Endovascular management of ruptured intracranial blister aneurysms

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Introduction

Intracranial blister aneurysms are rare lesions that are notoriously more difficult to treat than typical saccular aneurysms. High complication rates associated with surgery have sparked considerable interest in endovascular techniques, though not well studied, to treat blister aneurysms.

Methods

All consecutive intracranial blister aneurysm cases treated using an endovascular approach at our institution between January 2009 and January 2012 were retrospectively analyzed.

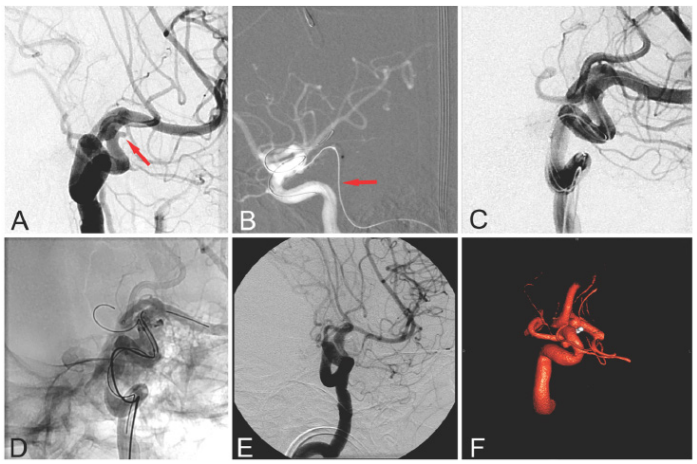
Results

Over the study period, 9 patients with blister aneurysms underwent 11 endovascular interventions. In various combinations, stents were used in 8/11, coils were used in 5/11, and Onyx was used in 3/11 procedures. At mean angiographic follow-up of 200 days, 8/9 aneurysms were completely or near-completely occluded by endovascular means alone requiring no further treatment, and 1 aneurysm required surgical bypass and trapping after one failed surgical and two failed endovascular treatments. At mean clinical follow-up of 416 days, mRS scores were improved in 6, stable in 2, and worsened in 1 patient. One complication occurred in 11 procedures (9%), resulting in a permanent residual neurologic deficit. No unintended endovascular parent vessel sacrifice, intra-procedural aneurysmal ruptures, anti-platelet-related complications, post-treatment aneurysmal re-ruptures, or deaths occurred.

Conclusions

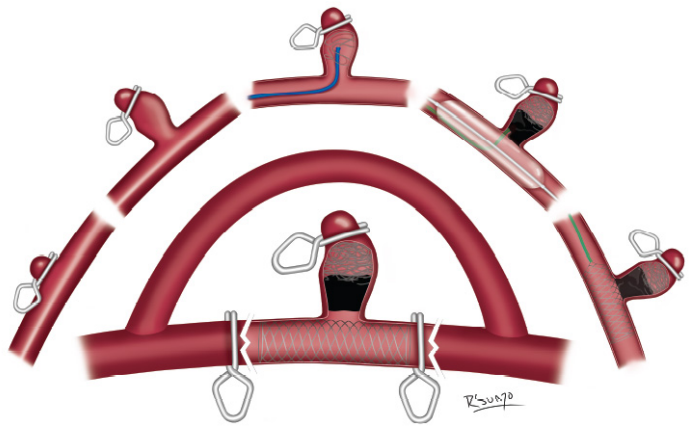
This series highlights both the spectrum and limitations of endovascular techniques currently utilized to treat blister aneurysms, including a novel application of stent-assisted Onyx embolization. Long-term follow-up and larger experiences are required to better define the role of endovascular therapy in the management of these difficult lesions.

Onyx Embolization with Stent Augmentation



A) Oblique angiogram demonstrates a small, ruptured blister aneurysm (red arrow A) of the left supraclinoid ICA. B) Roadmap angiogram demonstrating a microwire (red arrow B) that has been navigated through the vertebrobasilar circulation and retrograde across the left posterior communicating artery in order to access the aneurysm. C) Balloon-assisted Onyx embolization has been performed and the balloon is kept inflated to allow the Onyx to solidify within the aneurysm. D) Unsubtracted angiographic view showing a stent being deployed across the neck of the aneurysm immediately as the balloon is deflated in order to prevent the Onyx from refluxing out of the aneurysm. Follow-up E) oblique and F) 3D angiograms performed 1 week later demonstrate stable complete occlusion of the aneurysm.

Multiple Blister Aneurysm Treatments



Artist's depiction of a blister aneurysm that failed surgical clipping, primary coiling, Onyx embolization, stent flow-diversion, and was therefore ultimately treated with surgical bypass and trapping.