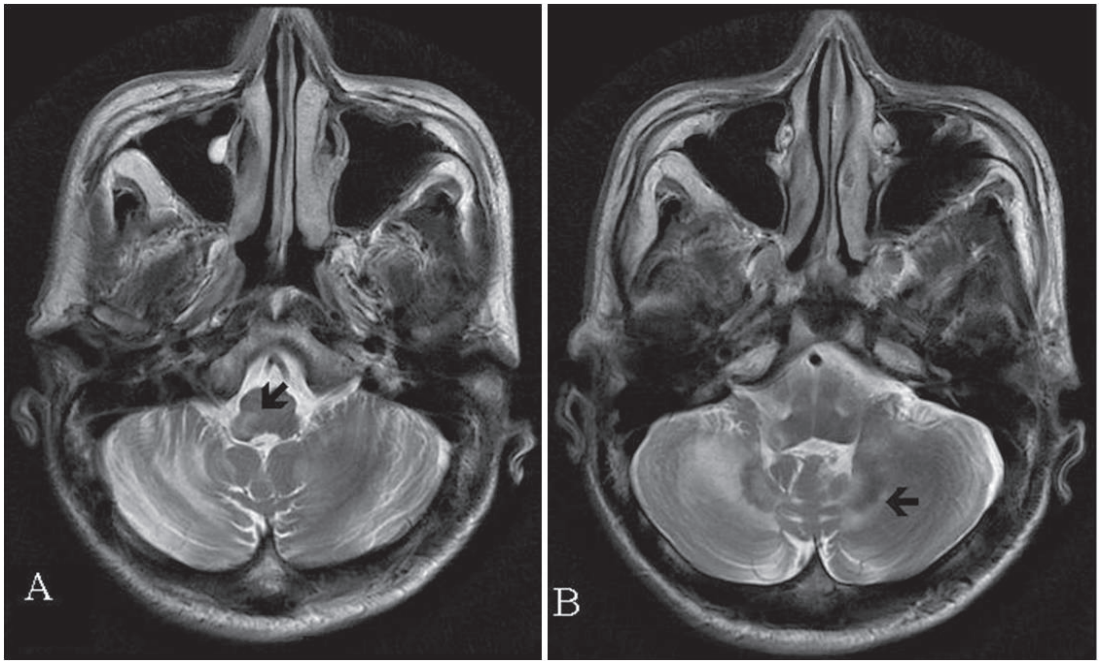

Figure 2: Follow up MRI (3 Tesla) examination at 5 weeks post HAART therapy. Axial T2-weighted images (TR/TE 6000ms/126.9ms). Arrows showing new high signal intensity lesions at the right side of medulla (A) and in the left cerebellum (B).

progressive right sided cerebellar symptoms. Repeated MRI showed extension of the right cerebellar lesions with additional lesions seen in the right side of the medulla and the left cerebellar hemisphere (Figures 2 and 3).

Stereotactic guided biopsy of the right cerebellar lesion was performed. The paraffin embedded formalin fixed tissue sample showed scattered bizarre astrocytes in a background of foamy macrophages, lymphocytes, some enlarged

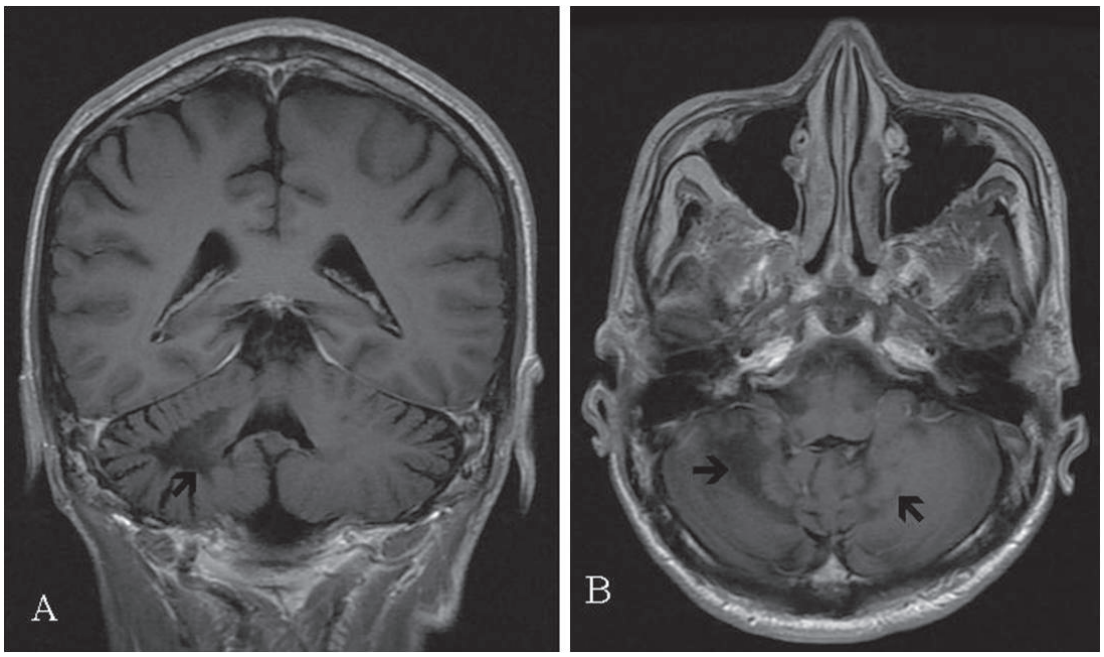

Figure 3: MRI (3T) examination performed 5 weeks post HAART therapy, (A) Coronal post Gadolinium T1-weighted image (TR/TE 2783ms/8.472ms), (B) Axial post Gadolium T1-weighted image (TR/TE 2943ms/8.48 ms). Arrows showing non enhancing low signal intensity lesions in both the cerebellar hemispheres.

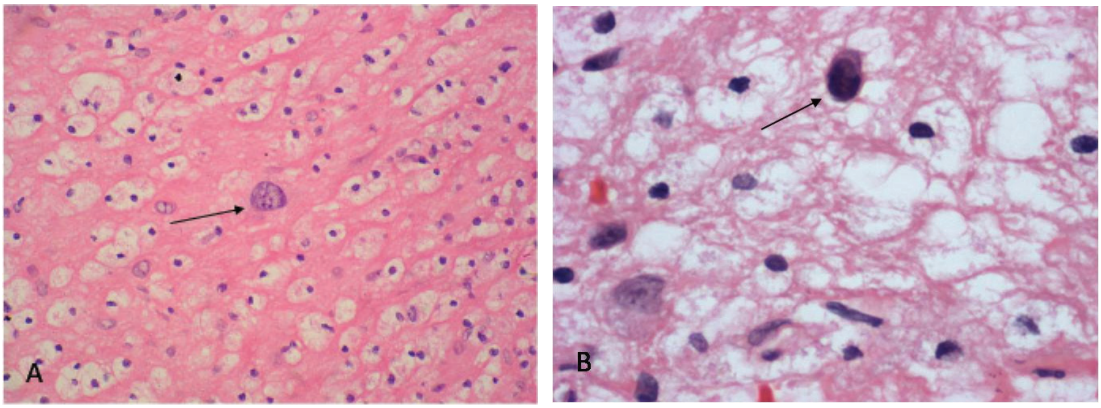

Figure 4a: Arrow showing an enlarged and reactive astrocyte in a background of foamy macrophages, lymphocytes and oligodendrocytes (H &E x 10).
4b: Arrow showing an enlarged oligodendrocyte with enlarged hyperchromatic nuclei containing intranuclear inclusions (H&E x 40).

oligodendrocytes with intranuclear inclusions (Figure 4). The immunohistochemistry for the JCV capsid protein VP-1 was positive in the nuclei of the infected oligodendrocytes. JC virus was subsequently identifited in the CSF using polymerase chain reaction (PCR).

The patient deteriorated further, became totally dependant and was only able to produce incomprehensible sound. He later succumbed to recurrent chest infections.

DISCUSSION

The diagnosis of PML in our patient with underlying HIV/AIDS is confirmed by the histology and presence of JC virus PCR in CSF. It is impossible to exclude coexistent primary CNS lymphoma or infiltrative astrocytoma. However, previous study has shown that primary brain tumors rarely co-exists with PML.[3]

MRI is a sensitive modality of early lesion detection, determination of the extent and character of the abnormalities. The most frequently affected regions are the cerebral hemispheres at the periventricular and /or subcortical white matter, followed by the cerebellum and brain stem.[4] The frontal and parieto-occipital lobes are classically affected. The lesions are typically multifocal, diffuse and asymmetric, involving the subcortical U-fibres giving rise to the scalloped borders along the cortex. These lesions usually demonstrate high signal intensity on T2- weighted/ FLAIR sequence

Table 1: Clinical and MRI features of PML limited to posterior fossa reported in literature.

Author/year	Age/sex	Location of lesions on MRI	Underlying illness	Clinical manifestations
Kastrup, 2002[5]	31/M	Brainstem	HIV	Progressive leg weakness, visual loss, dysarthria
Matthew, 2004[6]	44/F	Bilateral medulla	HIV	Ataxia, hyperreflexia, limb dysmetria
Kastrup, 2005[7]	42/M	Cerebellar / brainstem	HIV	Dysarthria, limb dysmetria, gait instability
Svensen, 2008[8]	51/M	Cerebellar / brainstem	SLE	Hemiparesis, dysarthria, diplopia, head tremor
Rahmat, 2010	41/M	Cerebellar / brainstem	HIV	Ataxia, motor incoordination, dysarthria.

and hypointense on T1- weighted images. Contrast enhancement is usually not observed and mass effect is uncommon.[4]

Our patient shows unusual white matter abnormality limited to the posterior fossa, with no clinical symptom elsewhere in the brain. This unusual selective infratentorial involvement has been previously reported in a small number of cases, shown in Table 1.[5-8]

Our patient thus further confirms that PML may present with isolated posterior fossa lesions.

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