

Case Reports & Case Series (CRP)

Marked morphologic change of cerebral vessel with coexistence of severe flow compromise during endovascular treatment for ruptured aneurysm

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A B S T R A C T

In the vasospasm periods, the optimal timing of treatment for ruptured intracranial aneurysms remains controversial. In general, it was recommended that treatment for a ruptured aneurysm be delayed until its disappearance, but this might be associated with aneurysmal re-rupture resulting in a poor outcome. Endovascular technique has been developed for many years, early treatment after aneurysmal subarachnoid hemorrhage (SAH) seems to be technically feasible even in the period of severe vasospasm. The present cases report our experiences of endovascular treatment for ruptured aneurysm in the presence of severe angiographic vasospasm and discuss the pertinent controversy.

1. Introduction

In the past, the timing for treatment of a ruptured aneurysm in the presence of severe vasospasm has been a controversial topic. Some authors have reported an increased frequency of delayed cerebral ischemia and poor outcome in patients in whom aneurysm treatment was performed during this period [9–11,16]. Therefore, it has been recommended that direct treatment for a ruptured aneurysm be delayed until vasospasm has disappeared or abated; however, this may be associated with aneurysmal re-rupture, and not allow for optimal subsequent medical treatment including induced hypertension. However, due to rapid advances in the development of surgical and endovascular techniques, recent several studies have demonstrated that early treatment for ruptured aneurysm is technically feasible, reduces the risk for re-rupture, and appears to be associated with improved clinical outcome, especially in patients with good clinical condition on admission [3–5,9,14,15]. In endovascular coiling for ruptured aneurysm during periods of severe spasm, unexpected situations may arise. We present two cases in which aneurysms in the presence of severe vasospasm were treated using endovascular coil embolization, and discuss varying points of view during the procedures.

2. Case reports

2.1. Case I

A 48-year-old woman experienced sudden onset of headache, irritability, and confusion. Her family could not recall the exact time when

the symptoms initially presented. Initial brain computed tomography revealed subarachnoid hemorrhage (SAH), and cerebral angiography revealed not only an anterior communicating artery (A-com) aneurysm, but also severe vasospasm involving both the anterior cerebral artery (ACA) and middle cerebral artery (MCA) (Fig. 1-A). The right ACA was not visualized and the left ACA was severely narrowed. Endovascular coiling was performed immediately. When the microcatheter was advanced near the aneurysm through the left ACA, blood flow arrest occurred in the total ACA territory (Fig. 1-B). The microcatheter was withdrawn to the internal carotid artery (ICA) bifurcation area and another microcatheter was positioned proximal to the ACA for angioplasty. We quickly first selected aneurysm with microcatheter, made from 2 coils, and immediately withdrew the microcatheter proximal to the ACA. After making the coil frame, a calcium channel blocker was administered continuously through another microcatheter located in the proximal ACA (Fig. 1-C). After waiting a few minutes, reselection and additional coiling was performed several times (Fig. 1-D). In this fashion, the aneurysm was obliterated and blood flow was well maintained in the ACA territory without the occurrence of a thromboembolic event. At final angiogram, the vasospasm was markedly improved (Fig. 1-E). Five days after embolization, the patient presented right-side weakness, and a repeat angioplasty was performed. Although diffusion-weighted imaging revealed focal acute infarction in the frontal lobe, the patient was discharged with no neurological deficit, except for mild confusion. Three weeks after discharge, cognitive function and consciousness were clearly recovered.

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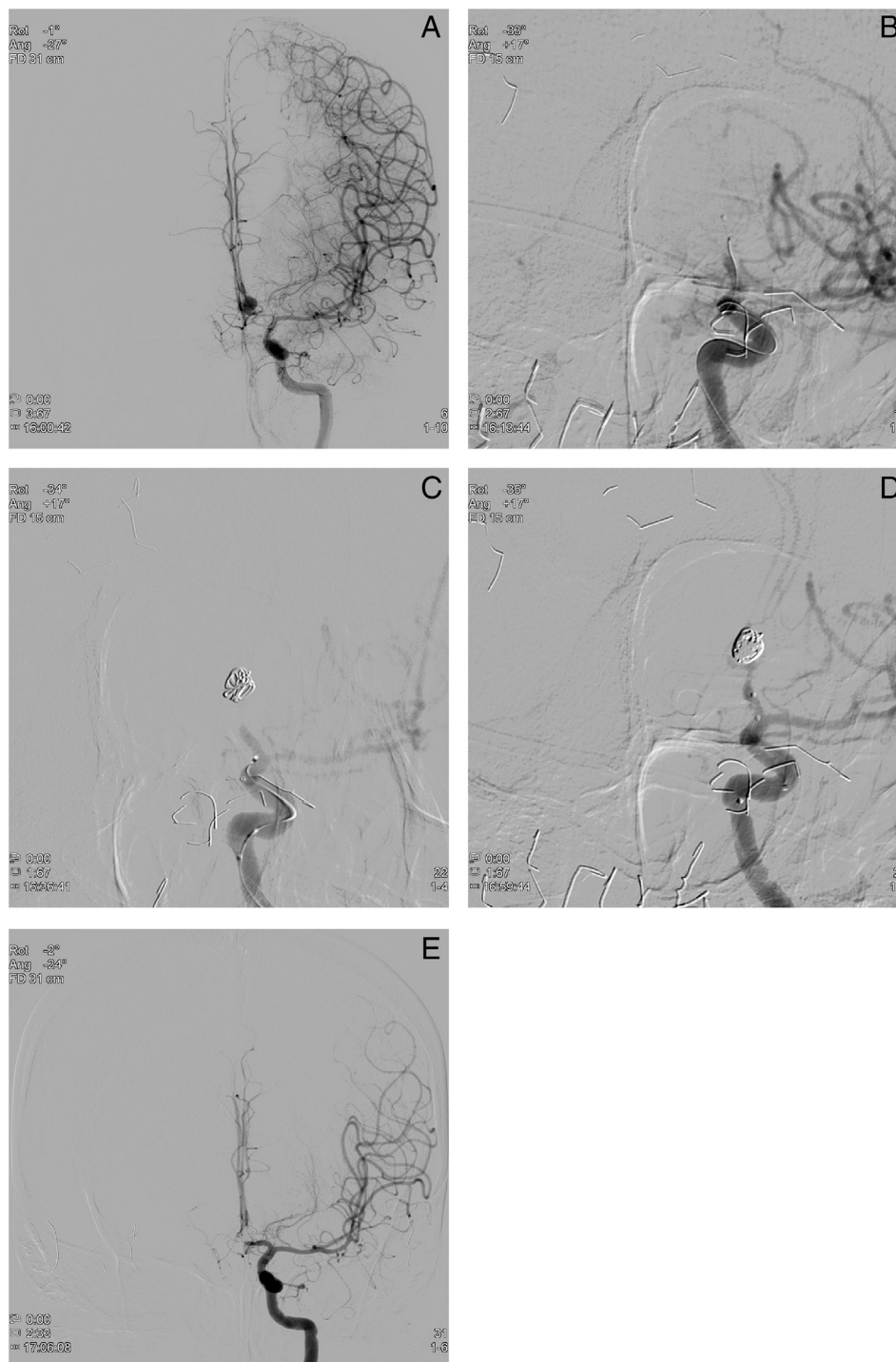


Fig. 1. A. Initial cerebral angiography reveals not only the anterior communicating artery (A-com) aneurysm but also severe vasospasm involving the anterior cerebral artery (ACA).
 B. When the microcatheter is advanced near the aneurysm through the left ACA, blood flow arrest occurred in the total ACA territory.
 C. After making the coil frame, a calcium channel blocker is administered continuously through another microcatheter localized to the proximal ACA.
 D. After waiting for few minutes, reselection and additional coiling is performed.
 E. At final angiogram, the vasospasm is markedly improved.

2.2. Case II

A 57-year-old man experienced sudden onset of headache 10 days previously. On admission, the patient presented with transient dysphasia and weakness in both legs. Diffusion-weighted magnetic resonance imaging was reviewed in another department and revealed cerebral hemorrhage in the right inferior frontal gyrus and scanty SAH.

Cerebral angiography revealed a ruptured distal ACA and unruptured MCA aneurysm. From the proximal portion of A2 to distal area, vasospasm was evident and especially severe in the proximal A2 to aneurysm neck (Fig. 2-A,B). Coiling was attempted immediately. When the microcatheter was advanced to the A2 segment through the left ACA, blood flow was not observed in the total ACA territory in angiogram (Fig. 2-C). An advance-withdrawal method (used in Case I) could

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