JHEP|Reports

Ammonia rises from the ashes!

To the Editor:

We read with great interest the study by Hadjihambi *et al.*[1] showing that oxygen concentrations were reduced in the brains of rats with cirrhosis, which was probably mediated by hyperammonemia. The authors suggest that this brain hypoxia could participate in the pathogenesis of hepatic encephalopathy (HE), which is still a matter of debate.[2]

With respect to this, we would like to report our clinical experience of a 35-year-old woman who was admitted to the intensive care unit (ICU) for coma (Glasgow coma scale at 3), variceal bleeding and shock, revealing decompensated alcohol-related cirrhosis. Control of bleeding was rapidly obtained by vasoactive drugs and banding. She displayed hyperammonemia at 106 mmol/L. Neurological examination was unremarkable; specifically, there were no focal signs and an electroencephalogram showed diffuse slowing without any epileptic discharge. Coma was rapidly resolutive with symptomatic ICU measures and lactulose through the nasogastric tube. Surprisingly, brain MRI revealed a diffuse cortical hypersignal (Fig. 1A). The patient was discharged at day 15 with mild neurological impairment, short-span memory loss and attention complaints. She stopped alcohol and was monitored regularly in our outpatient clinics. Control brain MRI performed 3 months after ICU discharge showed partial disappearance (Fig. 1B) and the one performed at 6 months the total disappearance of cortical hypersignals (Fig. 1C). Currently, cirrhosis is recompensated and all cognitive complaints have disappeared.

Diffuse cortical hypersignals on T2-weighted or FLAIR-weighted sequences are classically observed on brain MRI in a limited number of circumstances almost all associated with hypoxemia: cardiac arrest, severe hypoglycemia, status epilepticus or mitochondrial disease.[3] Rarely those abnormalities are observed in Creutzfeld-Jakob disease. Very similar abnormalities have been described in some case reports in HE, but their pathogenesis was unclear.[4] We hypothesize that cortical hypersignals on brain MRI in HE are related to decreased cortical oxygenation mediated by hyperammonemia, as described by Hadjihambi *et al.*,[1] potentially compromising brain energy metabolism as previously shown by us and others.[5,6] We would like to outline that brain lesions were reversible in our case with strict control of ammonemia, together with control of bleeding and symptomatic ICU management.

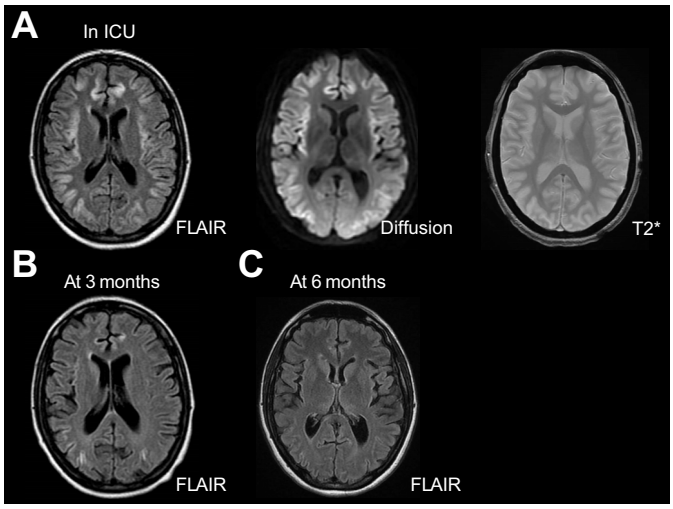

Fig. 1. Brain MRI (A) MRI imaging in ICU showing diffuse cortical hypersignals on both FLAIR and diffusion-weighted sequences. T2* weighted sequence was normal (B) Partial disappearance of the cortical hypersignals at 3 months; (C) Total disappearance of the cortical hypersignals at 6 months. FLAIR, fluid attenuated inversion recovery; ICU, intensive care unit.

The reversibility of HE is debated after liver transplantation, even if neuropsychological sequalae do not perfectly mimic HE symptoms.[7] The combination of long periods of hyperammonemia before transplantation and a second hit (namely hypovolemia which is inherent to the liver transplantation procedure, especially the anhepatic phase) could be responsible for altered brain oxygenation. Hence, a strict control of ammonia levels before transplantation could be an appealing strategy to avoid neurological sequalae.[8]

Finally, hyperammonemia and its clinical consequences have been completely revisited lately, in both acute and outpatient settings.[9,10] Going back to basics, we provide evidence of the utility of strict ammonia control in clinical situations favoring hypoxia, which are very frequent in patients with decompensated cirrhosis.

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Conflicts of interest

The authors have nothing to disclosure.

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Authors' contributions

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Supplementary data

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