

A Large Isolated True Brachial Artery Aneurysm in 6 Months Boy: Managed Surgically with Perfect Outcome. A Case Report

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Introduction

In both children and adults, peripheral artery aneurysms are much less common than central aneurysms. Only about 5% of peripheral aneurysms 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. pediatric aneurysms are more 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 polyarteritis nodosa [1].

Congenital upper extremity aneurysms are very rare and can be challenging, they can present as an isolated finding but they are often associated with other systemic conditions and because of the possibility of concurrent aneurysms, this condition requires multidisciplinary management.

These lesions can be asymptomatic masses or can present with pain, ischemia, or nerve compression. They should be differentiated from pseudo aneurysm, hematoma, vascular malformation, and other vascular lesions that can occur in the upper limb.

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. Both CTA and MRA can also help differentiate among pseudo aneurysm, 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.

Case Description

A 6-months-old boy presented with one month history of diminished and painful movement of the right arm. Additionally, the parents noted a tender swelling on the lower medial aspect of the upper arm. There was no family history of consanguinity or mixed connective tissue disorders. Examination was notable for a pulsatile swelling in the upper arm (brachial artery territory) with weak palpable radial and ulnar pulses with good -perfused hand. Nerve conduction study revealed intact radial and ulnar nerve motor function, but there was a diminished median nerve motor function.

Colour Duplex examination of right upper limb revealed a partially thrombosed brachial artery fusiform aneurysm (5.5cmx1.8cm), upper neck 3mm and 2.5mm lower neck, partial thrombus inside (2.4cmx1.1cm) and a biphasic flow above the thrombus (38/7 cm/second) with biphasic flow (148/60cm/S) in brachial artery above upper neck. Venous system was patent all the way up to subclavian vein and patent compressible cephalic and basilica veins with basilica vein diameter of 3 mm.

Operative Technique

The incision for optimal exposure access for proximal inflow and distal limit of the aneurysm was fashioned (Figure1) and a Binocular Loupe (Univet, Optical Technologies), Galilean TTL 3X0 Pro. Was used. Dissection of the brachial artery aneurysm, basilic vein, and the median nerve was performed proximal and distal to the aneurysm (Figures 2, 3); the area of disease was resected (Figure 4) along with a few millimeters of extra vessel on either side as margin. The brachial artery was reconstructed with the reversed basilica vein 3 cm length of the same limb (Figure 5), interposition vein graft using 7-0 nylon suture in an interrupted fashion under Loup magnification and the excised aneurysm (Figure

6) was sent for pathology. A3fr, Fogarty thrombectomy catheter and heparinized saline flushing were used distally and proximally before completion of the anastomosis. On table strong palpable radial and ulnar pulse, then Closure. The patient was maintained on daily aspirin for 1 month and pathology confirmed a true aneurysm, with no evidence of vasculitis, inflammation, infection, lamina disruption, cystic media necrosis, mucopolysaccharide deposition, with no other connective tissue abnormality.



Figure 1: Incision line planning.



Figure 2: Dissection and isolating the aneurysm from surrounding median nerve.

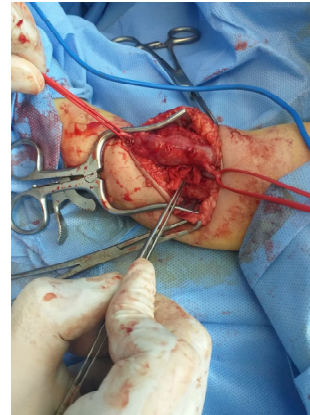


Figure 3: Proximal and distal control of brachial artery.



Figure 4: Excision.

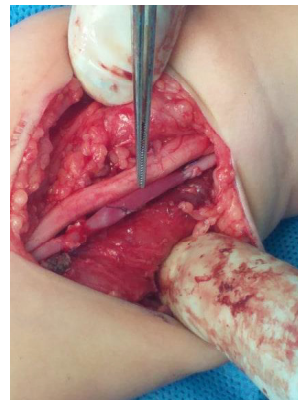


Figure 5: reconstruction with reversed basilica vein with palpable graft pulse and intact median nerve.



Figure 6: The excised aneurysm.

An ultrasound performed 1 week postoperatively demonstrated patency of the vein graft. Median nerve motor function was improved at 3 weeks postoperatively. Subsequent follow-up 3 months later and Doppler ultrasound demonstrated continued graft patency.

Discussion

Until 2016, Noopur Gangopadhyay, et al revised 14 children [1-13] below 12 years old, 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. 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]. 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 [6].

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.

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. Noopur Gangopadhyay et al. 2016, described a solitary brachial artery aneurysm in a 7 months infant that was reconstructed by interposition great saphenous vein graft [14].

Sameer A et al. 2017, reported 2 cases of spontaneous isolated true aneurysms of the brachial artery in two children. And successfully managed by surgical excision and micro-vascular repair with vein grafting [15].

In our patient the aneurysm was the largest in the revised literature, partially thrombosed, painful and increased in dimension in follow up scan was considered. However, we felt that the risk of spontaneous clotting of the brachial artery, or thromboembolism in the limb, or sudden aneurysm rupture and bleeding was quite high. Urgent intervention was likely the best option. Nevertheless, in our patient we utilized the reverse basilic vein graft to avoid the need for additional incisions.

Conclusion

The diagnosis of brachial artery aneurysms in pediatric patients involves a screening ultrasound, followed by further evaluation with CTA or MRA if indicated. 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.

We recommend surgical reconstruction in all pediatric peripheral aneurysms in the upper limb whatever the size or even asymptomatic cases, and recommend micro vascular techniques.

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