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Letter

Injury of the Dentato-Rubro-Thalamic Tract in a Patient with Thalamic Infarct

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A 71-year-old male patient was diagnosed with thalamic infarcts (Figure 1A). He showed ataxia since the onset of the thalamic infarcts. When he started rehabilitation ten days after onset, he revealed severe dysmetria (5 cm) in his right-hand during finger to nose test and moderate ataxic gait (20 points). The score of the Scale for the Assessment and Rating of Ataxia was 20 points (SARA, full score: 40 points, higher score means worse ataxia) [1].

Diffusion tensor imaging data was acquired ten days after onset using a 6-channel head coil on a 1.5 T Philips Gyroscan Intera with single-shot echo-planar imaging. For each of the 32 non-collinear diffusion sensitizing gradients, we acquired 70 contiguous slices parallel to the anterior commissure-posterior commissure line. For the reconstruction of dentato-rubro-thalamic tract (DRTT), the seed region of interest (ROI) was placed at the dentate nucleus behind the floor of the fourth ventricle on the coronal image [2]. Two target ROIs were placed on the junction of the superior cerebellar peduncle between the upper pons and cerebellum on the coronal image and the contralateral red nucleus of the upper midbrain on the axial image [2]. Out of 5000 samples generated from each seed voxel, results for each connection were visualized at three thresholds through each voxel for analysis. On ten-day diffusion tensor tractography (DTT), the right DRTT, which originates from the

right dentate nucleus of the cerebellum, terminated in the infarcted lesion in the left thalamus (Figure 1B).

The DRTT, which originates from the dentate nucleus in the cerebellum and terminates in the contralateral ventrolateral (VL) nucleus of the thalamus, is involved in movement control [2]. Therefore, abnormal movement such as ataxia can occur when the DRTT is injured [3-12]. In this case study, this patient showed severe dysmetria in his right hand and moderate ataxic gait. On DTT, the right DRTT appeared to be injured due to the infarct in the VL nucleus of the left thalamus. In this patient, injury of the right DRTT likely contributed to the ataxia. We believe that analysis of the DRTT using DTT would be useful in clarifying the cause of ataxia following cerebral infarct. However, the limitations of DTT should be considered: DTT could lead to both false positive and negative findings throughout the white matter of brain because of complex fiber configurations such as crossing or kissing fiber and partial volume effects [13, 14].

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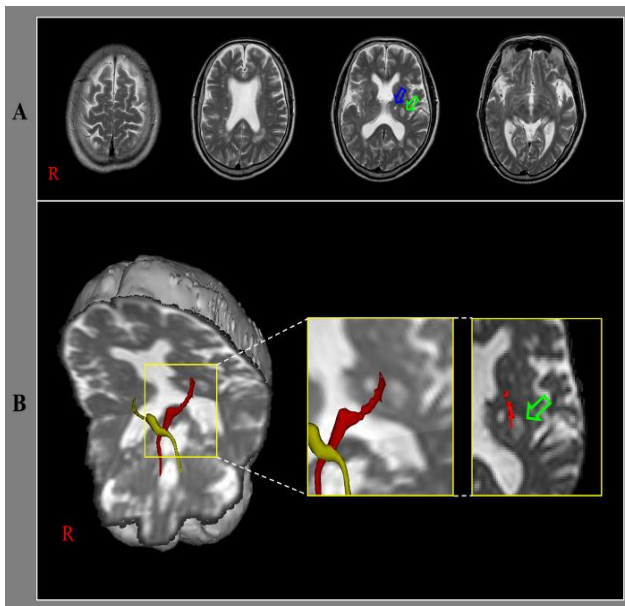


Figure 1: **A)** T2-weighted brain MR images ten days after onset show infarcts (pink and green arrows) in the left thalamus. **B)** Results of diffusion tensor tractography for dentato-rubro-thalamic tract (DRTT). On ten-day DTT, the right DRTT terminates in the infarcted lesion (green arrow) in the left thalamus

Disclosure

The authors reports no disclosures relevant to the manuscript.

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