Case Report

Reconstructive Endovascular Treatment of Vertical Stenosis Associated with Adjacent Aneurysm at the Same Arterial Anatomic Segment

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One case had a symptomatic vertebral artery stenosis coupled with a coincidental unruptured cerebral aneurysm at the same arterial anatomic segment. And another case had an asymptomatic vertebral artery stenosis coupled with a ruptured cerebral aneurysm at the same arterial anatomic segment. They underwent intracranial stenting. Both lesions were treated successfully and neither complications nor strokes occurred after the procedures. Covered stent placement in an intracranial stenosis with an adjacent ruptured or unruptured aneurysm may be a feasible method. **Key Words:** Stenosis—aneurysm—stent—endovascular.

In a systematic review on the prevalence of incidental aneurysms in autopsy and angiography studies, stenosis diseases seem to increase the risk of incidental aneurysms.[1,2] The North American Symptomatic Carotid Endarterectomy Trial reported that 3.1% of patients with carotid stenosis had aneurysms. Of the 2885 patients participating in the North American Symptomatic Carotid Endarterectomy Trial, 51 had ipsilateral unruptured intracranial aneurysms. Patients with a symptomatic cervical carotid stenosis coupled with a coexisting cerebral aneurysm in the carotid distal segment present a therapeutic dilemma.[3,4] To the best of our knowledge, however, there have been few reports on intracranial stenoses associated with adjacent aneurysms in the same arterial segment.[5] Recanalization by stent placement of intracranial stenosis in patients with adjacent aneurysms may be associated with a greater risk of complications. Stent placement procedures in the patient group can lead to difficulties because of the need to manage an aneurysm in the same anatomic segment. Although stent placement can protect the neck of the aneurysm, dilation of the stenotic vessel can increase the risk of aneurysm rupture.

There are several reports on endovascular treatment of internal carotid and vertebral artery aneurysms using covered stent.[6,7] We report 2 cases of successful endovascular treatment of vertebral artery aneurysm associated with adjacent stenosis in the same arterial segment.

Case 1

A 46-year-old male experienced a transient episode manifesting of recurrent drop attacks and an increase in the frequency of episodes of orthostatic dizziness, visual changes. He was symptomatic despite having taken oral clopidogrel, 75 mg/day. His motor examination revealed weakness in both upper (4⁄5) and lower (4⁄5, proximal greater than distal) extremities. He had 12-year history

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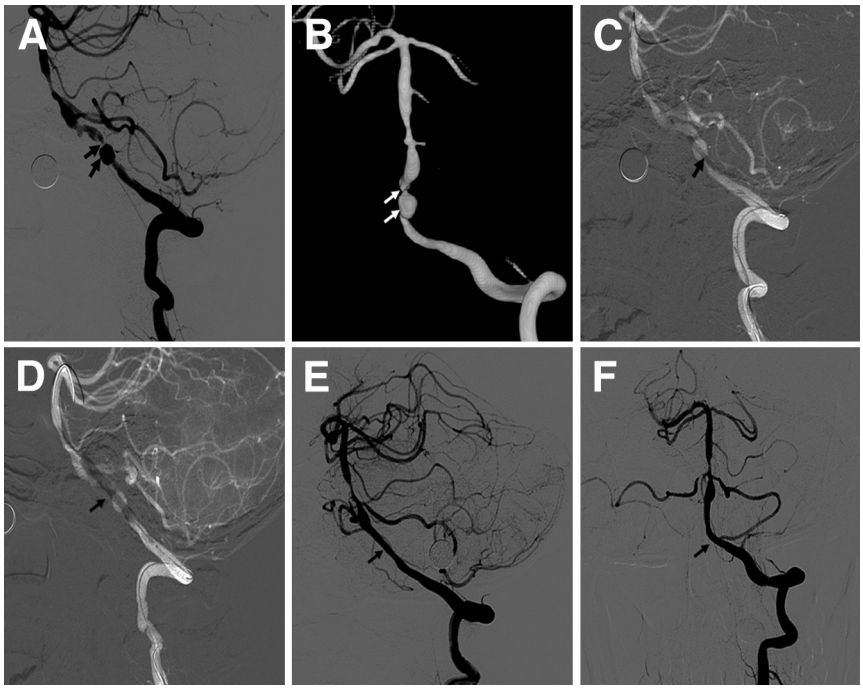

Figure 1. *(A) DSA showed severe stenosis (arrow) with adjacent aneurysm (arrow) of vertebral artery. (B) 3-Dimensional angiography showed severe stenosis (arrow) with adjacent aneurysm. (C) A 2.0 × 20-mm angioplasty balloon (arrow) was used to predilate the lesion. (D) The 3.5 × 19-mm covered stent (arrow) was inflated. (E and F) Angiographic result showed complete normalization of the vessel diameter and satisfactory occlusion of the aneurysm (arrows).*

of hypertension. He smoked 1-2 packs per day for 20 years. His laboratory tests were unremarkable. Magnetic resonance diffusion-weighted images disclosed multiple infarctions corresponding to the territory of the basilar artery. DSA angiogram revealed the diagnosis of a complete occlusion of the right vertebral artery and a left vertebral artery 4 × 5-mm aneurysm associated with adjacent stenosis (>75% stenosis diameter .86 mm) in the same arterial segment (Fig 1, A).

Under the general anesthesia, patient received heparin to achieve an activated clotting time of 250-300 seconds. Then, we positioned a 6F Envoy guiding catheter (Cordis, Miami, USA) in the diseased ipsilateral vertebral artery. Selective angiography was performed, and the targeted segment was outlined in 3-dimensional angiography (Fig 1, B). Using roadmap guidance, we navigated an exchange microguidewire, 300 cm in length and .014 inch in diameter (Transcend Floppy; Boston Scientific, Fremont, CA), into a distal branch of the posterior cerebral artery. An 2.0 × 20-mm angioplasty balloon (Maverickz; Boston Scientific) was used to predilate the lesion over exchange microguidewire to allow subsequent passage of a balloon-mounted stent (Fig 1, C). Tirofiban hydrochloride was started with a fixed 25-μg/kg intravenous bolus followed by .15 μg/kg/min in intravenous infusion for 24 hours. Then a 3.5 × 19-mm balloon-mounted covered stent (Jostent; Gaftmaster, Jomed, Germany) was then advanced over the .014-inch guidewire across the lesion site. Multiple control angiograms were obtained to confirm that the stent fully covered the aneurysm and stenosis. Under fluoroscopic control, the covered stent was then inflated with 6 atm pressure (Fig 1, D). Angiography was performed immediately after deflation of the balloon to confirm correct placement of the stent. An excellent angiographic result was achieved with complete normalization diameter of the stenotic vessel and satisfactory occlusion of the aneurysm (Fig 1, E,F). Long-term aspirin (100 mg/day) was given and clopidogrel (75 mg/day) was added for the following days till half a year. There were no procedural complications, and the patient was asymptomatic and neurologically intact at the 3-month clinical follow-up.

Case 2

A 57-year-old man became acutely unconscious and fell to the floor. The coma lasted for a few hours and was followed by nausea. His only medical problem was hypertension. His laboratory tests were unremarkable. Emergent cranial computed tomography demonstrated subarachnoid hemorrhage at the posterior fossa. DSA angiogram revealed the diagnosis of a right vertebral artery aneurysm (3.5 mm × 4.9 mm) associated with adjacent stenosis (>75% stenosis diameter .64 mm) in the same arterial segment (Fig 2, A).

Under the general anesthesia, patient received heparin to achieve an activated clotting time of 250-300 seconds. The targeted segment was outlined in 3-dimensional angiography (Fig 2, B). Using roadmap guidance, we navigated an exchange microguidewire 300 cm in length and .014 inch in diameter (Transcend Floppy; Boston Scientific) into a distal branch of the posterior cerebral artery. An 2.0 × 9-mm angioplasty balloon (Gateway; Boston Scientific) was used to predilate the lesion over exchange