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Case Report

Post-Traumatic Nodular Thickening of the Ulnar Nerve

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Received: April 17, 2023; **Published:** July 22, 2023

Abstract

Ultrasound of the left hand using a superficial high-frequency probe a focal nodular thickening of the left ulnar nerve next to the cutaneous scar which is hypoechoic heterogeneous in appearance with loss of the honeycomb appearance in relation to its swelling, without color Doppler taking. In the normal state on ultrasound, the nerve is made up of hypoechoic fascicles giving rise to a honeycomb appearance in the transverse plane and banded in the longitudinal plane. Its sonographic appearance resembles that of a tendon, but the sonographic structure of the latter is in fact the opposite, the differentiation of these 2 elements is based on anatomical knowledge but also calls on the dynamic specificity of ultrasound. In fact, muscle contraction maneuvers lead to characteristic tendon mobilization on ultrasound.

Keywords: *Ulnar Nerve; Post Traumatic; Ultrasound*

Introduction

Ultrasound findings of peripheral nerves were first reviewed by Fornage in 1988 [1]. Since then, technological advances like increased frequency and variable sizes of footprints of linear transducers have escalated the use of ultrasound in peripheral nerve pathologies. Exact site, extent and type of involvement, local cause of neuropathy, continuity of nerve and architectural distortion can be identified for accurate diagnosis and planning the management.

Case Presentation

A 41-year-old man who suffered a stabbing attack 3 months ago causes a wound on the dorsal side of the 4th and 5th finger of the left hand which is sutured. The postoperative course marked by a deficit of flexion and extension of the wrist.

Ultrasound of the left hand using a superficial high-frequency probe: Focal nodular thickening of the left ulnar nerve next to the cutaneous scar which is hypoechoic heterogeneous in appearance with loss of the honeycomb appearance in relation to its swelling, without color Doppler taking, measuring 4.6 mm (Figure 1-3) vs 2 mm (upstream breast segment) and extended over 11 mm.

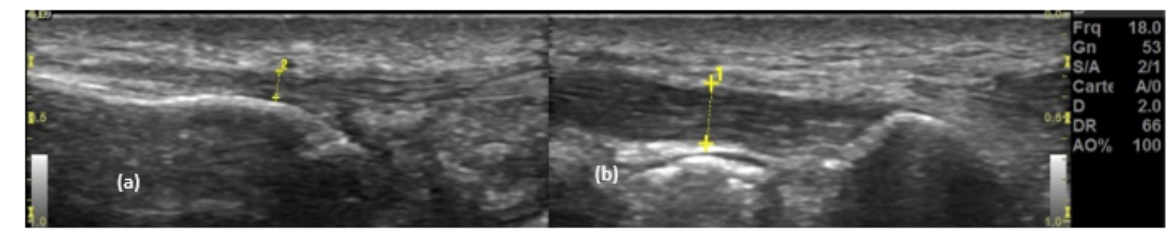

Figure 1: *Longitudinal section passing through the ulnar nerve opposite the cutaneous scar (a) In front of the cutaneous scar (b) opposite the cutaneous scar.*

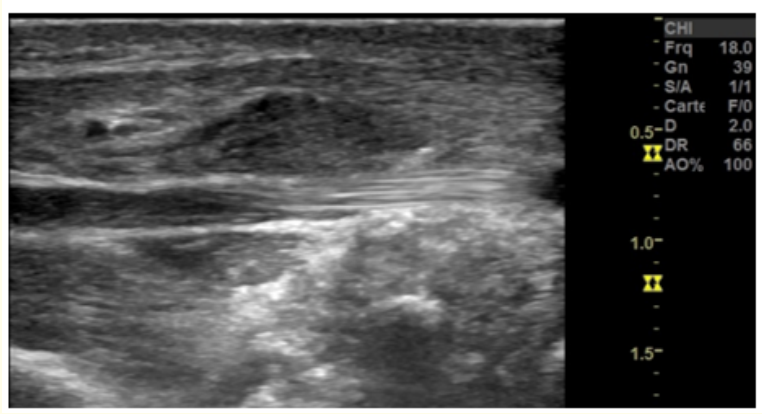

Figure 2: *Loss of honeycomb.*

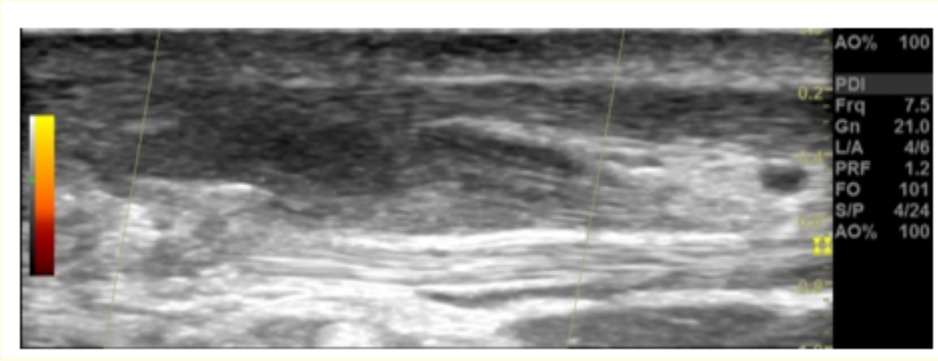

Figure 3: *Absence of color acquisition by color echo-doppler*

Comments

In the normal state on ultrasound, the nerve is made up of hypoechoic fascicles giving rise to a honeycomb appearance in the transverse plane and banded in the longitudinal plane. These fascicles are included in a more echogenic perimeter and all the fascicles are surrounded by the hyperechoic epineurium (Figure 4) [2].

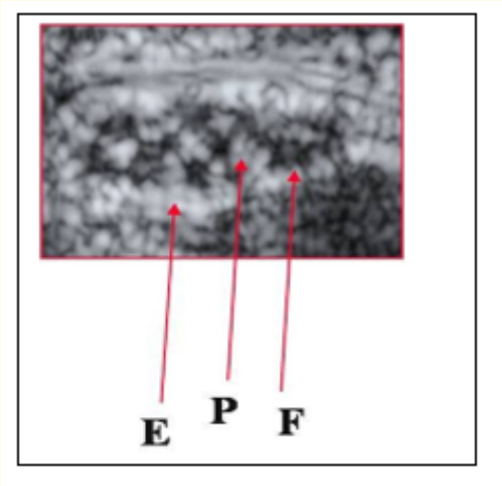

Figure 4: *Ultrasound aspect of the nerve in axial section showing the difference between: the epineurium (E), the perineurium (P), the fasciculus (F).*

Its sonographic appearance resembles that of a tendon, but the sonographic structure of the latter is in fact the opposite (hyperechoic collagen fibers in a hypoechoic environment) [3]; the differentiation of these 2 elements is based on anatomical knowledge but also calls on the dynamic specificity of ultrasound. In fact, muscle contraction maneuvers lead to characteristic tendon mobilization on ultrasound. In addition, the inclination of the probe in the axial plane is at the origin of a hypoechoic remodeling of the tendon (artifact of anisotropy) to which the nerve is practically not sensitive, making it possible to differentiate the 2 structures when they are relatives [4].

Nerve swelling is attributed for some authors to an obstruction of axonal cytoplasmic transport leading to an increase in the nerve caliber upstream of the point of compression and, for others, to an ischemic phenomenon. It induces reflex microvasculature and an inflammatory reaction primarily affecting the epineurium. Venous congestion produces edema and accentuates the compression phenomenon [5]. Direct trauma is also frequent at its level, showing a swollen nerve without deformation but with loss of its fibrillar structure and, sometimes, a blurred aspect of the nerve outline [5].

In certain chronic cases, it is the degeneration of the innervated muscles which will reveal an overlying attack. There is also, and this is the essential semiological element of this pathology, a focal deformation or a reduction in the caliber of the nerve next to the point of compression.

Then in the chronic phase, degenerative phenomena induced by fibrosis are the cause of a reduction in caliber with, on ultrasound, disappearance of the fibrillar character and development of a hyperechoic appearance [2,4]. In MRI, only the reduction in caliber attracts attention. The diagnosis is therefore much more difficult at this stage and it is often the detection of distal muscle degeneration which is the most revealing semiological element with the development of muscle hypotrophy in T2 hypersignal on MRI and hyperechoic on ultrasound.

Conclusion

Patients presenting with symptoms of ulnar nerve palsy have been conventionally diagnosed using clinical and electrodiagnostic findings. Use of high-resolution ultrasound will usher in a new era of multimodality approach in the diagnosis and treatment of nerve pathologies. It allows direct visualisation of the nerve with precise anatomical details and points towards the aetio-pathogenesis of the palsy, facilitating better clinical decision making and patient management.

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Volume 6 Issue 8 August 2023