Giant Basilar Artery Aneurysm in a 19-Month-Old Child with Tuberous Sclerosis; Treatment with GDC Occlusion

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Purpose
We present the case of a 19-month-old child with tuberous sclerosis who developed a giant aneurysm of the midbasilar artery. Multiple GDC were used to fill and occlude the aneurysm and the involved segment of the basilar artery. Postprocedure the child had transient peripheral sixth nerve palsy, and no permanent neurologic deficits. The use of GDC in the treatment of childhood aneurysms and the incidence of intracranial aneurysms in tuberous sclerosis is discussed.

Materials & Methods
A 19-month-old girl presented with three episodes of decreased movement and weakness of the left arm and leg. She had been diagnosed at 4 months of age with tuberous sclerosis (TS), after presenting with clinical seizures consisting of fluttering of the eyes and deviation of the face and mouth to the left. MR imaging of the brain demonstrated a large aneurysm of the midbasilar artery, projecting to the right of midline and impinging upon the adjacent pons. This aneurysm was not present on the MR exam performed at 4 months of age. The aneurysm measured approximately 2.3 cm in largest oblique diameter, and the basilar artery between the anterior inferior cerebellar arteries and the superior cerebellar arteries was incorporated into the lumen of the aneurysm. MR angiography and subsequent catheter angiography both demonstrated that the proximal basilar entered the aneurysm significantly more posterior and medial than the distal basilar artery exited it. The circle of Willis was incomplete, with a single small posterior communicating artery demonstrated on the left, and a "fetal origin" configuration of the right posterior cerebral artery.

The rapid development of this aneurysm and the flow characteristics demonstrated at catheter angiography both indicated a high likelihood of further aneurysm growth and rupture. A surgical approach was felt to be highly likely to result in severe neurologic deficit or death. Accordingly, the decision was made to primarily occlude both the aneurysm and the involved segment of the basilar artery with multiple GDC. A total of 22 GDC were deployed into the aneurysm. After deployment, vertebral and carotid angiography demonstrated unimpeded flow into the anterior inferior cerebellar arteries through the proximal basilar, and reconstitution of flow to the basilar tip and superior cerebellar arteries through the left posterior communicating artery.

Results
The child had a peripheral sixth nerve palsy that responded to a 3-week course of dexamethasone. She was maintained on aspirin for 2 weeks postprocedure. MR performed 3 days postprocedure showed some abnormal signal in the dorsal pons at the level of the aneurysm and multiple 1–2 mm sized foci of abnormal hyperintense signal on T2-weighted images in the cerebellar hemispheres and occipital poles. The latter were presumed to reflect microemboli to the posterior
circulation. Repeat MR exam performed 6 weeks postprocedure showed resolution of these multiple small foci of abnormal signal, and marked decrease in size of the abnormal signal in the dorsal pons. MRA showed continued patency of the left posterior communicating artery, AICAs, and SCAs, and absence of flow signal into the aneurysm lumen.

**Conclusion**

GDC can be safely and effectively used in very young children under appropriate circumstances. This is the youngest patient that we are aware of that has had GDC occlusion of an aneurysm. Only recently have intracranial aneurysms been recognized as a lesion associated with tuberous sclerosis. A recent review identified 15 cases of intracranial aneurysms in TS reported in the literature. The authors noted that these aneurysms most commonly affected the internal carotid arteries, and were frequently giant in size. This case emphasizes the importance of searching for aneurysms as a source of symptoms in patients with TS, and underscores the utility of endovascular therapeutic strategies in treating children with cerebrovascular lesions.

**References**