

## ULNAR ARTERY PSEUDO-ANEURYSM IN A YOUNG ADULT MALE DUE TO PENETRATING TRAUMA

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### Abstract

**Introduction:** We present a young adult male who developed a proximal left ulnar artery pseudo-aneurysm that resulted from a penetrating stab wound after a period of 10 years.

**Case Presentation:** A 28years old male was referred to our facility with a history of an expanding left forearm swelling. He was initially diagnosed as a case of haematoma. A clinical diagnosis of

pseudoaneurysm was confirmed by computed tomography angiography and resection done with ligation of the proximal ulnar artery and the distal branches.

**Conclusion:** Proximal ulnar artery pseudo-aneurysm is very rare and may be associated with dire consequences in cases of delayed or missed diagnosis. Operative intervention remains the mainstay of treatment.

**Keywords:** Proximal ulnar artery, Pseudo-aneurysm, Penetrating stab wound

### Introduction

Ulnar artery aneurysm may arise from infection, trauma and atherosclerosis involving the artery. Distal ulnar artery aneurysms have been well described in adults, although uncommon. Most cases are part of clinical finding in Hypothenar Hammer Syndrome. True aneurysms have a sac, which is formed by dilatation of the whole arterial wall and contain elements of internal elastic or muscular fibers whereas false aneurysm does not have all the component of the arterial wall.<sup>1,2</sup> Pseudo-aneurysms of the proximal ulnar artery are very rare (1%). The true natural incidence is unknown. However, it was reported to develop in 0.1% of patients following endovascular intervention requiring arterial puncture.<sup>16</sup> To the best of our knowledge, it has not been reported in Ghana although other peripheral arteries false aneurysm has been reported. Subfascial arteries of the upper limb are more affected by pseudoaneurysm compared to the perifascial arteries.

### Cases Presentation

A 28years old male presented at our facility with a fifteen-month history of an expanding left forearm swelling. He was stabbed with a knife at the site of the swelling more than 10 years ago during a cultural festival. The wound was successfully managed at a community health facility. However, he observed an increasing swelling of 15months duration at the previous wound site and reported back to the same health facility where he was initially treated. Following evaluation, he was diagnosed of haematoma and

referred to us. There was no other swelling elsewhere in his body and no significant or relevant family and other past medical history. On physical examination, he was not pale, anicteric, afebrile (temperature was 36.6C) with a respiratory rate of 15cycles/minute. Radial pulse was 86bpm, regular and normal volume.

A round (8x9cm), firm, pulsatile and expansile mass located in the medial left forearm 3cm distal to the cubital fossa was evident. It was covered by a normal skin but with a visible central scar, not warm to touch, non-tender, relatively mobile and no lymphadenopathy. The radial artery pulse was palpable, regular, normal volume and rate. The ulnar artery pulse was not palpable, had a very low pitch with handheld vascular Doppler. Allen's test was normal. The motor and sensory functions of distal left forearm and hand were normal.



**Figure 1:** Othersystemicexaminationwasnormal.

Laboratory investigations revealed that haemoglobin was 12.6g/dL, white blood cell count was 9,500/ $\mu$ L and platelet count was 315,000/ $\mu$ L. Based on the history of a stab wound to the left forearm and subsequent swelling as

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well as physical examination finding of a pulsatile (expansile) mass, a diagnosis of pseudo-aneurysm of the proximal left forearm was made. The clinical diagnosis was confirmed by Computed Tomography Angiography (CTA) which also showed a thrombus within the sack. (Fig. 2).



**Figure 2: CT Angiogram of the left ulnar artery pseudo-aneurysm: showing a saccular dilatation of the proximal aspect of the left ulnar artery with a filling defect.**

#### **Operative Details**

Under endotracheal general anaesthesia patient was placed supine on the operating couch with the left upper limb almost at right angle to the chest with pressure points appropriately padded. Intravenous (2g) Ceftriazone was given as a prophylactic antibiotic. The left upper limb was prepped and draped. A multiple lazy-S skin marking was placed over the swelling. A tourniquet was applied to the left arm and was inflated to limb occlusion pressure. Incision was made through the marking with extensive dissection to expose the aneurysm (saccular, measures 7x8cm). Other findings include five (5) arteries of equal caliber (<0.5mm) were seen leaving the distal end of the aneurysm. The ulnar and median were isolated and preserved. Following proximal and distal control of blood flow to the mass with vascular clamps, tourniquet was deflated and the mass was resected, incised and shows blood, extensive thrombus and multiple septa within its cavity. The distal arteries show evidence of good back flow. They were all ligated including the proximal ulnar artery with vicryl 2/0. Following aneurysmal resection, the radial artery pulse was clinically re-evaluated by palpation and revealed a regular, normal pulse rate (92bpm) with a good volume. In addition, the hand appeared pink with normal capillary refill time of less than 2 seconds. Wound bed was irrigated with normal saline using a 50cc syringe with moderate pressure and wound was closed in layers. Immediate post-operative

period was uneventful and patient was discharged home on post-op day seven. Patient follow up for one year has so far shown no significant problem.



**Figure 3a: Appearance of the UAP before skin incision.**



**Figure 3b: Surgical exposure of the UAP**



**Figure 3c: Excised UAP**





**Figure 3d: Dead space closure following aneurysmal resection.**



**Figure 3e-skin closure**

## Discussion

My current case is supported by reported cases of proximal ulnar artery pseudoaneurysm following tension band wiring and non-traumatic pseudoaneurysm associated with eosinophilia. However, there has been one reported case related to penetrating trauma<sup>10</sup> confirming the rarity of ulnar artery pseudoaneurysm (UAP). Pseudo-aneurysms are usually caused by break in the continuity of endothelium as a result of trauma (blunt or penetrating) with subsequent perivascular formation of blood clot, reorganization of the hematoma and recanalization of the vasculature through a newly formed false lumen<sup>1</sup>. There is absence of internal elastic lamina on histopathology evaluation. Complication of ulnar artery false aneurysm may include rupture, thrombosis, distal emboli and neurovascular compromise as a result of compression of the surrounding structures. Imaging modalities for the diagnosis of (UAP) include selective upper extremity

arteriography, ultrasonography, magnetic resonance imaging (MRI), and CTA. Ultrasound scan features include a hypoechoic saccular cystic formation demonstrating turbulent luminal blood flow and arising from the adjacent ulnar artery<sup>11</sup>. The typical finding on Doppler ultrasound is the “yin- yang” sign (a swirl of colours caused by the bidirectional flow within the aneurysm)<sup>3</sup>. The most specific sign of a pseudoaneurysm is the “to and fro” waveform on duplex ultrasound, seen due to the communicating channel between the artery and the pseudoaneurysmal sac<sup>12</sup>.

However, ultrasonography may still have a limitation of being operator-dependent. MRI is advantageously highly sensitive and specific, but is precluded from being a routine imaging option because of its time-intensive and expensive nature. Interestingly, Kehara et al. have described a case of nontraumatic UAP that resembled a soft tissue swelling on CT and MRI due to atypical imaging characteristics of the UAP<sup>13</sup>.

In our case, CTA provided evidence of a UAP with a filling defect likely thrombosis. CTA is an extremely valuable tool in the evaluation of UAP, when available, it is highly specific and sensitive. It can detect active extravasation, and assists in surgical planning<sup>3,12</sup>. It is becoming more favored compared to selective upper extremity arteriography (accepted gold standard investigation for diagnosis)<sup>14</sup>. Nevertheless, although catheter arteriography is becoming less and less common as the initial diagnostic imaging of choice, it is a useful tool when CTA findings are inconclusive or when endovascular intervention is due to be performed<sup>15</sup>. The management approach to pseudo-aneurysms may be conservative or surgical. Conservative care is indicated for smaller lesion without local mass effect (neurovascular compression), compartment syndrome and local infection<sup>16</sup>. Surgical intervention is indicated when the pseudo-aneurysm is associated with neurovascular compromise due to compression, infection and failure of conservative treatment. Options for surgery include (a.) excision of the pseudo-aneurysm with ligation of the ulnar artery (b.) microsurgical technique of ulnar artery re-anastomosis or an interposition vein graft following the excision of the pseudo-aneurysm<sup>4,5</sup>. Conservative treatment of ulnar artery pseudo-aneurysm comprise of ultra sound – guided compression, thrombin injection and endoluminal procedure<sup>5</sup>. Thrombin injection of small vessel pseudo-aneurysm, may be associated intravascular thrombosis, distal ischemia and the risks of systemic thrombin administration<sup>5</sup>. In our case, excision of the UAP/proximal and distal ligation of the ulnar artery and multiple branches was executed because of its progressive expansion and possibility of compressive neuropathy and rupture in the presence of adequate distal forearm and hand perfusion. The option of venous graft interposition was jettison because of the multiple arterial branches distal to the aneurysm as it was difficult to identify the main distal continuation of the ulnar artery.

## Conclusions

Proximal ulnar artery pseudo-aneurysm is rare and may be associated with dire consequences in cases of delayed or missed diagnosis. Early diagnosis and treatment is crucial in preventing long-term morbidity. Operative intervention remains the mainstay of treatment. Intraoperative angiography helps in choosing the surgical approach.

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