

Sonography findings in tears of the extensor pollicis longus tendon and correlation with CT, MRI and surgical findings

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Abstract

We present our experience in the diagnosis of extensor pollicis longus tendon tears using different imaging methods. In the past 2 years, 12 patients (7 males, 5 females) with extension deficit of distal phalanx of thumb were diagnosed with extensor pollicis longus tendon (EPL) rupture by means of different imaging methods. The ultrasound pattern consisted of a gap between tendon stumps occupied by a continuous (eight cases) or discontinuous (four cases) attenuated hypoechoic string. In nine cases, the tendon ends were identified as a thickened stump-like structure. In the other three cases, tendon stumps were attenuated and mixed with atrophic muscle or wrist subcutaneous fat. All ultrasound findings were confirmed by CT, MR and/or surgical findings.

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1. Introduction

The extensor pollicis longus (EPL) muscle arises in the mid-third of the dorsal aspect of the ulna and interosseous membrane, deep and medial to the extensor pollicis brevis and below the abductor pollicis longus. It then follows an oblique course, entering the wrist through the third compartment, medial to or over Lister's tubercle on the dorsal aspect of the radius. Lister's tubercle serves as a pulley around which the EPL changes direction to transmit its force to the thumb [1]. In the carpus, it crosses over the extensor carpi radialis tendons, forming the cubital limits of the anatomic snuffbox and, finally, it passes through the dorsum of the thumbs to reach its insertion site at the base of the distal phalanx [2].

The extensor pollicis longus tendon, like other extensor tendons, is a highly vulnerable structure due to its superficial location at the dorsum of forearm and wrist. It can rupture after wrist fracture from impingement by sharp bone fragments or orthopaedic devices as well as after stab wounds. Spontaneous ruptures have also been reported in patients with rheumatic diseases, local or systemic steroid administration or sports/work-related repetitive stress [3–4].

Tearing of the tendon produces loss of thumb extension and an inability to grip with the other fingers. This relative simplicity of the clinical diagnosis may explain the lack of clinical reports on the detection of this injury by imaging methods [5]. Most papers on tendon tearing are orthopaedic and treatment-related [6–7]. When the diagnosis is complicated by associated conditions, e.g., fracture or rheumatism, imaging methods are useful to localize the rupture and measure the size of the gap [5]. There have been reports of function deficit of the tendon due to immobilization with orthopaedic devices or fibrosis around the tendon. In these cases, indication for surgery can be rejected by demonstration of anatomic integrity, and EPL function can be recovered by removal of the device or physiotherapy. When clinically significant EPL rupture is demonstrated, it is usually treated by extensor indicis proprius tendon transfer [8].

The aim of this paper was to present our experience in diagnosing this condition by ultrasound, correlating findings with CT, MR and surgical diagnoses.

2. Patients and methods

In this prospective 2-year study, 12 consecutive patients (7 men and 5 women) with extension deficit of distal phalanx of the thumb underwent ultrasound examination by the first author, a radiologist with >10 years experience in musculoskeletal

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Table 1
Patient characteristics, origin of EPL tear and correlation of ultrasound diagnoses with CT, MRI and/or surgery findings

Case	Sex	Age	Hand	Type	Cause	Ultrasound correlated with
1	F	52	R	III	Distal radial fracture with Kirschner-wire fixation	CT, surgery
2	F	57	R	II	Distal radial fracture with Kirschner-wire fixation	MR, surgery
3	F	55	R	II	Rheumatoid arthritis	MR
4	M	51	L	III	Spontaneous	MR, surgery
5	M	41	L	III	After surgery for wrist ganglion	MR, surgery
6	F	51	L	III	Rheumatoid arthritis	MR
7	M	38	R	III	Spontaneous	MR, surgery
8	M	55	L	II	Distal radial fracture with Kirschner-wire fixation	MR
9	M	37	R	III	Spontaneous	MR
10	M	54	R	III	Spontaneous	MR, surgery
11	F	72	L	III	Distal radial fracture with Kirschner-wire fixation	MR, surgery
12	M	53	L	III	Spontaneous	MR

ultrasound. MR (11) or CT (1) was performed within 10 days; the CT examination was for a patient too obese to be placed in the MR scanner. The diagnosis was confirmed intraoperatively in the seven patients who underwent surgery, consisting of the transfer of extensor indicis proprius to the distal stump of the EPL.

Characteristics of the patients are listed in Table 1. Tendon injuries were classified as follows [9]:

1. Type I. Partial rupture. Identified by a focally enlarged tendon with focal areas of fibre rupture and reparative processes.
2. Type II. Severe rupture with attenuated tendon and some fibres remaining continuous.
3. Type III. Complete rupture with a gap and retraction of tendon stumps.

There was a mean delay of 60 days (range, 8–150 days) between injury and ultrasound study and a mean delay of 22 days (range, 10–60 days) between ultrasound study and surgery.

Ultrasound was performed using a Logic 500 scanner (GE Medical Systems Milwaukee, WI) with linear transducer of 9–11 MHz. The examination usually started with identification of the tendon in an axial plane medial to or above the Lister tubercle. It was then followed in proximal or distal direction from insertion of the muscle in mid-shaft of cubitus to its insertion in distal phalanx of thumb. We changed from axial to sagittal plane to fully observe changes in tendon thickness and tendon stump. The contralateral side was used as control for comparison of tendon thickness and muscle integrity. When normal muscular fibres were partially or totally replaced by echogenic tissue, the muscle was considered to have medium or severe atrophy.

The CT scan was performed using a Hispeed CT (GE Medical Systems). It was performed with 3 mm thickness, pitch factor of 1.5. The MR system used was an MR Max of 0.5 T or an MR Signa of 1.5 T (GE Medical Systems). In the former, the following sequences were obtained with patient in prone position and extended arm, using a quadrature knee coil and 15 × 15 cm field

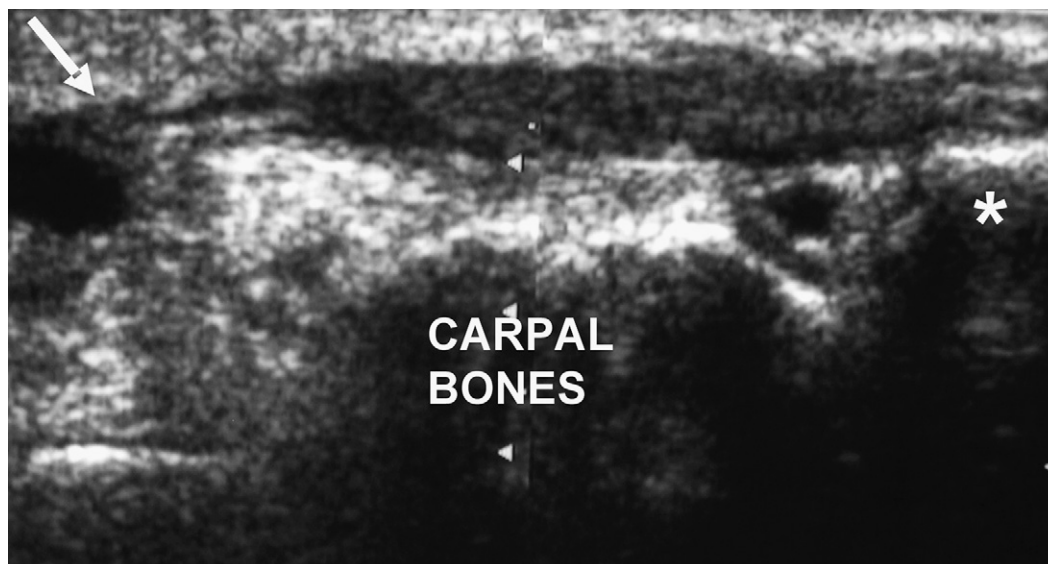


Fig. 1. Oblique sagittal ultrasound scan of the wrist, showing thickened distal tendon over the carpus and the first metacarpal (*) and tapering of hypoechoic string until its disappearance (arrow).

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