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Images in Neuroscience: Answer

Alcohol abuse and acute behavioural disturbances in a 24-year-old patient

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1. Answer

C. Marchiafava-Bignami disease (MBD).

2. Discussion

MBD was named after two Italian pathologists who described acute demyelination of the corpus callosum at necropsy in 3 South-Italian male red-wine drinkers.[1] Etiology is unknown. The main pathological features range from demyelination with preserved axon structure, to extensive necrosis with cystic formation and microbleedings.[2]

Clinical features are highly variable and include reduced consciousness, unsteady gait, behavioural disturbances, motor defects, seizures and, rarely, interhemispheric disconnection syndromes.[2] Most of these can be seen in much more frequent alcohol-related disorders like Wernicke's encephalopathy or central pontine myelinolysis, which may not have distinct ocular findings.[3]

Recent brain-imaging methods, particularly MRI, disclosed highly specific lesion patterns which, combined with the clinical features, were used to divide MBD in 2 subtypes: type A, characterized by consciousness impairment, extensive T2-weighted hyperintense swelling of the corpus callosum, and bad prognosis; and type B, characterized by behavioural and gait disturbances, restricted "sandwich-like" T2-weighted hyperintense lesions in the corpus callosum genu or splenium, and a better outcome.[4] MRI also assumes a pivotal role in distinguishing MBD from other diseases, as the lesions affect the central layers of the corpus callosum and are remarkably symmetric.[5] Diffusion weighted imaging (DWI) and fluid-attenuated inversion recovery are most sensitive, depicting striking hyperintense lesions.[3] This was seen in our patient (Fig. 1C, D).

Spectroscopy, showing increased myoinositol and choline peaks, without a decrease in the NAA/Cr ratio, suggested demyelination with absent or minor axonal damage. Perfusion-weighted imaging, has not, to our knowledge, been published in relation to MBD. In our patient no perfusion abnormality was seen, arguing against an acute disruptive lesion. Fiber-tracking showed callosal interhemispheric fiber disruption (Fig. 1B).

The combination of preserved NAA/Cr ratio and preserved perfusion may be a better outcome marker, as both argue against a necrotic lesion, which could be expected considering conventional imaging and DWI findings.

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