

CASE REPORT

Hypothenar eminence pain caused by smart phone use with the hands resting on a table

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Abstract

Smart phones have been in use since the early 90's. The use of these gadgets has increased dramatically in the past ten years with an estimated 4.8 billion users as of today (statistaR statistics portal). We continue to witness and describe new patterns of medical conditions directly or indirectly associated with use of these mobile phones. Psychosocial issues, musculoskeletal problems of the neck, back and upper limbs predominate. In this case presentation, one such description is presented of a painful hand condition that is attributed to common posture while using a smart phone in the office. This posture related hypothenar muscle inflammation due to smart phone use is the first to be described in literature to our knowledge. The purpose of this article is to show one way in which smartphone use can indirectly cause a disease state and pose a diagnostic challenge. Literature relating to other causes of pain around this hypothenar area is reviewed.

Keywords: smart phone, hypothenar muscle, pain, repetitive strain injury

Introduction

The increased use of smart phones has recently been associated with various patterns of hand and back pain. Most of the reported painful conditions of the hand relate to some form of tendonitis from overuse, for example of the extensor and flexor tendons of the thumb¹ (smartphone thumb or texting thumb pain) and index finger. It seems that prolonged use of smart phones exerts tension on muscles and tendons causing tendonitis, fatigue of neck, back and upper limb muscles². Also reported is osteoarthritis of the small joints of the hand. Most of these painful conditions occur when the smart phone is used while held in the palm. However it is also true that some of these painful conditions can be caused by neuropathic states due to compression of cervical nerve roots after prolonged bad neck postures during phone use³. Little is mentioned in the literature, about the hypothenar muscle inflammation arising from use of the smart phone when the hands rest on the edge of the table.

This case report demonstrates this finding and emphasizes the importance of keen history taking in assisting to get the diagnosis of a painful condition of the hand in current times. Literature concerning evaluation of a pain at the hypothenar eminence is also reviewed.

Case presentation

A 35 year old lady of Asian descent, presented with three day history of severe pain on her right hand. She described the pain as a constant ache in the right hypothenar region making her unable to rest her right hand on any surface or hold her bag for long. She had been on followup for chondromalacia patella for three years with no current knee complaints. She denied any history of diabetes or rheumatoid like symptoms and was not a smoker. She had no neck pain, and denied any recent trauma to the hand. She did not participate in any sporting activity. Other sensory modalities on the hand including proprioception, temperature and touch were preserved.

Examination of the neck was unremarkable and only local findings were significant, with a tender right hypothenar eminence, all the way from the pisiform to the 5th metacarpophalangeal joint especially the ulnar and dorsal aspect, no notable skin color changes and no callosities. Palpation elicited tenderness over the hypothenar eminence but the temperature was normal. Circulation distally was intact, as was tactile sensation over the hypothenar eminence. No masses were palpable and the skin was soft. Tinel's sign was negative over the ulnar nerve. Isolated motion of the neighboring joints was painless as long as the hypothenar muscles were not touched.

Her phone was placed on the table during the examination, and it kept ringing and interrupting the conversation. She complained that she was not able to use her phone in the office which prompted a question to her to demonstrate how she uses it. It was noted that she tried to place her palms on edge of the table and immediately complained of pain in the hypothenar eminence of her right hand. Upon prodding, she confessed it was her preferred way of texting; with the palms resting on her office table. She was a social media fan and liked to text on WhatsApp[®].

Figure 1 depicts the same patient at presentation, illustrates the preferred posture of her hands during texting. It is proposed that the repeated placement of her hand on the

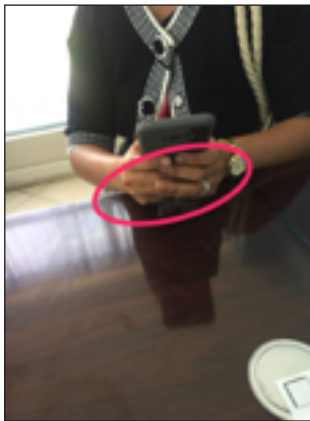


Figure 1. Photograph of the patient illustrating her preferred posture of the hands on the table while using the smart phone

table caused irritation and inflammation the hypothenar eminence.

An Ultrasound scan of the hypothenar area of the right hand was requested to exclude other etiologies and confirm the inflammation. The findings, illustrated in Figure 2, revealed inflammation in the hypothenar muscle bellies and an incidental small ganglion.

The diagnosis of hypothenar muscle inflammation due to repeated trauma from the edge of the table during texting was entertained. Additional testing by electromyography was considered but not pursued due to cost implications and its unavailability in town.

She was advised to stop resting her hand on the edge of the table, go slow on texting for a week and wear a padded pair of gloves for a week. Additionally, she was advised to use cold ice packs on the hypothenar eminence for about twenty minutes with one hour interval. She was started on a week's course of Celebrex[®] anti-inflammatory therapy. She returned two weeks later, well, with no pain and a fully functional hand.

Discussion

Currently there are no studies in literature that have established the the prevalence of hypothenar eminence pain.

Clinical evaluation of a patient with hypothenar pain needs to be meticulous to establish potential the etiology of the pain which includes trauma, inflammation, infection, tumors, neurovascular disorders and degenerative conditions. A few congenital aberrations of muscle development (not so uncommon in the hypothenar area) may explain certain nerve entrapments and require advanced investigations to detect. It is important to take history with these etiologies in mind (Table 1).

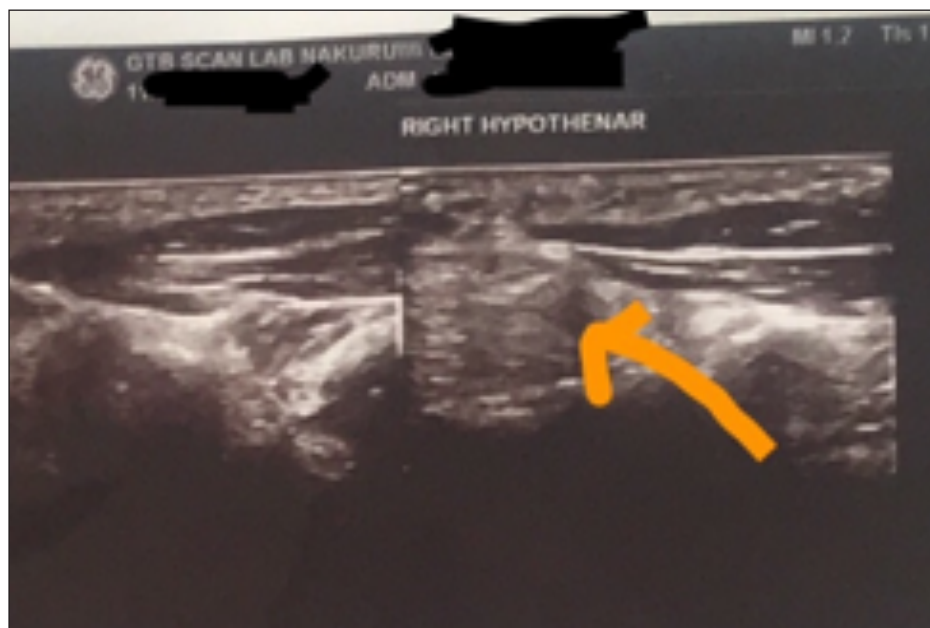


Figure 2. Ultrasound scan of the hypothenar area showing abundant edema of the hypothenar muscles (yellow arrow) evidence of inflammation.

Table 1. Causes of hypothenar eminence pain

Category	Example
Trauma	-Acute trauma -Soft tissue injuries -Fractures -Compartment syndrome -Chronic/repetitive overuse inflammation -Granulomas/callosities
Tumors	Benign- e.g., ganglions, lipomas, and others Malignancies
Inflammatory	Related to inflammatory disease eg Rheumatoid, Polymyositis etc
Infectious	Acute, e.g., purulent bacterial infection Chronic, e.g., Tuberculosis
Neurovascular	Vessel abnormalities, e.g., aneurysms Nerve compression, e.g., Guyon canal pressure
Degenerative	Joint degenerative disease
Congenital	Aberrant muscle development

A clinician may also evaluate organ/systems as sources of disease. In this case, the pain could be from bone and joints, the muscles, from the capsules and ligaments or from the neurovascular elements in the hypothenar area. Clinical tests to specifically evaluate the organ systems may yield the diagnosis for example of degenerative joint when a joint is moved.

Trauma is a common cause of hypothenar pain and may occur in one incident or as a chronic repetitive event as in this case, arising from the work, like use of a hammer, or sport like hockey, or habit of a patient like use of a walking stick (hypothenar hammer syndrome⁴).

While there are many complications of repetitive trauma which can cause pain, like compartment syndrome, vascular aneurysms, neuromas, ligament ruptures and fractures, there are also simple things like chronic muscular inflammation that may cause this pain. It is therefore necessary to obtain a thorough history and carry out a good clinical examination in order to avoid costly radiological and laboratory tests before a diagnosis is made.

The duration of symptoms and relationship to activities of daily living may help to clinch the diagnosis. Regular use of a laptop, for example, may hint at bad positioning of the hand causing tissue inflammation and pain. Manual workers who use their hands to hammer surfaces, callosities may be obvious and aneurysms of the superficial branch of the ulnar artery may develop in the syndrome known as hypothenar hammer syndrome⁵.

Traumatic incidents may be easy to evaluate for compartment syndrome, muscle and capsular tears, hematomas and fractures of the hamate, pisiform or fifth metacarpal. Most fractures may be picked by radiographs in multiple views, or Computerized Tomogram scans where necessary.

Old trauma in the hypothenar area may manifest with scarring and it may allude to neuromas or severe contracture which may block passing vessels and cause some forms of vascular claudication of the hypothenar eminence during activity.

The use of smartphones has resulted in a new pattern of painful conditions affecting the neck, back and upper limbs coupled with many other psychosocial issues. It is postulated that pain may be a consequence of prolonged muscle, tendon and capsule tension, causing 'overuse inflammation'². The hand is a common site of this pain with majority of symptoms occurring in the thumb due to its use when texting. Although rare, the hypothenar eminence as shown in this case, may be the location of pain. The cause of pain in this case may not have been the mobile phone per se, but the behavior associated with its use, in that the patient was constantly typing while resting her hands on the edge of the table, resulting in repeated trauma to the hypothenar eminence and possible ischaemic damage with resultant painful inflammation. The prevalence of all -cause-hypothenar pain is actually high¹. However, this may be true in specialist hand clinics but not so in general orthopedic practice where most painful conditions of the hand are due to trauma, infection and degenerative conditions. Smart phone associated hypothenar pain on the other hand is rare and this is the first reported case to our knowledge. Research is thus needed in the area of smartphone associated pain in the hand with an aim to establish the cause effect relationships, incidences and treatments available.

Away from trauma, there are several other notable causes of hypothenar eminence pain as mentioned above that deserve notice.

Inflammatory conditions manifesting in the hypothenar area like rheumatoid arthritis may be rare but possible. These may include subtle tendinitis of flexor tendons near and around the pisiform or enthesopathies, or they may present in form of compressive neuropathies of the ulnar nerve in the canal of Guyon⁶. In general, most inflammatory conditions will have many other symptoms in other systems that are beyond the scope of this article. The utility of tests like sonography, electromyography, MRI and advanced blood tests may be considered on a case by case basis in the event of a doubtful clinical picture. The general idea is to mark the location and extent of the pain and then evaluate and see if it follows a certain tendon for example, then the clinician may deduce that its tendonitis. A quick review of systems for other signs of inflammatory disease and simple laboratory tests should then settle the case.

Infection may arise from a penetrating injury. Hematogenous sources of infection may however not be obvious, but the clear signs of infection; hotness, tenderness and induration with fever and elevated cell counts should make the diagnosis simple⁷. One needs to establish the reasons if any, behind the infection which may include immune suppression, diabetes, malnutrition and drug abuse.

Tumors may be benign or malignant and may arise from any of the tissues around the hypothenar eminence. It is sometimes possible to clinically detect the primary tissue of origin i.e. bone, fat, muscle or skin, but in advanced cases it may not be possible. In many such cases, the standard approach to masses that involves clinical examination and laboratory workup and radiological investigations should arrive at a diagnosis and enable a clear plan of approach to its management along the guidelines of tumor management.

Neurovascular disorders may be suspected from the history when features like claudication and color changes during exertion are prominent, including neck pains and radicular symptoms, and signs like Tinel's sign. In some cases though, it may be necessary to carry out detailed neurovascular assessment by way of arteriograms, nerve conduction studies and MRI. The importance of a general body examination can not be over emphasized. Simple discoveries of features like enchondromas and exostoses can help explain masses in the hypothenar eminence as can cafe au lait lesions which can explain neurofibromas in this region.

Joint and capsular diseases around the hypothenar eminence are especially prevalent in sportsmen and women. Tendonitis of flexor carpi ulnaris insertion, chondromalacia of the pisiform bone (player pisiform), piso-triquetral instabilities and osteoarthritis and capsular sprains around the ulnar carpus are just but a few of the possible painful conditions to bear in mind when evaluating these patients. Most of these conditions may require radiographs, CT scans and MRI to diagnose. On some occasions though, piso-triquetral joint arthropathies can be picked by simple physical examination eliciting pain on pisiform compression and relief of this pain after ultrasound guided injection of lidocaine in the joint⁸. Whichever way one chooses to go about this, an attempt must be made to try and obtain a diagnosis that is accurate.

Conclusions

The current trend of increased use of mobile phones has resulted in new patterns of painful conditions of the neck, back and upper limb musculature including the hand. During assessment of a painful hand, the clinician needs to bear in mind the possibility that some of the painful tendonitis and myositis may be a direct pressure from hard surfaces due to placement of the hand on tables and chairs. It may then be helpful to advise the patient to avoid such mannerisms as part of the treatment strategy. In this case we have discussed a small proportion of this smartphone associated pain; hypothenar eminence pain. We note that while it may be common in specialized hand clinics, it poses challenges in diagnosis for a general practitioner who may see only an occasional patient. The differential diagnosis of this pain is wide and as varied as the number of structures present in this part of the hand. Meticulous history taking and examination, coupled with use of targeted investigations will generally lead to specific diagnosis that can enable specific treatment. Further studies will help establish the causal relationships between some painful hand conditions and smartphone mannerisms.

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