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Ryhanen, J

2021-10

Ryhanen , J , Waris , E & Kujala , S 2021 , ' Isolated entrapment of the brachialis branch of the musculocutaneous nerve: a case report ' , Journal of Hand Surgery (European Volume) , vol. 46 , no. 8 , 17531934211008795 , pp. 896-897 . https://doi.org/10.1177/17531934211008795

http://hdl.handle.net/10138/342983
https://doi.org/10.1177/17531934211008795

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doi: 10.1177/17531934211007304 available online at http://jhs.sagepub.com

Figure 1. Atrophy of the right brachialis muscle and prominence of the biceps brachii tendon.

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Dear Editor,

The musculocutaneous nerve (MCN) innervates the coracobrachialis muscle and the flexors of the elbow: the biceps brachii and brachialis muscles. Distally it continues as the lateral cutaneous antebrachial nerve (LCAN) and provides sensation to the radial border of the forearm. The brachialis muscle is considered the main flexor of the elbow. From the MCN, the brachialis often receives only one branch, but in 70%–80% of cases it is also innervated by the radial nerve.

Entrapment of the MCN is rare. It mostly occurs after strenuous elbow extension or forearm pronation (Davidson et al., 1998). The symptoms vary depending on the level of the entrapment. A lesion of the nerve proximal to its division into the LCAN causes a mixed motor and sensory syndrome, whereas pure sensory symptoms are due to a more distal entrapment of the LCAN. Motor symptoms include weakness of elbow flexion and loss of normal contour of the biceps muscle (Mastaglia,1986; Pecina and Bojanic, 1993). The sensory symptoms include numbness and a painful dysesthesia over the radial aspect of the volar forearm (Belzile and Cloutier, 2001). We report a case of an isolated entrapment of the single motor branch of the MCN to the brachialis muscle.

A 55-year-old man developed weakness of his elbow flexion and dull pain on the lateral side of the cubital area over several months. With activity he experienced muscular cramps of the anterior compartment of the upper arm. Pain was provoked especially in maximal elbow extension, in forceful elbow flexion and when pronating the forearm. The patient was afraid of dropping objects.

Clinical examination revealed atrophy of the brachialis muscle (Figure 1). The biceps brachii muscle was intact and functioned normally. Electrophysiological examination showed normal nerve conduction in the brachial plexus and in the main branch of the MCN, but chronic segmental damage of the brachialis branch of the MCN and denervation of the brachialis muscle. There were no clinical or neurophysiological sensory disturbances. Mild age-related degenerative changes were present on cervical MRI, but they did not explain the symptoms. A neurologic examination revealed no central nervous system pathologies.

During exploration, the MCN and its branches to the biceps brachii and brachialis muscle, as well as the LCAN, were identified in the distal upper-arm area. The MCN provided one branch to the brachialis muscle. A narrowing of this branch was present where it passed through the muscular fascia, indicating entrapment (Figure 2). More proximally, fascial bands and vessels caused relative tightness around both the brachialis branch and the LCAN branch. The muscle was atrophic and pale compared with the biceps brachii but responded to electrostimulation. The nerve was released from all entrapment locations.

The patient was clinically re-examined 1 year after surgery and interviewed by telephone 15 years after surgery. The pain had completely disappeared after surgery. However, elbow flexion strength was only slightly recovered and muscle atrophy was still evident. This may be due to delayed diagnosis and treatment, since severe prolonged nerve

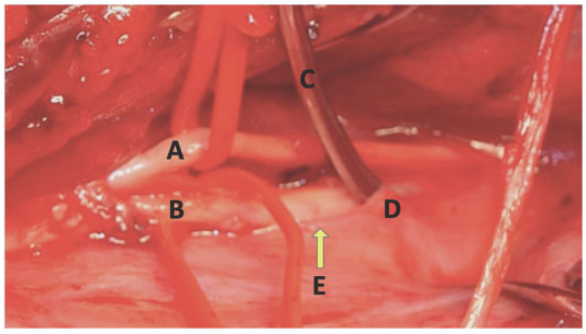

Figure 2. Entrapment of the brachialis branch of the musculocutaneous nerve. (a) The lateral cutaneous antebrachial nerve. (b) The brachialis branch of the musculocutaneous nerve. (c) An instrument lifting the fascia edge of the brachialis muscle off the nerve at the entrapment site. (d) The fascia edge of the brachialis muscle. (e) The yellow arrow shows a red constriction of the nerve at the entrapment site.

compression can cause irreversible muscular fibrosis and weakness (Kodama et al., 2020).

We conclude that isolated entrapment of the brachialis branch of the MCN must be suspected in the presence of unspecific elbow pain and weakness of elbow flexion together with brachialis muscle atrophy and distal prominence of the biceps brachii tendon. This is best seen when the patient flexes the elbow to 90° against resistance with the forearm supinated (Figure 1). Electrophysiological studies confirm the diagnosis. Nerve release may result in resolution of pain, but the brachalis muscle may not recover. Observation with expectation for spontaneous recovery could be considered for a short period but should not cause excessive delay before surgical exploration.

Declaration of conflicting interests The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Informed consent Written informed consent was obtained from the patient for anonymized information to be published in this article.

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doi: 10.1177/17531934211008795 available online at http://jhs.sagepub.com

Extended indications for retrograde intramedullary cannulated headless screws for proximal phalanx fractures

Dear Editor,

There has been increasing enthusiasm for treating metacarpal and phalangeal fractures employing the retrograde intramedullary cannulated headless screw (RICHS) technique with promising results (Boulton et al., 2010; Del Piñal et al., 2015; Ruchelsman et al., 2014). However, its indications have been restricted to axial-stable (transverse or short oblique) fracture patterns without articular involvement. The aim of the current report is to review our results with extended indications for the RICHS technique.

A retrospective evaluation of clinical and radiographic data between 2015 and 2020 identified 21 consecutive patients diagnosed with 17 proximal phalanx fractures with non-axial-stable patterns and four with articular or juxta-epiphyseal extension (Figure 1) that were treated using the limited-open, RICHS technique. There were nine men and 12 women, of mean age 38 years (range 18–62).

Criteria for surgical treatment were displaced intra-articular fractures and extra-articular fractures with more than 10° of angulation, more than 2 mm of shortening or with rotational deformity. There were 17 non-axial-stable fractures (10 spiral, six long oblique, one comminuted), four articular (two comminuted with metacarpophalangeal (MCP) joint involvement, and two short oblique juxta-epiphyseal at the proximal interphalangeal (PIP) joint). All fractures were closed with no neurovascular or soft tissue injuries.