Case Report

Distal Intersection Syndrome Combined With Partial Attritional Changes of the Extensor Carpi Radialis Brevis in Tennis Players

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The purpose of this study is to report the cases of 2 tennis players with distal intersection syndrome, a rare pathological condition, combined with partial attritional changes of the extensor carpi radialis brevis tendon. Both individuals were able to return to their original level of performance after surgical intervention consisting of synovectomy within the distal intersection and release of the distal part of the extensor retinaculum. Physicians should familiarize themselves with distal intersection syndrome, which can cause dorsoradial wrist pain in tennis players. If pain is prolonged, tendon attrition may occur, and surgical treatment may be indicated.

Anatomically, 2 areas called “intersections” exist near the wrist joint along with the extensor carpi radialis brevis (ECRB) and extensor carpi radialis longus tendons in the dorsal second compartment.1 The 2 tendons are intersected by the abductor pollicis longus and extensor pollicis brevis, which are proximal to the wrist joint (first or proximal intersection), and are intersected again 3–5 cm further distally by the extensor pollicis longus (EPL) tendon as it swings past the distal end of Lister’s tubercle (the second or distal intersection).2

Intersection syndrome is a general term for conditions that cause pain on the dorsoradial side of the wrist joint during wrist motion. It can occur at either the proximal or distal intersection points described above.1,2 Proximal intersection syndrome is a rare but well-known condition that occurs between the first and second dorsal compartment proximal to the wrist joint.3 Distal intersection syndrome (DIS) is a rare, lesser-known condition and involves tenosynovitis at the cross-section between the second and third compartments distal to the wrist joint.3 In the literature, patients with DIS were found to be exposed to occupational or recreational risk factors such as manual work or sports activity.1 Inflammation within the ECRB and extensor carpi radialis longus tendon sheath extends to the EPL tendon sheath, which promotes tenosynovitis and possibly eventual EPL tendon rupture.4 Additionally, Ferree et al6 reported a unique case of DIS combined with a frayed ECRB tendon after non-displaced distal radial fracture that was associated with prolonged dorsal wrist pain.

Recently, we treated 2 tennis players with DIS that induced partial attritional changes of the ECRB tendon; 1 of these patients also experienced a complete EPL tendon rupture. We present the case reports as well as a review of the literature.

Case Reports

Two cases involving DIS combined with partial attritional ruptures of the ECRB tendon were reviewed. This report was approved by the institutional review board of Hiroshima University Hospital. There was no history of trauma that affected wrist pain in either case or any inflammatory conditions, such as rheumatoid arthritis, revealed via laboratory examination.

Case 1

A 20-year-old right-handed male college soft tennis player visited our clinic after experiencing right dorsoradial wrist pain...
When hitting the ball for a few weeks, swelling and tenderness were present over the distal part of the dorsal second compartment, and active wrist extension with thumb flexion induced severe pain. Ultrasound examination revealed partial detachment of the dorsal extensor retinaculum from Lister’s tubercle, elevation of the ECRB during wrist extension, and synovial fluid pooling around the ECRB and extensor carpi radialis longus tendons (Fig. 1). Tenosynovitis around these tendons at the level of the distal intersection was suspected, and corticosteroid injection (5-mg triamcinolone) into the second compartment was administered. The injection relieved symptoms and allowed him to return to playing tennis. Eight months after the initial visit, he had difficulty extending the thumb and consulted our clinic again. The silhouette of EPL was not detected, extension of the interphalangeal joint of the thumb was limited, and he could not lift his thumb with his palm on the table (positive lift-off test). Ultrasound examination revealed a complete rupture of the EPL tendon at the wrist. We planned a cable graft using the palmaris longus tendon to preserve the complete isolation of thumb extension. After the application of a slow curved longitudinal incision over the EPL tendon, its complete rupture was confirmed, along with synovial hypertrophy around the tendon stumps and within the dorsal second compartment. Additionally, detachment of the extensor retinaculum from Lister’s tubercle and exposure of the bone surface of its radial side was confirmed. After synovectomy, partial attritional changes of the ECRB tendon on its ulnar surface were also observed (Fig. 2). A tendon graft for EPL tendon rupture and release of the extensor retinaculum at the distal part of the second compartment were performed. The thumb and wrist were immobilized using a volar orthosis, with the thumb fully extended and wrist extended 20° for 3 weeks, and standard range of motion exercises were followed. Three months after surgery, he was able to return to playing tennis without any wrist pain or thumb extension limitation.

Case 2

A 23-year-old right-handed male high-level, amateur tennis player (regional champion) complained of left dorsoradial wrist pain during his double-handed backhand stroke and consulted our clinic.
distal part is likely to play a similar role in constricting the tendon sheath of radial wrist extensors or the EPL in case of DIS. This kind of chronic partial laceration of the ECRB tendon at the distal intersection has not been reported previously. Based on operative findings, it is conceivable that possible causes of the laceration were: (1) compression stimulation by the extensor retinaculum due to repeated wrist extension movements, (2) mechanical stimulation due to bone exposure of Lister’s tubercle after retinaculum detachment, and (3) compression stimulation of the EPL due to grip movement.

EPL rupture has been reported as a complication of DIS and was also observed in case 1. The steroid injection may have also contributed to the EPL rupture in this case. However, flexor tendon ruptures after steroid injection are previously reported in older patients who received multiple injections. Additionally, intratendinous injection was suspected. Our case was a young patient who received a small-dose single injection using loss of resistance technique to avoid intratendinous injection. Thus, we believe that the most probable cause of tendon rupture was synovitis from the second to the third compartment. Indeed, tissue fragility due to synovitis and compression stimuli between the second compartment and the distal edge of the extensor retinaculum were determined to be the most likely reason for tendon rupture.

A diagnosis of DIS was made by combining local findings, such as the presence of localized swelling and tenderness, with magnetic resonance imaging and ultrasound imaging findings. The diagnosis in the 2 cases reported here was confirmed based on local imaging studies. Both patients complained of severe pain induced by active wrist extension combined with active thumb flexion or grip movement. Both experienced severe pain while hitting a ball with active wrist extension and gripping a racket handle, which requires full flexion of the thumb. This motion of active and full wrist extension and thumb flexion may have acted as a provocation test for the diagnosis of DIS.

The common treatment for DIS involves activity restriction, a wrist orthosis, nonsteroidal anti-inflammatory drug administration, and corticosteroid injection. Although these were performed in our cases, they were ineffective, and an operative treatment was suggested to eliminate restrictions on sporting activity. Synovectomy in the compartment was recommended, and in our cases, release of the peripheral part of the extensor retinaculum, which was the cause of compression of the ECRB tendon from intraoperative findings, was also performed. The patients were able to return to tennis activities after surgery. Both patients experienced prolonged pain before surgery, accompanied by partial rupture of the ECRB tendon. If pain is prolonged, it may be associated with tendon attrition, and surgical treatment may be indicated.

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