


Importance of the ultrasound in cubital tunnel syndrome

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Abstract We report a case of a patient with cubital tunnel syndrome caused by presence of a non-thrombotic vein in the cubital tunnel. Cubital tunnel syndrome is a symptom complex caused by the compression of the ulnar nerve at the elbow. It is the second most common peripheral compression neuropathy. Ulnar compression at the elbow can be clinically diagnosed; however, an electroneurographic examination is necessary to confirm the diagnosis. Sonography and MRI may be required to locate nerve lesions, but primarily to evaluate the causes of compression. We decided to report this case because it shows the importance of the ultrasound in the diagnosis of the cause of compressions, including those rare and unexpected.

Keywords Cubital tunnel syndrome · Anatomic variation · Veins · Ultrasonography

Introduction

Cubital tunnel syndrome is a symptom complex caused by the compression of the ulnar nerve at the elbow (Fig. 1), with sensory and motor deficiencies or dysesthesia. It is the second most common peripheral compression neuropathy [2, 8].

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From a clinical point of view, cubital tunnel syndrome presents with medial elbow pain and a spectrum of symptoms ranging from sensory symptoms in the fourth and fifth fingers to weakness of the intrinsic hand muscles [8].

Depending on the etiology, the syndrome can be categorized into primary or idiopathic and secondary or symptomatic. The primary form includes abnormalities such as luxation of the ulnar nerve, presence of anconeus epitrochlearis muscle, or hypertrophy/dislocation of the medial head of the triceps muscle. Anatomic abnormalities generally do not lead to clinical manifestations, but are predisposing factors. In many cases, the secondary forms follow a previous injury of the elbow joint such as distal humerus fractures, osteoarthritic changes with exostoses, unstable elbow joint, rheumatoid arthritis with proliferative synovium, and heterotopic ossifications. Other less common causes include osteochondromatosis, veins or venous plexus, and primary soft tissue lesions such as lipomas and ganglia [2].

Case report

A 45-year-old paraplegic male patient underwent ultrasonography of the elbow with diagnosis of cubital tunnel syndrome. The patient became paraplegic in 2012 after a spinal lesion caused by a car accident. Six months before the initial US examination, the patient slowly developed pain in the medial side of the right elbow, and sensory loss in the fourth and fifth fingers of the right hand. Electromyography showed a sensory disturbance of the ulnar nerve with compression in the cubital tunnel. The ultrasound showed a normal appearance of the anterior fascicles, a hypoechoic posterior part of the ulnar nerve, and

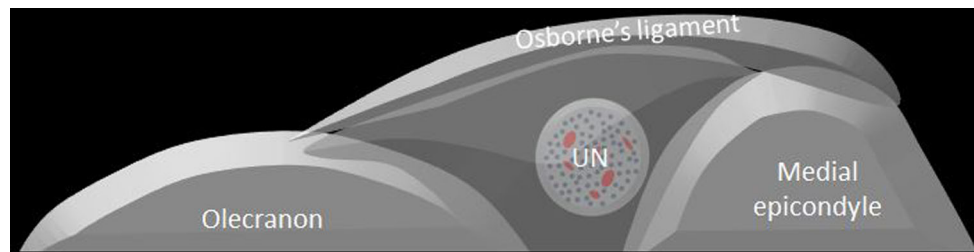


Fig. 1 The ulnar nerve in the elbow courses through the condylar groove, which is a space delimited by the olecranon and the medial epicondyle, and bridged by the cubital tunnel retinaculum (Osborne's

ligament) in a subcutaneous location. The scheme represents the right elbow from the same perspective from which it is observed in Fig. 2 and movie 1

presence of a vein in the cubital tunnel (Fig. 2) without thrombosis (movie 1). The diameter of the nerve was found to be 20 mm in the site of the compression, and according to Husarik and colleagues [6] this diameter represents the upper limit between normal and enlarged nerve. The diameter of the vein was about 7 mm. The presence of an accessory vein associated with an excessive use of the upper limbs—caused by the use of the wheelchair—was considered to be the cause of the cubital tunnel syndrome. A comparative examination revealed no abnormalities at the left elbow. This can be explained, in a right-handed man, by an asymmetric and predominant use of the right upper limb when rolling the wheelchair. No therapy was proposed but rather a clinical and instrumental follow-up.

Discussion

The ulnar nerve in the elbow courses through the condylar groove, which is a space delimited by the olecranon and the medial epicondyle, and bridged by the cubital tunnel retinaculum (Osborne's ligament) in a subcutaneous location [2, 3, 7, 8]. Normally, only the ulnar nerve is located in the cubital tunnel, while the nearby vascular structures—such as the superior collateral ulnar artery and veins—are located outside the cubital tunnel. The presence of a venous structure in the cubital tunnel can be either caused by an anomalous course of a vein or by the presence of an accessory branch located along the nerve. These two

possible anatomic variants are, in our opinion, likely to be present in asymptomatic patients since this anatomic site is very prone to anatomic variations [6]. The development of a cubital tunnel syndrome is probably related to additional factors such as thrombosis [1] or, as in our case, overuse. To our knowledge, only Abe and Saito [1] described another case of nerve compression of venous origin. The embryological basis of venous variations at the elbow is not well documented in the literature [7].

Ulnar compression at the elbow can be clinically diagnosed; however, an electroneurographic examination is necessary to confirm the diagnosis and to exclude the possibility of compression in other anatomic sites [2, 8, 9].

Sonography and MRI may be required to locate nerve lesions, but primarily to evaluate the causes of compression and help with the therapy. The main sonographic sign of cubital tunnel syndrome is a hypoechoic swelling of the ulnar nerve with loss of the fascicular pattern [4, 8, 9]. Physiologic compression of the nerve at the level of the cubital tunnel occurs during elbow flexion and increased signal intensity on fluid-sensitive magnetic resonance imaging (MRI) was reported in asymptomatic subjects [6]. Furthermore a moderate hypoechoic swelling of the nerve is frequently seen in asymptomatic subjects on ultrasound as well. For these reasons, neuropathy may be overestimated on both ultrasound and MRI.

In conclusion, cubital tunnel syndrome is often easily diagnosed both clinically and with an electroneurographic examination, but it may necessitate the use of imaging to

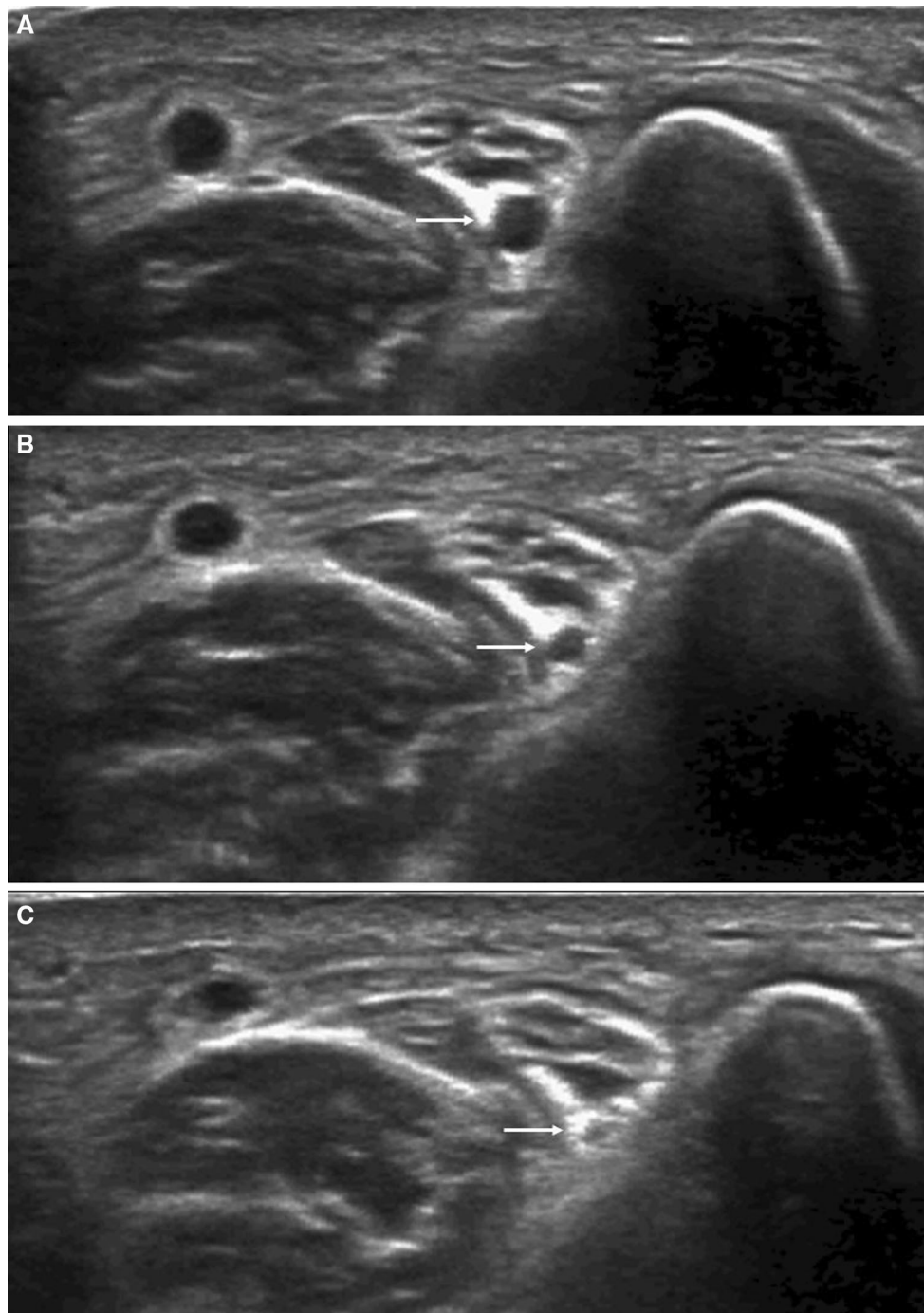


Fig. 2 Axial sonogram of the posterior face of the right elbow at the level of the cubital tunnel. The image shows a normal appearance of the anterior fascicles and a hypoechoic posterior part of the nerve, and

detect the cause. The case illustrated shows the importance of ultrasound in the diagnosis of the cause of compressions, including those that are rare and unexpected [1, 5].

Compliance with ethical standards

Conflict of interest None to disclose.

the presence in the cubital tunnel of a vein (*arrow*) compressible by the pressure of the probe (**a–c**)

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