

CASE REPORT

Brachial Artery Aneurysm with Brachial Plexus Neuropathy: A Case Report with Review of Literature

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Abstract

Brachial artery aneurysms (BAA) present in a diverse manner, neuropathy is however rare. A 20-year-old female presented with swelling, weakness, and numbness of the left upper limb that perplexed the clinicians. On nerve conduction studies there was evidence of re-innervation. Excision of brachial artery aneurysm with inter-positional reverse saphenous vein grafting was done. Various presentations and treatment modalities are discussed with review of literature.

Key Words

Brachial Artery Aneurysms, Aneurysms, Neuropathy, Reverse Saphenous Vein, Vascular Surgery

Introduction

Upper extremity arterial aneurysm was first diagnosed by Hippocrates as early as 460 BC. [1] and Guattani, gave its accurate description in 1772. [2] True arterial aneurysms of axillary artery commonly occur secondary to blunt trauma [4], brachial and more distal arteries are extremely rare. [3] We present an intriguing case of true brachial artery aneurysm which presented with neuropathy and occurred secondary to chronic granulomatous inflammation.

Case Report

A 20 year lady experienced pain in her left arm for 4 months which was on and off and 2 months later she developed a swelling in left upper arm along with weakness and numbness in left upper limb. There were no risk factors for stroke, no history of fever, trauma, bleeding tendency, or interventional procedure, swelling elsewhere or any congenital condition in the family. Medical management followed by surgical exploration of swelling was attempted but procedure was aborted and patient referred to our centre. General physical and systemic examination was unremarkable. Local Examination of left arm revealed a suture line with inflammation (Fig 1) with ill-defined, tender, non-pulsatile 6 x 5 cm swelling with no bruit or thrill. Distal radial and ulnar pulses were not palpable. Motor examination showed a weak grip, wrist drop with muscle power grade of 3/5 (MRC scale for muscle power) in the left upper limb

whereas, the right upper limb was normal. Sensory examination unveiled the impaired sensation left upper limb sparing the T1 dermatome. The sensation of the right upper limb was intact with normal reflexes in both limbs. Differential diagnosis of soft tissue tumour or aneurysm of Brachial artery aneurysm was made. USG Dropper's examination (Fig 2A,2B) and CT angiography (Fig 2C,2D) showed an aneurysm with 65 mm long and 54 mm of the largest for horizontal diameter and 35 mm of the aneurysm's neck diameter. Final diagnosis of BAA with neuropathy was made. Patient was planned for conservative management with antibiotics, analgesics and neurological evaluation. But, on nerve conduction studies, brachial plexus was found to be involved at middle and lower trunk with evidence of re-innervation. Thus, urgent surgical intervention was planned with excision of brachial artery aneurysm with inter-positional reverse saphenous vein graft (Fig 3). Postoperatively, radial and ulnar pulses were palpable with triphasic flow detected on doppler. Anticoagulation with low molecular weight heparin started on post-operative day 1 and warfarin on day 3 with a target INR of 2 - 3. Physiotherapy was also started. Histopathology on gross showed left brachial artery aneurysm with multiple friable soft tissue fragments together measuring 6x5 cm

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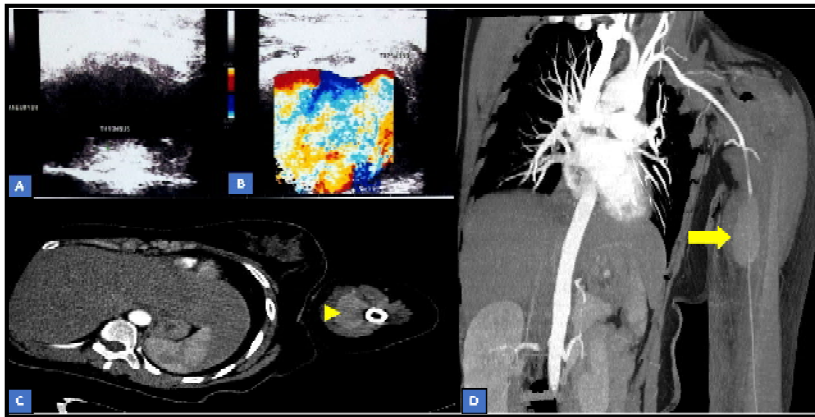


Fig 1. Left brachial artery aneurysm imaging (A) USG showing the aneurysm with a thrombus in situ, (B) Colour doppler showing turbulent flow in the aneurysmal dilatation, (C) Transverse CT section with arrow head marking the aneurysm, (D) Longitudinal CT section with arrow marked aneurysmal dilatation

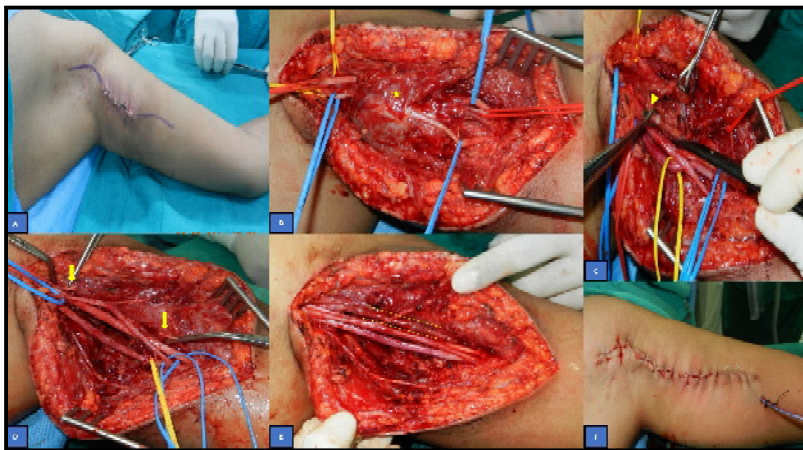


Fig 2. Operative steps, (A) patient positioned and the incision marked, (B) aneurysm is visualised (star mark) with entrapped nerve slinged, (C) aneurysmal sac is opened (arrowhead) and excised, (D) arrows pointing the cut ends of brachial artery, (E) reverse saphenous vein grafted (bracketed between the lines) along with release nerves, (F) skin closure done with a romovac drain placement

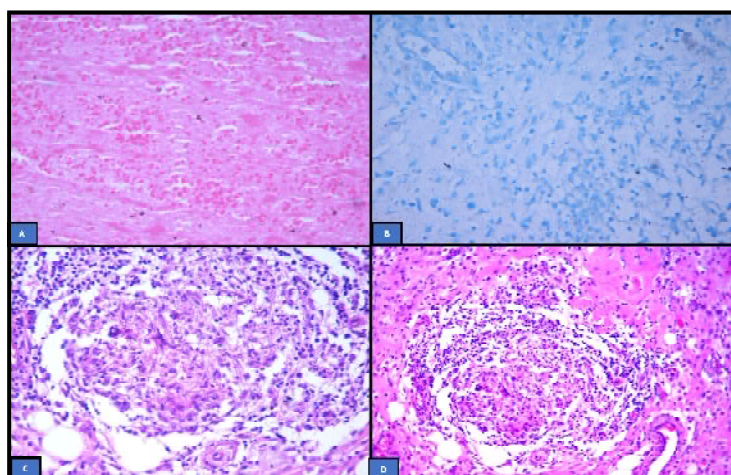


Fig 3. Histopathology, (A) HPE 10X image with fibrin thrombus, (B) AFB stain of the aneurysm is negative, (C) epithelioid granuloma with a multinucleate giant cells, (D) peri-granulomatous lymphocytic infiltrate, signifying chronic inflammation

pseudoaneurysm with 0.3-0.8 mm wall thickness. Adventitia showed fibrosis, chronic inflammation with non-necrotizing epithelioid cell granuloma with signs of tubercular etiology (*Fig 4*), however, AFB stain was negative. There was no proper vessel wall with complete three layers single section showed only adventitial layer, well-formed non-necrotizing epithelioid granuloma with multinucleate giant cell. Adjacent area showed chronic inflammation and fibrosis, no foreign body, no polarizable material and no identifiable fungal profiles. Final histopathological diagnosis was chronic granulomatosis. On follow up after 5 months, motor examination patient showed strong grip and muscle power grade is 4/5 in the left upper limb. Right upper limb was normal and all reflexes are intact. During 5-years follow up in the outpatient department, there was no aneurysm recurrence or any other complications.

Discussion

Upper extremity aneurysms occur more frequently than the lower extremity aneurysms, with subclavian artery aneurysm being the most common.^[2] BAA, however, constitute only 0.5% of peripheral artery aneurysms. Average diameter being 3.5-4.6 cm, as compared to the normal caliber of 5-7mm of brachial artery. In a series of 581 brachial artery reconstructions by Schunn et al, there was only one case with a true aneurysm of degenerative origin (1/581; 0.17%).^[2] The pathophysiology of aneurysm formation underlies complex interaction of various etio-pathological entities with basic etiology taking the driver's seat. The most common is trauma^[4] followed by iatrogenic procedures such as arteriovenous fistula and catheterization, blood donation, infections, and intravenous drug abuse.^[5] Aneurysmal dilatation are a component are atherosclerosis, collagen vascular diseases, ehler Danlos syndrome, cystic adventitial disease, fibromuscular dysplasia, buergers disease, behcets syndrome and neurofibromatosis.^[2] The presentation of these patients is vastly varied and perplexes the most experienced clinicians as well. Asymptomatic (58%) and about one third of them become symptomatic on follow up.^[3] Most common symptom is local swelling followed by pain and paresthesia. Rarely presents with neurological deficit, embolic or thrombotic phenomenon, distal ischemia and gangrene, compartment syndrome, rupture and/or bleeding of the aneurysm.^[6] The neurological deficit could be caused either by compression or ischemia. Depending upon location of aneurysm, it may involve median nerve or branches of brachial plexus.^[7] Differential diagnosis includes abscesses, as ilio-femoral aneurysm may masquerade as an inguinal abscess and internal carotid artery pseudoaneurysm as a peritonsillar abscess, soft tissue tumour, hematoma and arterio-venous malformation.^[8] USG duplex is first line screening tool and follow up of patient as well. CT angiography and MR angiography are used for exact anatomical delineation and operative planning.^[3] Symptomatic patients need urgent intervention with observation only for small, asymptomatic aneurysms. The

management options are surgery, endovascular, USG guided compression and percutaneous thrombin injection. The indications of surgical intervention are rapidly expanding pseudoaneurysm, distal ischemia due to pseudoaneurysm, infection of the pseudoaneurysm, local pressure causing neuropathy, failure of other modalities and ischemia due to the local pressure. Primary repair of pseudoaneurysm is done, only if the defect is small. Autologous reverse saphenous vein graft or prosthetic graft (PTFE/dacron) can be used for reconstruction. Other modalities of treatment are endovascular stenting and percutaneous thrombin injection.^[8] Tuberculosis can present as aneurysm in the abdominal aorta, pulmonary artery, gastroduodenal artery and femoral artery.^[9,10] Our case presented with compressive brachial plexus neuropathy, wrist drop and re-innervation on nerve conduction study, so early surgical intervention excision with reverse saphenous vein grafting was done to restore artery. Histopathology suggested a pseudoaneurysm secondary to chronic inflammation, but tubercular etiology was ruled out.

Conclusion

Brachial artery aneurysms are rare and should be differentiated from abscess. Neuropathy and distal ischemia may be associated with it. Surgical management is gold standard.

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