ANGIOGRAPHICALLY PROVEN HYPOTHENAR HAMMER SYNDROME IN A SCHOOL TEACHER

Ezamin AR¹, Suppiah S*¹,², Abu Hassan H¹, Mohd Saini S¹, Norafida B¹, Ab Hamid S¹, Abd Rashid SN¹, Mahmud R¹

¹Department of Imaging, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia
²Centre for Diagnostic Nuclear Imaging, Universiti Putra Malaysia

*Corresponding author: Dr. Subapriya Suppiah (email address: subapriya@upm.edu.my)

ABSTRACT

Hypotenar hammer syndrome (HSS) is a rare condition caused by thrombosis of the superficial palmar branch of the ulnar artery, known to occur in people who use the hypothenar or medial aspect of their hands literally as a hammer in a routine or habitual manner, leading to ischaemia of the hands. Certain occupational and recreational activities have been reported to predispose to this trauma-induced condition, however, there are no reports documenting this syndrome in a school teacher. Most studies have also been diagnosed on clinical and ultrasound imaging grounds. However, conventional upper limb angiography is considered the gold standard as of late, and it has been able to diagnose this condition more frequently, after exclusion of other risk factors such as connective tissue disease and congenital vascular malformations. We report a case of a teacher who presented with pain and weakness of his dominant hand, which has been angiographically proven to be due to ulnar artery occlusion at the palmar arch. This article can help explain a potentially debilitating condition that has never been reported before in a teacher, thus highlighting possible behavioural related occupational hazards that can be avoided.

Keywords: limb ischaemia, angiography, ulnar artery occlusion
1.0 Introduction

Hypotenar hammer syndrome (HHS) is a rare condition occurring in people who use the hypothenar or medial aspect of their hands literally as a hammer in a routine or habitual manner. There are some occupations and recreational activities that are known to predispose to this condition, which leads to ischaemia of the hands; e.g. mechanics, power drill operators, athletes and volleyball player, to name a few. Some studies have also reported an association between fibromuscular dysplasia (FMD) and HHS evidenced by surgical and biopsy findings (Larsen et al., 2013). Angiography is a valuable tool in the clinical evaluation of suspected vascular pathology for both diagnostic and therapeutic indications (Suppiah & Abdul Aziz, 2014) and is considered the gold standard for diagnosis of FMD in the renal arteries and other deeply located blood vessels (Slovut & Olin, 2004). The clinical presentation of HHS is commonly digital pain; followed by symptoms of cold intolerance, cyanosis, numbness, tingling, and ulceration in certain patients (Larsen et al., 2013).

2.0 Case Report

We report a case of a 55-years-old Malay gentleman, who had worked as a school teacher for approximately 20 years. He presented to the orthopaedic clinic of our centre with history of progressively worsening right hand pain and numbness for the past 2 years. The pain was intermittent and throbbing in nature. Sometimes, it was associated with pale discolouration of his fingers on the right hand, but denied having bluish discolouration of his fingers. He did not have any associated systemic symptoms.

On further questioning, he informed that he was not a smoker and that he did not perform any contact sports or experience any recent trauma. Nonetheless, he admitted to frequently pounding the table at his classroom using the palm of both his hands, but more often using his right hand – which was his dominant hand, to emphasize his point during teaching. He denied history of having regularly extracurricular or recreational sports activities. He had no siblings with similar condition. He also did not have previous history of surgery or drug allergy.

On examination, he has good nutritional and hydration status, his vital signs were stable, pulse rate 88 beats/minute, blood pressure 133/84mmHg, and he was pink on room air and not jaundiced. He had no clinical stigmata of connective tissue disease. Both his hands were warm to touch. No obvious deformity detected. However, there was slight wasting of the hypothenar muscles, and reduced power of the right 4th and 5th fingers. In addition, it was noted that the Modified Allen’s test on the right hand was negative, which indicated that ulnar artery supply to the right hand was not sufficient. Tinel’s sign was negative bilaterally.

His full blood count and serology tests were normal. He underwent conventional angiography of bilateral upper limbs to investigate for vascular abnormality. Under aseptic technique, via right femoral access, a 5-French Impress® hydrophilic KA2 catheter (Merit Medical Systems, Inc., USA) was introduced and advanced to selectively catheterize the left and right subclavian arteries. This kind of catheter is used because it is designed to reduce friction for
smoother navigation through tortuous vessels. Subsequently, low osmolar contrast material was injected and angiography images were obtained. The catheters were then selectively advanced down to the distal brachial artery for improved visualization of the distal flow in the upper limbs bilaterally. It was noted that the left upper limb had normal proximal limb arterial vascular anatomy but reduced flow after the distal third of the forearm (Figure 1). Furthermore, it was noted that there was sudden cutoff of blood flow at the distal one third of the right ulnar artery and absent flow in the superficial palmar branch of the right ulnar artery (Figure 2). There was no evidence of central artery stricture, vascular malformation or aneurysm in the vessels of bilateral upper limbs.

He was conservatively managed and given advice on behavioural modification; and referred for physiotherapy. His symptoms improved with time and there were no progressive symptoms noted.

**Figure 1:** Angiogram of the left upper limb (a) demonstrating reduced flow in the left ulnar artery at distal third of the forearm (black arrow) as well (b) reduced flow in the palmar arch (white arrow).
Figure 2: Angiogram of the right upper limb (a) demonstrating sudden cutoff of flow in the right ulnar artery at distal third of the forearm (black arrow) as well (b) absent flow in the palmar arch (white arrow).

3.0 Discussion

There are many causes of digital ischaemia, which include Raynaud’s disease, Raynaud’s phenomenon associated with connective tissue disorders, vasculitis, atherosclerosis with secondary thrombosis, arterial emboli from cardiac source, thromboangiitis obliterans, and thoracic syndrome (Ablett & Hackett, 2008). Hypothenar hammer syndrome (HHS) is a rare cause of digital ischaemia, with less than 2000 cases are reported in English language literature as of date (Abudakka et al., 2006); it may be underreported due to lack of evidence. The majority of HHS cases (97%) were due to trauma; namely chronic repetitive trauma that was usually occupational in nature was reported (Larsen et al, 2013). Generally, this syndrome has been described to occur in the dominant hands of men who, during occupational or recreational activities, use the heel of the hand as a hammer (Cigna et al., 2010). Conversely, other cardiovascular risk factors, including hypertension, dyslipidemia, and diabetes mellitus, were infrequent, and a history of connective tissue disease, venous thrombosis, or previous myocardial infarction was very uncommon (Larsen et al., 2013).
Angiography is the gold standard to detect this condition and frequently detected findings include ulnar artery occlusion (89%), irregularity (56%), tortuosity (46%), and digital emboli (89%) of the upper limb ulnar artery as this artery is prone to be compressed by the hamate carpal bone at Guyon’s canal (Larsen et al., 2013). Treatment is usually supportive and advice on behavioural modification, nonetheless some cases benefit from surgical intervention (Cigna et al., 2010). Histologic features in HHS most often represent secondary changes consistent with repetitive trauma (Larsen et al., 2013).

As our subject had history of frequently hitting his palm on the desktop, this had likely caused vascular injury and thrombosis, worst in the superficial palmar branch of his right ulnar artery at Guyon’s canal. To the knowledge of the authors, there are not been a similar case reported in English literature before in a school teacher. HHS is a diagnosis of exclusion and caution needs to be exercised when interpreting the results of investigations and diagnostic images. HHS was diagnosed in this teacher after confirmation was made by upper limb angiography. Previously most cases have been diagnosed using ultrasound or at autopsy; but currently, angiography is the recognised modality of choice (Ablett & Hackett, 2008).

4.0 Conclusion

Hypothenar hammer syndrome is a rare condition, likely due to under diagnosis; nevertheless with the advanced in imaging technology and high index of suspicious; it can be diagnosed using a minimally invasive technique. We also aim to highlight the condition as a possible occupational or behavioural related hazard; with potential reversibility based on clinical recognition of this vascular problem and prompt behavioral modification.

Acknowledgement

We would like to thank the Director General of Health, Ministry of Health Malaysia for permitting the use of data sourced from Serdang Hospital, Malaysia.

References


