CASE REPORT

Infantile intracranial aneurysm of the superior cerebellar artery

Molly Ann Del Santo, Steve Mario Cordina

Department of Neurology,
University of South Alabama,
Mobile, Alabama, USA

Correspondence to

M A Del Santo, Department of
Neurology, University of South
Alabama, Mobile, AL 36617,
USA;
mdelsanto@health.
southalabama.edu

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SUMMARY

Intracranial aneurysms in the pediatric population are rare. We report a case of a 3-month-old infant who presented with inconsolable crying, vomiting, and sunset eye sign. CT revealed a subarachnoid hemorrhage, with CT angiogram revealing a superior cerebellar artery aneurysm. An external ventricular drain was placed for acute management of hydrocephalus, with definitive treatment by endovascular technique with a total of six microcoils to embolize the aneurysm. Serial transcranial Dopplers revealed no subsequent vasospasm. Although aneurysms in the pediatric population are rare, once the diagnosis is established, early treatment results in better outcomes.

BACKGROUND

Aneurysms in the pediatric population, and specifically the infant population, are rare compared with the general population. Recognizing clinical signs and symptoms of ruptured aneurysms in the infant population is critical for diagnosis. Treatment of intracranial aneurysms has been trending towards the use of minimally invasive approaches, where endovascular intervention circumvents the need for open surgery.

CASE PRESENTATION

A 3-month-old male infant with no previous medical conditions or known trauma presented with a 1 week history of inconsolable crying, coughing, vomiting, and no relief after a course of amoxicillin. On the ninth day after the onset of

Figure 2 CT angiogram reconstruction demonstrating a saccular aneurysm arising from the posterior circulation.

symptoms, the patient became limp, was vomiting, and had downward gaze of his eyes.

The patient was admitted to the hospital and noticed to have sunset eye sign and full anterior fontanel. CT scan showed blood in the ambient cistern on the right adjacent to the brainstem ([figure 1](#)). The ventricles were enlarged. CT angiogram revealed a 6.5×7 mm saccular aneurysm in the right superior cerebellar artery (SCA) with hemorrhage extending into the third ventricle ([figure 2](#)). An external ventricular drain was placed emergently at the bedside to relieve increased intracranial pressure. Dexamethasone and levetiracetam were started the

Figure 1 A non-contrast CT scan of the head (left) revealing right posterior subarachnoid hemorrhage. CT angiogram of the head (right) revealing a saccular aneurysm in the posterior circulation.

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Figure 3 Cerebral angiography demonstrating an aneurysm arising from the right superior cerebellar artery.

day after admission for prophylactic treatment of seizures and to prevent cerebral edema.

TREATMENT

The patient was then taken for aneurysm coil embolization under general endotracheal anesthesia. Groin access was obtained with ultrasound guidance using a 4 F Silhouette Transitionless micropuncture sheath (Cook Medical, Bloomington, Indiana, USA) that was exchanged with a 4 F sheath (Terumo Medical, Somerset, New Jersey, USA). In line with the established protocol at our institution, a mixture of verapamil (0.07 mg/kg), lidocaine (0.375 mg/kg), nitroglycerin (2.5 mg/kg), and heparin (100 U/kg) were then infused intra-arterially into the right common femoral artery for prophylaxis of arterial vasospasm and for anticoagulation. A 65 cm 4 F Berenstein diagnostic catheter (AngioDynamics, Latham, New York, USA) was then advanced into the right vertebral artery.

Figure 4 Preoperative (left) and postoperative (right) conventional cerebral angiograms. Post coiling image confirming complete embolization of the aneurysm with no contrasted filling noted within the aneurysm.

Through the guide catheter, a Headway 17 Advanced Soft microcatheter (Microvention Inc, Tustin, California, USA) was advanced into the basilar artery over a Synchro 2 Soft microwire (Stryker Inc, Kalamazoo, Michigan, USA). Superselective arteriography confirmed the 5.6 mm×6.6 mm saccular aneurysm in the proximal right SCA (figure 3). The microcatheter was then advanced into the aneurysm over the microwire. Through the microcatheter, a combined total of 6 HyperSoft 3D, VFC, and HydroSoft coils (Microvention Inc) were advanced sequentially into the aneurysm until no further aneurysm filling was noted (figure 4). Protamine 0.625 mg/kg was then administered, the sheath was removed, and hemostasis obtained by manual compression. A total of 3.4 mL/kg body weight of iodixanol (Visipaque, GE Healthcare, Buckinghamshire, UK) were used for the procedure, with a total dose area product calculated at 43 978 mGy cm².

OUTCOME AND FOLLOW-UP

The patient tolerated the procedure well with no postoperative complications. Daily transcranial Doppler measurements for 14 days after the procedure revealed no flow at the aneurysm and no vasospasm. During a follow-up examination 7 months later, the patient was noted to have met all of his developmental milestones. No recurrence of aneurysm was identified on further MRI and MR angiogram scans (figure 5).

DISCUSSION

Aneurysms are most commonly found in the adult population and are formed by accumulated risk factors causing chronic stress at branch points of vessels, which weakens the integrity of the blood vessel over time and forms an aneurysm. Predisposing genetic or developmental factors as well as environmental factors, such as trauma causing dissecting aneurysm or infection, are the leading causes of aneurysmal formation in the pediatric population. The generation of aneurysms in the pediatric population accounts for only 0.5–4.6% of total intracranial aneurysms.¹

Children <1 year of age with intracranial aneurysms have a higher prevalence of giant aneurysms in the posterior circulation, three times higher prevalence of middle cerebral artery aneurysms compared with other vessels, and association of

Figure 5 Seven month postoperative imaging on MRI T2 axial (left) and MRI T2 coronal (right).

hemorrhage with younger age and smaller sized aneurysms.² SCA aneurysms are rare and account for 1.7% of all intracranial aneurysms.³ Buis *et al*² found one published case report of an SCA aneurysm in an infant <1 year of age.

Clinical presentations of an aneurysm include symptoms suggestive of a mass effect or subarachnoid hemorrhage, such as thunderclap headache, nausea and vomiting, inconsolable crying, bulging fontanel, focal neurological deficits, or seizures.⁴ Forced eye deviation downwards, also known as sunset eye sign, may also be observed and results from compression of the periaqueductal gray matter causing upgaze paresis.⁵ Diagnosis of an aneurysm is made based on imaging, with DSA being the gold standard for diagnosis.

Treatment for pediatric aneurysms has advanced with the development of technology. Early attempts at surgical interventions for pediatric aneurysms were associated with high mortality rates, but eventually became comparable with adult mortality rates with the improvement of microsurgical techniques and

equipment, including microsurgical clips and microscope magnification.⁶ During the past 20 years, utilization of radiographically guided endovascular techniques to treat aneurysms has resulted in better outcomes for posterior fossa aneurysms, causing a shift in treatment to favor an endovascular over a surgical approach at our institution.⁷ Serial monitoring for vasospasm and recurrence of hemorrhage can be achieved using non-invasive transcranial Doppler ultrasound given the ease of imaging in this population due to the open fontanelle windows.

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REFERENCES

- Gemmete JJ, Toma AK, Davagnanam I, *et al*. Pediatric cerebral aneurysms. *Neuroimaging Clin N Am* 2013;23:771–9.
- Buis DR, van Ouwkerk WJR, Takahata H, *et al*. Intracranial aneurysms in children under 1 year of age: a systematic review of the literature. *Childs Nerv Syst* 2006;22:1395–409.
- Peluso JPP, van Rooij WJ, Sluzewski M, *et al*. Superior cerebellar artery aneurysms: incidence, clinical presentation and midterm outcome of endovascular treatment. *Neuroradiology* 2007;49:747–51.
- Garg K, Singh PK, Sharma BS, *et al*. Pediatric intracranial aneurysms—our experience and review of literature. *Childs Nerv Syst* 2014;30:873–83.
- Chattha AS, Delong GR. Sylvian aqueduct syndrome as a sign of acute obstructive hydrocephalus in children. *J Neurol Neurosurg Psychiatry*. 1975;38:288–96.
- Bederson JB, Awad IA, Wiebers DO, *et al*. Recommendations for the management of patients with unruptured intracranial aneurysms: a statement for healthcare professionals from the Stroke Council of the American Heart Association. *Circulation* 2000;102:2300–8.
- Saraf R, Shrivastava M, Siddhartha W, *et al*. Intracranial pediatric aneurysms: endovascular treatment and its outcome. *J Neurosurg Pediatr* 2012;10:230–40.

Learning points

- ▶ Infantile intracranial aneurysms are rare.
- ▶ Detection of signs and symptoms of ruptured aneurysms are paramount for early diagnosis and treatment.
- ▶ Minimally invasive endovascular techniques have shown improved outcomes.
- ▶ Transcranial Doppler ultrasound is a relatively fast and non-invasive surveillance technique post intervention.

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