

MR and Tc-99m HMPAO SPECT images in a case of unusual widening of perivascular spaces (Virchow-Robin spaces)

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We report a rare case of unusual widening of perivascular spaces (Virchow-Robin spaces).

MR images showed multiple small round cystic areas along the perforating medullary arteries with signal intensity identical to the cerebrospinal fluid predominantly in the right cerebral white matter.

Tc-99m HMPAO SPECT images showed no remarkable laterality and no definite ischemic lesion, and the neurological status of the patient was not remarkable.

MR was a diagnostic examination and Tc-99m HMPAO SPECT was a useful supplementary examination in the evaluation of this case of unusual widening of Virchow-Robin spaces.

Key words: brain, Virchow-Robin space, Tc-99m HMPAO, SPECT, MR

INTRODUCTION

THE PERIVENTRICULAR SPACES, known as the Virchow-Robin spaces (VRS) are extensions of the subarachnoid space around perforating arteries penetrating into the brain parenchyma.¹⁻³ It is reported that to differentiate the VRS from lacunar infarcts in the basal ganglia is occasionally difficult, and when widening of the VRS is observed in the white matter, the differentiation is especially difficult.^{4,5}

We report a rare case of unusual widening of the VRS and discuss the usefulness of MR and Tc-99m HMPAO SPECT images.

CASE REPORT

A 71-year-old male who had no history of serious illness consulted his family physician because of transient muscular weakness of the extremities, and was told to have multiple cerebral infarcts on CT. He was referred to our hospital for further examination.

On admission, he had normal mental status and no neurological deficit. On MR imaging, T1-weighted (TR/

TE 600/10), T2-weighted (TR/TE 4800/120) and fluid-attenuated inversion-recovery (FLAIR) images (TR/TE/TI 8000/120/2000) (Fig. 1 A-E) disclosed multiple small round cystic areas predominantly in the right cerebral white matter. These cystic areas had the same signal intensity as the cerebrospinal fluid (CSF) in all pulse sequences, and their location conformed to the course of the perforating arteries branching from the cortical arteries. These findings strongly suggested unusual widening of the VRS.²⁻⁶ Periventricular hyperintensity was apparent bilaterally on the T2-weighted and FLAIR images, and was considered gliosis or demyelination.

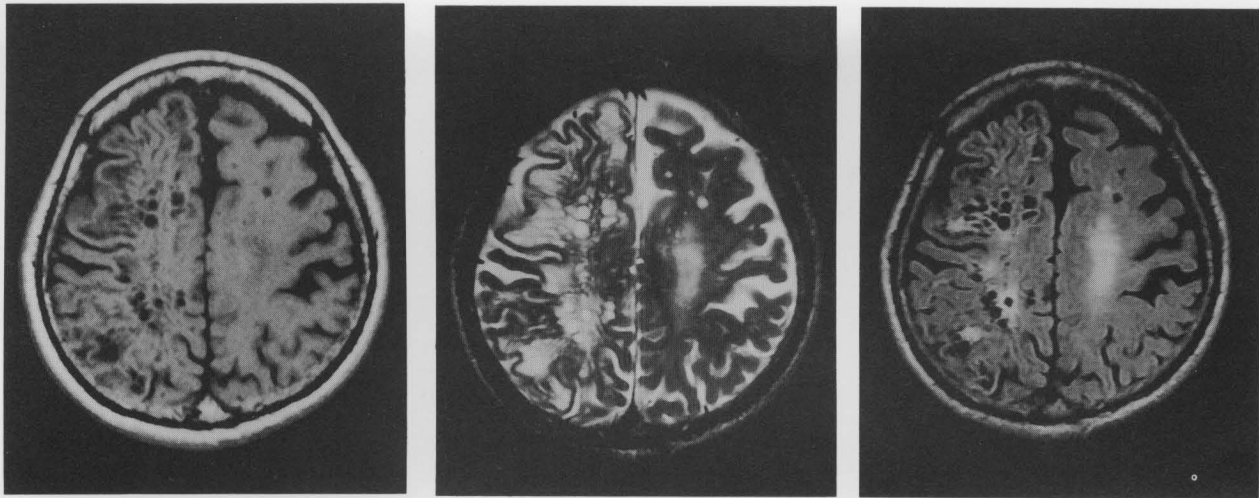
Brain perfusion SPECT was performed with Tc-99m HMPAO and showed no remarkable laterality or definite ischemic lesion. A hypoperfusion area in the right parieto-occipital lobe was considered due to a decrease in the volume of the brain parenchyma caused by widening of the VRS (Fig. 2 A-C). Cerebral angiography did not reveal any abnormality. Three years later, follow-up MR and Tc-99m HMPAO SPECT images did not show any change.

DISCUSSION

This report has described MR and Tc-99m HMPAO SPECT images in a case of unusual widening of the VRS, and is presented for two reasons.

Received August 2, 1999, revision accepted September 27, 1999.

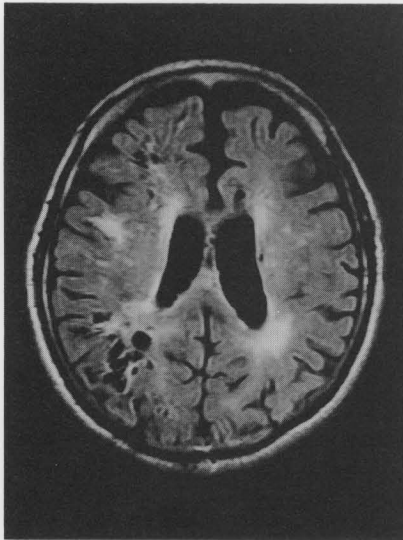
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A

B

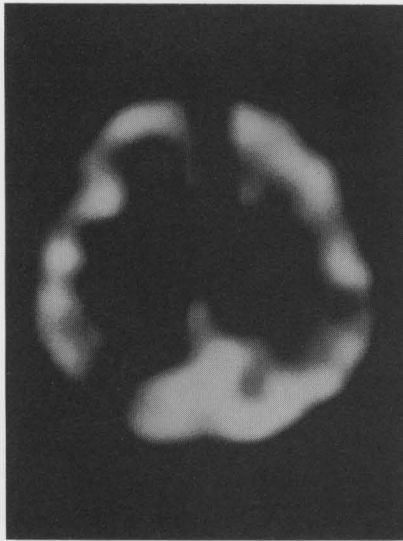
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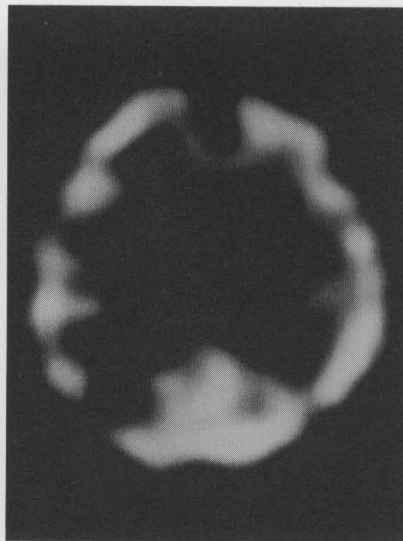
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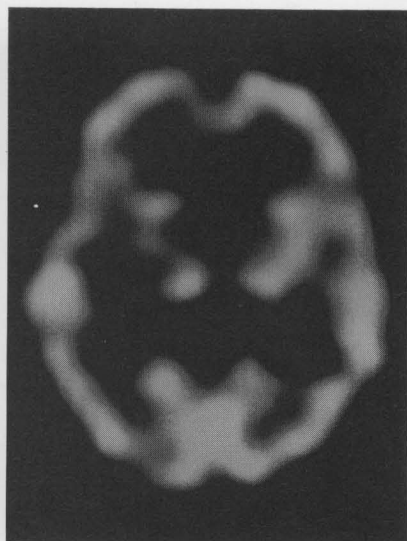
Fig. 1 MR T1-weighted (A), T2-weighted (B) and fluid-attenuated inversion-recovery (FLAIR) images (C-E) showed multiple small round cystic areas predominantly in the right cerebral white matter. These cystic areas were isointense relative to cerebrospinal fluid and conformed to the course of the perforating arteries.



A



B



C

Fig. 2 Tc-99m HMPAO brain perfusion SPECT showed no remarkable laterality and no definite ischemic lesion. Hypoperfusion area in the right parieto-occipital lobe was considered due to volume decrease of brain parenchyma.

First, unusual widening of the VRS as in this case is rare, although widened VRS cases have increasingly been reported as advances have been made in MR imaging.²⁻⁸ VRS are seen in ① the anterior commissure and basal ganglia, along the path of the lenticulostriate arteries, ② the convex white matter along the path of the perforating arteries branching from the cortical arteries, ③ the mid-brain, along the path of the perforating arteries from the posterior cerebral arteries.⁶ Dilatation of the VRS within the convex white matter is rarer, and has been shown to correlate with age, hypertension, dementia and incidental white matter lesions. But dilated VRS are believed to be another phenomenon in the aging brain rather than representing independent variables, and have a non-pathognomonic nature.^{2,4}

The differential diagnosis of unusual widening of the VRS should include a variety of cysts, ventricular diverticula, mucopolysaccharidosis,^{7,8} and especially cystic infarction.^{4,6} In this case, unusual widening of the VRS was distinguishable on the basis of clinical and MR findings (anatomical location and signal isointensity with the CSF in all pulse sequences).

Second, to the best of our knowledge, there is no description of brain perfusion SPECT in the evaluation of the unusual widening of the VRS.

In this case, although it is difficult to evaluate the perfusion in the white matter by the conventional qualitative method, Tc-99m HMPAO SPECT images showed no definite ischemic lesion, and the clinical symptoms and neurologic findings were not serious.

In conclusion, MR was a diagnostic examination and Tc-99m HMPAO SPECT was a useful supplementary examination in the evaluation of a case of unusual widening of the VRS.

ACKNOWLEDGMENTS

The authors thank Mr. Junsuke Uejima and Mr. Takashi Nishikawaji for their valuable assistance.

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