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Irreducible dorsal distal radius fracture-dislocation with accompanying dorsal displacement of flexor tendons and median nerve: A rare type of injury

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ABSTRACT

INTRODUCTION: High energy distal radius fractures may cause significant soft tissue injuries. Dorsal displacement of median nerve and flexor tendons to dorsal compartment between distal radioulnar joint was an unreported type of soft tissue injury.
PRESENTATION OF CASE: 35-Year male admitted following fall from height diagnosed as closed distal radius fracture with dorsal displacement. The patient had no flexion and extension of all fingers with loss of sensation. Radial artery pulse was not palpable. Radiography and CT imaging revealed distal radius fracture with dorsal displacement with dorsal carpal dislocation. After failure of closed reduction, operative treatment was performed. At surgery, flexor tendons and median nerve was found to be placed at dorsal compartment. Reduction of the soft tissues was facilitated by distraction of distal radioulnar joint.
DISCUSSION: Dorsal displacement of volar structures as the result of fracture dislocation was found to be an unreported type of injury. Difficulty during reduction of dorsally displaced structures is an important feature of the case.
CONCLUSION: For severely displaced and deformed distal radial fractures and fracture dislocations, threshold for operative treatment should be kept low.

1. Background

Fractures of distal radius with severe dorsal displacement occur due to high-energy trauma. Soft tissue interposition is one of the obstacles of reduction. Dorsal displacement of median nerve and flexor tendons to dorsal compartment, following dorsal radiocarpal fracture-dislocation is an unreported type of injury. We present such a case and challenges encountered during treatment.

2. Case

35-Year-old male patient admitted to emergency department after a fall from approximately 5 m of height on his right upper extremity. Physical examination revealed dinner fork deformity with loss of flexion and extension of all fingers with loss of sensation of 1st, 2nd and 3rd fingers. Radial artery pulse was not palpable. X-rays showed distal radius fracture with dorsal dissociation of carpal bones from the distal ulna (Fig. 1). Closed reduction under sedation was attempted. After failure of reduction computerized tomography imaging was performed. CT revealed fracture of radial styloid and multiple fragmented distal radial fracture with dorsal and proximal displacement of carpus. Distal radioulnar joint was stable (Fig. 2). Due to failure of reduction operative treatment was performed.

Surgery

Volar approach was performed. After superficial dissection, radial artery (RA), tendon of flexor carpi radialis (FCR) and palmaris longus (PL) were seen coursing over distal radius directly (Fig. 3). Avulsions of pronator quadratus (PQ) from radius and triradiate fibrocartilaginous complex (TFCC) from distal ulna, as well as avulsion of volar capsule of distal radioulnar joint were also encountered. After incision of transverse carpal ligament, median nerve (MN), and tendons of flexor digitorum profundus (FDP), flexor digitorum superficialis (FDS) and flexor pollicis profundus (FPL) were found to be located behind the radius and ulna on the dorsal compartment (Fig. 4). It was concluded that these structures (MN, FDS, FDP, FPL) passed between distal ulna and radius,

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Fig. 1. X-rays showing fracture-dislocation of distal radius, lateral (a) and AP (b) view.

as the result of dorsal directed shear force. Reduction of displaced soft tissue structures could be achieved by two 2.2 mm. K-wires placed longitudinally to distal radius and ulna (Fig. 5). After reduction integrity of tendons was checked. Contusion of median nerve

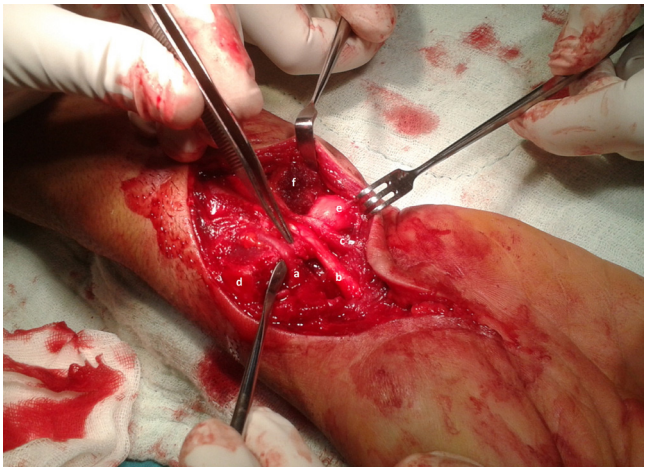

Fig. 3. Volar approach: radial artery (a), tendons of FCR (b) and PL (c), distal radius (d), distal ulna (e), and avulsed pronator quadratus (f).

was noted and neurolysis was performed (Fig. 6). After reduction of the fracture, fixation was achieved by Penning external fixator and a KW inserted to radial styloid (Fig. 7). TFCC was reattached to ulnar styloid with transosseous sutures. Ulnar artery and nerve with tendon of FCU were intact. Skin closure could be facilitated by split thickness grafting due to excessive swelling of soft tissues.

2.1. Aftertreatment

Active finger motion was encouraged after first postoperative day. Skin healed uneventfully. Fixator and K-wire were removed at post operative 6th week with rehabilitation with active motion. On the follow up, median nerve dysfunction persisted for 6 months

Fig. 2. Axial (a and b) and sagittal (c and d) CT images showing dorsally and proximally displaced radiocarpal fracture dislocation.