

Delayed aneurysm rupture following treatment with the WEB embolization device

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SUMMARY

Delayed rupture of an aneurysm following WEB embolization has not yet been reported. We present a case of a multiply ruptured anterior communicating artery aneurysm treated via WEB embolization. A post-treatment CT scan confirmed no evidence of rebleeding during treatment. Four hours after treatment, the patient developed an acute, significant increase in intracranial pressure with bloody ventriculostomy output, with CT scan demonstrating new parenchymal and intraventricular hemorrhage. The aneurysm was subsequently treated via microsurgical clipping that did not identify an “uncovered” bleb or rupture source.

was a more expedient approach than balloon-assisted coiling as well as a potentially safer approach to protect both daughter A2s.

The patient was systemically heparinized. Via a 6F long sheath, a 5F intermediate catheter was advanced over a 021 microcatheter into the supraclinoid ICA. The microcatheter was then advanced into the aneurysm and used to deploy a 7×3 WEB device on a single pass (figure C,D, post deployment). The degree of device lateral compression was 1.3 mm. After groin closure, the patient was administered 300 mg of rectal Aspirin (ASA) and taken for a CT scan that demonstrated no evidence of rebleed or untoward event (figure 1E).

BACKGROUND

The Woven EndoBridge (WEB) embolization device is a safe and effective alternative to device-assisted coil embolization of wide-necked unruptured aneurysms as demonstrated in multiple trials.¹ Given its delayed obliterative effect, its utility in acutely ruptured aneurysms has garnered more scrutiny, though early multicentre reports have not yet identified cases of rerupture after WEB embolization of ruptured aneurysms.² We present the first published case report of delayed rerupture following WEB embolization.

CASE PRESENTATION

This patient in their 40s with medical history significant only for prior drug abuse presented initially to an outside hospital with severe headache and decreasing level of arousal. The patient had reported 2 weeks of headache. CT scan demonstrated diffuse subarachnoid hemorrhage, and the patient was transferred to our institution. On arrival, the patient was not opening eyes and withdrew all extremities with new bradycardia. Urine toxicology was negative. CT scan demonstrated evidence of a new left frontal intraparenchymal hemorrhage (figure 1A), consistent with interval rebleed. A ventriculostomy was placed, and the patient was taken for angiography to identify and plan securing of the aneurysm.

INVESTIGATIONS

Diagnostic angiography confirmed a 6 mm anterior communicating artery aneurysm with a broad neck filling via a near obligate left A1 (figure 1B).

TREATMENT

Given poor clinical grade, despite the broad neck, we decided to proceed with endovascular therapy rather than clipping. We felt that WEB embolization

OUTCOME AND FOLLOW-UP

Four hours after the conclusion of the procedure, the patient developed an acute rise in intracranial pressure with new bright red blood draining from the ventriculostomy. CT scan demonstrated evidence of rebleeding with a larger right frontal hematoma and new third ventricular blood (figure 1F). Intracranial pressure was ultimately controlled, and the patient was taken the following morning for microsurgical clipping, confirming the intra-aneurysmal location of the WEB (figure 1G) and proceeding successfully at obliterating the aneurysm (figure 1H). Prior to clip placement, the neck was clearly visualized without evidence of unsecured bleb or rupture site at the neck. On closing the clip blades, the WEB compressed easily and in fact extruded through the dome as clip closed. Indocyanine green videoangiography confirmed aneurysmal obliteration and preservation of the daughter branches.

On the day after clipping, the patient neurologically improved and started to localize. Unfortunately, the patient subsequently developed refractory septic shock and consequent multiorgan system failure beginning on postbleed day 4 and ultimately expired.

DISCUSSION

Among other multicentre trials, the WEB intrasaccular therapy study confirmed the safety and effectiveness of WEB embolization of unruptured aneurysms across a cohort of 148 patients.¹ A matched cohort analysis for 66 patients treated via WEB embolization demonstrated lower complication rates but similar mid-term occlusion and retreatment rates as compared with stent-assisted coiling.² WEB utility for wide-necked aneurysms coupled to procedural expedience may make it ideal for these aneurysms in the ruptured setting as well. A limitation, however, is the delayed angiographic



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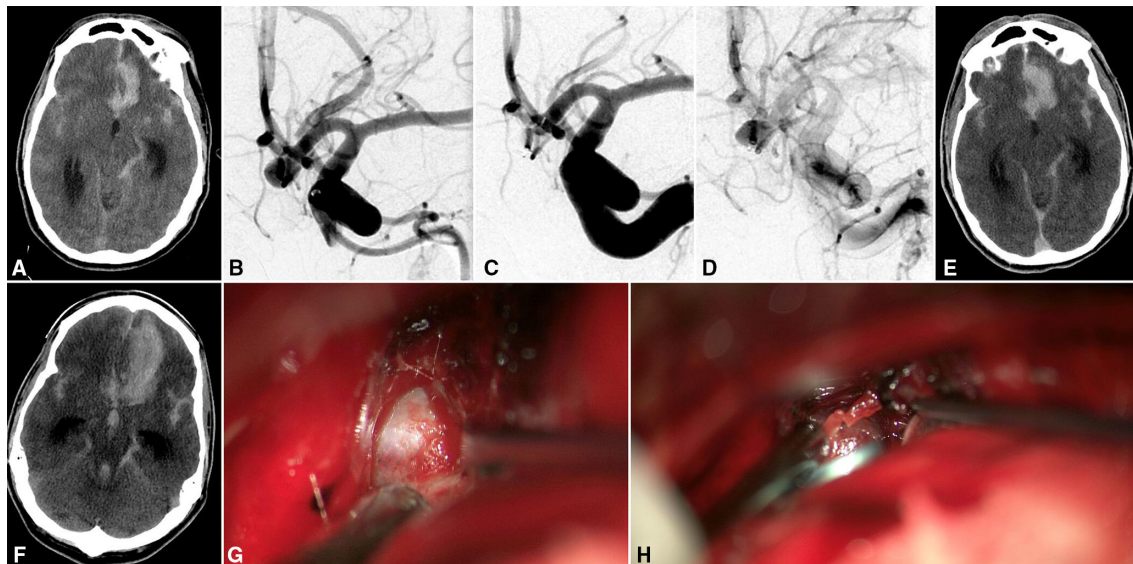


Figure 1 Non-contrast CT on arrival to our hospital demonstrated subarachnoid hemorrhage and development of a new left frontal intraparenchymal hemorrhage, consistent with aneurysm rebleed (A). Digital subtraction angiography working view of a 6 mm anterior communicating artery aneurysm filling via a near obligate left A1 (B). Digital subtraction angiography post WEB deployment in working views (C, early arterial phase; D, late arterial phase). CT post device deployment demonstrates a stable subarachnoid hemorrhage and left frontal hematoma (E). After 4 hours, after an acute IntraCranial Pressure (ICP) spike, an interval CT scan demonstrates an enlarged frontal hematoma and new third ventricular blood (F). Intraoperative view demonstrates the WEB device in the aneurysm (G); no uncovered alternative rupture site could be identified. Postclipping intraoperative view (H).

obliterative effect; however, whether this has clinical relevance remains to be elucidated. A recent eight-centre study of 91 patients with ruptured aneurysms treated via WEB embolization reported a procedural-related morbidity of 3.3% without any rerupture events.³

In our own institutional experience over the last 1.5 years, of 28 aneurysms treated via WEB embolization, 3 were acutely ruptured and this represents our only case of aneurysm rupture after WEB embolization. An important unique facet of this case was two rupture events on the day of treatment, potentially portending a more dangerous early post-treatment course as the aneurysm undergoes thrombosis. In fact, the aneurysm may have also ruptured 2 weeks prior in the context of clinical history. In an analysis of early rebleeding after ruptured aneurysm coiling, a rate of 1.4% was garnered across a cohort of 431 patients.⁴

Independent risk factors for rebleeding included an adjacent intraparenchymal bleed and small aneurysm size, both characteristics of this case as well.

In conclusion, our report suggests added caution or consideration of adjunctive coiling for particularly malignant ruptured aneurysms being treated via WEB embolization such as those with rebleeding events prior to treatment.

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Learning points

- ▶ WEB embolization is an expedient tool for the treatment of wide-necked aneurysms.
- ▶ This is the first reported case of delayed rerupture following WEB embolization of a ruptured aneurysm; it is important to highlight that the aneurysm had ruptured two times in the same day prior to treatment.
- ▶ This case highlights the importance of expedient aneurysm obliteration to mitigate risk of rerupture, particularly for aneurysms that have bled more than once.

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