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Original article

A rare cause of ulnar nerve entrapment at the elbow area illustrated by six cases: The anconeus epitrochlearis muscle

Une cause de compression du nerf ulnaire au coude illustrée par six cas : le muscle anconeus epitrochlearis

J. Fernandez [a,*], O. Camuzard [a], M.-O. Gauci [b], M. Winter [c]

[a] *Service de chirurgie de la main, hôpital Saint-Roch, CHU de Nice, 5, rue Pierre-Dévoluy, 06001 Nice, France*
[b] *Service d'orthopédie, hôpital de l'Archet, CHU de Nice, 151, route de Saint-Antoine, 06200 Nice, France*
[c] *Service de chirurgie de la main, clinique Saint-Jean, 92-94, avenue Dr-Maurice-Donat, 06800 Cagnes-sur-Mer, France*

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Abstract

Ulnar nerve entrapment is the second most common compressive neuropathy after carpal tunnel syndrome. The accessory anconeus epitrochlearis muscle – present in 4% to 34% of the general population – is a known, but rare cause of ulnar nerve entrapment at the elbow. The aim of this article was to expand our knowledge about this condition based on six cases that we encountered at our hospital between 2011 and 2015. Every patient had a typical clinical presentation: hypoesthesia or sensory deficit in the fourth and fifth fingers; potential intrinsics atrophy of the fourth intermetacarpal space; loss of strength and difficulty with fifth finger abduction. Although it can be useful to have the patient undergo ultrasonography or MRI to aid in the diagnosis, only electromyography (EMG) was performed in our patients. EMG revealed clear compression in the ulnar groove, with conduction block and a large drop in nerve conduction velocity. Treatment typically consists of conservative treatment first (splint, analgesics). Surgical treatment should be considered when conservative treatment has failed or the patient presents severe neurological deficits. In all of our patients, the ulnar nerve was surgically released but not transposed. Five of the six patients had completely recovered after 0.5 to 4 years follow-up. Ulnar nerve entrapment at the elbow by the anconeus epitrochlearis muscle is not common, but it must not be ignored. Only ultrasonography, MRI or, preferably, surgical exploration can establish the diagnosis. EMG findings such as reduced motor nerve conduction velocity in a short segment of the ulnar nerve provides evidence of anconeus epitrochlearis-induced neuropathy.

Keywords: Ulnar nerve compression; Anconeus epitrochlearis muscle; Compressive neuropathy; Neurolysis

Résumé

La compression du nerf ulnaire au coude est la seconde neuropathie compressive après la compression du nerf médian au niveau du canal carpien. Une compression par le muscle anconeus epitrochlearis, muscle surnuméraire présent dans 4 à 34 % des cas, est une cause connue mais peu fréquente. Le but de cet article était de faire le point sur cette cause à partir de six cas que nous avons rencontrés, série qui constitue la plus grande série de la littérature. Nous illustrons cette mise au point par six cas ayant présenté une compression du nerf ulnaire au coude par le muscle anconeus epitrochlearis, inclus de manière prospective et monocentrique entre 2011 et 2015. Tous les patients de notre série présentaient un tableau classique de compression du nerf ulnaire au coude : troubles sensitifs dans les quatrième et cinquième doigts, troubles moteurs avec possible amyotrophie des intrinsèques du quatrième espace intermétacarpien. La prise en charge diagnostique consiste à réaliser un électromyogramme (EMG), voire dans certains cas, une échographie du coude et une IRM (œdème en pondération T1). Aucun de nos patients n'a eu d'échographie ou d'IRM. Tous les EMG ont montré une compression nette au niveau du sillon du nerf ulnaire avec bloc de conduction et effondrement de la vitesse de conduction. La prise en charge thérapeutique consistait en un traitement médical dans un premier temps (orthèse, antalgiques) puis, en cas

* Corresponding author.
E-mail address: fernandez.jonathan11@gmail.com (J. Fernandez).

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d'échec ou en cas de signes neurologiques importants, en un traitement chirurgical : décompression du nerf avec ou sans transposition. Nous avons réalisé une neurolyse du nerf ulnaire dans tous les cas sans transposition du nerf. Les résultats à distance étaient bons, car cinq patients sur six ont récupéré complètement. La compression du nerf ulnaire au coude par le muscle anconeus epitrochlearis est rare mais il faut savoir y penser. Seules une échographie, une IRM ou, mieux, la chirurgie permettent d'établir le diagnostic, même si certains signes EMG comme un ralentissement de la conduction motrice sur un court segment du nerf ulnaire sont en faveur de cette étiologie.

Mots clés : Compression du nerf ulnaire ; Muscle anconeus epitrochlearis ; Neuropathie compressive ; Neurolyse

1. Introduction

Ulnar nerve entrapment is the second most common compressive neuropathy after carpal tunnel syndrome [1]. The ulnar nerve can be compressed at various points along its trajectory, but most cases are localized to the elbow and to Guyon's canal. Of the many causes of ulnar neuropathy, the most common are traumatic and idiopathic in nature. The anconeus epitrochlearis muscle, first described by Scafer and Schaeffer, is a well-known, but rare cause of ulnar nerve entrapment at the elbow [2]. This muscle is present in 4% to 34% of the general population [3].

In this article, we will be describing six cases of ulnar nerve entrapment at the elbow secondary to the presence of the anconeus epitrochlearis muscle. This is the largest published case series of ulnar nerve entrapment at the elbow due to the anconeus epitrochlearis muscle.

2. Case reports

Six patients with ulnar nerve entrapment at the elbow due to the presence of the anconeus epitrochlearis muscle were included prospectively at a single hospital between 2011 and 2015. The average patient age was 45 years (26–61 years); there were four men and two women. All patients were right-handed; the right elbow was affected in two cases and the left elbow in four cases.

Five patients had a McGowan grade III condition [4] (severe sensory and motor deficit) and one patient had a grade I condition (subjective symptoms and mild paresthesia). All patients had a positive Tinel's sign; two patients had reduced sensory discrimination (10 mm and 6 mm on Weber's test).

All patients had a typical clinical presentation: hypoesthesia or sensory deficit in the fourth and fifth fingers; potential intrinsics atrophy of the fourth intermetacarpal space; loss of strength and difficulty with fifth finger abduction. None of the patients underwent ultrasonography imaging or MRI, but an electromyography (EMG) was performed in all cases. The EMGs found clear compression in the ulnar groove, with conduction block and a large drop in nerve conduction velocity. One patient also presented with ipsilateral medial nerve compression in the carpal tunnel.

Surgical treatment was initiated through a medial retro-epicondylar incision, with division of the anconeus epitrochlearis muscle, release of the ulnar nerve but preservation of the branches destined to the flexor carpi ulnaris, and fasciotomy of the flexor carpi ulnaris over 3 cm. The absence of residual compression was confirmed by opening of Osborne's ligament and absence of compression under Amadio's arcade (if present). The nerve's stability was assessed. Nerve transposition was not performed. Epicondylectomy was performed in one patient to reduce the feelings of snapping and ulnar nerve instability. This reduced the nerve's excursion and the significant pressure induced by flexion-extension movements leading to nerve translation without altering its vascularization.

The follow-up period range from 2 to 4 years. Five patients were fully recovered; one patient was clearly improved but had persistent residual atrophy and loss of strength. This persistent isolated loss of strength did not require surgical revision (with or without transposition) as signs of ulnar nerve entrapment were no longer present. However, this case highlights the need for surgical treatment of all patients where intrinsic muscle atrophy is present, as it is very difficult to recover from this atrophy. Detailed information on each case is given in Table 1.

3. Discussion

3.1. Ulnar nerve anatomy

The ulnar nerve is a mixed nerve consisting of nerve fibers from the C8 and T1 roots, a branch of the medial fascicle of the brachial plexus. It is initially located in the humeral canal in the upper arm's anterior compartment, inside a vascular bundle; it then perforates the medial intermuscular septum in the upper-third of the arm, and descends into the posterior compartment behind the septum and in front of the medial head of the triceps brachii. It is accompanied by the superior ulnar collateral artery and does not branch off in the arm. It joins the epicondylar (ulnar) groove at the elbow, behind the medial epicondyle.

After crossing the ulnar nerve groove, it enters under the arcade joining the humeral and ulnar heads of the flexor carpi ulnaris muscle. It rests on the medial face and then the anterior face of the flexor digitorum profundus muscle and is covered by the flexor carpi ulnaris muscle. In the lower-third of the forearm, the nerve rests on the pronator quadratus muscle, medial to the tendon of the flexor carpi ulnaris muscle and lateral to the tendons of the flexor digitorum superficialis and profundus muscles. It is covered by the antebrachial fascia before it enters the wrist. It gives rise to muscle branches for the flexor carpi ulnaris muscle and the medial portion of the flexor digitorum profundus. It then gives rise to a dorsal branch,