Early Rebleeding after Internal Trapping of a Ruptured Vertebral Artery Dissecting Aneurysm: A Case Report

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Subarachnoid hemorrhage (SAH) from vertebral artery (VA) dissecting aneurysms is rare and potentially fatal. Early rebleeding from ruptured VA dissecting aneurysms excessively reduces favorable outcome rates of the ruptured dissecting aneurysms, so that early diagnosis and treatment are essential for preventing early rebleeding and devastating results. A 52-year-old man was referred to our hospital due to an abruptly developed severe headache and sequential mental change. SAH due to ruptured left VA dissecting aneurysm was noted. We performed early endovascular internal trapping, and successful flow arrest on final angiogram was confirmed. About 6 hours later after internal trapping of the aneurysm, his mentality abruptly deteriorated and rebleeding was confirmed. We present this case of early rebleeding from vertebral dissecting aneurysm after endovascular internal trapping, along with a literature review.

Key Words: Vertebral artery; Dissecting aneurysm; Subarachnoid hemorrhage; Rebleeding; Internal trapping

Subarachnoid hemorrhage (SAH) from dissecting aneurysms of the vertebrobasilar system has been reported to account for 4.5% of intracranial SAH (1). Since ruptured VA dissecting aneurysms are associated with a higher incidence of rebleeding (2, 3), early diagnosis and treatment are required (4). Due to its lower invasiveness and good outcomes, endovascular treatment has been considered an alternative treatment modality for ruptured VA dissecting aneurysms (5-7). Concomitant occlusion of the dissecting aneurysm and the parent artery with detachable coils (internal trapping) is considered a fairly effective treatment method for VA dissecting aneurysms in their acute stage (4), with a high success rate and a low complication rate (4, 7). Here we present a case of early rebleeding from a vertebral dissecting aneurysm after internal trapping, along with a literature review.

CASE REPORT

A 52-year-old man without remarkable medical history abruptly developed a severe headache and sequential mental change. On arrival at our hospital, he showed deep stuporous mentality and presented an
abnormal extension of extremities to pain (Glasgow coma scale 5). Computed tomography (CT) showed diffuse SAH with 4th ventricle hemorrhage(Fig. 1). Immediate cerebral angiography revealed a dissecting aneurysm arising from the left VA just distal to the origin of the posterior inferior cerebellar artery (PICA) (Fig. 1). We promptly performed internal trapping of the left VA with coils. Fourteen Guglielmi detachable coils (GDCs), 98 cm in length, were placed across the dissection site just distal to the origin of the PICA. The dissecting segment of the left VA were completely occluded, with preservation of the left PICA. The opposite right VA adequately supplied the basilar artery (BA) and both posterior cerebral arteries (PCA) (Fig. 1). Immediate post-procedural brain CT showed mildly increased IVH and ventricle size (Fig. 2). The patient seemed tolerable compared with his pre-operative state, so we treated him conservatively, by sedation and medical control of his intracranial pressure. About 6 hours later after internal trapping of his aneurysm, his blood pressure fluctuated and his mentality abruptly deteriorated (Glasgow coma scale 3).

We thought that his hydrocephalus may have been aggravated, and we performed an emergent external ventricular drainage (EVD) via the right Kocher’s point. When a catheter was inserted into the ventricle, fresh blood was expelled through the catheter at high pressure. We believed that severe rebleeding had developed, and performed a contralateral EVD insertion.

Postoperatively, he showed a comatous mentality.
Due to his poor condition, a follow-up angiography was not performed. The patient died on the 16th postoperative day.

**DISCUSSION**

The natural history of VA dissecting aneurysms presenting with SAH is notable for a high incidence of recurrent bleeding within the first hours or days after ictus(2, 3). An analysis of 42 patients with SAH from VA dissecting aneurysms treated at a single institution, and who had not undergone surgical or endovascular therapy, found that the incidence of rebleeding 69% (29/42), and that rebleeding predicted poor clinical outcome, with a high mortality rate of 48.7% (14/29) (2). Because of this high mortality rate related, surgical or endovascular interventions should be promptly performed to prevent rebleeding in patients with ruptured VA dissecting aneurysms(3, 4).

Open surgical procedures have been replaced recently by endovascular treatment. Endovascular occlusion of the affected site, including both the aneurysm and parent artery, has been found to be a safe, less invasive and reliable treatment for VA dissecting aneurysms(4,6,7). For example, of 29 patients with acute SAH due to rupturing of VA dissecting aneurysms who were treated with endovascular techniques, 28 (97%) showed no technical or clinical complications, with only 1 patient showing evidence of aneurysm recanalization(9). In two patients with late recanalization after internal trapping of VA dissecting aneurysms, the VA recanalized in an antegrade fashion during the follow-up period(8). This may have been due to occlusion of the false lumen within the aneurysm, or to use of an insufficient number of coils. These findings suggested that recanalization may occur even in patients successfully treated with internal trapping because endovascular treatment involves only the arterial lumen.

We have presented here a case of early rebleeding from a VA dissecting aneurysm after endovascular internal trapping. Recanalization or incomplete coiling may have caused this early rebleeding, even if the procedure seemed angiographically complete.

Histological examination showed that stenosis corresponded to intramural hematoma, and pearl-dilation could be covered by adventitia alone with little or no remaining internal elastica lamina(9).

Since, in our patient, cerebral angiography revealed a dissecting aneurysm in a string and pearl pattern arising just distal to the origin of the PICA, we tried to preserve the left PICA. In dissecting aneurysms involving the ostium of the PICA, however it is necessary to use an intravascular stent or perform an occipital artery-PICA anastomosis before undertaking the internal trapping(4).

It is questionable that the portion of angiographic abnormality include the entrance through the intimal tear of the dissecting aneurysm, and we also could not
be sure of the target portion of the internal trapping.

If the VA dissecting aneurysm of our patient involved the ostium of the PICA histologically, other treatment modalities, including proximal occlusion, occipital artery-PICA bypass surgery and trapping, and stent-assisted techniques, should have been considered instead of internal trapping alone.

CONCLUSION

We present here a patient who experienced early rebleeding from a vertebral dissecting aneurysm after endovascular internal trapping. Recanalization or incomplete coiling may have caused this early rebleeding, even if the procedure was angiographically complete. These findings suggest that physicians should be alert to the fact that rebleeding may occur, despite angiographic evidence of successful occlusion of the affected artery and dissecting aneurysm.

References

retrospective study of 29 patients. *Neuroradiology* 2005;47:97-104

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