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A survey of extensor pollicis longus tendon injury at the time of distal radius fractures

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ABSTRACT

Background: The purpose of this study is to investigate the presence or absence, incidence, and degree of extensor pollicis longus (EPL) tendon injury by visual confirmation of the EPL at the time of osteosynthesis for distal radius fractures.
Methods: The subjects were 25 patients (5 males and 20 females; mean age: 56 years) with distal radius fracture that had a dorsal roof fragment. During osteosynthesis using a volar locking plate, the third compartment was exposed in order to determine the EPL injury. The survey items in this study were: incidences of the forms of EPL injury (1: absent, 2: tendon floor fibrillation, and 3: laceration), and the presence or absence of periosteal rupture on the EPL tendon floor. In addition, on the final follow-up, the presence or absence of EPL rupture, the range of wrist motion, grip strength, Visual Analog Scale (VAS) score, Quick Disabilities of the Arm, Shoulder and Hand (Q-DASH) score, and the Mayo wrist score were investigated.
Results: During the operation, EPL injury was classified as: 1) absent (12%), 2) tendon floor fibrillation (52%), or 3) laceration (36%). In the EPL tendon floor, periosteal rupture was observed in all patients. The mean postoperative follow-up period was 8 months (6–12 months) and no EPL rupture was observed in any patient. The wrist range of motion was 71° for flexion, 75° for extension, 84° for pronation, and 85° for supination, and the grip (% compared with the unaffected side) was 79%. The VAS, Q-DASH and Mayo scores were 1, 10 and 93 respectively.
Conclusion: This study showed a high incidence of EPL tendon injury at the time of distal radius fractures (88%). To improve the ambient environment of the damaged tendon may be useful in terms of the prevention of tendon injury.

Introduction

Rupture of the extensor pollicis longus (EPL) is a well-described complication of distal radius fractures. First described by Duplay in 1876 [1], EPL rupture after distal radius fracture has subsequently been reported multiple times [2–9]. Incidence of this complication has variably reported to be from 0.2% to 4.0% [8–11].

Various causes of this complication have been suggested. Since this complication appears to occur more frequently in non-displaced and minimally displaced distal radius fractures [2,4,5,8,11], some authors suggested that ruptures of the extensor pollicis longus can occur after minimally displaced fractures because the attachment of extensor retinaculum to Lister's tubercle remains intact and together with the formation of callus, leads to narrowing of the third compartment [11,12]. This can cause reduction in the blood supply to the tendon, degenerative necrosis, and eventual rupture [5]. Another possibility is iatrogenic damage or attrition on protruding screws. Therefore, Al-Rashid et al. recommended careful drilling and placement of the distal radial screws so that they sit flush on the dorsal cortex to avoid EPL rupture [13].

In recent years, some cases of EPL tendon rupture early after distal radius fractures have been reported [14,15]. Therefore, we formulated a hypothesis that EPL tendon damage occurs at the time of fracture injury, and its cause is a physical factor associated

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with irritation between the EPL tendon and dorsal bone fragment. The purpose of this study is to investigate the presence or absence, incidence, and degree of EPL tendon injury by visual confirmation of the EPL at the time of osteosynthesis for distal radius fractures.

Patients and methods

This study was approved by the medical research ethics committee at our university, and informed consent was obtained from all patients.

Of 48 patients with a distal radius fracture who underwent surgery in our department between March 2015 and February 2016, 25 (5 males and 20 females; mean age, 56.0 years) who showed a dorsal roof fragment on CT images, and could be followed up for 6 months or more after the operation were included as the subjects. Osteosynthesis was performed under brachial plexus block using a volar locking plate in all patients. During this procedure, the third compartment was exposed from the dorsal side. After the presence or absence of EPL injury was determined, the EPL tendon was transferred to the dorsal side of the extensor retinaculum. None of the patients required postoperative splint fixation.

The survey items in this study were: the fracture type according to the AO classification on preoperative plain X-ray images, displacement direction of the distal bone fragment, incidences of the forms of EPL injury (1: absent, 2: tendon floor fibrillation, and 3: laceration) (Fig. 1A–D), and the presence or absence of periosteal rupture of the dorsal bone fragment or fracture line on the EPL tendon floor. In addition, at the time of the final follow-up observation, the presence or absence of EPL rupture, the range of wrist motion, grip strength (%, compared with the unaffected side), Visual Analog Scale (VAS) score, Quick Disabilities of the Arm, Shoulder and Hand (Q-DASH) score, and the Mayo wrist score were investigated.

Results

The fracture type according to the AO classification on preoperative plain X-ray images was A2 in 7 patients, A3 in 1, C1 in 15, and C3 in 2. Concerning the displacement direction of the

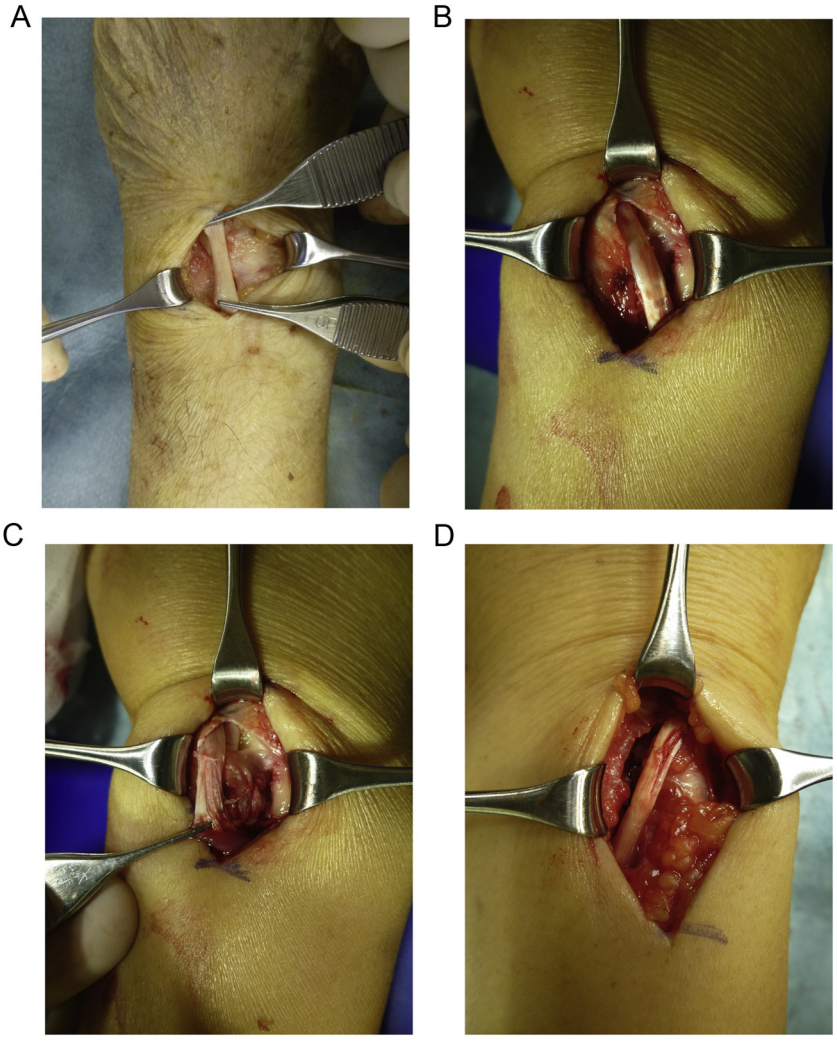

Fig. 1. The extensor retinaculum was resected, and the third compartment was exposed and observed. Intraoperative findings in the EPL.
The EPL injury form was classified as: 1) absent, 2) fibrillation of the extensor tendon floor, or 3) laceration, and investigation was performed.
A: Absent of injury.
B and C: Presence of fibrillation of the extensor tendon floor. When the EPL was observed from the dorsal side, there was no EPL tendon injury (B), but fibrillation of the extensor tendon floor was present (C).
D: There was a longitudinal laceration in the EPL tendon.

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