Transient disappearance of white matter lesions on correction of hyponatremia

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The nature of white matter lesions (WMLs), commonly seen on MRI in the elderly, is controversial. We describe a rare phenomenon of transient disappearance of WMLs during correction of hyponatremia.

Case report

A 65-year-old woman with schizophrenia developed hyponatremia due to water intoxication. She had not taken any medications potentially affecting white matter changes. Serum sodium (mEq/L)/osmolality (mOsm/kgH₂O) levels were 104.1/230.5 on admission, 133.3/284.3 at day 4, and 139.3/295.7 at day 38. The rate of correction was proper (0.3 mEq/L/h). On admission, MRI showed cortical hyperintensities on diffusion-weighted imaging as well as hypointensities on apparent diffusion coefficient maps, suggesting hyponatremia-related edema (figure, A). These abnormalities had disappeared on follow-up MRI with normalization of serum sodium and osmolality (figure, B and C). Interestingly, several WMLs on fluid-attenuated inversion recovery imaging showed transient disappearance at day 4 (figure, B) and reappearance at day 40 (figure, C).

DISCUSSION

Because white matter behaves like a sponge,¹ osmotic changes may cause water outflow from the brain. Similar lesion disappearance was reported in hemispheric compression by subdural hematomas,² indicating different properties between normal tissue and WMLs. Osmotic demyelination syndrome is a well-known condition associated with abnormal osmolality, and vulnerability to osmotic change varies between brain regions. The images suggest qualitative differences between normal tissue and WMLs during recovery from brain edema, which might contribute to transient lesion attenuation. Although WMLs are generally considered permanent, water inflow and outflow of the white matter may be associated with lesion appearance on MRI.

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Figure Serial brain MRI

Left, middle, and right panels show diffusion-weighted imaging (DWI), fluid-attenuated inversion recovery (FLAIR), and apparent diffusion coefficient (ADC) maps. (A) Diffuse cortical DWI and ADC abnormalities on admission. (B) Transient disappearance of subcortical FLAIR hyperintensities on day 4. (C) Reappearance of subcortical lesions on FLAIR on day 40.

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