

Injury of the ascending reticular activating system by multiple brain herniations: A case report

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Objectives

We report on a patient who showed injury of the ascending reticular activating system (ARAS) by transtentorial herniation, Kernohan's notch phenomenon, and subfalcine herniation following stroke, using diffusion tensor tractography (DTT).

Case report

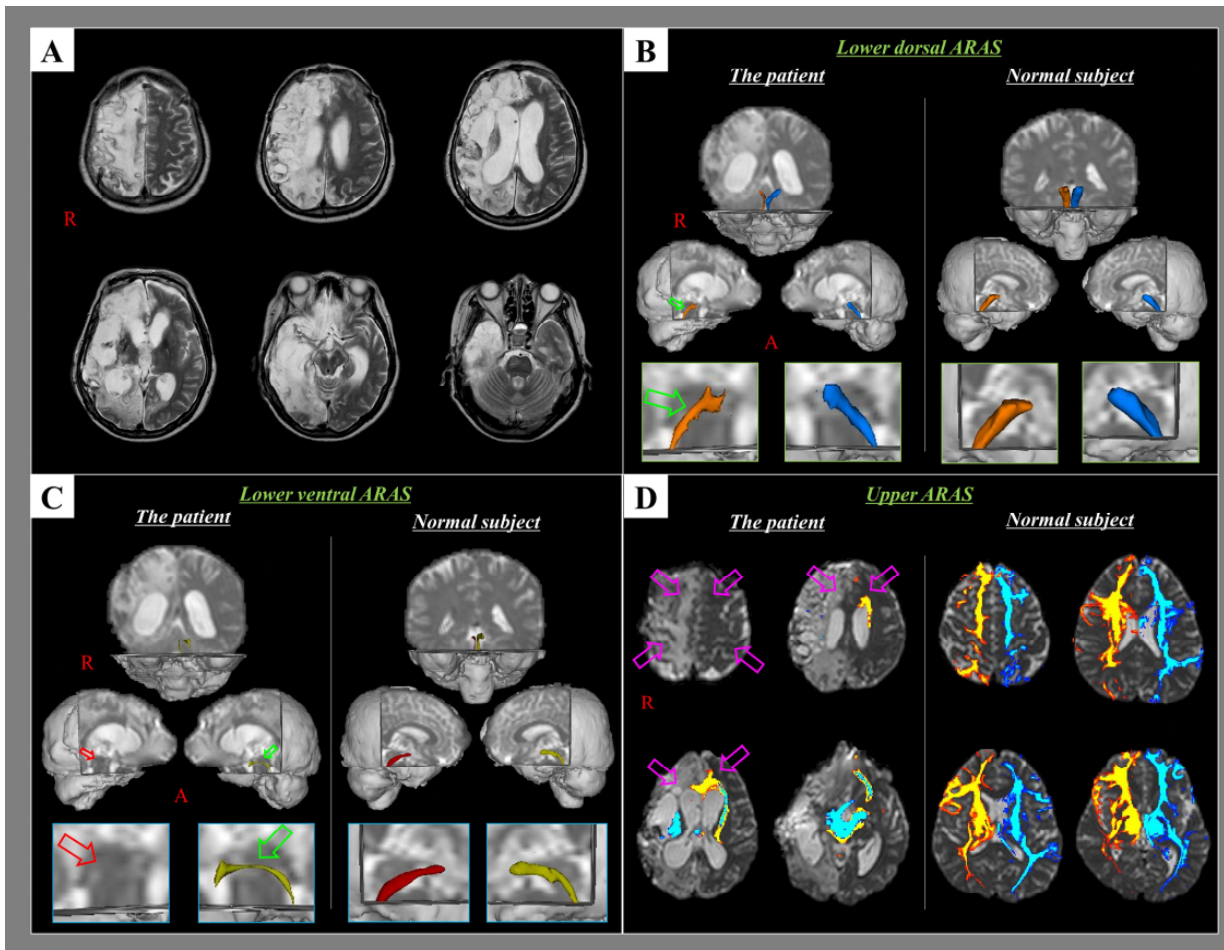
A 53-year-old female patient was diagnosed as subarachnoid hemorrhage and underwent coiling of a ruptured aneurysm of the right middle cerebral artery bifurcation. The next day, she also underwent decompressive craniectomy on the right fronto-parieto-temporal areas and hematoma removal for an intracerebral hemorrhage in the right fronto-temporal lobes. After seven months from onset, she was transferred to the rehabilitation department of the other university hospital for rehabilitation. The patient exhibited impaired alertness, with a Glasgow Coma Scale score of 11 and Coma Recovery Scale-Revised score of 14. On 7-month DTT, narrowing of the right lower dorsal ARAS and left ventral ARAS, and non-reconstruction of the right lower ventral ARAS were observed. In the upper ARAS, the neural connectivity between the thalamic intralaminar nucleus and the cerebral cortex was decreased in both prefrontal and parietal cortices.

Conclusions

Injury of the ARAS by transtentorial herniation, Kernohan's notch phenomenon, and subfalcine herniation was demonstrated in a stroke patient. Our results suggest that evaluation of the ARAS using DTT would be helpful to understanding the state of the ARAS in patients with brain herniation.

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(A) Brain MR images at seven months after onset show multiple leukomalactic lesions in the right fronto-parieto-temporal lobes. (C) Results of diffusion tensor tractography for the ascending reticular activating system (ARAS) of the patient. On 7-month DTT, narrowing (green arrows) of the right lower dorsal ARAS and left ventral ARAS, and non-reconstruction (red arrows) of the right lower ventral ARAS were observed. In the upper ARAS, the neural connectivity between the thalamic intralaminar nucleus and the cerebral cortex was decreased in both prefrontal and parietal cortices (pink arrows) compared with a normal subject (58-year old female).