

Peritendinitis of the Fourth Dorsal Compartment Due to Anomalous Extensor Indicis Proprius: A Case Report and Review of Anatomical Variations

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ABSTRACT

Anomalous extensor indicis proprius (EIP) tendons are rare anatomical variations that can cause wrist pain and dysfunction due to tendon compression and inflammation. These variations, though often asymptomatic, are implicated in conditions such as fourth extensor compartment peritendinitis, requiring accurate diagnosis and tailored treatment. We report the case of a 56-year-old man with chronic right wrist pain lasting eight months, primarily aggravated by finger extension. Physical examination revealed a tender nodule on the dorsum of the wrist and pain elicited by the Spinner test, indicating involvement of the fourth dorsal compartment. Magnetic resonance imaging (MRI) showed an anomalous, thickened EIP tendon with peritendinitis. The patient opted for conservative management, including nonsteroidal anti-inflammatory drugs (NSAIDs) and activity modification, which led to complete symptom resolution within two weeks. This case highlights the clinical relevance of EIP tendon anomalies, which can mimic other wrist pathologies. The Spinner test and imaging modalities such as MRI are essential for diagnosis. While conservative treatment is often sufficient, surgical decompression may be necessary in refractory cases. Awareness of these rare anatomical variations is crucial for accurate diagnosis and effective management, ensuring better outcomes for patients with wrist pain.

KEYWORDS

anomalous extensors; wrist pain; extensor indicis proprius

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INTRODUCTION

The extensor indicis (EI) muscle originates from the posterior surface of the ulna and inserts into the index finger (1). Anatomical variations, such as the anomalous extensor indicis proprius (EIP), are rare but can cause hand pain and dysfunction due to compression and inflammation of adjacent tendons, resulting in wrist pain. Although these variants rarely cause symptoms, several published reports have linked them to cases of wrist pain (2).

The evolution of forearm extensor muscles involves three main groups: brachio-antebrachial, antebrachial-manual, and manual. Anatomical variations, such as the *extensor indicis et medii communis* (EIMC) and *extensor digitorum brevis manus* (EDBM), have incidences ranging from 1% to 12%. Although rare, these anomalies can cause dorsum hand pain and are suspected through clinical tests (3).

Here, we report the case of a 56-year-old man with right wrist pain for eight months treated conservatively.

CASE REPORT

A 56-year-old man presented with a history of chronic right wrist pain persisting for eight months. The discomfort was most pronounced during finger extension and had progressively interfered with his daily activities. He described the pain as localized to the dorsum of the wrist, with exacerbation during specific movements.

On physical examination, a palpable and tender nodule was identified on the dorsum of the wrist. The Spinner test, which involves wrist flexion and metacarpophalangeal joint extension of the index finger against resistance, elicited significant pain localized to the fourth dorsal compartment. Besides localized tenderness and pain provoked

by the Spinner test, there was no snapping wrist phenomenon, no palpable crepitus, and no clinical evidence of extensor tendon subluxation. Posterior interosseous nerve entrapment was considered; however, the pain was strictly localized to the dorsal wrist, there were no neurological deficits (including preserved finger and thumb extension strength), and imaging demonstrated tenosynovial inflammation at the fourth compartment – findings that favored a tendinous etiology over neuropathic pain. This finding was consistent with tendon pathology. The patient denied any history of prior surgeries, trauma, or systemic illnesses, with no other relevant medical history.

Magnetic resonance imaging (MRI) of the wrist revealed key diagnostic findings, including fluid effusion within the sheath of the common extensor tendons of the fingers. Additionally, the imaging showed a thickened, anomalous extensor indicis proprius (EIP) tendon with intermediate signal intensity and surrounding fluid, indicative of inflammation. Although the MRI confirmed the anomalous tendon within the fourth dorsal compartment, the distal insertions and potential bifurcations were not fully covered in the protocol, preventing a definitive classification according to Komiyama et al. (1). Therefore, it was reported simply as an anomalous EIP associated with peritendinitis. These findings confirmed the diagnosis of peritendinitis of the fourth extensor compartment, attributed to degeneration of the anomalous EIP tendon (Fig. 1).

Given the absence of significant functional impairment or severe symptoms, the patient opted for conservative management over surgical intervention. He was prescribed a regimen of nonsteroidal anti-inflammatory drugs (NSAIDs) and advised on activity modification to alleviate mechanical stress on the affected tendons. Remarkably, his symptoms resolved completely within two weeks, demonstrating a favorable response to conservative treatment.

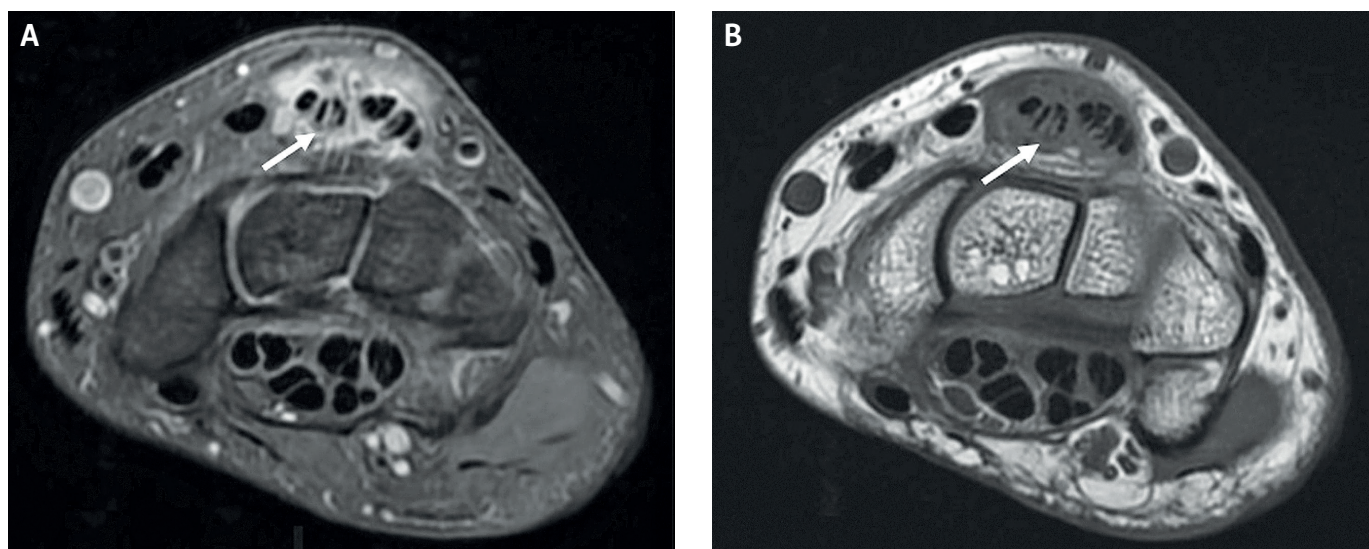


Fig. 1 Right wrist MRI DP FAT SAT sequence (A) and T1 sequence (B) in axial section detecting fluid effusion in the sheath of the common extensor tendons of the fingers, and a thickened anomalous extensor indicis proprius (EIP) tendon with intermediate signal and surrounding fluid effusion, characterizing peritendinitis of the fourth extensor compartment due to a degenerated anomalous EIP tendon (white arrows). The set of findings is compatible with extensor index finger syndrome.

Informed consent for the publication of this case report and accompanying images was obtained from the patient.

DISCUSSION

In 1939, Garcia highlighted the clinical significance of anomalous EIP of the hand (4). EIP syndrome was initially defined by Ritter and Inglis in 1969, who reported two patients with dorsal wrist pain and localized swelling in the fourth compartment. Surgical exploration revealed marked synovitis and a distal muscle belly of the EIP (5).

In Komiyama et al.'s study of 164 hands, 87% of cases showed the EI tendon inserting on the ulnar side of the extensor digitorum (ED) tendon for the index finger, considered the normal type. In 13% of hands, anatomical variations were classified into four types. Type 1 involved tendon bifurcation into two slips. Type 2 showed additional tendons, while Type 3 presented an extra tendon on the ulnar side, inserting into the middle finger. An index extensor muscle with three tendons originating from the muscle was classified as Type 4. In this type, a radial index extensor from the supernumerary tendons was positioned on the radial side of the ED tendon for the index finger and attached to the radial side of the dorsum of this finger (1).

In our case, MRI localized the pathology to an anomalous EIP within the fourth dorsal compartment but did not allow definitive Komiyama subtyping. In the event of failed conservative therapy, the preferred operation would be open decompression with tenosynovectomy. Intraoperative inspection is crucial to identify and, if necessary, address any accessory slip or low-lying tendon/muscle belly (e.g., selective debulking or resection), thereby relieving compartment crowding and reducing the risk of recurrence while preserving index extension.

The EIP muscle presents anatomical variations in 15.6% of cases, as evidenced by Caudwell et al. (6). Ogura et al. suggest that the extensor digitorum brevis manus (EDBM) may be a variant of the EIP, with an incidence of up to 10% (7). Although rare, these anomalies can cause pain on the dorsum of the hand (8).

The Spinner test, developed in 1972, aids in diagnosing EIP syndrome, provoking pain in the fourth dorsal compartment when the wrist is flexed and the index finger extended against resistance. The pain intensifies with simultaneous flexion of the wrist and the metacarpophalangeal joint of the index finger, occurring both with active and passive flexion. EIP syndrome was described by Ritter and Inglis in 1969, characterized by pain and localized swelling on the dorsum of the wrist, with synovitis and tendon changes (9).

Ultrasonography may aid in diagnosis. In the report of Kim 2013, the anomalous extensor muscle was identified showing a typical muscle-like echo texture (10). Diagnosis can be assisted by MRI and should consider anatomical variations, accessory insertions of the EIP tendon, accessory finger muscles, ganglia, and synovitis (11). The Spinner and Olshansky test aids in diagnosing EIP syndrome,

which is initially treated conservatively, consisting of rest, splinting, and steroid injection as the initial therapy (12). Surgical decompression of the fourth compartment is an option if conservative treatment fails (13). Although posterior interosseous neuropathy can present with dorsal forearm pain, our patient lacked neurological deficits and had focal fourth-compartment tenosynovitis, making nerve compression unlikely in this context.

CONCLUSION

This case report highlights the importance of recognizing muscle anomalies, such as an anomalous extensor indicis proprius tendon, which can lead to complications such as fourth extensor compartment peritendinitis. Identifying anatomical variations is crucial, as it can directly impact the diagnosis and treatment of painful wrist conditions. Although conservative treatment with nonsteroidal anti-inflammatory drugs was effective in this case, it is essential to consider surgical options in situations where conservative management does not provide relief. Careful clinical evaluation, combined with the use of imaging techniques such as magnetic resonance imaging, can facilitate the differentiation between similar conditions, contributing to a more targeted therapeutic approach. This case reinforces the need for a deeper understanding of wrist muscle anomalies in clinical practice, promoting more accurate diagnosis and appropriate treatments.

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