



MANAGEMENT OF SMALL ANEURYSMS OF THE HAND: LITERATURE REVIEW

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Abstract: Distal ulnar artery aneurysms, although uncommon, have been well described in adults as a clinical finding as a part of the **hypothenar hammer syndrome**. Congenital true aneurysms of the ulnar artery, however, are rare. The diagnostic and treatment algorithms for ulnar artery aneurysm are not well established because the disease is very rare.

Discussion: There should be a clear defined algorithm for Diagnosing and treatment of Hand Aneurysms. In this paper we are discussing the literature review of the small hand aneurysm m, mainly the ulnar artery and also giving an example from our practice of case that presented with us with Small thrombosed ulnar aneurysm that we dealt with it with our best practice at the time.

Therefore the need for clarification of the possible management ways of the peripheral hand aneurysms have issued and this literature review was done for discussing the possible ways along with the preferred methods for managing peripheral hand aneurysms.

Conclusion: Treatment of ulnar artery aneurysms should not be determined by the presence of symptoms. The development of thromboembolic complications with subsequent finger and hand ischemia can occur without warning signs. The surgical options for ulnar artery aneurysms depend on the presence of adequate perfusion in the hand after the aneurysm is excluded from the hand circulation. The reconstruction can be achieved by a primary end-to-end anastomosis if there is no tension or with the use of an interposition vein graft if the defect is large. So, we conclude that an algorithm needs to be existed for the treatment of such rare conditions.

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Introduction: Distal ulnar artery aneurysms are uncommon lesions. They have however been well described as part of 'hypothenar hammer syndrome'. This is typically an occupationally acquired disease seen in the skilled trades or sportsmen and was first described by Von Rosen in 1934 (1). Here intimal damage is caused by repetitive trauma to

the vulnerable portion of the ulnar artery as it courses around the hook of the hamate bone in the wrist through use of the dominant hand as a 'hammer'. Subsequent thrombosis of the artery occurs with the potential for aneurysm formation (1). Despite an awareness of this phenomenon in the literature, management of such cases appears to vary, largely due to a lack of a diagnostic and treatment algorithm. However given the potential for thromboembolism, aneurysmal rupture and digit ischaemia clarity is needed on the management of distal ulnar artery aneurysms (2). Here we present a case of a 27 year old electrician with an otherwise unknown cause of a false aneurysm of the ulnar artery then we will go through the literature review of hand aneurysms management.

Case presentation: A 27 year old electrician presented to the accident and emergency department at Cumberland infirmary, Carlisle (CIC) with one day history of coldness and paraesthesia to the fingers of his right (dominant) hand, particularly the middle and ring fingers. There was no history of trauma. However he had noted a new large pulsatile

painless mass in the palmar aspect of his right hand five days previously. His past medical history only included asthma. There was no history of recreational sports, Raynaud's disease, vasculitis, connective tissue disease, infections or known congenital anatomical abnormalities. He did not take any regular medication and was a non-smoker.

On examination he appeared well. His vital signs were unremarkable; oxygen saturations of 99% on room air, a respiratory rate of 11 beats per minute (bpm), blood pressure 146/87mmHg and a heart rate of 87 bpm (sinus rhythm). His chest had good bilateral entry and no added murmurs were noted on auscultation of the heart.

A focused examination revealed a large 2 x 3cm cystic, non-tender pulsatile mass in the palmar aspect of his right hand. There was evidence of finger ischemia, notably discolouration, reduced capillary refill time of the middle and ring fingers alongside paraesthesia on sensory examination. The radial and ulnar arteries of the right lower limb were palpable and Allen's test showed that the ulnar artery is the dominant.



Figure 1: The patient's right hand on presentation

Blood tests were unremarkable including those for predisposing conditions for aneurysm formation. A clinical diagnosis of HHS was made with the aid of an ultrasound (USS). An angiogram of the right brachial artery confirmed advanced thrombotic disease of the digital arteries causing flow obstruction in the forearm.



Figure 2: Ultrasound scan of the hand Aneurysm

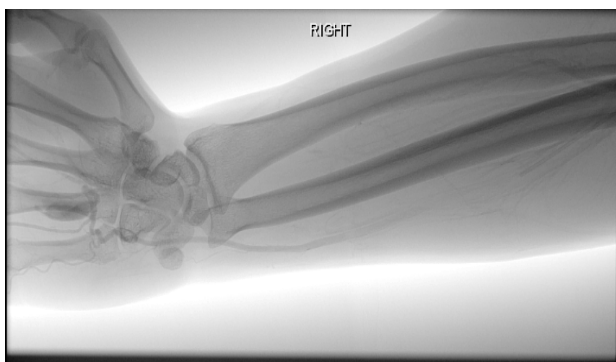
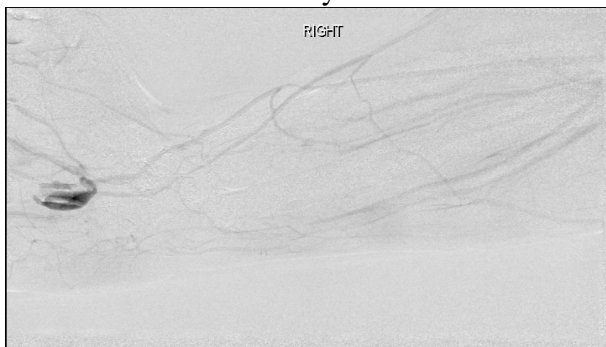


Figure 3: Angiogram on of the hand aneurysm

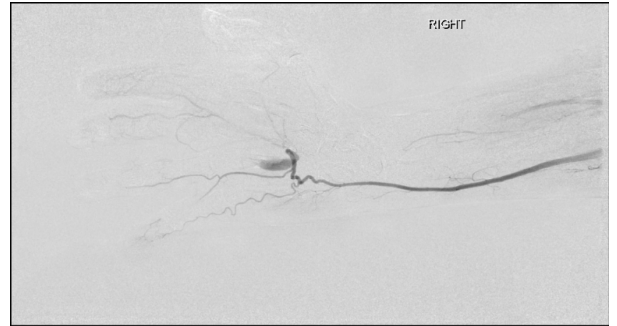


Figure 4: Angiogram brachial of the right hand showing improvement of the circulation of the hand with patent digital arteries and clearly seen partially thrombolysed aneurysm arising from palmar arch near the branch for second and third finger

The patient was admitted to the intensive care unit (ITU) for an intrarterial infusion of TPA (alteplase) and heparin. He received a total of 35.5mg, given at a rate of 0.5mg per hour as per protocol/trust guidelines. Despite this the patient still had a delayed capillary refill time of 2.5 seconds to middle and Index fingers. An angiogram of the right lower arm performed showed further improvement in the circulation of the right hand with patent digital arteries (Fig. 4). A partially thrombolysed aneurysm arising from the palmar arch near the ring and middle fingers however was clearly evident.

As thrombolysis was uneventful, a decision was made for surgical management given ulnar artery dominance due to the risk of thrombus and digit ischaemia. A right ulnar artery exclusion and excision was performed 1 day after admission. On surgical exploration a 3cm clotted full thickness suspected true aneurysm was found arising from the branch of the ulnar artery. The aneurysm was resected without reconstruction as there was intraoperative evidence of adequate hand perfusion after exclusion of the aneurysm on Doppler signals. No other abnormal findings were noted. The patient's post-operative course was very good and hand function/perfusion on arterial duplex studies and normal digit pressures were maintained. Histological analysis later found appearances consistent with a *false aneurysm*.

As previously mentioned there is a lack of definitive algorithm for the diagnosis and management of distal ulnar artery aneurysms. Without prospective randomized controlled trials (RCT) comparing outcomes between the

various treatment modalities proves difficult. Therefore following a review of the literature (mainly based on small retrospective case series) we will discuss possible management options (4).

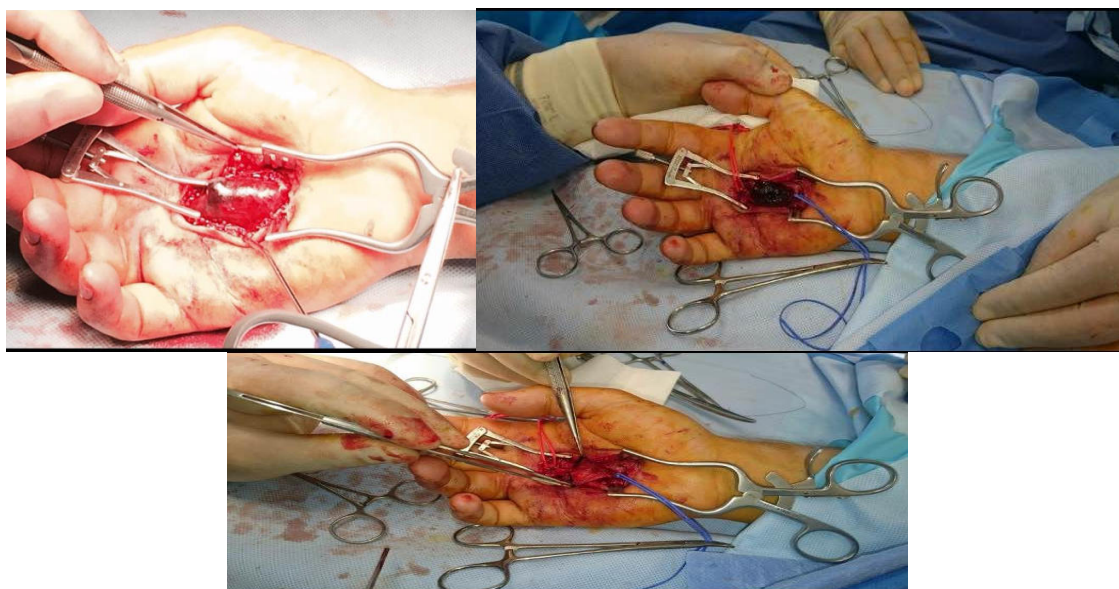


Figure 5: A right ulnar artery exclusion and excision

Discussion and literature review: HHS is a clinical diagnosis and may present with symptoms of pain, pallor, cyanosis, coolness and colour changes to the involved digits, usually with characteristic sparing of the thumb. Paraesthesia, hypothenar tenderness and sensitivity to cold may also present. With ulnar artery aneurysms a pulsatile mass may be apparent. (4). A ‘diagnostic algorithm’ suggested by Schrottle *et al* (4) includes a history of repetitive hand trauma, a physical examination including an Allen’s test (ideally a positive result but does not rule out HHS, possibly a positive tinels sign).

Management is classified into conservative, medical or surgical. Multiple modalities are often used depending on the individual case to ensure optimal treatment. The acuteness of symptoms, severity of ischemia, type of ulnar artery pathology and the presence of collateral blood supply are all important factors which determine initial management(4). Other considerations will include the perceived risk of

rupture, thromboembolic complications and surgical risk may also be considered (5). It is also important to emphasise that more aggressive, interventional and surgical approaches have been suggested by the majority for acute limb-threatening ischaemia. (4). equally if conservative and medical management has failed an interventional approach may be trialled. A surgical approach may be preferred for skilled labourers and sportsmen who may require a faster return to work (4).

Conservative management has been advocated as having a role in all cases. Mousa *et al* (6) advocates conservative management as the ‘treatment of choice’ in appropriately selected cases. It begins most importantly with avoidance of the exacerbating factors, protection of the hands where possible in occupational related causes, smoking cessation, maintenance of a warm environment, pain control and local wound management may be used (4,7)

Medical therapy may involve use of calcium channel blockers and antiplatelet agents in most patients although there is no evidence on the efficiency of this. Medications and conservative measures discussed may help on the basis of improving distal blood flow (4,8). Anticoagulants such as heparin and Coumadin have been also used in some case reports and possibly in post-reconstructive management but their use is unclear. Prostaglandins have also been suggested for severe ischaemia (4).

Surgical management is regarded as the 'gold standard' for large aneurysms which have a high risk of rupture or distal embolization. However it is usually only advocated for the following specific cases: -1) preventing distal embolization when there is a partially thrombolysed ulnar artery aneurysm 2) for removal of a painful aneurysmal mass or necrotic tissue 3) for relief of ulnar artery since compromise of the ulnar nerve can occur via ulnar arterial thrombosis leading to severe chronic inflammation of the Guyons' canal (16). Local thrombolysis should be considered in severe ischaemia, perhaps pre-operatively for distal digital emboli not accessible by a surgical thrombectomy (1). Some studies rarely report the need for surgical intervention, whilst others prefer this method of management. Generally ligation of the ulnar artery, resection of the aneurysm with an end-to-end anastomosis or resection and vascular reconstruction using a graft may be performed (14). The inferior epigastric artery has been suggested as conduit due to improved patency based on their use in coronary artery bypass (15). There is difference in opinion regarding revascularization; some suggest it should be used in all whilst others only advocate its use in selected cases. Stent grafts may also have a role in surgical management as they are less invasive than open repair, however long-term follow-up data for this is only based on small number of studies.

In conclusion; given the rarity of the disease, lack evidence from high quality studies comparing management options and long-term

follow up results making recommendations for best practice proves difficult. Essentially the management options suggested following our literature review can be used to guide management. However given the high risk of adverse outcomes ultimately a clinical decision should be made on a case-by-case basis.

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