An Interesting Surgical Technique and Literature Review: Multiple Telescoping Flow Diverting Devices for Embolization of a Giant Internal Carotid Artery Aneurysm

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Breck Aaron Jones, MD; Adam Benjamin Lipson, MD; Alex Patrick Michael, MD
Southern Illinois University School of Medicine
Division of Neurosurgery
Disclosures

• We have no relevant partnerships or financial relationships to disclose
Introduction

• Giant intracranial aneurysms are a challenging cerebrovascular entity.
• They pose high risk for spontaneous rupture with poor neurological outcome.
• Current treatment options are surgical clipping, surgical bypass, artery ligation, endovascular coiling, or flow diversion.
• Unfortunately, morphological features may preclude standard clipping or coiling, especially in large dysplastic vessels.
• Previous studies have shown that fewer than half of giant (>2.5cm) aneurysms are clippable. Treatment of these generally involves surgical bypass.
• In multiple studies, flow diversion has demonstrated similar neurologic outcomes compared to coiling for aneurysm treatment, and offers new potential ways to manage giant aneurysms.
• Here, we present and interesting surgical technique utilizing multiple flow-diverting stents telescoped in one another to treat a giant ectatic internal carotid artery aneurysm.
Surgical Technique

• An 18 year old Caucasian male presented with a one year history of left-sided retro-orbital headaches presented to the hospital following an injury where an electronic device exploded near his face.

• A non-contrast CT of the head was performed as part of a trauma workup and revealed a 2.6cm mass near the cavernous sinus with a peripheral rim of calcification and chronic bony remodeling of the left skull base.

• An angiogram was performed which revealed an extremely dysplastic left internal carotid artery from the petrous through ophthalmic segment leading to fusiform aneurysmal enlargement. This measured 3cm in its longest dimension.

• The patient was presented at our institutional cerebrovascular conference where the risks of microsurgical bypass or endovascular treatment were discussed.

• The International Study of Unruptured Intracranial Aneurysms says that aneurysms of the ICA measuring greater than 25mm have a 1 year rupture risk of 6% and and 5 year cumulate culture risk of 40%.
Surgical Technique

Diagnostic Cerebral Angiogram and 3D reconstruction
Surgical Technique

• The decision was made to attempt endovascular treatment using multiple flow-diverting stents telescoped through one another to bridge the length of the dysplastic vessel.
• He was started on high dose aspirin and clopidogrel 5 days prior to treatment and P2Y12 tests were used to evaluate for anti platelet function.
• General anesthesia was induced and the patient’s groin was prepped and draped.
• SSEP and EEG monitoring was performed for the duration of the procedure.
• ACTs were monitored to maintain adequate heparinization.
• Access to the right common femoral artery was obtained.
• The left common carotid was selected with a 5F Vert catheter and the sheath was exchanged for an 8F long guiding sheath.
Surgical Technique

• In the case of a rupture or unsuccessful treatment, vessel sacrifice was considered. Prior to treatment a balloon occlusion test was performed.
• Left common femoral access was obtained and the right internal carotid was selected for injection.
• A balloon was used to occlude the left internal carotid and the left hemisphere filled briskly from the right carotid via collateral circulation. At this point it was decided to proceed with treatment with the option of vessel sacrifice if a severe complication arose.
• The catheter was advanced to the origin of the aneurysm and magnified treatment views were obtained.
• A microwire and catheter were carefully used to traverse the length of the aneurysm into the proximal MCA and a 3.5x25mm flow diverting stent was selected for deployment. Subsequent stents were deployed with their origin inside each previous stent to create a lengthened or telescoped construct that spanned the ICA proximal to the aneurysm to the MCA distal to the aneurysm.
• Final angiograms were performed showing significant decrease in the filling of the aneurysm and the catheters were removed.
• The right groin was closed with an 8F AngioSeale device and the left groin was closed with a Mynx Grip device.
• The patient was awakened from anesthesia and transferred to the ICU. No EEG or SSEP changes were noticed during the procedure.
Discussion

• Giant intracranial aneurysms remain a difficult pathology to treat but here we show that multiple flow-diverting stents can be used as an “internal bypass” to protect dysplastic and ectatic vessels.

• The patient had to be placed on dual-antiplatelet agents with routine monitoring with the plan to move to a single anti platelet agent at six months post procedure.
Summary Points

• Giant aneurysms and ectatic cerebral vessels can be internally bypassed using a telescoping technique by deploying flow-diverting stents in succession within one another.

• This technique is safe with potentially less morbidity than microsurgical bypass.