

Bilateral Internal Carotid Artery Aneurysms at the Subpetrosal Portion with Unilateral Lower Cranial Nerve Palsies: Review and Consideration of Surgical Strategy

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Background: Symptomatic bilateral extracranial internal carotid artery (ICA) aneurysms at the subpetrosal portion are extremely rare, and their treatment strategy remains unknown. **Clinical Presentation:** A 42-year-old man presented to our hospital with a 2-month history of sudden onset of hoarseness, dysarthria, and dysphagia. Magnetic resonance imaging, magnetic resonance angiography, and computed tomography angiography revealed extracranial bilateral ICA aneurysms at the subpetrosal portion. The left-sided aneurysm compressed the left-sided lower cranial nerves (IX, X, XI, and XII), whereas the right-sided aneurysm was asymptomatic. We prioritized the treatment of the right-sided aneurysm to prevent bilateral lower cranial nerve deficits. This strategy was used because aneurysm treatment is not guaranteed to cure the left-sided cranial nerve palsies that lasted for 2 months. The right-sided ICA aneurysm was treated with ICA ligation and high-flow extracranial–intracranial bypass using the radial artery as bypass graft. Stent-assisted coil embolization was performed to the left-sided ICA aneurysm after 17 days. The patient showed no right-sided symptoms, and his left-sided symptoms remarkably improved 1 year after surgery. **Conclusion:** Our unique surgical strategy of prioritizing the aneurysm on the “asymptomatic” side may be one of the best treatment approaches in an extremely rare bilateral aneurysm case. **Key Words:** Bilateral extracranial internal carotid artery aneurysms—EC–IC bypass—lower cranial nerve deficit—subpetrosal portion—symptomatic.

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Introduction

Extracranial internal carotid artery (ICA) aneurysms are rare and account for .1%-4% of all arterial aneurysms.¹⁻³ These aneurysms generally exist at the ICA bifurcation or the proximal side of ICA.^{4,5} Extracranial distal ICA aneurysms are mostly related to carotid artery dissection,⁶⁻⁸ and their main symptom is associated with cerebral ischemia caused by embolism from dissecting aneurysm.^{9,10} In this paper, we report an extremely rare case of spontaneous bilateral extracranial ICA aneurysms at the subpetrosal portion, of which the aneurysm on one side caused ipsilateral lower cranial nerve palsies. We used

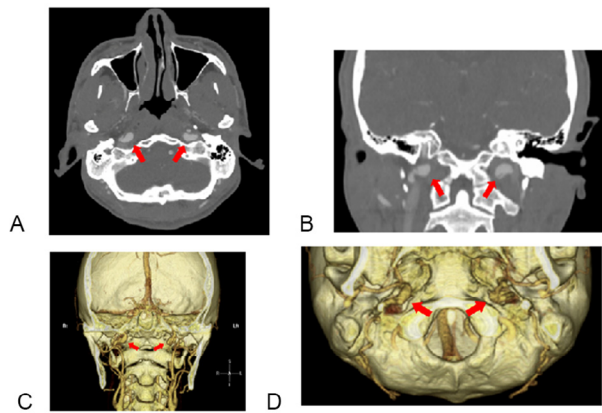


Figure 1. Computed tomography angiography (A: axial image; B: coronal image) and 3-dimensional computed tomography angiography (C and D). The arrows indicate bilateral internal carotid artery aneurysms at the subpetrosal portion. These aneurysms are located just under the jugular foramen.

a unique treatment strategy including surgical and endovascular interventions.

Clinical Presentation

A 42-year-old man had been experiencing hoarseness, dysphagia, and dysarthria for 2 months. He had no remarkable history or familial history and no abnormality on laboratory examinations. Neurologic examination

revealed weak swallowing reflex, dropping of the palatine arch on the left side, and left-sided weakness of the sternocleidomastoid muscle and tongue. Laryngoscopic examination demonstrated left-sided vocal cord paralysis. Video fluoroscopic examination of swallowing showed stagnation of foods at the laryngeal vestibule. Based on the above findings, we diagnosed the patient with left-sided lower cranial nerve (IX, X, XI, and XII) palsies. Other cranial nerves on the left side and all cranial nerves on the right side were normal. Magnetic resonance imaging (MRI) demonstrated that no intracranial abnormality caused the lower cranial nerve palsies. Computed tomography angiography (CTA) and magnetic resonance angiography (MRA) revealed bilateral ICA aneurysms at the subpetrosal portion. These aneurysms were located just under the jugular foramen (Fig 1). Constructive interference in steady-state MRI revealed that both aneurysms exist close to the lower cranial nerves and appear to compress these nerves (Fig 2), whereas right-sided aneurysm did not show any symptoms. Digital subtraction angiography (DSA) confirmed the presence of bilateral ICA aneurysms at the subpetrosal portion, which were 14.3 mm in diameter on the left side and 8 mm in diameter on the right side (Fig 3, A-D). Although these aneurysms mildly compressed the bilateral internal jugular vein, venous return and collateral route for venous return were sufficient. There was no evidence of bilateral venous congestion on DSA and MRI. Based on these findings, the

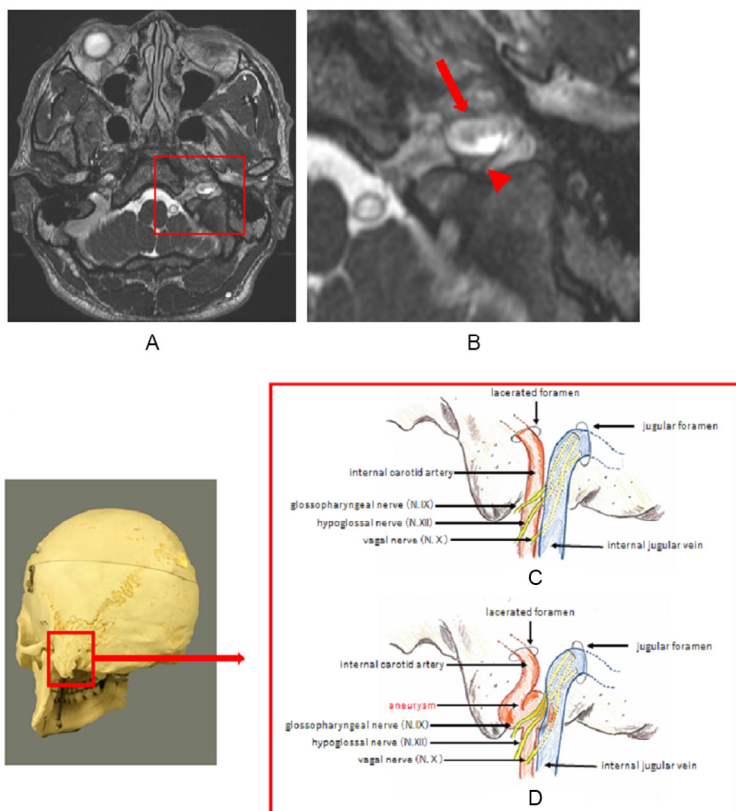


Figure 2. Constructive interference in steady-state magnetic resonance imaging reveals left-sided aneurysmal compression of the lower cranial nerves (A). The arrowhead (B) indicates left-sided lower cranial nerves, and the arrow (B) indicates left-sided ICA aneurysm at the subpetrosal portion. Subpanel (C) shows the neighboring structures, which include the left lower cranial nerves, jugular foramen, jugular vein, lacerated foramen, and ICA information. Subpanel (D) shows an aneurysm and its neighboring structures, which include compressed lower cranial nerves. Abbreviation: ICA, internal carotid artery.

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