Distal Superior Cerebellar Artery Dissecting Aneurysm treated with a Flow-Diverting Device

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Introduction

Distal fusiform aneurysms in the superior cerebellar artery (SCA) are rare and present several challenges to clinicians, especially when ruptured. While several treatment options are available, including surgical clipping and endovascular coiling, numerous challenges remain due to vital neighboring structures and brainstem perforating vessels. This case report demonstrates the successful treatment of a fusiform aneurysm in the SCA with a flow-diverting device.
Methods/Case

A 31-year old female presented to our institution with a sudden onset of “the worst headache of her life”. Patient on neurological exam was intact with no focal deficits. On imaging, subarachnoid hemorrhage was discovered in the basal cisterns predominantly in the left ambient cistern with vessel imaging demonstrating a **distal fusiform aneurysm of the SCA**. Patient was classified as a Hunt-Hess 2, Fisher 3 Subarachnoid Hemorrhage.

CT of the head demonstrating asymmetric subarachnoid hemorrhage in the left ambient and quadrigeminal cisterns (blue arrow) with early hydrocephalus.

3-D reformatted digital subtraction angiography demonstrating left fusiform aneurysm of the superior cerebellar artery (SCA) (blue arrow). Mild vasospasm can be seen in the distal basilar artery and bilateral SCA and posterior cerebellar artery.
Results

After resolution of vasospasm, a delayed endovascular approach with deployment of the LVIS Jr. stent across the fusiform aneurysm was chosen. The treatment goal was to preserve intraluminal flow with flow diversion from the aneurysm for reduction and eventual obliteration/healing. At 3-month follow-up, the patient had no complaint and was intact on examination.
Results

CT angiogram at 3-month follow-up demonstrating left superior cerebellar artery LVIS Jr. stent with preserved flow both proximal and distal to stent.

**Patient declined to have repeat Angiogram following treatment to assess vessel patency and aneurysm resolution.**
Results

Flow Diverters

Wang et al., highlighted the flow-diverting properties of the LVIS Jr stent which were compared with those of the Pipeline Embolization Device (PED) and Enterprise stent.[1] Wang concluded that the LVIS Jr was superior to the Enterprise but carried less flow-diverting effects than the PED.

Results

PITA Trial

The Pipeline Embolization Device for the Intracranial Treatment of Aneurysms Trial

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CONCLUSIONS: Intracranial aneurysm treatment with the PED is technically feasible and can be achieved with a safety profile analogous to that reported for stent-supported coil embolization. PED treatment elicited a very high rate (93%) of complete angiographic occlusion at 6 months in a population of the most challenging anatomic subtypes of cerebral aneurysms.

The PITA investigators highlighted complications related to both occlusion of perforators across the device and “kinking” through tortuous segments making delivery challenging. The reported peri-procedural complication rate was 6.5% [2]

Discussion

The ruptured SCA aneurysm in our patient presented several challenges to treatment. Our patient was right-handed with a body mass index of 52.27, therefore a craniotomy via a sub-temporal approach would pose several risks including damage to brainstem perforators and retraction injury to the dominant temporal lobe during exposure. Additionally, the fusiform morphology would not allow simple clipping but rather clip reconstruction. Coil occlusion would be difficult due to the fusiform morphology. And perforators supplying the midbrain would be at risk if the vessel occluded during coiling. Delivery of the Pipeline device was difficult in tortuous segments of the parent vessel. The lateral ponto-mesencephalic segment makes a sharp bend around the crus cerebri which would be difficult to navigate with the PED. The LVIS Jr device could be deployed with a smaller microcatheter which posed less risk of dissection during delivery.
Summary Points

• Ruptured SCA aneurysms pose several challenges for both microsurgical and endovascular treatments due to its deep location and brainstem perforators.
• Flow diverting devices preserve distal lumen patency and allow for aneurysm thrombosis/repair.
• Although not ideal in ruptured aneurysms due to delayed treatment effect, this case highlights the use of the LVIS Jr. Flow diverter in the treatment of a ruptured dissecting SCA aneurysm.