SHORT REPORT

The Hypothenar Hammer Syndrome

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Introduction

The hypothenar hammer syndrome (HHS) was first described by von Rosen in 1934, in a factory worker who used his hand as a hammer to loosen a tightly fixed screw.1 Although rare, in those days hand ischemia through trauma was more associated with the backlash of the iron starting handle against the hand whilst starting the car engine.

Repetitive minor blunt trauma of the hypothenar region as well as one major blow to this area of prolonged exposure to vibrating tools can result in an ulnar artery injury (spasm, thrombosis, aneurysm) at the level of the hamate bone.2,10,15

After leaving Guyon’s canal the ulnar artery terminates by dividing into a superficial and a deep branch. The ulnar artery lies superficial after it has emerged out of Guyon’s canal. It is protected by skin, subcutaneous tissue, the palmaris brevis muscle and the volar carpal ligament. The hook of the hamate bone acts as an anvil for the overlying superficial ulnar artery (Fig. 1).

Human cadaver studies have shown a complete superficial arch in 70% of people. The deep arch is patent in 97%.2

This can result in clinical symptoms of Raynaud’s phenomenon, digital ischemia, digital embolic disease and/or cold intolerance.11 This occupational disease is often not recognized at first which may lead to a delay in treatment.

Incidence of the HHS is only 1.7% in a population with Raynaud’s phenomenon.8 In a population at risk, the incidence increases to 14%.4 The overall incidence of HHS in the general population is not known. The incidence of Raynaud’s phenomenon in the general female population in a cool climate ranges from 20 to 25%.

Case Reports

In our clinic we have seen and treated four patients with HHS. All were men and presented with cold intolerance. They were all involved in heavy manual labor. We performed arteriography on all of these patients.

Three out of four patients had an incomplete deep arch. Out of these three one had also an ulnar artery thrombosis and another had an ulnar artery aneurysm. The aneurysms were resected with venous interposition grafting. The other two patients received pharmaceutical therapy, calcium channel blockers and anticoagulants, as well as a sympathectomy (Table 1).

Review after 5 years showed all four patients had a satisfactory result. Both grafts were patent without signs of new emboli. Follow up of the non-operative group was uneventful after 7 years (Figs 2A and B).

Discussion

A thorough patient history for occupation, hobbies and previous hand trauma is necessary since most patients lack insight into the relationship between occupation or recreational activities and this disease.
In general a single traumatic event is remembered well. Documented cases come from a very diverse range of occupations and numerous recreational sports.

Symptoms may be provoked by exposure to cold, emotional stress on smoking and remain localized to the involved digits. In order to rule out other possible causes, hematological and serological testing should be done, including analysis for any connective tissue disease together with relevant diagnostic tests.

In the recent literature the reliable use of colour coded duplex ultrasound is emphasized and put against the invasive diagnostic procedure of arteriography. In the course of preoperative planning, however, arteriography is still mandatory in order to rule out any other cause of arterial emboli coming from the aortic arch, the subclavian artery or the brachial tree.

The differential diagnosis of upper extremity ischemia includes arteriosclerotic occlusive disease, thrombangiitis obliterans and arterial emboli from a more proximal source such as atrial fibrillation, rheumatic valvular vegetations, thoracic outlet compression syndrome and diabetic or collagen vascular disease.

We have performed a literature review of 25 articles comprising a total of 81 hands in 79 patients.

The main symptoms were; cold fingers in 38%, cold intolerance in 72%, painful dysesthesia in 26%,
nervousness in 28%, pain in 22%, ulcers in 15% and a pulsatile mass in 4%. The articles we reviewed contained 15 aneurysms, 44 thrombosed ulnar arteries, 18 stenosed or occluded ulnar arteries, three corkscrew deformities and one patient with an incomplete deep arch.

The main treatment method in the aneurysm group was resection and venous interposition grafting (60%); 40% received more than one method of treatment. In the thrombosis group more than 50% were treated with resection and venous interposition grafting; 42% were treated with vasoactive drugs. Almost 25% had more than one method of treatment. In the occlusion group half was treated with non-operative methods. Anticoagulants were prescribed in 25%. Thrombolysis was done in 25%. One third of this patient group had multiple treatments.

The modes of treatment were thrombolysis with recombinant tissue-type plasminogen activator (rt-PA), urokinase and streptokinase. Heparin was used intravenously to prevent further growth of thrombus mass and release of emboli. Aspirin and red blood cell (RBC) modifying drugs are prescribed as well as vasoactive drugs. RBC modifying drugs change membrane elasticity to make flow through capillaries easier. Calcium channel blockers as well as vasodilator drugs increase capillary diameter to improve blood flow and oxygenation. Calcium channel blockers decrease vascular smooth muscle contractility; nitroglycerine has a direct vasodilator effect. Sympathectomy was performed as an upper thoracic sympathectomy and ganglionectomy or as a stellate block.

Conservative or non-operative treatment options consisted of instructions as to hand care and protection, and change of work or working habits. Medication was prescribed in some cases. Everyone was encouraged to quit smoking meticulous handcare was taught.

Despite the various treatment regimes, patients seem to do well after any kind of treatment. Whether that is due to the secondary measures, the relatively small group that is collected here or the publishing of favorable cases is uncertain. In general, operative treatment should be undertaken if there is a hypoplastic superficial arch or hypoplastic radial artery. Complete occlusion of the affected ulnar artery would cause distal circulatory problems. With an intact superficial arch a partial thrombotic occlusion or an aneurysm could be resected with or without venous interposition to prevent recurrence of peripheral emboli. Reasons not to perform surgery are the ischemic state of the hand and the palmar scar. To what extent the local effect of the operation, and subsequent “local” sympathectomy, influences the clinical results is unclear. Thrombolytic agents are a possibility in patients with contraindications for surgery.

References


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