Congenital brachial artery aneurysms in the upper extremity are very rare. Although most brachial artery aneurysms are associated with systemic diseases, they can present as an isolated finding. These lesions can be asymptomatic masses or can present with pain, ischemia, or nerve compression. They must be differentiated from pseudoaneurysm, hematoma, vascular malformation, and other vascular lesions that can occur in the upper limb. Surgical repair of moderate or large brachial artery aneurysms is indicated to prevent thrombosis, ischemia, rupture, or neurologic compromise. We present a case of brachial artery aneurysm in a 7-month-old male infant, and the literature is reviewed.

CASE REPORT

A 7-month-old boy presented with a 10-day history of diminished spontaneous movement of the left arm and a weak grip reflex. Additionally, the parents noted a mass on the medial aspect of the upper arm. There was no family history of vascular anomaly or mixed connective tissue disorder. Examination was notable for a pulsatile mass in the upper arm with palpable radial and ulnar pulses and a well-perfused hand. Radial and ulnar nerve motor function was intact, but there was a diminished median nerve motor function, with minimal thumb and index finger flexion. Ultrasound showed a 2.0 × 2.4 cm fusiform dilatation of the brachial artery in the mid-upper arm with turbulent flow suggestive of an aneurysm (Fig. 1). Vein mapping of the lower extremities was performed preoperatively in anticipation of the need for interposition grafting. Magnetic resonance angiogram (MRA) showed an isolated aneurysm of the left brachial artery with no other affected vasculature (Fig. 2).

A longitudinal incision was made over the course of the aneurysm. Dissection of the brachial artery, basilic vein, and the median, radial, and ulnar cutaneous nerves was performed proximal and distal to the aneurysm (Fig. 3). These structures were then dissected off.
the aneurysm. Marked compression of the median nerve was noted (Fig. 3). The brachial artery was clamped proximal and distal to the aneurysm and the aneurysm excised. Concurrently, the left greater saphenous vein was harvested. The brachial artery was reconstructed with the reversed saphenous interposition vein graft using 9-0 nylon suture in an interrupted fashion under the operating microscope (Fig. 4). Reperfusion was confirmed with a Doppler signal along the graft and distally along the radial and ulnar arteries.

The patient was maintained on daily aspirin for 1 month. Pathology confirmed a true aneurysm, with no evidence of vasculitis, inflammation, infection, lamina disruption, cystic media necrosis, mucopolysaccharide deposition, or other connective tissue abnormality. An ultrasound performed 1 week postoperatively demonstrated patency of the vein graft. Median nerve motor function was improved at 2 weeks postoperatively and returned to normal by 1 month postoperatively. Subsequent examination and Doppler ultrasound demonstrated continued graft patency.

**DISCUSSION**

In both children and adults, peripheral artery aneurysms are much less common than central aneurysms. Of peripheral aneurysms, only about 5% are located in the upper extremity. Within the upper extremity, subclavian involvement is most common, and more distal lesions are rare. In the pediatric population, true aneurysms have been described in the axillary, brachial, ulnar, and radial arteries. Unlike adults, in whom aneurysms are usually related to hypertension and atherosclerosis, pediatric aneurysms are typically associated with cardiac anomalies (aortic aneurysms) and other conditions, such as the Marfan syndrome, the Ehlers–Danlos syndrome, the Turner syndrome, infection (mycotic), and various types of vasculitis such as giant cell arteritis, the Kawasaki disease, and polyaneritis nodosa.1

Since the 1950s, 14 cases of brachial artery aneurysm in children younger than 12 years have been reported.1–13 In most cases (9 of 14), other associated aneurysms, both central and peripheral, were present. In 5 cases, the brachial artery aneurysm was solitary. In just over half (8 cases), an associated systemic diagnosis was identified, with giant cell arteritis being the most commonly associated diagnosis. Other associated diagnoses were polyarteritis nodosa, Kawasaki arteritis, and the Ehlers–Danlos syndrome. Cases with multiple aneurysms were not necessarily associated with an identified systemic diagnosis. In some cases, the presence of a solitary brachial artery aneurysm was followed by the subsequent development of an aneurysm at another location, either central or peripheral. In 1 case, a second aneurysm (abdominal aorta) developed 9 years after the brachial artery aneurysm was treated, suggesting that continued long-term surveillance of these children is important.5

Brachial artery aneurysms may be initially confused with hematoma, vascular malformation, or arteriovenous fistula. Doppler ultrasonography, computed tomography angiography (CTA), or MRA...
can be performed to define the characteristics of the lesion. Ultrasonography has less sensitivity and specificity than CTA or MRA and should be used as a screening study in these patients. Although both CTA and MRA expose the child to an intravenous dye load, they can also help differentiate among pseudoaneurysm, true aneurysm, and arteriovenous fistula. They also provide additional information regarding extravasation of blood from the lesion, evidence of thrombosis, and the status of adjacent structures.

Although rupture, thrombosis, occlusion, and embolization are theoretical concerns, only 1 case of thrombosis of a brachial artery aneurysm in a child has been described, and no cases of embolization or rupture have been reported. Because of this, an asymptomatic brachial artery aneurysm does not necessarily require urgent surgical intervention. It may be reasonable to observe small asymptomatic aneurysms in very young children until the child is larger, and small aneurysms associated with inflammatory conditions can potentially be treated with prednisone, intravenous immunoglobulin, or other immune modulators to prevent progression. Moderate or large aneurysms, enlarging aneurysms, or aneurysms causing neurologic or vascular symptoms should be treated surgically. Definitive surgical treatment involves resection of the aneurysm with arterial repair or reconstruction. For small lesions, end-to-end anastomosis may be performed after resection. For larger lesions, an interposition vein graft is required. In infants and small children, microsurgical techniques are required.

In summary, the diagnosis of brachial artery aneurysms in pediatric patients involves a screening ultrasound, followed by further evaluation with CTA or MRA. Early surgical intervention including resection and microsurgical reconstruction should be performed for moderate or large lesions, expanding lesions, or aneurysms that are causing neurologic or vascular symptoms. Small asymptomatic aneurysms may potentially be observed until the child is larger, and lesions associated with systemic inflammatory conditions (polyarteritis nodosa, giant cell arteritis, etc.) may benefit from immunosuppression. A rheumatologist and geneticist should be involved to help screen for associated conditions. Because of the frequent association with aneurysms at other locations, full-body arterial evaluation is important. Because a subsequent second central or peripheral aneurysm can develop many years later, children with solitary brachial artery aneurysms should be followed long-term with screening studies.

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