

Temporal Profile of CT and T2*-Weighted Gradient-Echo MRI in a Patient with Unilateral Thalamostriate Vein Thrombosis

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Deep cerebral venous system thrombosis (DCVST) is an uncommon variety of thrombosis that accounts for 11% of cases of cerebral venous thrombosis. Thalamostriate vein (TSV) thrombosis is further rare among patients with DCVST. Although patients with cerebral venous thrombosis commonly have characteristic neurological deficits including headache, deterioration of consciousness, and seizures, patients with DCVST do not necessarily show such symptoms. Therefore, diagnosis of DCVST is sometimes difficult. Here we report a case of TSV thrombosis with a unilateral basal ganglion lesion presenting with right-sided hemiparesis. A 61-year-old Japanese female was referred to our hospital. On neurological examination, she had no headache but presented with right facial paresis with dysarthria. Her right hemiparesis was present in the upper and lower extremities. We repeatedly performed brain computed tomography (CT) and T2*-weighted conventional gradient-echo (GRE) magnetic resonance imaging, and conclusively diagnosed as left TSV thrombosis. We firstly report a case of unilateral DCVST associated with TSV thrombosis in which a temporal profile of CT and T2*-weighted GRE images was obtained. Although DCVST is a rare clinical entity, physicians should be aware that repeated radiological observations can be useful for the diagnosis and early medical treatment for DCVST.

Key Words: Deep cerebral venous system thrombosis—T2*-weighted gradient-echo MRI—venous infarction—case report

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Dear Editor,

Background

Thalamostriate vein (TSV) thrombosis is rarely reported among patients with deep cerebral venous system thrombosis (DCVST).^{1,2} Here we report a case of TSV thrombosis with a unilateral basal ganglion lesion presenting with right-sided hemiparesis.

Case Presentation

A 61-year-old Japanese female with hypertension and past smoking habits suddenly developed right-sided hemiparesis and dysarthria. Her National Institutes of

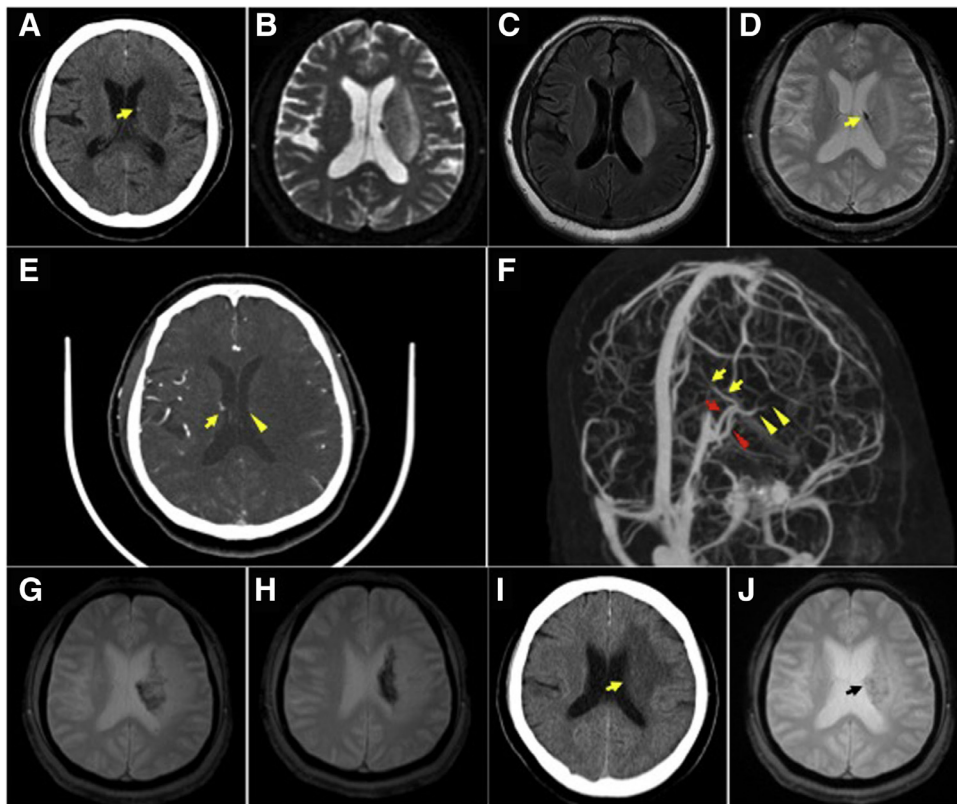


Figure 1. (A–D) Representative images of unenhanced computed tomography (CT) (A), and apparent diffusion coefficient (B), fluid-attenuated inversion recovery (C), and T2*-weighted magnetic resonance images (T2*-WI, (D) on admission, showing a thrombus in the left thalamostriate vein (TSV, yellow arrows) and infarcts in the left basal ganglion. (E, F) Contrast-enhanced CT, showing the filling defect in the left TSV (yellow arrowheads) compared to the right TSV (yellow arrows), and right (red arrow) and left (red arrowhead) internal cerebral veins were patent, indicating that left TSV but not right TSV and bilateral internal cerebral veins was occluded. (G, H) Representative images of T2*-WI 1 week after admission, showing expansion of hypointense lesions indicating venous congestion. (I, J) Representative images of unenhanced CT (I) and T2*-WI (J) after intravenous heparin therapy, showing disappearance of the thrombus in the left TSV (arrows) and shrinkage of the venous congestion. (Color version of figure is available online.)

Health Stroke Scale (NIHSS) score was 4. Serum D-dimer was 1.2 $\mu\text{g}/\text{ml}$. Brain computed tomography (CT) on admission showed a hyperdense dotted lesion in the TSV and a hypodense area in the left basal ganglion (Fig 1A). Brain magnetic resonance imaging (MRI) showed a hyperintense area in the left basal ganglion on apparent diffusion coefficient (ADC) and fluid attenuated inversion recovery (FLAIR) (Fig 1,B,C), suggesting vasogenic edema, and an enlarged TSV on T2*-weighted conventional gradient-echo (GRE), suggesting DCVST (Fig 1D). One week after admission, contrast-enhanced CT demonstrated filling defects in the left TSV and patent internal cerebral veins; T2*-weighted GRE showed expansion of enlarged hypointense lesions, indicating venous congestion,³ which led to the conclusive diagnosis of DCVST caused by the occlusion of left TSV (Fig 1,E-H). We thus treated the patient with intravenous heparin. Two weeks after therapy, her NIHSS score improved to 0, and the hyperdense spot lesion on CT and venous congestion on T2*-weighted GRE had diminished (Fig 1,I,J).

Discussion

For the diagnosis of DCVST, unenhanced CT demonstrates not only an acute thrombus, but increased hematocrit levels, as a hyperdensity becomes visible due to blood filling the vein.^{4,5} The value of T2*-weighted GRE to detect a thrombosed vein as a loss of signal resulting from the susceptibility effects of deoxyhemoglobin within the blood clots was reported.² However, diagnosis of DCVST is difficult in cases with no lesion or a unilateral infarct lesion on MRI.^{2,4,6} A previous case series showed that the diagnostic delay is about 20 days in isolated DCVST.² In our case, initial CT and T2*-weighted GRE led us to suspect a tiny thrombus in the left TSV and venous infarction in the left basal ganglion. After 1 week, based on expansion of hypointense lesions on T2*-weighted GRE indicating venous congestion owing to TSV thrombosis as well as contrast-enhanced CT, we conclusively diagnosed the patient with DCVST. After coagulation therapy, the left TSV thrombus and venous congestion diminished together, along with alleviation of neurological

symptoms. As far as we know, this is the first report of unilateral DCVST associated with TSV thrombosis in which a temporal profile of CT and T2*-weighted GRE was obtained.

Consent for Publication

Written informed consent for publication of this case report and the accompanying images was obtained from the patient.

Competing Interests

The authors declare that they have no competing interests.

Authors' Contributions

Study concept and design: HK and YU. Acquisition of data: HK, YU, and MS. Analysis and interpretation of data: HK, YU, MS, NM, KY, and RT. Drafting of the manuscript: HK and YU. Critical revision of the manuscript for important intellectual content: NH. All authors read and approved the final manuscript.

Ethics Approval and Consent to Participate

The authors declare that ethics approval was not required for this case report.

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