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Case Report

Spontaneous extensor tendon rupture due to scaphoid osteophyte: A case report and literature review

Seigo Suganuma^{a,*}, Kaoru Tada^b, Shingo Takagawa^a,
Hidetoshi Yasutake^a, Keito Shimanuki^a, Hiroyuki Tsuchiya^b

^a Department of Orthopaedic Surgery, Ishikawa Prefectural Central Hospital, 2-1 Kuratsuki-higashi, Kanazawa, Ishikawa 920-8530, Japan

^b Department of Orthopaedic Surgery, Kanazawa University Hospital, Kanazawa, Japan

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ABSTRACT

Spontaneous attritional extensor tendon ruptures of the index finger due to carpal bone lesions are uncommon. Here, we report the case of a patient with a spontaneous rupture of the extensor indicis proprius (EIP) and index extensor digitorum communis (EDC2) tendons due to a previously symptomatic dorsal scaphoid osteophyte. A healthy 60-year-old man with right-hand dominance experienced mild pain over the dorsum of his left hand for no particular cause. He was a maker of tatami mats. Nine months later, he noted a sudden snap on the dorsum of his right hand while he was making tatami mats and he became unable to extend his index finger. Plain radiography revealed an osteophyte on the dorsal side of the scaphoid. Computed tomography revealed a bone fragment on the dorsal side between the scaphoid and lunate, which seemed to be derived from the scaphoid osteophyte. He underwent surgery 24 days after the incident. First, the fragment was excised; then tendon transfer was performed. EIP and EDC2 tendons were bundled using a side-to-side suture and connected to the middle extensor digitorum communis tendon using interlacing sutures. Histopathological findings of the resected bone were compatible with osteoarthritic change. Tatami mat making re-

* Corresponding author.

E-mail address: suganumaseigo1978@yahoo.co.jp (S. Suganuma).

quires repeated radioulnar deviation, which could be a risk factor for scaphoid osteophytes. To our knowledge, the present case is the first to report extensor tendon rupture due to a scaphoid osteophyte in a healthy person. Although there is no consensus on the appropriate management of symptomatic scaphoid osteophytes, early intervention at the first sign of tenosynovitis might be necessary to prevent extensor tendon ruptures.

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Introduction

Spontaneous extensor tendon rupture is a common complication in rheumatoid arthritis, osteoarthritis, and distal radius fractures. However, attritional extensor tendon ruptures due to carpal bone lesions are uncommon. Here, we report the case of a patient with spontaneous rupture of the extensor indicis proprius (EIP) and index extensor digitorum communis (EDC2) tendons due to a previously symptomatic dorsal scaphoid osteophyte.

Case report

This report was written with the approval of the institutional review board (No. 1249). Informed consent was obtained from the patient for the publication of this report.

A healthy 60-year-old man with right-hand dominance experienced mild pain over the dorsum of his left hand for no particular cause. The patient was a maker of tatami mats. He had no history of trauma or inflammatory disease. He then presented to a nearby clinic. At that time, there was an osteophyte on the dorsal side of the scaphoid on plain radiography, and he underwent conservative treatment with nonsteroidal anti-inflammatory drugs.

However, 9 months later, he noted a sudden snap on the dorsum of his right hand while making tatami mats and he became unable to extend his index finger. He immediately consulted the clinic and was referred to our institution. On physical examination, he had no tenderness or swelling on the dorsum of his right hand, but he had an extension lag of his index finger. Plain radiography revealed an osteophyte on the dorsal side of the scaphoid. There was no scapholunate dissociation. Computed tomography revealed a bone fragment on the dorsal side between the scaphoid and lunate, which seemed to be derived from the scaphoid osteophyte (Figure 1). Magnetic resonance imaging demonstrated a suspected rupture of the EIP and EDC2 tendons around the bone fragment. There was no intensity change on the scaphoid or lunate, meaning that avascular necrosis was improbable.

He underwent surgery 24 days after the incidence under a brachial plexus block. A straight skin incision was made over the dorsum of his left wrist. Intraoperative findings indicated the rupture of the EIP and EDC2 tendons around the bone fragment, detected with computed tomography (Figure 2), and these tendons adhered to each other. Incision of the joint capsule revealed a bone fragment over the dorsal scaphoid. First, this fragment was excised. Thereafter, tendon transfer was performed. EIP and EDC2 tendons were bundled using a side-to-side suture and connected to the middle extensor digitorum communis tendon using interlacing sutures (Figure 2). The capsule was repaired to smoothen the bed for the sliding tendon. Histopathological findings of the resected bone fragment revealed fibrillation-like changes and chondrocyte cloning with partial cartilaginous plug-like depression, which are compatible with osteoarthritic change. The day after the surgery, a tension-reduced position was achieved by taping the index finger to the dorsal side of the middle finger. Subsequently, immediate active range-of-motion exercise was started. The wrist was fixed in the neutral position with a volar



Figure 1. Left: plain radiography, Right: computed tomography (CT) There was an osteophyte on the dorsal side of the scaphoid on plain radiography (circle). There was no scapholunate dissociation. CT demonstrated a bone fragment on the dorsal side between the scaphoid and lunate (circle), which seemed to be derived from a scaphoid osteophyte.

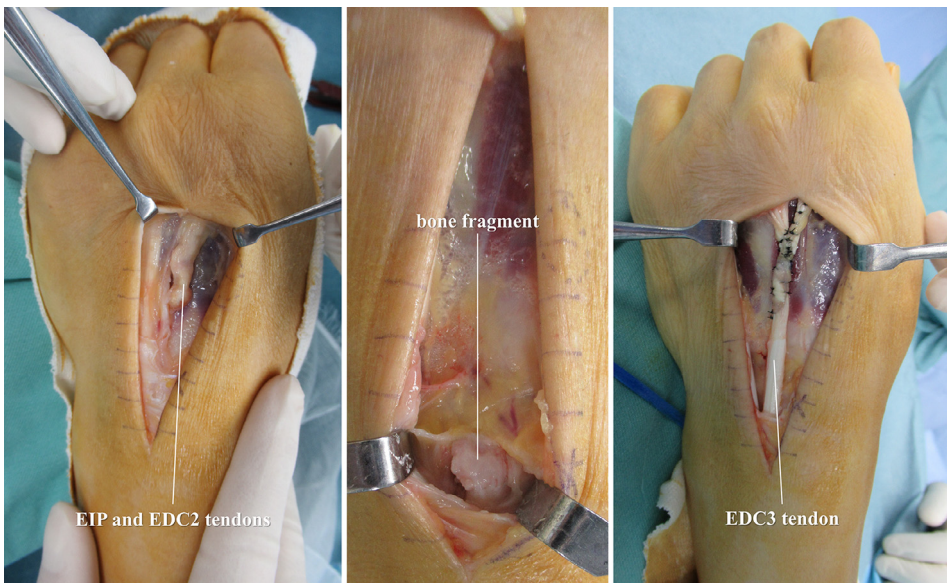


Figure 2. Intraoperative findings indicated the rupture of the extensor indicis proprius (EIP) and index extensor digitorum communis (EDC2) tendons (left) over the bone fragment (middle). First, this fragment was excised. Then, the EIP and EDC2 tendons were bundled using side-to-side suturing and connected to the middle extensor digitorum communis (EDC3) tendon using an interlacing suture (right).

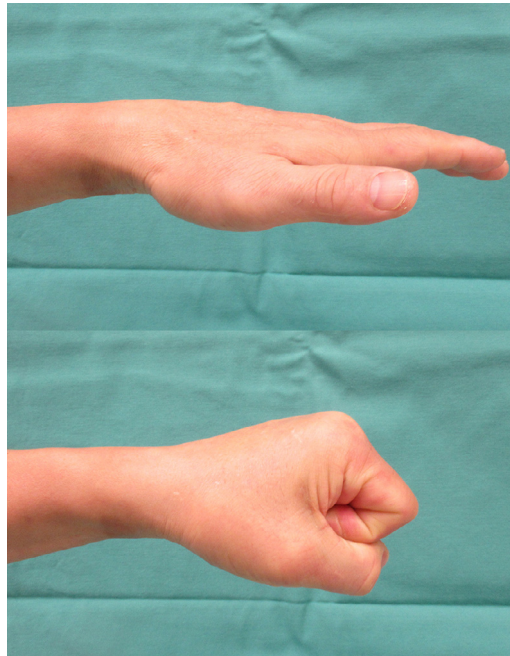


Figure 3. One year postoperatively, the patient had regained full range of motion in the index finger.

Table 1

Attritional extensor tendon ruptures of the index finger due to carpal bone lesions.

Author	Year	Age	Sex	Side	Occupation	Cause	Ruptured tendon
Miki T ¹	1986	84	M	L	Painter	Kienböck	EIP/EDC2
Murase T ⁵	1997	62	M	R	Housewife	Kienböck	EIP/EDC2
Pacha-Vicente D ⁶	2007	U	F	U	U	Kienböck	EIP/EDC2
Williams MR ²	2008	59	M	R	U	Carpal boss	EIP/EDC2
Niwa T ⁷	2010	73	M	L	Farmer	Kienböck	EIP/EDC2
Katayama T ³	2011	55	F	R	U	OL	EIP/EDC2
Hernández-Cortés P ⁸	2012	67	M	L	U	Kienböck	EIP/EDC2
Hernández-Cortés P ⁸	2012	73	M	R	U	Kienböck	EIP/EDC2
Kohyama S ⁴	2015	74	M	L	U	AVNS	EIP

M: Male, F: Female, R: Right, L: Left, U: Unknown, OL: Osteochondroma of the lunate, AVNS: Avascular necrosis of the scaphoid, EIP: extensor indicis proprius, EDC2: index extensor digitorum communis.

plastic splint except during rehabilitation. He was allowed to perform active range of motion exercises without the splint only in the presence of an occupational therapist. The application of the splint was continued for 4 weeks after surgery, and taping was continued for 6 weeks. He returned to work without limitation 3 months after surgery. It has been 1 year since the surgery, and patient has fully regained the range of motion of his index finger (Figure 3). The Disabilities of the Arm, Shoulder, and Hand score was 2.5 points.

Discussion

There have been some reports of spontaneous extensor tendon ruptures due to carpal bone lesions such as Kienböck disease,¹ carpal boss,² osteochondroma,³ and avascular necrosis of the scaphoid.⁴ However, attritional extensor tendon ruptures of the index finger due to these lesions are relatively uncommon, as only nine cases have been reported in the literature as shown in Table 1. Anatomically,

EIP and EDC2 tendons pass along the ulnar side of the scaphoid, leading to the rupture of EIP and EDC2 tendons due to a scaphoid lesion.

The aetiology of the scaphoid osteophyte is unknown. Regarding the scaphoid osteophyte, flexor tendon ruptures are more common. A Mannerfelt lesion is an attritional rupture of the flexor pollicis longus tendon caused by a *volar* scaphoid osteophyte that has eroded through the wrist capsule, commonly seen in rheumatoid arthritis. Such ruptures have been previously described by multiple authors.^{9,10} However, to our knowledge, the present case is the first report of extensor tendon rupture due to a *dorsal* scaphoid osteophyte in a healthy person. In the present case, excessive load on the insertion of the dorsal scapholunate ligament can be hypothesised as a cause of scaphoid osteophyte because the patient had no history of trauma or inflammatory disease. Histopathological findings also supported the diagnosis of osteoarthritis. Tatami mat making requires repeated radioulnar deviation, which could be a risk factor for scaphoid osteophytes.

The patient had felt pain over the dorsum of his hand 9 months before the extensor tendon rupture. Tenosynovitis of the EIP and EDC2 tendons may have already occurred due to friction between the extensor tendons and scaphoid osteophyte. Although there is no consensus on the appropriate management of symptomatic scaphoid osteophytes, we suggest that more detailed examinations, such as magnetic resonance imaging, should have been performed at that time. Attritional extensor tendon ruptures are uncommon complications of the dorsal carpal osteophyte. However, early intervention at the first sign of tenosynovitis might be necessary because extensor tendon ruptures may require more invasive surgery such as tendon transfer and may eventually result in worse function compared to non-ruptured tendons. In the present case, resection of the bone fragment and extensor tendon transfer eventually helped to relieve pain in the patient and improved the extension lag of his index finger.

As this is a case report, there are several limitations to be considered, namely the inability to generalise, danger of over-interpretation, and inability to establish a causal relationship. Further studies should therefore consider the use of larger sample sizes and a prospective design.

Declaration of Competing Interest

None of the authors have any conflict of interest in relation to this work.

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Guidelines

This report was written in line with the STROBE guidelines.

Ethical approval

This report was written with the approval of the institutional review board (No. 1249).

References

1. Miki T, Yamamuro T, Kotoura Y, et al. Rupture of the extensor tendons of the fingers. Report of three unusual cases. *J Bone Joint Surg Am.* 1986;68:610–614.
2. Williams MR, Fullilove SM. Re: a carpal boss leading to extensor tendon ruptures—A case report. *J Hand Surg.* 2008;33B:223.
3. Katayama T, Ono H, Furuta K. Osteochondroma of the lunate with extensor tendons rupture of the index finger: a case report. *Hand Surg.* 2011;16:181–184.
4. Kohyama S, Nishiura Y, Hara Y, Ochiai N. Extensor tendon rupture of the index finger secondary to avascular necrosis of the scaphoid: a case report. *J Orthop Surg (Hong Kong).* 2015;23:120–122.
5. Murase T, Ando Y, Hiroshima K. Extensor tendon rupture due to Kienböck's disease. *J Hand Surg Br.* 1997;22:597–598.
6. Pacha-Vicente D, Sevilla-Tirado J, López-Martínez R, et al. Extensor digiti minimi damage due to longstanding Kienböck's disease. *J Hand Surg Eur Vol.* 2007;32:231.

7. Niwa T, Uchiyama S, Yamazaki H, et al. Closed tendon rupture as a result of Kienböck disease. *Scand J Plast Reconstr Surg Hand Surg*. 2010;44:59–63.
8. Hernández-Cortés P, Pajares-López M, Gómez-Sánchez R, et al. Rupture of extensor tendon secondary to previously undiagnosed Kienböck disease. *J Plast Surg Hand Surg*. 2012;46:291–293.
9. Mannerfelt L, Norman O. Attrition ruptures of flexor tendons in rheumatoid arthritis caused by bony spurs in the carpal tunnel. A clinical and radiological study. *J Bone Joint Surg*. 1969;51B:270–277.
10. Tse R, Friedrich JB, Hentz VR. Use of the transverse carpal ligament for soft tissue reconstruction of a Mannerfelt lesion. *Hand (N Y)*. 2012;7:303–305.