Lesions of the ulnar nerve are the most common causes of paralysis of a peripheral nerve. The cubital tunnel (or sulcus ulnaris) syndrome is the second most frequent compression syndrome of the upper extremities after the carpal tunnel syndrome.

We report our findings in a patient who suffered from cubital tunnel syndrome and underwent subcutaneous anterior transposition, a surgical procedure in which the ulnar nerve is removed from the osseous fibrotic canal and replaced anteriorly in the subcutaneous space on the flexion side of the elbow.

Nine years after surgery, the patient developed a recurrent entrapment syndrome due to a pair of ganglion cysts located in the cubital area. These cysts could be not be diagnosed by routine electrophysiologic methods but were successfully identified by ultrasonography.

**CASE REPORT**

A 57 year old farmer was referred to our department to determine the cause of recurrent complaints involving the ulnar nerve. Nine years earlier he had undergone subcutaneous anterior transposition of his left ulnar nerve because of a cubital tunnel syndrome, which was caused by chronic fibrosis within the cubital tunnel, probably related to his occupation. Surgery was successful, and the patient returned to work without complaints after the intervention.

The patient’s history revealed that pain and numbness in the fourth and fifth fingers had reappeared a few months prior to his referral to our hospital. Clinical examination showed a positive Tinel sign at the proximal third of the lower right arm, with no other conspicuous findings except substantial obesity. (The Tinel sign is a diagnostic sign that is pathognomonic for neuroma formation; it consists of electrical pain that is elicited by repeated percussion of the affected nerve transcutaneously at the site of the lesion.)

A routine nerve conduction study showed a complete conduction block; however, precise localization of the

**ABBREVIATIONS**

MR, Magnetic resonance
leison (i.e., proximal, within, or distal to the operated area) was impossible. Specifically, no compound muscle action potential could be obtained by stimulating the ulnar nerve anywhere between the upper and lower arm, with either surface or needle electrodes, at the hypothenar muscle. Subsequent electromyographic investigation revealed only mild signs of denervation within the hypothenar muscles, with normal muscle activity in the flexor carpi ulnaris muscle.

Because of this unsatisfactory electrophysiologic result, preoperative investigation was extended with a high-resolution sonography using a linear 5–10 MHz broadband array transducer (HDI 3000, Advanced Technology Laboratories, Bothell, WA). The ulnar nerve was identified proximal to the elbow joint, and the correct anatomic position was confirmed by the characteristic echogenic fibrillar echotexture of the nerve. Somewhat distal and ventral to the elbow joint, located between the joint and the nerve, we detected an inhomogeneous mass with a maximum diameter of 2 cm, which had anechoic areas with posterior acoustic enhancement revealing cystic components (Fig. 1A).

Approximately 5 cm distal to this first mass, a second anechoic structure was detected between the nerve and the skin, which had a maximum diameter of 1.7 cm (Fig. 1B). The two cystic lesions were superficial and deep to the ulnar nerve, creating an S-shape course to the nerve. Echogenic structures corresponding to fibrotic tissue were seen around the nerve. The entire cystic-fibrotic lesion was not palpable.

At surgery, the nerve was dissected at the level of the distal third of the humerus. It was found to be surrounded by fibrotic tissue along its entire course into the cubital area. Distal to the medial epicondyle, the nerve had a mediodistally curved course. Both sonographically demonstrated cystic masses were found at the level of the head of the flexor carpi ulnaris muscle. After removal of the masses and the fibrotic tissue, surgery was completed by submuscular transposition of the nerve. Histopathologic investigation of the resected specimen revealed a cyst containing acellular myxoid material in a fibrous capsule and without an epithelial lining. The final histologic diagnosis confirmed the existence of ganglion cysts (Fig. 2).

Figure 1 A, Ventral to the elbow joint the ulnar nerve (arrows) is displaced superficially by a 2 cm, inhomogeneous cystic-fibrotic lesion. B, Approximately 5 cm distal to this first lesion a large cystic lesion causes displacement of the nerve (arrows).
No complications occurred in the postoperative period, and the patient was referred to physiotherapy. After therapy, the patient’s nerve entrapment syndrome improved.

**DISCUSSION**

The lesion site in nerve compression syndromes usually is localized by routine nerve conduction studies. In the case presented here, the ulnar nerve could not be stimulated transcutaneously, as no compound muscle action potentials could be recorded from the hypothenar muscle, although this muscle was mildly affected. Most probably, the patient’s obesity prevented successful stimulation of the ulnar nerve at the upper arm, and the lack of even a vague point of localization of the lesion forced the surgeons to look for another diagnostic tool. The imaging method of choice to localize sites of lesion in nerve entrapment syndromes is MR imaging. However, this tool is not always available; thus, sonography is an alternative modality when MR imaging is unavailable. The resulting findings made further investigations unnecessary and confirmed the indication for surgery.

Peripheral nerves can easily be identified by their characteristic echogenic fibrillar texture and followed throughout their course by sonography. Sonography also is capable of allowing differentiation of solid versus cystic soft tissue masses, and ultrasonographically guided percutaneous aspiration may be considered.

Chiou and colleagues recently described the morphologic changes occurring in the ulnar nerve in patients with cubital tunnel syndrome using high-resolution ultrasonography. In this study, the area of the ulnar nerve in patients with cubital tunnel syndrome was 0.139 cm² ± 0.06 at the epicondyle level, which was significantly greater than on the asymptomatic side (0.069 cm² ± 0.29; P = 0.0002) and also significantly greater than in the control group (0.068 cm² ± 0.29; P < 0.0001). The mean area of the ulnar nerve 5 cm below the epicondyle, at the forearm level, was 0.066 cm² ± 0.023 in patients with cubital tunnel syndrome, which was not significantly greater than on the asymptomatic side (0.057 cm² ± 0.12; P = 0.26) or in the control group (0.062 cm² ± 0.01; P = 0.53). In this patient group the nerve was in its regular anatomic position, and therefore we assume that none of the patients had previously been operated on. Furthermore, all of the symptomatic limbs were proved afterward to have cubital tunnel syndrome by electromyography. In our case the patient had been operated on previously because of cubital tunnel syndrome; therefore the nerve was not in its regular anatomic position and furthermore it was surrounded by fibrotic tissue and displaced by cystic masses, a situation which made electromyographic investigations unsuccessful.

We conclude that in cases of peripheral nerve entrapment syndrome with inconclusive nerve conduction or electromyographic findings, high-resolution sonography can be recommended as the initial imaging method to localize the lesion site.
REFERENCES


