Accessory extensor pollicis longus tendon in emergency surgery

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Abstract

Background: A true accessory extensor tendon of the thumb seems to be rare. We found a variation of the accessory extensor pollicis longus (EPL) tendon while performing an emergency surgical procedure. Identification of this accessory tendon during emergency surgery has not been previously reported.

Case presentation: A 43-year-old man presented to our hospital after sustaining a work-related injury involving a saw. During the operation, the tendons of the EPL, accessory EPL, and extensor pollicis brevis were severed. The lacerated tendon and tendon sheath were repaired, and the wrist and thumb were positioned in extension. The patient’s postoperative activity returned to normal without the need for a second tendon release operation.

Conclusions: Surgeons should be aware of this anatomic anomaly of the EPL tendon. Presentation of our case increases clinicians’ chances of preoperatively detecting this anomaly, which can improve surgical outcomes.

Keywords

Accessory extensor pollicis longus, variations, preoperative detection, tendon laceration, tendon release, emergency surgery

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Background

The extensor pollicis longus (EPL) originates from the middle third of the posterior ulna (below the abductor pollicis longus) and adjacent interosseous membrane. The EPL tendon inserts onto the base of the distal phalanx of the thumb via Lister’s tubercle. In a cadaveric study, tendon bony insertions were anatomically and histologically detailed for use as reference landmarks during digital surgery and invasive procedures.1 The EPL receives its blood supply from the anterior and posterior interosseous arteries. It is innervated by the posterior interosseous nerve, which is a continuation of a deep branch of the radial nerve (root values C7 and C8). Together with the extensor pollicis brevis, the EPL allows for extension of the thumb in the first metacarpophalangeal joint.2,3 Variations of the extensor tendons in the hand are common.4 However, a true accessory extensor tendon of the thumb—with its own origin, insertion, and separate muscle belly—seems to be rare. These types of anomalies can be observed in cadaveric anatomy studies, imaging examinations, and elective surgeries. Knowledge of variations of tendons in the hand is important for surgeons. Clinicians and surgeons who encounter this condition must be aware of the variant forms of this anatomy and morphology. We herein report the first encounter of an anatomical variation of the accessory EPL tendon during an emergency surgical procedure.

Case presentation

A 43-year-old man presented to our hospital after sustaining a work-related injury involving a saw. His left thumb was unable to actively extend, but the rest of his fingers and both wrists were able to function normally. No obvious numbness was present at the fingertips or thumb web. The patient had no family history of cancer or chronic disease. After simple debridement, dressing, and intramuscular injection of tetanus anti-toxin to prevent tetanus, the patient underwent a tendon exploration operation. During the operation, the tendons of the EPL, accessory EPL, and extensor pollicis brevis were severed (Figure 1(a)). The tendons of the EPL and accessory EPL were in the same tendon sheath. A junctura tendinum was not present between these two accessory tendons. The tendons of the EPL and accessory EPL were the same size. Although a full-length exploration was not possible, we pulled the two tendons to each side and explored them with vascular clamps, but no connection was found.

The broken tendon and tendon sheath were repaired, and the wrist and thumb were positioned in extension (Figure 1(b)). The tendon was repaired using a modified Kessler technique with 3-0 Ti-Cron™-coated braided polyester sutures (Covidien/Medtronic, Minneapolis, MN, USA). Pulling on both repaired tendons resulted in extension of the interphalangeal joint of the thumb. The incision was allowed to undergo primary healing.

Postoperatively, the patient was treated with cefuroxime axetil tablets (Glaxo Wellcome Operations, London, UK) for 1 week at a dosage of 0.25 g every 12 hours. He underwent functional exercise under the guidance of a rehabilitation doctor beginning 1 week after surgery and continuous splint fixation beginning 3 weeks after surgery to avoid tendon adhesion. A clinical questionnaire was completed over the telephone and at the clinic. The patient’s postoperative activity returned to normal, and he had not required a second tendon release operation by the 1-year follow-up. During the telephone follow-up, the patient reported that the range of motion of his wrist and fingers on the affected side were almost normal.
Hand extensor anomalies can be observed in cadaveric anatomy studies, imaging examinations, and elective surgeries. A true accessory extensor tendon of thumb can rarely be foreseen and is often neglected. A supernumerary EPL was first described by Wood in the 1860s; because this muscle was also connected to the index finger, it was termed the extensor pollicis et indicis communis. Seven such cases have been found in cadaveric anatomy studies. An additional three cases were found during elective surgeries: one caused dorsal wrist pain, another caused discomfort on the wrist joint after a bowling game, and another caused severe osteoarthritis of the wrist. An incidental case following hand surgery has not been reported in the literature. Our case was identified during an emergency surgical procedure. Thus, detailed preoperative imaging studies such as ultrasound or magnetic resonance imaging were not possible. This variation may be found in certain surgeries in which dissection to the wrist is easily performed, such as right proximal row carpectomy, treatment of scaphoid nonunion, and release of De Quervain’s tenosynovitis. When an anatomical variation is detected, the clinician should identify the origin, trajectory, insertion, relationships, vascularization, innervation, and incidence. Because our operation was performed in the middle of the metacarpal bone, there was no need to expand the incision to explore the origin. In a cadaveric study, tendon bony insertions can be anatomically and histologically examined in detail. They can then be used as reference landmarks during digital surgery and invasive procedures. Variations of a true supernumerary long extensor tendon of the thumb have six subtypes: Type 1a (double EPL tendons traveling through different compartments),

Figure 1. Tendons found during surgery. (a) The tendon of the extensor pollicis longus (EPL), tendon of the accessory EPL, and tendon of the extensor pollicis brevis were all severed. (b) The tendon of the EPL, tendon of the accessory EPL, and tendon of the extensor pollicis brevis were all repaired.
Type 1b (double EPL tendons traveling through the same compartment), Type 1c (tendon attaching onto the distal portion of the original EPL tendon and traveling through different compartments), Type 1d (supernumerary tendon originating immediately proximal to the origin of the extensor indicis proprius (EIP)), Type 1e (extensor pollicis et indicis communis: one attaching to the radial side of the extensor hood of the index finger and the other to the thumb), and Type 1f (extracompartamental two-slip extensor pollicis tendons, with the radial side passing between the first and second compartments and the ulnar side traveling through the extensor retinaculum).

Variations of interconnections between the long extensor tendon to the thumb and neighboring tendons can be divided into four subtypes: Type 2a (extensor pollicis et indicis accessories: interconnections between the EPL and EIP), Type 2b (interconnection between the EPL and extensor digitorum communis tendon of the index finger), Type 2c (interconnections between the EPL and extensor hood of the index finger, with the accessory slip of the EPL tendon from the third compartment), and Type 2d (interconnections between the EPL and extensor hood of the index finger, with the accessory slip of the EPL tendon from the EPL tendon). Our case is consistent with Type 1f. The forearm extensor muscles differentiate into a radial portion, superficial portion, and deep portion. The deep portion forms the EPL and EIP on the ulnar side and the abductor pollicis longus and extensor pollicis brevis on the radial side. This may be one reason for the accessory EPL.11.17

Because the third compartment is relatively spacious, most patients with accessory EPLs are asymptomatic. Therefore, previous cases have been incidentally discovered during autopsy and other elective operations. Physical examination does not allow for a diagnosis of tendon variability. Complete rupture of the EPL may be mistaken for a partial tear because of the presence of the accessory EPL. If the accessory tendon is missed, only one tendon is sutured. This may easily result in weakening of the thumb extension strength, and if the tendon stump remains within the tendon sheath, stenosis and adhesion can develop.18,19 Very few patients have symptoms of pain because of the inflammatory synovitis.20 Knowledge of such anomalies may help surgeons to avoid unwanted and unintentional damage to the accessory tendons during surgical procedures. These tendons have the potential to be used in tendon transfer and repair. In contrast to previous anatomical studies, we did not probe the site of origin in this case. Surgeons should be aware of this anatomic anomaly of the EPL tendon. Our case increases clinicians’ chances of preoperatively detecting this anomaly, which can improve surgical outcomes.

Authors’ contributions
HL designed the study, collected the data, and analyzed the results. JQ, KW, and HY Z drafted the manuscript. All authors have read and approved the final manuscript.

Availability of data and materials
The dataset supporting the conclusions of this article is included with the article.

Declaration of conflicting interest
The authors declare that there is no conflict of interest.

Ethics
Ethical approval was given by the medical ethics committee of the First Affiliated Hospital, College of Medicine, Zhejiang University (reference number 2017(169)). Written informed consent was obtained from the patient for publication of this article and any accompanying images. A copy of the consent form is available for review upon request of the editor of this journal.
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