Closed Extensor Digitorum Communis Tendons Rupture at the Musculotendinous Junction: A Case Report

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A 42-year-old male motorcyclist suffered severe pain in his right forearm and was not able to extend the fingers of his right hand after a rolled-over accident. He inflicted a direct blunt trauma to his right forearm while he held the hand grip of his motorcycle snugly. On examination, there was a 2 × 2 cm tense soft tissue swelling at the middle and distal third of his dorsal right forearm. (►Fig. 1) There was no skeleton fracture on the radiographs. The patient was cared for a probable impending compartment syndrome. After 24 hours, there was no pain on passive extension of his digits and diagnosis of compartment syndrome was ruled out. The patient was not able to extend his index, ring, and little fingers' metacarpophalangeal (MP) joints actively; but, he could extend his wrist, thumb, and middle digits. Ultrasound examination of the soft tissue swelling demonstrated a heterogeneous mass in dorsal forearm muscles. A volar splint was applied to protect the wrist and MP joints in extension and he was referred to our outpatient clinic.

We visited the patient 2 weeks after his accident. The dynamic tenodesis effect of extensor tendons on the index, ring, and little fingers were lost. Nerve conduction study for a probable posterior interosseous nerve injury was normal.

Through a direct dorsal approach, it was found that extensor digitorum communis (EDC) tendons of the index, ring, and little fingers as well as extensor digiti minimi (EDM) were ruptured at their musculotendinous junctions and extensor indicis proprius (EIP) tendon was slack while EDC of the middle finger, wrist, and thumb extensors were intact. There was no sign of tenosynovitis. (►Fig. 2)

End-to-end repair of the ruptured tendons were not possible because of EDC muscle retraction. Since only EDC to middle finger was intact, it was believed that end-to-side repair of four ruptured tendons to one tendon could not provide an endurable extension function to four MP joints. To manage lack of extension of MP joints, the extensor carpi

radialis longus (ECRL) tendon was transferred to the distal stumps of the ruptured index, ring, and little fingers' extensor tendons. The wrist and MP joints were protected by a volar splint for 3 weeks. Then range of motion and strengthening exercises were started.

Four months after operation, the patient was able to fully flex his MP joints (►Fig. 3) and extend them (►Fig. 4). Power grip of the right and left hands (Sammons Preston, Warrenville, Illinois, United States) was 30 kg and 40 kg, respectively. The patient was satisfied with his right hand function.

There are a few case reports indicating closed rupture of EDC tendons at musculotendinous junction. In all reported patients, mechanism of the injury was a strong stretching force applied to contract EDC by an indirect trauma. In the present case, there was a direct blow to forearm while the patient held grip of his motorcycle snugly and EDC was under intense stretching. Comparing with previous reports, there were more injured tendons (three EDC and EDM tendons were ruptured and EIP tendon was slack) in the present case.^{1–4}

Mudgal and Mudgal transferred flexor carpi radialis tendon to the ruptured EDC of index finger and EIP at their musculotendinous junctions.¹ Stuart and Briggs treated a case of complete closed rupture of EIP and incomplete rupture of index EDC tendon with end-to-side suture; however, the result was not satisfactory.²

Takami et al reported a series of ten patients with closed extensor tendon rupture at musculotendinous junctions. Five patients were treated by side-to-side junctures, three patients treated by tendon transfer, and two patients with incomplete ruptures were treated by splints. Fair result was observed in one patient with ECRL tendon transfer probably because of insufficient excursion of ECRL.³

Komura et al reported a case of ruptured EDC tendon of index finger as well as EIP at their musculotendinous

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Fig. 1 Soft tissue swelling at the dorsal middle and distal third of the right forearm and lack of extension of the ring and little metacarpophalangeal joints. The extension of index metacarpophalangeal joint is incomplete.

Fig. 2 The extensor digitorum communis tendons of the index, ring, and little fingers and extensor digiti minimi tendon are ruptured at the musculotendinous junction while the extensor digitorum communis of the middle finger are intact. The white arrow indicates the intact extensor digitorum communis of the middle finger.

Fig. 3 Four months postoperatively the patient was able to fully flex his metacarpophalangeal joints.

Fig. 4 Four months postoperatively there was no lack of extension of the metacarpophalangeal joints.

junctions and another case of complete rupture of EIP and loosening of EDC tendon of index finger. The first case was treated by an end-to-side suture of EDC tendon of index finger to middle EDC tendon. But, the patient was unable to extend his index finger independently to push a button or type on a keyboard. The second case was treated by EDM tendon transfer to EIP tendon.⁴

Treatment options for closed rupture of extensor tendons at musculotendinous junction include end-to-end repair, end-to-side suture to an uninjured neighbor tendon, tendon graft, tendon transfer, and splint. Usually, direct end-to-end repair is not possible because the muscle is shredded, swollen, and has different rate of retraction. Meanwhile, poor vascularization of musculotendinous junction may deter a robust repair. Tendon grafting is not a suitable option because the muscle has little tendinous material within to hold a tendon weave or suture. Splint may be used for incomplete rupture of extensor tendons.¹⁻⁴

In the present case, ECRL tendon transfer provided a satisfactory extension function to MP joints and resulted in quick recovery.

Note

This study was accomplished in Department of Orthopedics, Imam Khomeini Hospital, Urmia University of Medical Sciences, Urmia, Iran.

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