Ultrasonographic tinel sign: two case reports

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ABSTRACT

Peripheral nerve sonography has been regarded as an important tool for evaluating anatomic changes within nerves and muscles. Over the last few years, the role of Ultrasonographic Tinel (UST) sign in diagnostic sensitivity and its relationship with neurophysiologic findings has increased.

Ultrasonographic Tinel sign helps to interpret the ultrasonographic and clinical findings and have proven useful in making a diagnosis.

Keywords: Ultrasonography; Tinel sign; Nerve

INTRODUCTION

It is said that the more ultrasound is used in electrodiagnostic studies, the newer ultrasonographic signs have proven helpful in making a diagnosis[1,2]. Ultrasound is described as a complementary tool to electrophysiological studies in peripheral nerve lesions. It also determines or clarifies supplementary information to physical examination by ultrasonographic palpation and ultrasonographic tinel sign. Ultrasonographic tinel sign (UST) was described as paresthesias, which is produced when the transducer compresses a nerve lesion[3]. We present two cases that demonstrate the usefulness of ultrasound (in particular the UST sign); one guiding a surgical intervention; and the other determining the exact location of an entrapment.

CASE REPORTS

In our first patient, we observed the presence of a UST sign, with focal nerve lesion, regardless of the etiology of nerve damage. Our patient was a 25-year-old woman who presented to our institution 6 months after a piece of broken glass cut her left wrist. There was no motor deficit, but clinical ulnar sensory deficit in the 4th and 5th finger could be depicted.

Neurophysiologic test results were unremarkable. Therefore, a substantial evaluation of the ulnar nerve throughout the whole left upper extremity (starting from the axilla up to the 5th finger) was carried out done by using a linear array probe (7-12 MHz Logiq P5, GE Medical Systems, USA). During the ultrasound examination, she reported an electric shock sensation spreading along the nerve after the probe compressed the nerve, 4 cm distal to the distal wrist crease, just inside the palm of the hand. Ultrasound showed a focal enlargement of the ulnar nerve fascicles, caused by a post-traumatic neuroma on that site (Figure 1). The UST sign provided accurate guidance during the operation for neuroma. The patient underwent surgical exploration, which revealed a neuroma at the same location as revealed with the ultrasound. The excision of the neuroma was performed. The post-operative course was uncomplicated and in the follow-up appointment, six weeks after the procedure, the patient's complaints had been relieved.

Our second patient was a 40-year-old man who had clinical ulnar sensory deficit in the right 4 and 5th finger. There was no motor deficit. Electromyography revealed a mild slowing of ulnar motor conduction velocity, 2 cm above the medial epicondyle. We examined the entire course of the left ulnar nerve from axilla up to the wrist. The left ulnar nerve had a consistent cross sectional area of 8–9 mm^2 at all levels except at inside the flexor carpi ulnaris muscle, where it enlarged to 16 mm^2, approximately 23 mm distal to the olecranon. At this site the patient had dysesthesias and paresthesias when the ultrasound transducer was used to compress the nerve. The right ulnar nerve was 9 mm^2 at the opposite site. In this case the UST sign helped to determine the exact location of compression site (Figure 2). Initially conservative therapy (patient education,

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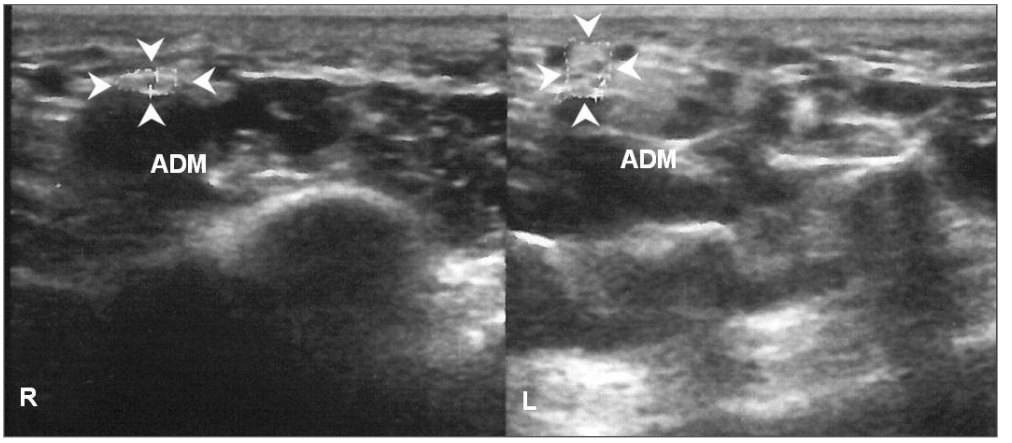

FIGURE 1. Arrowheads indicating the right (R) and left (L) ulnar nerves in hypothenar region of the hand

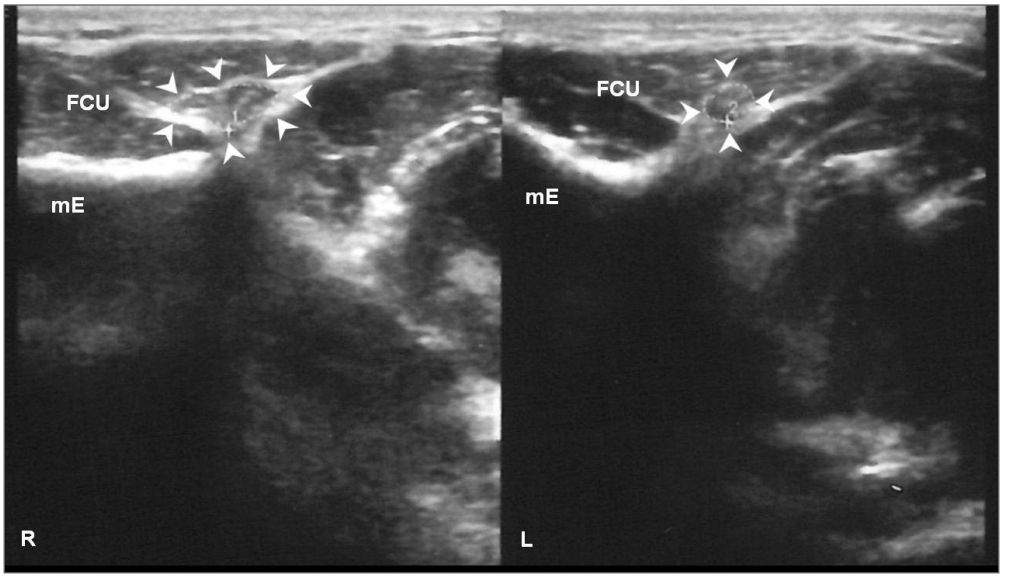

FIGURE 2. Arrowheads indicating the right (R) and left (L) ulnar nerves in flexor carpi ulnaris muscle (FCU)

anterior elbow extension splinting and correction of ergonomics at work) with non-steroidal anti-inflammatory drugs were given and after 6 weeks, at the follow-up appointment, the patient's complaints were improved.

DISCUSSION

High-resolution ultrasonography was defined as a non-invasive, readily applicable imaging modality, capable of depicting real-time static and dynamic morphological information concerning the peripheral nerves and their surrounding tissues[4,5]. It is also mentioned that continuous progress in ultrasonographic technology makes it possible to visualize nerve imaging at the fascicular level, and it provides anatomic information of changes within nerves and muscles[6].

Besides its imaging modalities it gives and verifies additional information during physical examination. Manual palpation is an important part of the physical examination and provides qualitative assessment of soft tissues. Ultrasonographic palpation also confirms the sensitive and painful points that are discovered or missed during a physical examination. Similarly, the ultrasonographic tinel sign also detects the entire nerve

pathway and it may help to locate symptomatic lesions that are not detectable through neurophysiologic tests.

In the early 1900s, the Tinel sign was described as tingling upon palpation of injured or regenerating nerves. In 2009, the UST sign was firstly described as a case report[3]. They defined it similarly to another famous clinical sign, the ultrasonographic Murphy's sign, which refers to pain caused when the ultrasound transducer is pressed along the gallbladder. This sign has been used for years in the diagnosis of cholecystitis[7]. As previously reported[1,3], our case study also highlights the value of an UST sign as a guide for identifying focal nerve lesions. UST sign helps to precisely determine the lesion's location that is not detected during neurophysiologic tests. It can guide the surgical teams to the exact location of the lesion.

In our first case, ultrasonography demonstrated the correct diagnosis and lesion's location. Probably a more detailed physical examination could have produced a diagnosis of neuroma. A physical examination with manual tapping over the nerve (without the ultrasound transducer) would have been helpful. In fact, we performed manual tapping over the nerve trace, but we couldn't locate the lesion. This result is most likely because we only performed manual tapping just around the wrist, not distally, where the neuroma was located. When using manual tapping, one could skip the area of the neuroma and in some cases the diagnosis could be overlooked, like in our patient. Performing ultrasound along the entire nerve pathway could be analyzed in greater detail. Therefore, UST sign could provide additional complementary information.

In our second case, in fact, the exact diagnosis is clear with the electrodiagnosis. With this case we would like to emphasize the corroboration of the electrophysiological findings with ultrasonographic tinel sign. We believed it helped to increase the diagnostic confidence.

In a number of case studies, patients with ulnar nerve entrapment symptoms and normal nerve conduction have been reported. They were diagnosed through the examination of their ulnar nerves with the use of high-resolution ultrasound. The increased cross-sectional area of the ulnar nerve at the elbow helped confirm the diagnosis of ulnar nerve entrapment[8]. We consider that in such cases testing for ultrasonographic tinel sign would also increase the accuracy of the diagnosis. In mild cases, in the absence of anatomic enlargement, detecting UST sign might also be valuable.

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