

Anomalous muscles within the first dorsal extensor compartment of the wrist

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Abstract A 73-year-old woman presented with a 12-month history of a tender first dorsal extensor compartment of her right wrist along with swelling which extended proximally. Caring for her grandchildren exacerbated her pain, and rest relieved it. Over a 2-month period, two injections and splint immobilization failed to provide pain relief and swelling reduction. An ultrasound showed anomalous muscles within the first dorsal extensor compartment. Surgical release of the first compartment showed the abductor pollicis longus and extensor pollicis brevis tendons flanked by muscles within an inflamed sheath. Releasing the compartment resulted in complete pain relief. Anatomic variations within the first dorsal extensor compartment have been reported, but there has been no report on double anomalous muscles within the compartment. The details of the case, utility of ultrasound, and a brief review of the literature are described.

Introduction

deQuervain's disease is stenosing tenosynovitis involving the abductor pollicis longus (APL) and extensor pollicis brevis (EPB) tendons within the first dorsal extensor compartment of the wrist [5]. The swollen tendons and retinaculum are painful. In 1930, Finkelstein first reported on an anatomical variation within this compartment [6]; since then, several case reports have been published regarding the anomalous

composition of musculature and tendons of the first dorsal extensor compartment [1, 3, 4, 6–8]. We report a case of APL and EPB tendons flanked by muscles within the same osteoligamentous tunnel (without a septum), which was initially identified by ultrasound.

Case report

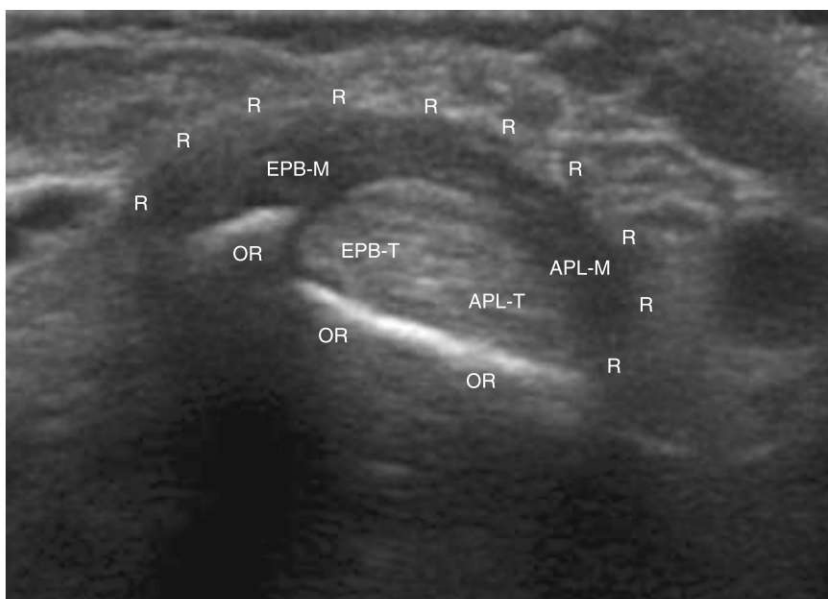
A 73-year-old, right-hand-dominant homemaker complained of pain and swelling over the first dorsal extensor compartment of her right wrist of 1 year's duration. The exertional-related pain was initially episodic and mild with a maximum pain score of 3/10, but eventually, it became more frequent and severe with a maximum score of 10/10. Her swelling remained relatively constant. On physical exam, she had mild fullness of the dorsoradial aspect of her right wrist, which extended proximally into the forearm. The area over the first compartment was tender to palpation, soft, and without crepitus. Eichhoff maneuver and Finkelstein's test were both negative. The patient was given an injection in the first dorsal extensor compartment—2 mL of local infiltration anesthesia and steroid (1:1 mixture of 1 % lidocaine and Kenalog 40 mg/mL). She returned to the office 1 month later with no improvement in pain or swelling. Thus, she was given another injection and also placed in a thumb spica splint. The patient returned to the office 2 weeks later with full compliance of the splint but without improvement in pain or swelling.

Ultrasound (SonoSite M-Turbo Ultrasound Machine, FujiFilm Bothell, Washington) was utilized to evaluate this persistently painful and swollen area. The linear transducer was set to variable frequency, 13–6 MHz, in mode B. The ultrasound revealed a hyper-echoic structure—the tendons, surrounded by a thick hypo-

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Fig. 1 Cross-sectional ultrasound image of the first dorsal compartment showing the hyper-echoic APL and EPB tendons (*APL-T* and *EPB-T*) surrounded by hypo-echoic muscles (*APL-M* and *EPB-M*) surrounded by the retinaculum (*R*). The hyper-echoic line is the osseous ridge (*OR*) of the distal radius

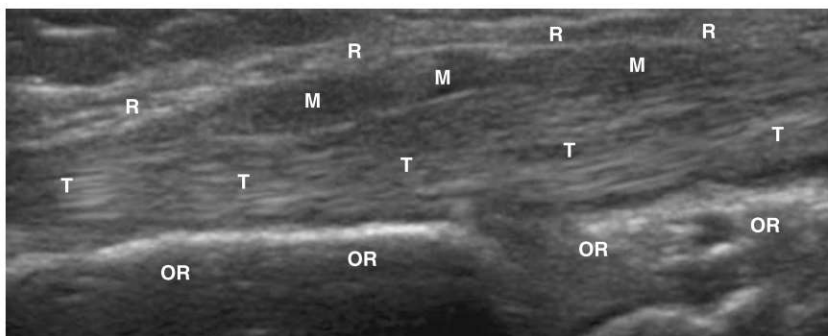


echoic structure extending proximally into the forearm—thought to be anomalous muscles within the first dorsal extensor compartment (Figs. 1 and 2). Deeper to this soft tissue mass was a hyper-echoic line consistent with the osseous ridge of the distal radius. These findings were discussed with the patient, and since conservative measures failed, she agreed to have surgery.

During surgery, a longitudinal incision was made, centered over of the dorsoradial swelling. Blunt dissection was used to locate the radial sensory nerve, which was protected. Dissection was carried down to the level of the extensor retinaculum of the first dorsal extensor compartment, and a 15-blade scalpel was used to incise it in line with the tendons. Upon release of the extensor retinaculum, hypertrophic muscles bulged out of the compartment (Fig. 3). These muscles were identified

as the abductor pollicis longus and extensor pollicis brevis. The extensor retinaculum was further released proximally and distally until the muscle bellies were free from compression. The tendons and muscles were of normal color and were not inflamed. However, the muscles appeared hypertrophied. The extensor retinaculum was thickened and inflamed. Additional APL or EPB tendon slips were not present, and the compartment was not septated. Upon ulnar deviation of the wrist, the muscle bellies slid further into the released compartment, and during radial deviation, the distal extent still remained within the compartment. The wound was irrigated and closed with interrupted 4–0 nylon sutures, leaving the retinaculum open. On the first postoperative day visit, the patient reported complete resolution of the pain. By the second week, she

Fig. 2 Longitudinal ultrasound image of the first dorsal compartment showing a hyper-echoic tendon (*T*) surrounded by a hypo-echoic muscles (*M*) within the hyper-echoic retinaculum (*R*) and hyper-echoic osseous ridge (*OR*) of the distal radius



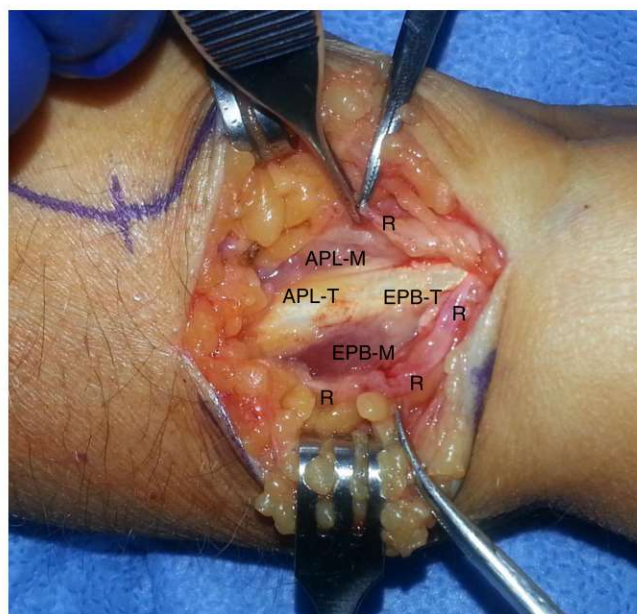


Fig. 3 Intraoperative photo showing hypertrophied but non-inflamed tendons (*APL-T* and *EPB-T*) flanked by their own muscles (*APL-M* and *EPB-M*). The extensor retinaculum (*cpb*) of the first dorsal extensor compartment is thickened and inflamed

had resumed normal activities. At the 1-year follow-up, there was no recurrence of symptoms.

Discussion

The muscle belly of APL or EPB within the first dorsal extensor compartment was reported by one of us in two separate cases [8]. Other cases of muscle within this compartment have not been reported. This condition is similar to extensor indicis proprius and extensor digiti minimi proprius syndromes, in which muscle hypertrophy within a tight extensor compartment of the wrist causes pain [9].

The presence of pain uncontrolled by injections and splinting, a negative Finkelstein's test, and especially the persistent dorsoradial swelling that extends proximally from the wrist into the forearm may suggest an anomalous muscle within the first dorsal extensor compartment. In such cases, the compartment should be evaluated with ultrasound, which was depicted with high accuracy, anatomic variations, and subcompartmentalization within this compartment [2, 10]. Given the anomalous muscles and lack of tenosynovitis, the steroid and anesthetic injection

were set to fail. Surgical release of the extensor retinaculum of the first dorsal extensor compartment with the presence of anomalous musculature provides successful treatment without recurrence.

Compliance with ethics requirements Statement of human and animal rights

This article does not contain any studies with human or animal subjects.

Conflict of interest Christian J. Zaino, Joshua T. Mitgang, Mohini Rawat and Mukund R. Patel declare that they have no conflict of interest.

Statement of informed consent Informed consent was obtained from the patient regarding the photography and material included in this case report.

Disclaimers None of the authors, or their immediate family members, have received royalties from any of the equipment discussed herein.

Grants None

References

1. Abe Y, Tsue K, Nagai E, et al. Extensor pollicis longus tenosynovitis mimicking de Quervain's disease because of its course through the first extensor compartment: a report of 2 cases. *J Hand Surg Am*. 2004;29(2):225–9.
2. Choi SJ, Ahn JH, Lee YJ, et al. de Quervain disease: US identification of anatomic variations in the first extensor compartment with an emphasis on subcompartmentalization. *Radiology*. 2011;260(2):480–6.
3. Dhuria R, Mehta V, Suri RK, et al. Anomalous composition of musculature of the first dorsal fibro-osseous compartment of the wrist. *Singap Med J*. 2012;53(6):e133–5.
4. Gonzalez MH, Sohlberg R, Brown A, et al. The first dorsal extensor compartment: an anatomic study. *J Hand Surg Am*. 1995;20(4):657–60.
5. Ilyas AM, Ast M, Schaffner AA, et al. de Quervain tenosynovitis of the wrist. *J Am Acad Orthop Surg*. 2007;15(12):757–64.
6. Jackson WT, Viegas SF, Coon TM, et al. Anatomical variations in the first extensor compartment of the wrist. A clinical and anatomical study. *J Bone Joint Surg Am*. 1986;68(6):923–6.
7. Motoura H, Shiozaki K, Kawasaki K. Anatomical variations in the tendon sheath of the first compartment. *Anat Sci Int*. 2010;85(3):145–51.
8. Patel MR, Desai SS. Anomalous muscles of the first dorsal compartment of the wrist. *J Hand Surg Am*. 1988;13(6):829–31.
9. Patel MR, Moradia VJ, Bassini L, et al. Extensor indicis proprius syndrome: a case report. *J Hand Surg Am*. 1996;21(5):914–5.
10. Rousset P, Vuillemin-Bodaghi V, Laredo JD, et al. Anatomic variations in the first extensor compartment of the wrist: accuracy of US. *Radiology*. 2010;257(2):427–33.