

## Case Report

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## Early Rupture after Coiling of Unruptured Aneurysm

We describe a case of an unruptured basilar top aneurysm that was associated with early rupture after incomplete coiling. A 62-year-old woman with a history of several small infarctions has undergone coiling of unruptured basilar top aneurysm. Two weeks after initial coiling the patient presented with Hunt and Hess grade IV subarachnoid hemorrhage consistent with a ruptured basilar top aneurysm. Repeat angiography revealed a rupture of recanalized basilar top aneurysm. Second embolization with additional coils resulted in complete occlusion. However, her neurological status was not improved afterward and she was transferred to department of rehabilitation one month after hemorrhage with comatous state. To our knowledge, this is the first case of fatal early rupture after coiling of unruptured aneurysm. It has been speculated that coiling could cause injury to aneurysmal wall and facilitate rupture.

**KEY WORDS :** Cerebral aneurysm · Coiling · Early rupture.

### INTRODUCTION

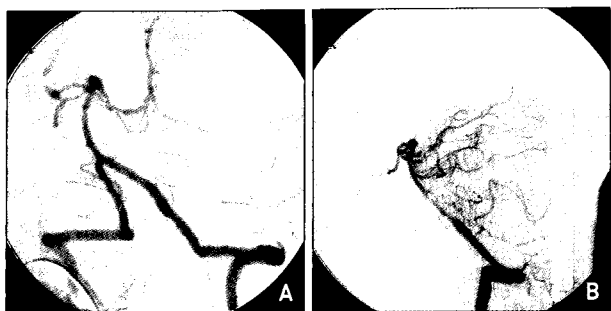
The management of unruptured intracranial aneurysms remains controversial because of incomplete and conflicting data about the natural history of these lesions and the risks associated with their repair<sup>2,10</sup>. Endovascular occlusion of aneurysms is a safe and effective therapeutic alternative to open surgery. Despite substantial evidence that interventional procedures are superior in terms of outcome after one year, there is still debate on the long-term occlusion of coiled aneurysms and the risk for rerupture<sup>1,6,7</sup>. The incidence of bleeding from an aneurysm during or after endovascular therapy is reported to be 2 to 4%<sup>4,5</sup>. The most of these events represent previously ruptured aneurysms that were treated with coil and then reruptured at a later date. To our knowledge, a few cases of delayed rupture of an unruptured aneurysm that were managed with endovascular treatment have been previous reported<sup>3,4</sup>. This is the first case of early rupture after coiling of unruptured aneurysm in the literature.

### CASE REPORT

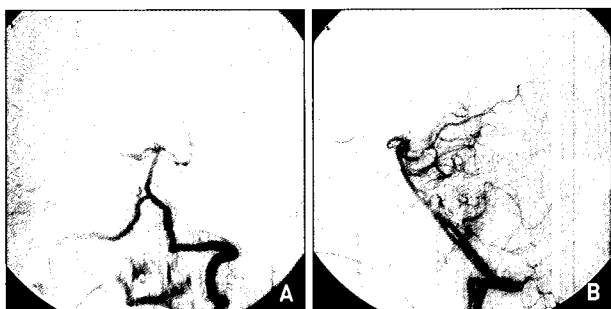
A 62-year-old woman with a history of hypertension and diabetes mellitus was transferred to our department for management of an unruptured aneurysm discovered on magnetic resonance angiography. She had experienced several small infarctions in the both cerebral hemispheres and the latest cerebrovascular accident was about one month before the consultation. There was mild right hemiparesis and dysarthria on admission.

Digital subtraction angiography demonstrated a solitary aneurysm of the basilar top. The aneurysm was measured of  $5 \times 3.3 \times 4.2$  mm and presented a broad neck (Fig. 1). Coiling was performed with the patient under general anesthesia. Because of the wide neck of the aneurysm, it was not possible to place a coil in the aneurysm without it prolapsing into the basilar artery. Therefore, two microcatheter technique was introduced to achieve coil stability. Two microcatheters with different markers were positioned within the aneurysm. Two coils deployed via two microcatheters. Each coil occupied different parts of the aneurysm, and simultaneously they were mixed at the central part. In this case, to make a more complicated mixture of the two coils, the second coil was advanced before complete deployment of the first coil. After complete deployment of the two coils, first coil was detached. After making a stable coil frame by using two coils, the residual aneurysmal sac was filled additional three

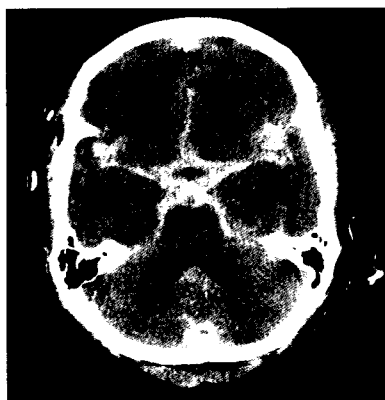
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**Fig. 1.** Initial left vertebral angiogram (A, B) shows a basilar top aneurysm measured  $5 \times 3.3 \times 4.2$  mm with a wide neck.



**Fig. 2.** Postinterventional angiogram of the basilar top aneurysm. Anteroposterior (A) and lateral (B) view after coiling shows a small amount of residual neck filling. The coils are located inside the aneurysm.

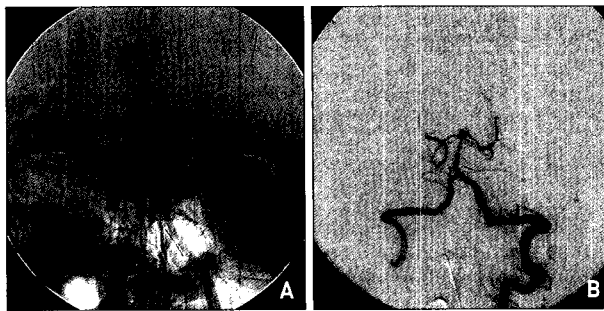


**Fig. 3.** Computed tomographic scan following bleeding episode demonstrates thick subarachnoid hemorrhage in the basal cisterns and Sylvian fissure.

coils through both microcatheters. It was not possible to place another coil in the aneurysm because of coil migration to the left posterior cerebral artery. A total of 5 coils were positioned in the aneurysm. The aneurysm was occluded incompletely with some residual filling of its neck (Fig. 2).

There were no periprocedural complications and the patient made an uneventful recovery.

Two weeks after coiling, the patient presented with Hunt and Hess Grade IV subarachnoid hemorrhage consistent with a ruptured basilar top aneurysm (Fig. 3). Repeat angiography revealed blood flow into the sac and changed position of the coils with protrusion to the right posterior cerebral artery (Fig. 4). No abnormal finding was observed on the anterior circulation. We considered a rupture of recanalized basilar top aneurysm and tried to second coiling. Four



**Fig. 4.** Repeat angiogram following bleeding episode 2 weeks after initial coiling. Unsubtracted (A) and corresponding subtracted (B) anteroposterior view reveals blood flow into the sac and changed position of the coils with protrusion to the right posterior cerebral artery.



**Fig. 5.** Angiogram following second coiling demonstrates complete occlusion.

additional coils brought about complete occlusion of previous coil-embolized basilar top aneurysm (Fig. 5). However, her neurological status was not improved afterwards and she was transferred to department of rehabilitation one month

after hemorrhage with comatous state.

## DISCUSSION

The management of unruptured intracranial aneurysms remains controversial because of incomplete and conflicting data about the natural history of these lesions and the risks associated with their repair<sup>2,10</sup>. Many factors are involved in the decision about the management of unruptured aneurysms. Site, size and group specific risks of the natural history should be compared with site, size and age specific risks of repair for each patients. The lowest-risk natural history group includes unruptured aneurysms less than 7 mm in diameter in the anterior circulation in asymptomatic patients without subarachnoid hemorrhage from a separate aneurysm<sup>2,10</sup>.

Coiling of aneurysms has become an alternative treatment technique to clipping. Within ruptured aneurysms, the publication of results of the International Subarachnoid Aneurysm Trial (ISAT) revealed a significantly improved outcome after 1 year in patients with endovascular treatment compared with surgically treated patients<sup>6,7</sup>. Nevertheless, there is debate on the efficacy of the endovascular approach in terms of complete aneurysm occlusion, recanalization

and the risk of recurrent hemorrhage<sup>1,6,7</sup>. Coil embolization harbors a greater risk for aneurysm remnants and recanalization compared with surgical clipping<sup>1,6,7</sup>. However, even in incompletely occluded aneurysms, the risk for recurrent hemorrhage appears to be low<sup>6,7,9</sup>. Sluzewski et al.<sup>8</sup> described that risk factors for early rebleeding after coiling of ruptured aneurysm were adjacent hematoma on initial computed tomogram and small aneurysm size. They concluded that a more restricted postembolization anticoagulation strategy in high-risk aneurysms might prevent the occurrence of rerupture. The most of these events represent previously ruptured aneurysms that were treated with coil.

Recently, data from a prospective observational study, the International Study of Unruptured Intracranial Aneurysm (ISUIA) have been published<sup>10</sup>. Results of this study showed the incidence of perioperative hemorrhage was noted 2% in endovascular therapy of unruptured aneurysms. Although endovascular procedures might be associated with less immediate risk, long-term risk and durability of treatment is not known and data from prolonged follow-up of treated patients are needed, similar to results of ISAT<sup>2,10</sup>.

Only two previous cases of delayed rupture of an unruptured aneurysm that was managed endovascularly have been published. In 1998, Hodgson et al.<sup>3</sup> for the first time reported a case of an 8 mm unruptured middle cerebral artery aneurysm that was treated endovascularly and appeared to be completely occluded after 6 months. At 18 months after the original procedure, the aneurysm ruptured, the angiography revealed a large recurrence. In 2002, Horowitz et al.<sup>4</sup> presented a case of an unruptured anterior communicating aneurysm that was well embolized with Guglielmi detachable coils and stable at 6-month angiographic follow-up, which subsequently ruptured 23 months after initial therapy. They suggested that causative factors for delayed rupture included residual aneurysmal neck, a partially thrombosed aneurysm, a diseased anterior communicating artery and a propensity for aneurysm growth and emphasized the point that meticulous follow-up is necessary in all individuals who undergo endovascular surgery.

To the best of our knowledge, there have been no reports on early rupture after coiling of unruptured aneurysm. The cause of early rupture after coiling of unruptured aneurysm

is unclear. We believe that coiling could produce some degrees of trauma to unruptured aneurysm wall and early rupture, though exceedingly rare, might occur after partial occlusion. Therefore, careful follow-up is necessary in patients with incomplete occlusion of aneurysm, even in case of unruptured one.

## CONCLUSION

A case of early rupture after coiling of unruptured basilar top aneurysm is presented with its clinical features and review of literature.

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