CASE REPORT

Antegrade Recanalization of Parent Artery after Internal Trapping of Ruptured Vertebral Artery Dissecting Aneurysm

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We report a patient with a ruptured vertebral artery (VA) dissecting aneurysm that was treated by internal trapping of the aneurysm and parent artery using detachable coils with subsequent antegrade recanalization of occluded vertebral artery during the follow-up period. A 38-year-old man was admitted with a ruptured right VA dissecting aneurysm just distal to origin of right posterior inferior cerebellar artery. The dissected segment of the VA was occluded by coil embolization. The 14 months follow-up angiography showed that dissected aneurysm was completely occluded, but the parent artery was recanalized in an antegrade fashion. Based on this unique case, the authors suggest that careful angiographic follow-up of dissecting aneurysm is required, even in patients successfully treated with endovascular occlusion of the affected artery and aneurysm.

Key Words : Dissecting aneurysm · Recanalization · Vertebral artery.

INTRODUCTION

Dissecting aneurysms of the intracranial vertebral artery are increasingly diagnosed as a cause of subarachnoid hemorrhage (SAH), especially in young to middle-aged adults. Once ruptured to cause SAH, dissecting aneurysms are associated with a high incidence of re-bleeding and a high mortality rate at the time of re-bleeding, indicating the need for early treatment. The most commonly accepted treatment modality is complete isolation of the dissected segment by surgical trapping or endovascular occlusion. Because surgery involves high risks for treatment-related morbidity and mortality, an endovascular method is preferred in treating vertebral artery dissecting aneurysm. In endovascular treatment, shifting from proximal occlusion of vertebral artery to internal trapping of dissected site using controllable detachable coils has been advocated as a primary treatment with or without bypass.

In the preset article, we describe a case in which an occluded vertebral artery recanalized in an antegrade fashion, despite internal trapping of the aneurysm and affected artery using controllable coils. Possible explanations for the antegrade recanalization of the occluded vertebral artery are also discussed.

CASE REPORT

A 38-year-old man, with a history of stupor (Hunt and Hess grade III) after sudden severe headache, was admitted to our emergency room, where computed tomography (CT) revealed SAH predominantly in the posterior fossa and basal cistern. The patient had a history of hypertension. However, he did not have any previous neurologic disease, or history of drug abuse. Following CT angiography (CTA) revealed fusiform dilatation of right intracranial vertebral artery. Coronal CT source image also showed low density intimal flap and pseudoaneurysm, consistent with a dissecting aneurysm (Fig. 1). The cerebral angiography showed a fusiform aneurysm of the right distal vertebral artery and prolonged contrast stagnation in the false lumen of dissecting aneurysm. A washout of the contrast was also observed at the same time in the parent artery. The right posterior inferior cerebellar artery (PICA) arose proximal to the dissected segment of the intracranial right vertebral artery (Fig. 2). The vertebral arteries were codominant.
events. A follow-up CTA performed 12 days after the procedure showed no residual or recurrence of aneurysm. The patient was doing well and returned to work 2 months after the onset of the symptoms. Fourteen months after the embolization, another follow-up angiography was performed, which revealed spontaneous recanalization of the occluded right vertebral artery with a normal arterial configuration and antegrade flow into the basilar artery. The recanalized vertebral artery was located just inferior and medial to the deployed coil meshes (Fig. 4). It was decided that no further intervention was needed. At the last clinical follow-up 16 months after initial treatment, the patient was fully symptom free.

**DISCUSSION**

Ruptured vertebrobasilar artery dissecting aneurysms have an extremely high rate of early rebleeding, and rebleeding is associated with a poor clinical outcome. Considering the aggressive behavior of ruptured vertebral dissecting aneurysms, most definitive treatment is parent vessel deconstruction. This can be achieved by using either open surgical trapping or endovascular-
lar balloon or coil occlusion\(^9\). Several recent reports have shown that even deconstructive approach achieved by endovascular procedures does not completely eliminate the risk of re-bleeding from ruptured vertebral artery dissecting aneurysm\(^6\). However, endovascular occlusion of the affected site, including both aneurysm and parent artery, may be considered the first option for treatment in patients who will tolerate sacrifice of the parent vessel along its diseased segment\(^9\).

Baik et al.\(^9\) reported a rare case of ruptured vertebral artery dissecting aneurysm that was treated by endovascular occlusion of the aneurysm and parent artery. Nine months following endovascular treatment, the vertebral artery recanalized in an antegrade fashion. Similarly, Sawada et al.\(^9\) also reported two rare cases of ruptured vertebral artery dissecting aneurysms that were treated using GDCs, and the recanalized vertebral artery in an antegrade fashion was found during the follow-up period (3-6 months). In the present case, internal trapping was performed using detachable coils, thereby sacrificing the parent artery at the level of dissection and completely occluding the dissecting aneurysm. During follow-up period, right vertebral angiogram obtained fourteen months after endovascular treatment revealed recanalization of the antegrade blood flow just inferior and medial to the occluded coil meshes with the dissecting aneurysm.

For our rare recanalization case, we propose possibilities for the actual mechanism of the antegrade recanalization related to the internal trapping of a dissecting aneurysm. First, the true lumen may have been occluded by the false lumen. Thus, if the false lumen had both entrance and an exit and true lumen was collapsed based on the enlarged false lumen, the abnormal configuration of the dilated segment of the dissection may have been just the false lumen. As a consequence, the microcatheter could have been placed into the false lumen, thereby occluding the false lumen with the aneurysm in the initial procedure. Then, several months later, although the false lumen was still occluded, another channel opened in the true lumen that had been compressed by the enlarged false lumen. In our present case, the initial CTA coronal source images depicted a thin layer of intimal flap of the dissecting aneurysm and following angiogram also revealed persistent contrast stasis in the dissected false lumen. If the microcatheter had been navigated into the false lumen, thereby occluding the false lumen by detachable coils, then the false lumen could have compressed the true lumen during the initial treatment. On the other hand, technical explanation was also considered, such as, deployed coils did not cover the entry zone of the dissecting aneurysm and parent artery on the postembo...


