Case Report

A Case of Bilateral Giant Internal Carotid Artery Aneurysms at the Cavernous Portion Managed by 2-stage Extracranial–Intracranial Bypass with Parent Artery Occlusion: Consideration for Bypass Selection and Timing of Surgeries

Miki Fujimura, MD,*† Kenichi Sato, MD,* Naoto Kimura, MD,† Takashi Inoue, MD,† Hiroaki Shimizu, MD,* and Teiji Tominaga, MD*

Bilateral giant internal carotid artery (ICA) aneurysms at the cavernous portion with bilateral cranial nerve symptoms are extremely rare. Extracranial–intracranial (EC-IC) bypass with parent artery occlusion (PAO) is one of the preferred procedures for giant ICA aneurysm at the cavernous portion with cranial nerve palsy; however, optimal bypass selection and the timing of surgery are controversial, particularly in bilateral cases. A 28-year-old woman developed left third nerve palsy with giant ICA aneurysms at the bilateral cavernous portion. Because only the left aneurysm was symptomatic, she initially underwent left EC-IC bypass using a saphenous vein graft with PAO without complications, which relieved her symptoms. However, she developed right third/fifth nerve palsy 10 months later, at which time magnetic resonance (MR) imaging and MR angiography revealed an enlarged right ICA aneurysm and shrunken left ICA aneurysm. Balloon test occlusion of the right ICA identified sufficient ischemic tolerance; therefore, she underwent right superficial temporal artery–middle cerebral artery bypass with PAO. Both bypasses were confirmed by MR angiography to be patent after surgery. Cranial nerve palsy gradually improved postoperatively, and single-photon emission computed tomography confirmed static cerebral hemodynamics. In conclusion, high-flow EC-IC bypass with PAO is recommended in the first stage of surgery on a unilaterally symptomatic side to minimize postoperative hemodynamic stress to the contralateral aneurysm. Once the contralateral side becomes symptomatic, second stage EC-IC bypass with PAO, either low-flow or high-flow bypass, is recommended based on the results of balloon test occlusion. **Key Words:** Giant cerebral aneurysm—extracranial–intracranial bypass—complex aneurysm—balloon test occlusion.

From the *Department of Neurosurgery, Tohoku University Graduate School of Medicine, Sendai; and †Department of Neurosurgery, National Hospital Organization, Sendai Medical Center, Sendai, Japan.

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Address correspondence to Miki Fujimura, MD, Department of Neurosurgery, Tohoku University Graduate School of Medicine, 1.1. Seiryo-machi, Aoba-ku, Sendai 980-8574, Japan. E-mail: mfujimur@gmail.com.

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Aneurysms in the cavernous carotid artery account for between 3% and 5% of all intracranial aneurysms; however, giant internal carotid artery (ICA) aneurysms at the bilateral cavernous portion are rare and have only been reported in a limited number of studies.[1-6] Bilateral giant cavernous ICA aneurysms manifesting as bilateral cranial nerve symptoms are rarer,[1] for which an optimal treatment and favorable timing of management are yet to be determined. Extracranial–intracranial (EC-IC) bypass with parent artery occlusion (PAO) is one of the preferred procedures for giant ICA aneurysm at the cavernous portion with cranial nerve palsy,[7-10] whereas optimal bypass selection, whether low-flow or high-flow bypass, is controversial especially for patients with bilateral pathology. We here described the case of a 28-year-old woman with giant ICA aneurysms at the bilateral cavernous portion, who was successfully managed by 2-stage EC-IC bypass with PAO.

Case Report

Initial Surgery for the Left ICA Aneurysm

A 28-year-old woman was introduced to our clinic because of double vision and left blepharoptosis. Both her past history and familial history were unremarkable. A neurologic examination on admission revealed left oculomotor nerve palsy and hypesthesia at the territory of the third branch of the left trigeminal nerve. No cranial nerve symptoms were observed on the right side at this time. A laboratory examination revealed no abnormality, and a physical examination did not indicate any sign of systemic inflammation. Initial T2-weighted magnetic resonance (MR) imaging and MR angiography demonstrated bilateral giant internal ICA aneurysms (Fig 1, A,B). Preoperative catheter angiography confirmed the presence of giant ICA aneurysms at the bilateral cavernous portion (Fig 1, C-E), which were 27 mm in diameter on the left and 25 mm in diameter on the right side. Because only the left ICA aneurysm was symptomatic at this time, we initially attempted radical management for the left ICA aneurysm. The patient intended to get married soon after the management of her aneurysms, and we considered EC-IC bypass with PAO to be more beneficial for the patient than endovascular management by stent placement, which requires dual antiplatelet therapy. Because of the patient's preference to undergo EC-IC bypass with PAO, we attempted open surgery instead of endovascular management with parent artery

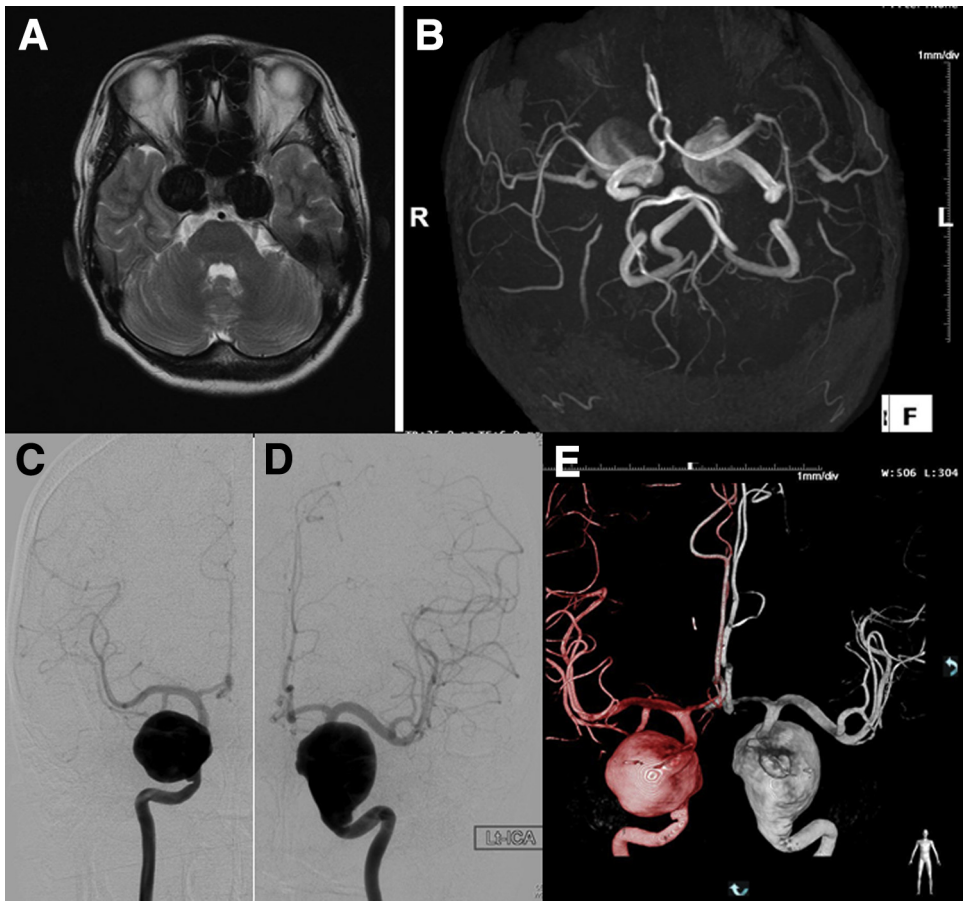

Figure 1. *Initial T2-weighted magnetic resonance (MR) imaging (A) and MR angiography (B) demonstrating bilateral giant internal carotid artery aneurysms. Preoperative catheter angiography revealing giant aneurysms at the bilateral cavernous portion. Antero-posterior views of right (C) and left (D) digital subtraction angiography, and combined 3-dimensional rotational digital angiography (E).*