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Ascending reticular activating system injury recovery during early post-stroke period: A case report

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Objectives

We report on a patient who showed early recovery from impaired consciousness and ascending reticular activating system (ARAS) following intracerebral hemorrhage (ICH) and intraventricular hemorrhage (IVH).

Methods

A 62-year-old male was diagnosed with spontaneous IVH and ICH in the right temporal lobe due to moyamoya disease. At six weeks after stroke onset, he was transferred to the rehabilitation department of the same hospital to undergo rehabilitation. The patient exhibited impaired consciousness, with a Coma Recovery Scale-Revised (GRS-R) score of 16. He underwent comprehensive rehabilitative therapy, including drug treatment for recovery of consciousness, as well as physical and occupational therapies. He recovered well and rapidly, and his consciousness score recovered to full (GRS-R = 23) at nine weeks after onset. The right lower dorsal ARAS was not reconstructed on 6-week post-onset diffusion tensor tractography (DTT), but it was reconstructed on 9-week post-onset DTT. In the upper ARAS, neural connectivity to the prefrontal cortex, which was reduced on 6-week DTT, had enlarged in both hemispheres on 9-week DTT.

Conclusions

Recovery of ARAS injury was demonstrated by DTT in a patient who showed rapid and full recovery of consciousness during the early period following ICH and IVH. Our results suggest the importance of intensive rehabilitation during the early post-onset period of stroke in patients with impaired consciousness following a stroke.

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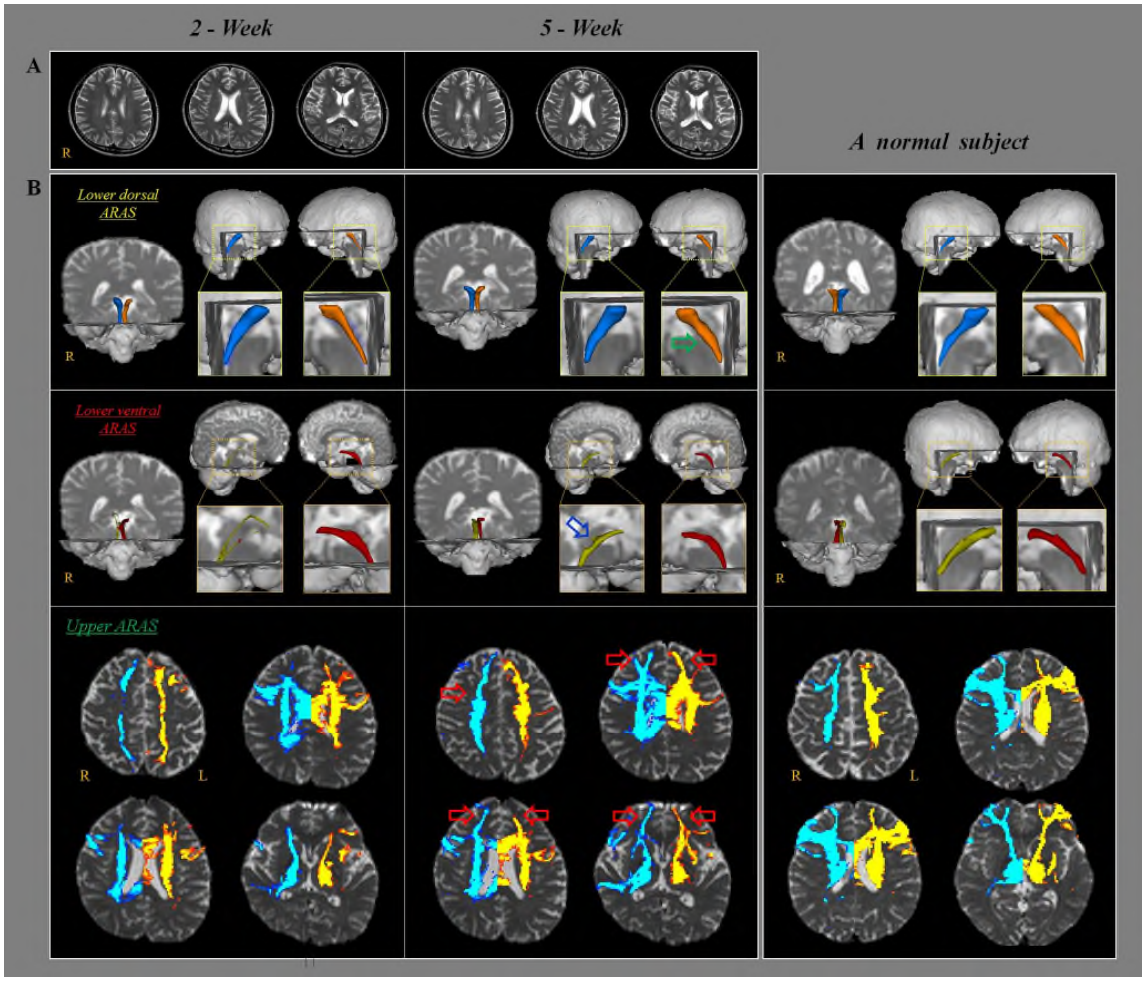

Fig. 1. (A) Brain computed tomography at stroke onset shows evidence of intraventricular hemorrhage and intracerebral hemorrhage in the right temporal lobe. (B) T2-weighted brain magnetic resonance images obtained at six weeks after stroke onset reveal leukomalactic lesions in the right temporal lobe and the subcortical white matter. (C) Results of diffusion tensor tractography (DTT) of the patient. The right lower dorsal ARAS is not reconstructed on 6-week DTT; however, it is reconstructed on 9-week DTT (green arrows). In the upper ARAS, reduced neural connectivity to the prefrontal cortex is observed on 6-week post-onset DTT (red arrows), but connectivity is increased in both hemispheres on 9-week DTT. The normal subject is a 62-year old male.