

# Case Lessons

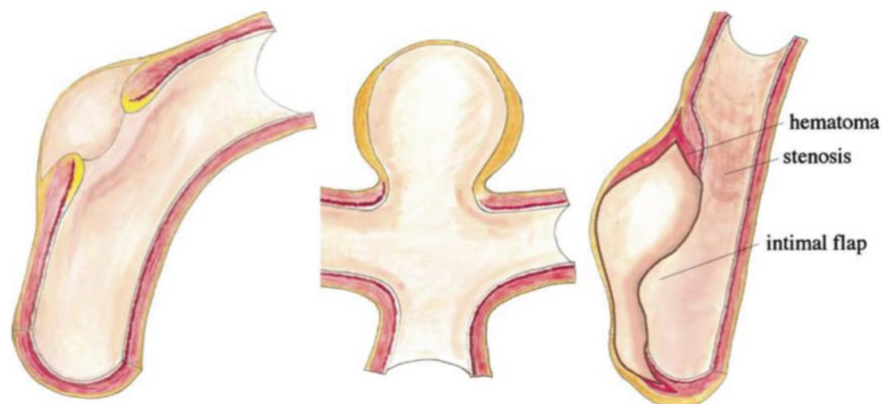
## Multimodal treatment of MCA blister and DACA saccular aneurysms

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**Key words:** Blood blister aneurysms (BBA), microsurgical treatment, coil embolization.

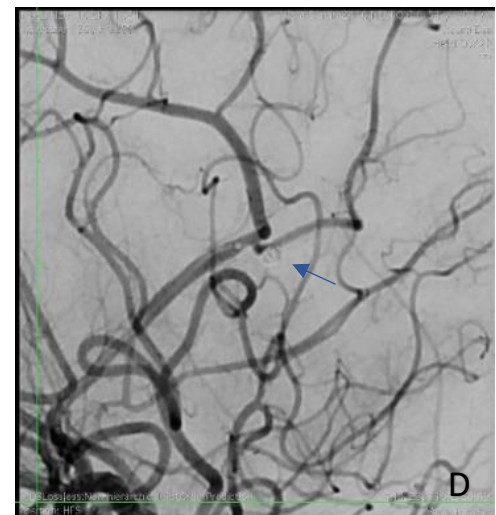
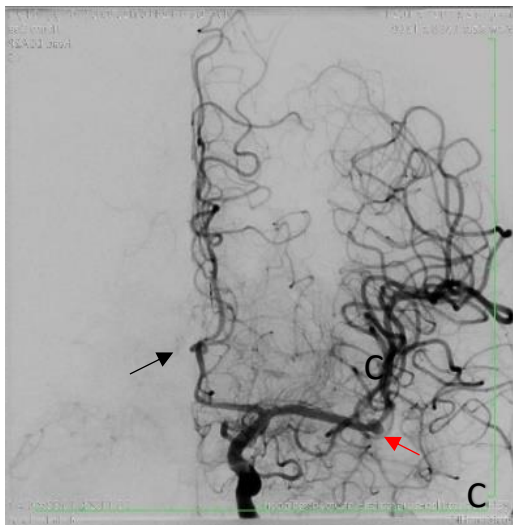
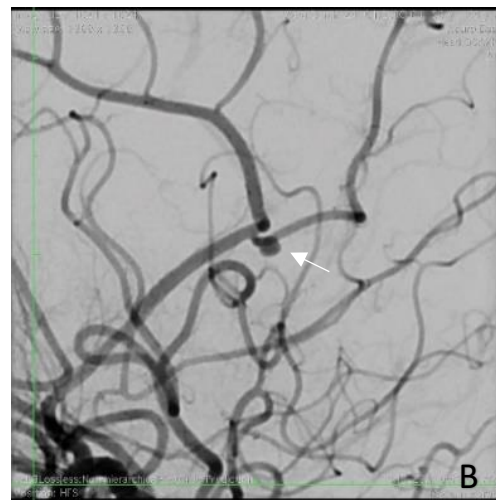
**Introduction:** Blood blister aneurysms (BBA) are a rare subset of intracranial aneurysms that represent a therapeutic challenge from both a surgical and endovascular perspective. It accounts for approximately 0.3–1% of intracranial aneurysms and 0.9–6.5% of ruptured aneurysms <sup>(1)</sup>, 98.7% originate from the ICA, and only 0.4% from the MCA <sup>(2)</sup>. Blood blister aneurysms are complex and challenging vascular lesions that lack an identifiable neck, and have a high risk of rupture. Successful microsurgical treatment of BBA has been demonstrated, including clipping, wrap-clipping, suturing, and EC-IC bypass<sup>(3)</sup>, on the other hand endovascular interventions utilizing flow diversion are an alternative for the treatment of BBA <sup>(5)</sup>.

Based on the pathophysiology of their formation, BBA may be classified into three categories. The first kind stated that blister aneurysms typically have a breach in the artery wall covered by thin, fibrinous tissue, which indicates that the entity is actually a type of pseudoaneurysm. Second type demonstrated angiographically an increase in size and change in the shape from the blister shape to the classic berry shape in the first several days after presentation, suggesting a dynamic pathology. Blister aneurysms of the third type, as reported by angiographic and intraoperative observational studies, have been linked to ICA dissection.



**Figure 1:** Illustrations demonstrating structural differences among 3 types of aneurysms. The BBA (blood blister–like aneurysm) (left) is a focal wall defect covered with thin fibrous tissue located where the vessel displays the most curvature, generally associated with atherosclerosis. The wall of a berry aneurysm (center) is composed of a thickened intima and adventitia. In a dissecting aneurysm (right), the wall is dissected for a certain distance, and both stenotic and dilated portions can be observed.

**Case presentation:** The patient had SAH 6 months ago, and was diagnosed with 2 aneurysms of the right DACA and MCA. (Figure 2A). DSA confirmed a 3 mm ruptured saccular aneurysm of the right DACA and an ipsilateral 3 mm unruptured MCA bifurcation blister aneurysm (Figure 2B,C). Optimal embolization of the ruptured DACA aneurysm was achieved. (Figure 2D)



**Figure 2:** **Figure 2A**-CT showing SAH (black arrow). **Figure 2B** DSA showing right DACA aneurysm (white arrow) **Figure 2C**- DSA showing Saccular aneurysm of right DACA 3mm and one of the ipsilateral MCA 4 mm (black arrow shows the DACA aneurysm, red arrow shows the MCA aneurysm) . **Figure 2D**- Optimal embolization of right DACA aneurysm (blue arrow).

The MCA aneurysm was discussed with Professor Emmanuel Houdart and the neuro-interventional team, and was considered a blister shape aneurysm and he strongly recommended clipping in a second stage.

Six months later through pterional craniotomy microsurgical clipping was carried out for the right MCA blister aneurysm. (Figure 3A).



**Figure 3**-Figure 3A-MCA blister aneurysm (black arrow showing the aneurysm)

**Surgical procedure:** Inside-out microdissection of the Sylvian fissure, exposing the bifurcation of M1 and identifying both temporal and frontal M2, identifying the blister aneurysm immediate after the bifurcation, with the dome oriented superiorly and laterally. Microdissection is then performed to split the temporal M2, which runs parallel to the dome laterally. After the neck is carefully dissected, a straight Yasargil 3mm mini clip is placed in the neck of the aneurysm. We ensure the correctness of the clip and the persistence of the flow in both M2. (intraoperative video on request to Dr. M.Grada)

Post-operative period was uneventful. The patient left the hospital on day 4. NIHSS 0 GCS 15. A post-operative MRI Angiography was done after surgery which revealed complete exclusion of the aneurysm and impacted DACA coiled aneurysm.

**Discussion:** Blister aneurysms of MCA, are very rare and their treatment is challenging. BBA represent a surgical dilemma, where intraoperative rupture rates have been reported to be up to 50% compared with

the 7% seen with saccular aneurysms<sup>(4)</sup>. Park et al.,<sup>36</sup> in which the authors concluded that endovascular coiling of BBAs of the ICA cannot be recommended due to the high rates of procedural rupture (75%), aneurysm regrowth, and rebleeding<sup>(6)</sup>. The technical difficulty of coiling and the lower rate of retreatment with flow diversion make it an attractive option, but this is tempered by the higher rate of thromboembolic events with FDs and the possibility for hemorrhagic complications with dual antiplatelet therapy.<sup>(5)</sup> A high degree of preoperative awareness and extremely careful dissection during surgery can prevent poor clinical outcomes. In addition, the surgeon should prepare for all possible surgical strategies, including clipping, wrapping, and trapping.

**Conclusions:** Blood-blister aneurysms pose a therapeutic challenge with potentially catastrophic consequences. Multimodal treatment can be made, in cases of multiple aneurysms, after careful consideration of the patient, the architecture of the aneurysms, and team discussion. In cases of BBA, surgical clipping provides aneurysm closure following the procedure and sustained occlusion at the follow-up.

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