Teaching NeuroImages: Vertebral artery compression by head tilt around the roll axis diagnosed by transcranial Doppler

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Figure 1 Magnetic resonance angiography of the head and neck

Contrast-enhanced magnetic resonance angiography shows hypoplasia of the right vertebral artery (long arrow) terminating in posterior inferior cerebellar artery and mild stenosis of the left vertebral artery (short arrow).

A 59-year-old man reported transient vertigo and diplopia during leftward head tilt around the roll axis. Neurologic examination was unremarkable with the head erect or tilted. Magnetic resonance angiography of the head and neck showed hypoplasia of the right vertebral artery (figure 1). Transcranial Doppler waveform was monitored during leftward head tilt. The left vertebral artery flow velocity decreased with tilt, and abruptly increased after returning to erect posture (figure 2). Vertebral artery can be stretched or kinked by head rotation or tilt,^{1,2} typically at the C1-2 level.¹ Transcranial Doppler could be helpful in diagnosis of such cases.

Author contributions

J.-H. Park: study concept and design, drafting of the manuscript. J. Song: study concept and design, drafting of the manuscript. J. Shin: study concept and design, critical revision of manuscript for intellectual content. H.-S. Jang: study concept and design, critical revision of manuscript for

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Figure 2 Transcranial Doppler monitoring of the left vertebral artery

(A) Normal waveform with erect neck posture. (B, C) After left head tilt, diastolic velocity decreased first (arrowheads) and systolic velocity decreased later. (D, E) When erect posture was assumed, flow velocity dramatically increased immediately (arrow) and (F) normalized after about 2 minutes.

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