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IMAGING VIGNETTE

ADVANCED

CLINICAL VIGNETTE

Vertebral Artery Stenting in a Patient With Bow Hunter's Syndrome

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ABSTRACT

This report describes the case of a man with Bow Hunter's syndrome that was diagnosed by dynamic cerebral angiography. A decision for endovascular treatment was made. A self-expandable stent, 8 × 300 mm, was implanted in the left vertebral artery with excellent results, with resolution of the patient's symptoms and without any procedure-related complications. (**Level of Difficulty: Advanced.**) (J Am Coll Cardiol Case Rep 2019;1:73–4)

Rotational vertebrobasilar occlusion, also known as Bow Hunter's syndrome, is a rare cause of posterior circulation ischemia in which rotation of the head leads to reduction in blood flow in the posterior cerebral circulation. It was first described by Sorensen in 1978 in a patient with rotational vertebral artery (VA) compression causing brainstem stroke (1).

Symptoms are most often transient and nonspecific and include vertigo, syncope, nausea, dysarthria, dysphagia, and other sensorimotor findings such as tinnitus (2). Because Bow Hunter's syndrome is a relatively rare disorder, management has not been standardized, and there are no clinical practical guidelines for its diagnosis and treatment. Rotational vertebrobasilar occlusion can be demonstrated on vascular ultrasound, computed tomography angiography, magnetic resonance angiography, or percutaneous cerebral angiography (3). Treatment of the condition should be individualized, depending on the underlying mechanism of vascular compression. Conservative, surgical, and, more recently, endovascular approaches have been proposed (3).

A 45-year-old white man presented to our department with a 3-month history of repetitive episodes of dizziness and lightheadedness on rightward head rotation. In the differential diagnosis, we considered various conditions, such as transient ischemic attack, arrhythmia, orthostatic hypotension, and central positional vertigo.

On examination, patient's vital signs included blood pressure of 130/75 mm Hg and a heart rate of 70 beats/min. Reproducible dizziness was induced by head rotation to the right. No other neurological symptoms were observed, and the rest of the physical examination was unremarkable.

Results of laboratory tests, including complete blood count, serum chemistry, electrolytes, and D-dimer levels, were within normal ranges. Findings on transthoracic echocardiography and 24-h Holter and blood pressure monitoring were also unremarkable. Extracranial and transcranial ultrasound imaging revealed patent carotid arteries and VAs with normal blood flow bilaterally and no steal phenomenon.

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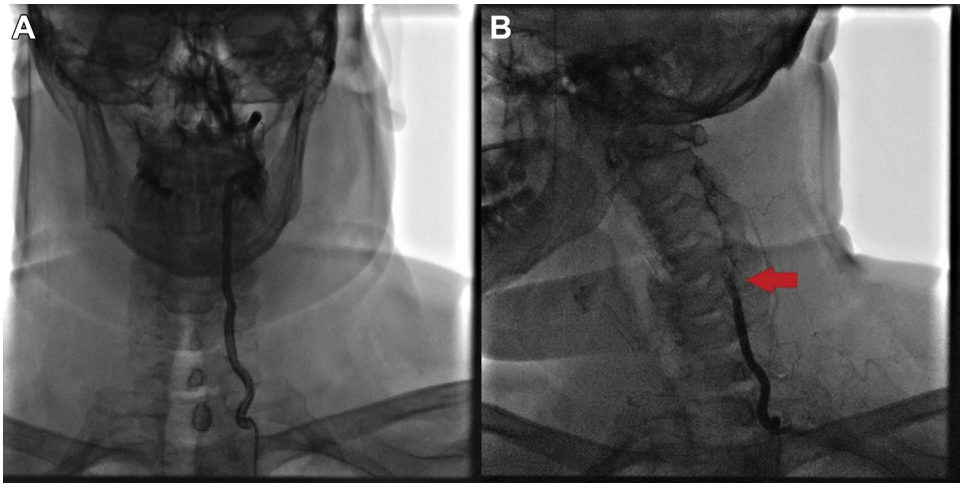
FIGURE 1 Dynamic Angiography of the Left Vertebral Artery



(A) Patent blood flow in the neutral head position. **(B)** Occlusion of left vertebral artery **(arrow)** during rightward head rotation. Also see Video 1.

Computed tomography angiography of the head and neck was then performed. These images demonstrated a dominant left VA with a hypoplastic right VA and unremarkable carotid arteries (Supplemental Figure 1). For better evaluation of the patient's disorder, we decided to perform dynamic cerebral angiography. The obtained images revealed patent carotid arteries and VAs bilaterally with the patient in the neutral head position, with the diameter of the right VA one-third the diameter of the left VA (Supplemental Figures 2A, 2B, 3A, 3B, 4A, and 4B). Images taken with the patient in various head positions were obtained to confirm dynamic VA occlusion and to verify the position that induced the most pronounced symptoms. The area of maximum dynamic stenosis with near occlusion of left VA was noted at the C5 level during rightward head abduction (**Figures 1A and 1B**, Video 1). A self-expandable 8 × 300 mm stent (Roadsaver carotid artery stent system, Terumo Europe, Leuven, Belgium) was implanted in the C4-C6 segment of the VA. After the intervention, blood flow through the left VA was preserved with the patient in the neutral head position and on head rotation to the right (Supplemental Figures 5A and 5B). The patient experienced no complications from the procedure. The patient remained asymptomatic and was discharged on the second day after the intervention.

At 6-month follow-up, the patient remained asymptomatic. Selective catheterization of the left VA revealed a patent vessel with preserved blood flow in various head positions.

In conclusion, this case illustrates that an endovascular approach offers a safe and clinically effective alternative for the treatment of Bow Hunter's syndrome.

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KEY WORDS endovascular treatment, posterior circulation ischemia, rotational vertebrobasilar occlusion, vertebral artery

APPENDIX For supplemental figures and a video, please see the online version of this paper.