Acute thrombosis and recanalization of a ruptured anterior communicating artery aneurysm

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Abstract
A 35-year-old man sustained a subarachnoid hemorrhage due to the rupture of an anterior communicating artery aneurysm. A second angiogram taken 8 hours later demonstrated that the ruptured aneurysm had thrombosed spontaneously with a small residual aneurysm stump at the neck. CT scans and conventional angiograms taken 2 days later demonstrated recanalization of the aneurysm, which was successfully treated by endovascular coiling. This case differs from previous reports of spontaneously thrombosed ruptured aneurysms because the aneurysm recanalized within 2 days. Thus a thrombosed ruptured aneurysm has the potential for recanalization, and should be considered at risk of further hemorrhage.

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1. Introduction

The incidence of spontaneous thrombosis of intracranial aneurysms varies depending on location, size, and origin. Edner et al. suggested that only 1% or 2% of ruptured intracranial aneurysms had undergone spontaneous and complete thrombosis on subsequent angiography.1 Several completely thrombosed intracranial aneurysms have been found in various locations.1–3 However, the natural history of ruptured aneurysms that thrombose spontaneously is still unclear. Reports of recanalization of a spontaneously thrombosed aneurysm are rare.2,4–7 We describe a spontaneous thrombosis and recanalization of a ruptured anterior communicating artery aneurysm within 2 days.

2. Case report

A 35-year-old man experienced a sudden loss of consciousness while bathing. He was transferred to the emergency room where his Glasgow Coma Scale score was E1V1M5. His neck was stiff but there was no focal neurological signs. Laboratory blood tests found no abnormalities. A CT scan demonstrated diffuse subarachnoid hemorrhage and mild dilatation of the ventricular system. Cerebral angiography revealed a saccular aneurysm arising from the anterior communicating artery (Fig. 1A). Stasis of contrast medium within the aneurysm dome was noted in the late arterial phase (Fig. 1B). However, a second angiogram for endovascular embolization performed 8 hours later demonstrated that the aneurysm had nearly disappeared (Fig. 2). Only a small stump at the neck was noted. The embolization was withheld because no treatment target could be identified. Two days later, CT angiography demonstrated that the aneurysm had recanalized. Conventional angiography confirmed reappearance of the aneurysm (Fig. 3A). The size of the aneurysm was smaller, and part of the dome remained thrombosed. Subsequently, the aneurysm was completely occluded with detachable coils (Fig. 3B). The patient progressed favorably and returned home without deficit 1 week later. MRI performed 2 months later revealed complete disappearance of the aneurysm.

3. Discussion

Various factors influence the spontaneous thrombosis of an aneurysm. Black and German8 demonstrated that the volume-to-orifice ratio of the aneurysm is the major contributing factor to the balance between thrombogenesis and thrombolysis. In aneurysms with a relatively small neck, intraluminal thrombosis may occur. Antifibrinolytic agents have been related to spontaneous thrombosis of ruptured aneurysms.2 Local inhibition of plasminogen activators in and around the aneurysm wall may cause spontaneous aneurysm thrombosis during treatment with antifibrinolytic drugs. In our patient, no antifibrinolytic agent was used. No vaso-
spasm was demonstrated on the serial angiograms. Stasis of contrast medium within the aneurysm indicated sluggish intra-aneurysmal flow, which may promote spontaneous thrombosis of the aneurysm. As demonstrated in our patient, recanalization may be another event in the dynamic disease process of ruptured intracranial aneurysms. However, the mechanism of recanalization is poorly understood. Liquefaction of the thrombus and subsequent intrathrombotic dissection by blood flow is one possible explanation.\(^5\)

No consensus exists regarding the management of spontaneously thrombosed aneurysms. Continuous follow-up of thrombosed aneurysms will provide information regarding their natural history and assist in their overall treatment. In the current case, the first embolization was withheld because the aneurysm disappeared. We believed it was unsafe to embolize a non-visualized target. Some neurosurgeons may choose to surgically exclude the thrombosed aneurysm from the circulation because it might place the patient at risk not only of embolic complications but also of recanalization and even rupture.

This case supports the importance of periodic follow-up for patients harboring a thrombosed aneurysm. The thrombosed ruptured aneurysm may recanalize within a short time and should be considered at risk for further hemorrhage. Because the natural history of spontaneously thrombosed aneurysms is still unclear, it not possible to predict when a thrombosed aneurysm might recanalize. The timing of imaging studies used to demonstrate recanalization varies in the reported cases. Our patient differs from others previously reported because the thrombosed aneurysm recanalized within 2 days. Therefore, it may be reasonable to follow a thrombosed ruptured aneurysm with neuroimaging studies daily during the early presenting period of rupture. However, the exact frequency of follow-up studies can not be determined from the previously reported cases. More studies are necessary to clarify the natural history of acutely thrombosed ruptured aneurysms to assist in their overall management.

References


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Fig. 3. (A) A third angiogram 2 days later showing the reappearance of the ruptured aneurysm. (B) The ruptured aneurysm was successfully treated with endovascular embolization.