

Isolated Ulnar Artery Thrombotic Occlusion - Hypothenar Hammer Syndrome: A Case Report of a Young Male

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Abstract: A 52 year old male a carpenter by profession presented with acute onset of pain in the hypothenar area and paresthesia of the left fourth and fifth finger and followed by discoloration over hypothenar area. A suspicion of ulnar artery occlusion was made clinically by Allen's test and later ulnar artery thrombosis was confirmed by CT angiogram of upper limb. There is no specific treatment for hypothenar hammer syndrome described. This patient was managed with calcium channel blocker (CCB), intravenous Heparin infusion followed by NOAC^[2] and analgesics and had complete recovery. Presently he is under follow up.

Keywords: Hypothenar hammer syndrome (HHS), Acute Ulnar artery occlusion, Guyon's canal

1. Introduction

Hypothenar hammer syndrome^[1] is a seldom documented clinical condition that is quite common to be missed by general practitioners in clinical practice. A high level of clinical suspicion and a careful history taking is necessary to clinch the diagnosis. Hypothenar hammer syndrome (HHS) is due to post traumatic thrombosis of distal ulnar artery at the level of wrist and hypothenar eminence. It is a very common condition for which the patients visit a clinic for paresthesia and pain of hands. HHS was first described as post-traumatic thrombosis of the ulnar artery at the level of wrist from a repetitive blunt trauma and was published by von Rosen in 1934. Conn et al. in the year 1970 named this infrequent lesion as hypothenar hammer syndrome (HHS). The term was coined because it was commonly seen in people who use their palm of dominant hand as a substitute for a hammer for repetitive tapping or beating that results in contusion and injury to the ulnar artery at Guyon's canal. HHS presents with ischemic symptoms of the ulnar aspect of the hand. It is characterized by paresthesia and pain of fourth and fifth fingers of the hands, cold, discoloration of hand, digital ischemia and ischemic trophic lesion. High index of clinical suspicion of this condition is essential as this can be easily missed out by the clinicians at the very early stage of the disease. A very simple, easy and grateful test conducted at bedside can help in deciding to go ahead with other confirmatory investigations. These include Doppler ultrasound scanning, MR angiography and peripheral arteriography. Treatment depends on the intensity and speed of the appearance of symptoms and may vary from an oral

medical treatment to a microsurgical reconstruction of the damaged segment^[3].

2. Case Presentation

A 52 years old male with no prior medical history and who is a carpenter by profession. He had visited the outpatient department of our hospital with two day history of pain and paresthesia of fourth and fifth fingers and the hypothenar eminence of left hand and associated discoloration at the wrist.

On Clinical examination he had discoloration and minimal edema over the left distal ulnar aspect of the wrist and hypothenar eminence. No restriction of movements of wrist joints, metacarpophalangeal joints, proximal and distal interphalangeal joints but pain and paresthesia were present along the 4th and 5th fingers of left hand. There was no weakness of thumb abduction and opposition or atrophy of thenar muscles. No signs of sensory loss or weakness along the distribution of Median nerve. A positive Allen's test was suggestive of ulnar artery occlusion of the left hand.

A Doppler ultrasonography of left upper limb was done showed distal ulnar artery at wrist edematous wall with echogenic thrombus filling the lumen for a length approximately 3.2 cm with terminal tortuous end of the vessel and thrombus noted to extend into terminal superficial palmar arch. A CT angiogram of upper limb confirmed the diagnosis and Work up for coagulopathy was negative (Fig 1 & Fig 2)



Figure 1: Showing discoloration of palm



Figure 2: CT angiogram showing absent contrast opacification of ulnar artery beyond wrist

He was treated with intravenous heparin infusion for 24 hours and followed by NOAC (rivaroxaban), calcium channel blocker to relieve vessel spasm and analgesic, Acetaminophen was given for pain. His symptoms had improved dramatically over the next three to five days and hence no surgical intervention was required in this case^[4]. He is currently on regular follow up.

3. Discussion

The ulnar artery is vulnerable to injury at the wrist due to repetitive trauma at this site. Guyon's canal is formed by

four borders (Fig 3): the roof is formed by volar carpal ligament, floor by the transverse carpal ligament, radial border by hook of hamate and medial border by the pisiform bone along with pisohamate ligament. Guyon's canal contains the Ulnar nerve and its branches, ulnar artery, venous and lymphatic drainage^[5]. With repetitive blunt trauma to this area ulnar artery is trapped between the volar carpal ligament and unciform process of hamate bone. . Both ulnar artery and superficial palmar arch can be injured at the distal end of the Guyon's canal.

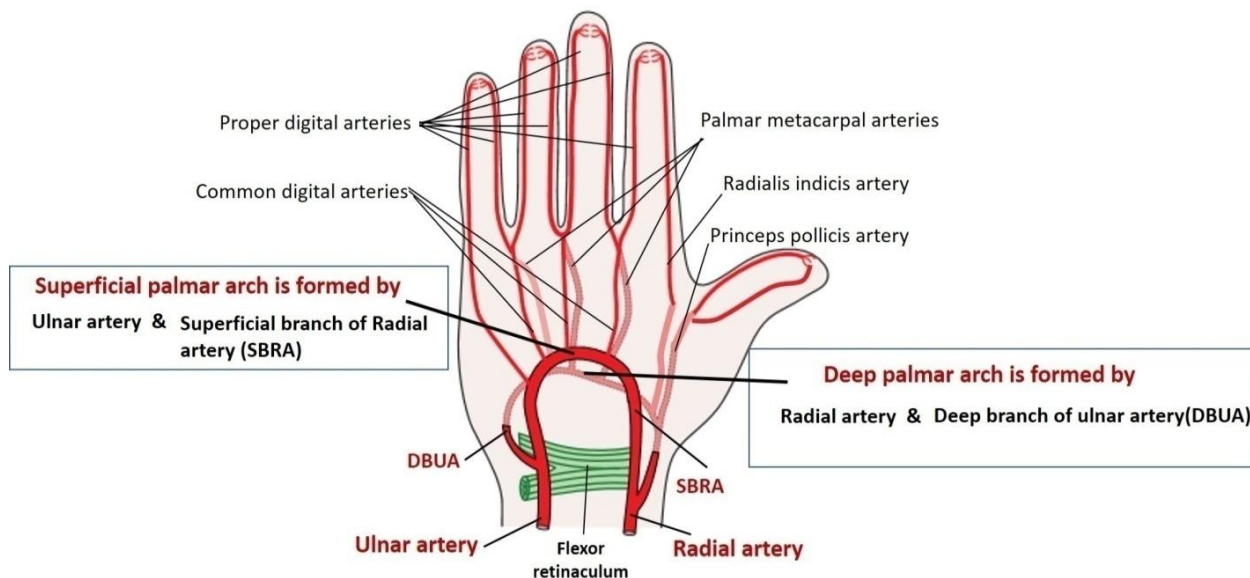


Figure 3: GUYONS canal

Blunt trauma to the ulnar artery results in intimal damage leading to loss antithrombogenicity, platelets aggregation and thrombus formation. When the trauma causes injury to the medial layer it can lead to formation of aneurysm and distal embolisation. Marry et al described angiographic evidence of different forms of ulnar artery involvement with ulnar artery acute thrombosis being the most common type followed by aneurysm and digital artery embolisation [6]. Vascular insufficiency in a rare condition okhiro syndrome of Duane anomaly is secondary to HHS

The clinical presentation of HHS depends on the extend of occlusion, speed of occurrence and the development of collateral circulation. This condition predominantly affects males in their fifth decade of life. Although Dominant hand is the site of involvement of HHS, in around 40% of patients Non dominant hand were affected [7]. Classical description in HHS is repetitive blunt trauma to the dominant hand but there are case reports suggesting even a single episode of trauma results in post traumatic ulnar thrombosis and/or aneurysm. Sometimes patient may present with swelling at the wrist which is the most notable sign of an aneurysmal swelling. Fortunately digital ulceration and even gangrene is very infrequent presentation but can be seen in more severe cases of HHS.

HHS is requires a high degree of clinical suspicion as this condition is missed by many clinicians. Detailed history and physical examination that should include a very simple and fast test at bedside testing i. e Allen’s test [8] will give a clue to the diagnosis. A positive Allen’s test suggests occlusion, stenosis and incomplete development of superficial ulnar arch or distal ulnar artery. In a series Allen test was negative in 14% patients with Hypothenar hammer syndrome [9]. The blood flow and site of thrombus formation can be easily assessed non invasively with Doppler ultrasonography. Advantage of this investigation is it doesn’t induce vasospasm and arterial hemodynamics can be studies [10].

The gold standard investigations for HHS is angiography. Different pathognomic findings in angiography include: tortuosity of ulnar artery with corkscrew appearance,

aneurysm formation, ulnar artery occlusion overlying hook of hamate, intraluminal embolism at the digits and ulnar artery occlusion. Kaji et al have classified vascular lesion based on the arteriography abnormality into three types [11]. (Fig 4)

Type 1	Stenosis of superficial palmar arch around the hook of the hamate
Type 2a	Occlusion of the superficial palmar arch around the hook of the hamate
Type 2b	Occlusions of both superficial and deep palmar arches around the hook of the hamate
Type 3a	Occlusion of the ulnar artery at the proximal part of the wrist
Type 3b	Occlusion of the ulnar artery near the wrist

Figure 4: Arteriographic classification

There are no well defined treatment strategies for hypothenar hammer syndrome as of now. Majority of treatments are based on individual case reports and case series. For most patients nonsurgical treatment is sufficient. smoking cessation, avoiding cold, avoiding repetitive trauma to hand would help reduction of symptoms and recurrence, and pharmacological treatment include intraarterial thrombolysis, calcium channel blocker (nifedipine, diltiazem) to relieve vasospasm, antipaltelets and anticoagulation. Surgical options include arterial ligation, resection of thrombosed arterial segment and aneurysm and resection and vascular reconstruction with vein or artery. The recurrence rate of HHS was 23% at one year follow up in one series studied [12].

4. Conclusion

Hypothenar hammer syndrome (HHS) is a common clinical condition that needs a very high clinical suspicion and appropriate clinical examination for its diagnosis. Allen’s test is essential for the diagnosis. There is no definite

guideline to the management of HHS. Majority of them are managed conservatively but depending on the speed of appearance and collateral development surgical treatment is always an option.

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