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CUBITAL TUNNEL SYNDROME - CASE REPORT

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Abstract

Cubital tunnel syndrome is the second most common peripheral neuropathy of the upper extremity. It is caused by compression of the ulnar nerve at the elbow region. Cubital tunnel syndrome is a neuropathy of the ulnar nerve causing symptoms of shooting pain and numbness along the medial aspect of the forearm, including the medial half of the fourth digit and the fifth digit. We present a case report of a 47-year-old male patient, an architect by profession, who complained of left elbow and forearm pain that radiated into his hand and motor weakness in the little and ring fingers of the left hand. MRI imaging of the cervical spine showed normal findings. EMNG findings revealed compressive sensorimotor neuropathy of the left ulnar nerve, with compression at the level of the elbow joint. The patient was diagnosed with cubital tunnel syndrome, caused by compression of the ulnar nerve at the elbow. The treatment was conservative, with the use of anti-inflammatory medications and physical therapy, resulting in a good clinical outcome.

Key words: Cubital tunnel, sensorimotor neuropathy

Introduction

Entrapment of the ulnar nerve at the elbow, commonly referred to as cubital tunnel syndrome, is the second most common compressive neuropathy of the upper extremity, with only carpal tunnel syndrome presenting more frequently. Neuropathy of the ulnar nerve causes symptoms of shooting pain, tingling, and numbness along the medial aspect of the forearm, including the medial half of the fourth digit and the fifth digit, and is usually caused by compression or irritation of the nerve at the elbow. The onset of such neuropraxias can be the result of an acute injury or can complicate a chronic overuse syndrome. Additionally, the superficial location of the ulnar nerve at the elbow leaves it susceptible to external pressure or trauma and subsequent compressive symptoms. Cubital tunnel syndrome represents a major disability in the workforce, especially with the increased use of computers and the accompanying repetitive use of the limb with the elbow in a flexed position. Accurate physical diagnosis can localize the site of ulnar nerve entrapment to the elbow or wrist. Optimal management is still unclear, but both conservative and operative modalities exist to treat cubital tunnel syndrome.

The ulnar nerve innervates the medial side of the forearm, the ulnar side of the palm, the little finger, and the ulnar half of the ring finger. It supplies motor branches to the flexor carpi ulnaris, the flexor digitorum profundus of the little and ring fingers, the hypothenar muscles, the adductor pollicis brevis, all of the interossei, and the third and fourth lumbricals. It is noteworthy that the ulnar nerve gives no motor or sensory branches above the elbow. The ulnar nerve originates from the C8–T1 nerve roots and is a terminal branch of the brachial plexus.

In the upper arm, the ulnar nerve courses posterior and medial to the brachial artery and then heads toward the posterior aspect of the elbow, piercing the medial intermuscular (IM) septum at the arcade of Struthers. The ulnar nerve reaches the hand via Guyon's canal to provide motor and sensory innervation to the digits. It then traverses along the medial aspect of the triceps to enter the cubital tunnel. At this point, the ulnar nerve travels between the olecranon and the medial epicondyle and beneath the Osborne ligament. Once the nerve exits the cubital tunnel, it passes under the aponeurotic head of the flexor carpi ulnaris to enter the forearm.

The cubital tunnel region is where the ulnar nerve is most likely to be compressed due to its location and anatomy. However, the nerve can also be compressed at the arcade of Struthers or by the aponeurotic head of the flexor carpi ulnaris, resulting in symptoms of ulnar neuropathy.[1]

Multiple etiologies can result in ulnar nerve compression at the cubital tunnel. Cubital tunnel syndrome may occur when a person has an injury to the area or frequently bends the elbow (during lifting, pulling, or reaching) or frequently leans on the elbow. Injuries such as swelling, dislocations, effusions, and fractures of the elbow joint can cause anatomical damage through compression or irritation of the ulnar nerve, leading to cubital tunnel syndrome.

The ulnar nerve is quite superficial at the level of the medial epicondyle; therefore, pressure on the ulnar nerve is a common cause of symptoms. The ulnar nerve lies behind the medial epicondyle. During flexion of the elbow joint, the ulnar nerve is stretched because of this anatomical position. Repetitive elbow flexion and extension can cause further damage and irritation to the ulnar nerve. Prolonged stretching of the ulnar nerve can also result in compression at the cubital tunnel. In many cases, the cause remains unknown[2]

Cubital tunnel syndrome is the second most common peripheral neuropathy of the upper extremity. The left side is more commonly affected. Males are affected more often than females.[3]

There has been an association with smoking.[4] The exact pathophysiology of cubital tunnel syndrome is unknown.

The most common symptoms of cubital tunnel syndrome are numbness and tingling in the hand, particularly the ring and little fingers, especially when the elbow is bent; hand pain; aching pain along the inside of the elbow; numbness and tingling at night; a weak grip; and clumsiness due to muscle weakness in the affected arm and hand. Motor symptoms are less common and usually manifest in severe cases of ulnar neuropathy. Froment's sign can be positive, indicating weakness of the adductor pollicis, which is supplied by the ulnar nerve.

On examination, findings may range from mild weakness of the interosseous muscles to severe atrophy of the intrinsic hand muscles and weakness of the handgrip. Ulnar claw hand is unlikely in cubital tunnel syndrome because the flexor digitorum profundus to the ring and little fingers is also denervated. Tinel's sign may be positive along the cubital tunnel.[5.6]

Diagnosis can be made clinically and confirmed with diagnostic tests. In addition to a complete medical history and physical examination, diagnostic tests for cubital tunnel syndrome may include nerve conduction studies. An X-ray of the elbow joint can be performed to exclude bony pathologies such as osteophytes and old fractures, which may cause compression of the nerve.[7,8]

Electromyoneurography with plurisegmental nerve stimulation is of great diagnostic benefit for patients with cubital tunnel syndrome. Nerve conduction tests measure how fast signals travel along a nerve to identify compression or constriction. Electromyography evaluates nerve and muscle function and may be used to test the forearm muscles controlled by the ulnar nerve. Abnormal muscle function may indicate pathology of the ulnar nerve.

Magnetic resonance imaging (MRI) is also used for the diagnosis of cubital tunnel syndrome. It is helpful in identifying other causes of compression, such as ganglion cysts, neuromas, aneurysms, and soft tissue swelling.

The most effective treatment for cubital tunnel syndrome is activity modification, including rest and avoidance of activities that aggravate the condition, such as repetitive elbow flexion. Additional conservative measures include nerve gliding exercises and the use of an elbow pad to protect against chronic irritation from hard surfaces. To limit movement and reduce irritation, it is recommended to wear a splint or foam elbow brace at night. Anti-inflammatory medications are also used in the management of this condition. If conservative treatment does not lead to improvement, surgery may be considered as a therapeutic option in severe cases. Moreover, all surgical procedures carry risks, and there is debate within the profession regarding when surgery should be performed for this condition. In practice, surgical treatment is reserved for more severe cases or for those in which conservative management has been deemed to have failed.

Case report

A 47-year-old right-hand–dominant man, an architect by profession, presented for neurological examination complaining of left elbow and forearm pain that radiated into his hand, with motor weakness in the little and ring fingers of the left hand. These complaints had been present for about two months. In the period preceding clinical presentation, he had been working intensively on an architectural project, with continuous pressure of his left elbow on a hard surface of the working table. The patient had no comorbidities.

On physical examination, there was no redness or forearm muscle wasting; however, moderate hypothenar wasting was present. Tinel's and Froment's signs were positive. Sensation to light touch and two-point discrimination was normal. MRI imaging of the cervical spine showed normal findings.

ENG examination of the motor nerves revealed prolonged distal motor latency (DML) with borderline motor conduction velocities and normal CMAP amplitude for the left ulnar nerve. ENG examination of the sensory nerves with plurisegmental stimulation of the ulnar nerve showed prolonged DML with reduced sensory conduction velocity in the region of the elbow and forearm, with normal parameters at the level of Guyon's canal. EMNG findings were consistent with a compressive sensory lesion of the left ulnar nerve, with the level of compression at the elbow, consistent with cubital tunnel syndrome.

Occupational Factors

The patient's occupation as an architect involves prolonged sedentary work, predominantly computer-based drafting and design, frequently exceeding 8 hours per day. This working pattern is associated with sustained elbow flexion and repetitive mechanical stress on the ulnar nerve at the cubital tunnel. During prolonged computer use, the patient reported habitual resting of the left elbow on a hard desk surface, leading to continuous external compression of the ulnar nerve at the medial epicondyle.

Additionally, static postures, limited arm repositioning, and inadequate ergonomic support contribute to increased intraneural pressure within the cubital tunnel, particularly during elbow flexion beyond 90 degrees. Repetitive microtrauma and prolonged low-grade compression are well-recognized occupational risk factors for the development of cubital tunnel syndrome, especially in professions requiring long periods of desk-based work. In this case, the combination of prolonged elbow flexion, direct pressure, and insufficient ergonomic adjustments likely played a significant role in symptom development.

The patient was diagnosed with left cubital tunnel syndrome, which is caused by compression of the ulnar nerve at the elbow.

Therapeutic Approach

Initial management consisted of conservative treatment aimed at reducing mechanical stress on the ulnar nerve. The patient was advised on ergonomic modifications, including avoidance of prolonged elbow flexion, elimination of direct elbow pressure on hard surfaces, and adjustment of desk and chair height to maintain a neutral upper limb position. The use of elbow padding during working hours and a night splint to limit elbow flexion during sleep was recommended.

Pharmacological therapy included non-steroidal anti-inflammatory drugs (NSAIDs) for pain control and reduction of local inflammatory response. A structured physical therapy program was initiated, focusing on nerve gliding exercises, stretching of the flexor–pronator muscle group, and postural correction to reduce strain on the elbow and shoulder girdle.

The patient was closely monitored for clinical improvement. Surgical intervention was considered unnecessary at this stage, given the absence of severe or progressive motor deficit and the favorable response to conservative management.

Conclusion

In summary, cubital tunnel syndrome is a common entrapment neuropathy of the upper extremity. Thorough knowledge of the motor and sensory distribution of the ulnar nerve is critical in evaluating patients with ulnar neuropathy and in identifying the site of pathology. With a detailed history and physical examination, the etiology is often readily apparent.

Treatment methods are primarily based on conservative management, including rest, NSAIDs, and physiotherapy. An interprofessional team, including a neurologist and a specialist in physical medicine and rehabilitation, can enhance recovery. Physiotherapy can provide significant benefit if muscle weakness is present. In most cases, conservative treatment results in a good clinical outcome. However, some patients, particularly those with significant motor weakness, have a poorer response to conservative treatment and may require surgical intervention.

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