Case Report

Flexor Tendon Rupture after Distal Radius Fracture Report of 2 Cases

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Flexor tendon rupture after distal radius fracture is very rare. The authors reported two cases. The first case had flexor pollicis longus tendon rupture. The other had flexor pollicis longus and multiple finger flexor tendons rupture. The authors propose two modes of mechanism of tendon rupture after distal radius fracture.

Keywords: *Flexor tendon rupture, Fracture distal radius, Mechanism of rupture*

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Flexor tendon rupture after distal radius fracture is a rare complication. There were some reports about this condition, but there was no report that clarified the different modes of mechanism[1-3]. Because of the clinical difference in these reported cases, the mechanism that causes tendon rupture should be different. By analyzing the previous reports, the authors have found that all the cases can be divided into two groups, based on onset of rupture, severity of initial injury, and presence of attritional cause. The authors propose the two different modes of mechanism that will help to understand the mechanism of rupture.

Case Report

Case 1

A 70-year-old woman presented with inability to flex interphalangeal (IP) joint of her left thumb. Four and a half months earlier, she had a distal radius fracture that was treated by closed reduction and cast immobilization at another hospital. When the cast was removed at the sixth week, it was found that she could not flex IP joint of her left thumb. She also had numbness at volar surface of her ring and middle finger. The physical examination revealed loss of active IP joint flexion of thumb with no hyperextension deformity. The tenodesis effect was absent in various wrist and metacarpophalangeal joint positions. There was no swelling, and passive range of motion was full. The Tinel's test was positive for median nerve at wrist crease, and nerve compression test was positive at 30 seconds.

The radiographs revealed malunion of distal radius with associated ulnar styloid fracture.

Intraoperatively, there was volar angulation of fracture site. The flexor pollicis longus (FPL) tendon was ruptured. The distal stump was coiled into nodule and retracted distally (Fig. 1).

Corrective osteotomy with corticocancellous iliac bone graft was performed through volar approach. Locking T-plate was used to fix the osteotomy site. The carpal tunnel was decompressed. The ring finger flexor digitorum superficialis (FDS) tendon was transferred to the distal stump of FPL tendon. After surgery, the posterior thumb spica slab was applied for three weeks. The slab was replaced by protective thumb spica splint and was used for another three weeks. At three months follow-up, the patient could actively flex IP joint of her thumb for 30 degrees with nearly normal passive range of motion of wrist and fingers.

Case 2

A 71-year-old woman presented with inability to flex her left index finger and IP joint of her left thumb for three months. The IP joint of thumb was in

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hyperextended position. One and a half year earlier, she had sustained a fracture of her distal radius that ended up with malunion. The physical examination revealed deformity of her left wrist with prominent ulnar head. The IP joint of thumb was in hyperextended position and could not be flexed actively. The passive range of motion of IP joint was 30/50 degrees. The normal finger cascade was lost, and the index finger was rested in the extended position. The flexor digitorum profundus (FDP) function was lost in the index and middle finger. The tenodesis test was performed, and it revealed some continuity of flexor tendons. The radiographs demonstrated malunion of distal radius with sharp anterior bony spur at the malunion site (Fig. 2). Intraoperatively, there was sharp anterior bony spur at the malunion site. The FPL and FDP to the index and middle finger were ruptured. The FDS to the index finger was also ruptured. The ruptured tendons were connected by fibrotic tissue (pseudotendon) (Fig. 3). The anterior bony spur and fibrotic tissue were excised. The FDS to the ring finger was transferred to the distal stump of FDP to the index finger. The FDP to the ring and little finger was transferred to FDP to the middle finger in side-to-side manner. The thumb's IP joint was fused with K-wire in ten-degree flexion.

Eight weeks after surgery, the patient could actively do tip pinching of thumb and index finger. At three months follow-up, the patient could actively flex the index finger with nearly full range of motion.

Fig. 1 Operative findings of the first case: the arrow indicates the distal part of ruptured FPL, which was retracted and coiled into nodule

Fig. 2 Wrist radiographs of the second case: there is sharp anterior bony spur at the malunion site (arrow)

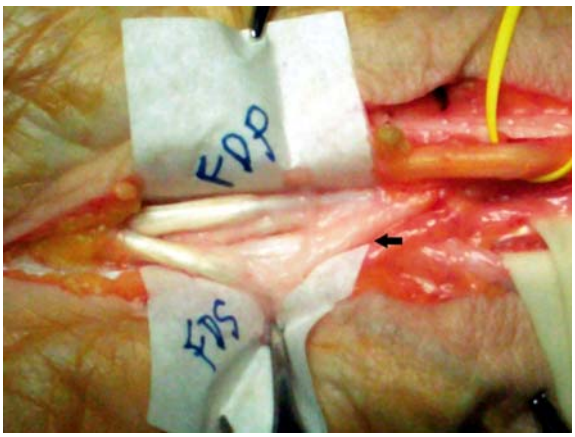

Fig. 3 Operative finding of the second case: the finger flexor tendons were ruptured with connected by fibrotic tissue (pseudotendon) (arrow)

Discussion

Rupture of finger flexor tendons after distal radius fracture is very rare. Most of the cases had rupture of finger flexor tendon associated with anterior bony spur[1-6]. The proposed mechanism was attrition by anterior bony spur or other structures, such as displaced ulnar head[7,8] and hypertrophic change of distal radio-ulnar joint[9]. The other reported cases were rupture of finger flexor tendon that occurred shortly after distal radius fracture[10]. The proposed mechanisms were tendon laceration at the time of injury that ended up with subsequent rupture. By analyzing the previous reports, the authors have found that the patients who had flexor tendon rupture could be divided into two groups by using the following parameters:- timing between injury and subsequent rupture, severity of injury, and presence of attritional causes. The first group was the patients who had tendon rupture that occurred shortly after fracture (range 4 hours to 6 weeks after the injury)[2,3,10,11]. The mechanism of trauma was severe and displacement of

fracture was common. The most likely mechanism is acute partial or total flexor tendon rupture at the time of injury. According to McMaster's study, if more than 50% of tendon substance is torn, the subsequent complete rupture of the tendon tends to occur[12]. In the second group, the timing is quite long (range 8 months to 30 years after the injury)[1,4-8,13,14]. The mechanism observed in this group is attritional rupture.

In the authors' report, the onset of finger flexor tendon rupture in the first case was 6 weeks after the fracture. Intraoperative findings were rupture of FPL. The distal stump was coiled into a nodule and retracted far distally. These findings were likely to result from sudden rupture, because there was no evidence of healing and fibrosis between the ends. This case represented the first mode of mechanism. Contrary to the first case, the onset of finger flexor tendon rupture after distal radius fracture in the second case was quite long. The intraoperative findings were rupture of finger flexor tendon with partial healing. There was fibrotic tissue joining between the ends of ruptured tendon. These findings were likely to have result from chronic attrition with incomplete healing.

Although there were some reports of this rare condition, there was no discussion about the mode of mechanism of flexor tendon rupture after distal radius fracture. The authors propose two modes of mechanism by using the criteria as described.

Competing interests

There are no competing interests in preparation of the present report.

Acknowledgements

The present study was reviewed and approved by the Committee on Human Rights Related to Researches Involving Human Subjects, based on the Declaration of Helsinki.

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รายงานผู้ป่วยกระดูกข้อมือหักที่มีเส้นเอ็นงอนิ้วมือขาดร่วมด้วยจำนวน 2 ราย

สรศักดิ์ ศุภผล, ภัทรวัณย์ วรธนารัตน์, ธนพจน์ จันทร์นุ่ม

ภาวะเส้นเอ็นงอนิ้วมือขาดในผู้ป่วยที่กระดูกข้อมือหักนั้นพบได้น้อยมาก ซึ่งทางคณะผู้นิพนธ์จะรายงานทั้งหมด 2 ราย โดยรายแรกเป็นการขาดของเส้นเอ็นงอนิ้วหัวแม่มือ ส่วนรายที่สองเป็นการขาดของทั้งเส้นเอ็นงอนิ้วหัวแม่มือและเส้นเอ็นงอนิ้วมืออีกหลายเส้น ทางคณะผู้นิพนธ์ได้เสนอกลไกการบาดเจ็บของเส้นเอ็นงอนิ้วมือเป็นสองกลุ่มซึ่งแตกต่างกันในแต่ละราย