Case report

Dorsal approach for open reduction of complex metacarpophalangeal joint dislocation: A case report

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Abstract:
Dislocations of the metacarpophalangeal joint are uncommon. The distinction between subluxations and dislocations is critical. Complex dislocations require surgical reduction. The need for surgical reduction is primarily due to the anatomy of this region, which contributes to the complexity of this injury and to the degree of difficulty in its reduction. The problem can be approached by a dorsal or volar method. Dorsal approach has advantage of reduced neurovascular injury and direct exposure of fibrocartilagenous volar plate which blocks the reduction otherwise.

Keywords: Kaplan’s dislocation, Dorsal approach, Open reduction

Introduction:
Metacarpophalangeal (MP) joint dislocations are uncommon, seen in thumb, index, and little finger. Middle and index finger is associated with injuries to other digits. Dislocations of metacarpophalangeal joint can be dorsal or volar. These dislocations when reducible are called as simple dislocations. Majority of them are irreducible and are called as Complex metacarpophalangeal joint dislocations; classically described by Kaplan¹ to involve rupture of the volar plate from its weaker proximal attachment to the metacarpal. The volar fibrocartilaginous plate becomes entrapped between the metacarpal head and base of the proximal phalanx and blocks the reduction.²-⁶ Also, the flexor tendons, pretendinous band of palmer fascia, and lumbricals forms trap around dislocated mp joint which further prevents closed reduction. Attempt to reduce the joint without opening further tightens this trap. Clinically, patients presents with mild extension and ulnar deviation at the MP joint, with flexion of the interphalangeal (IP) joints, puckering of skin over MP joint on palmer region. Open reduction is the treatment of choice for complex MP joint dislocations, as closed reduction is contraindicated.

Radiologically a plain AP anteroposterior view x-ray shows dorsal dislocation of base of phalanx and a lateral view shows dorsal dislocation of MP joint. MP joints are stable primarily by the volar plate, having thin attachment to the metacarpal and thick attachment to phalanx. Secondary supports being strong capsuloligamentous structure, and laterally, by the collateral and deep transverse ligament. Complex MP joint dislocations demand open reduction. This may either be done by a volar or dorsal approach. Many articles describe volar approach,⁷-¹⁶ and some of them describe dorsal approach¹⁷. This case report emphasizes dorsal approach for open reduction of complex MP joint dislocations.

Case report:
A 25 year old male, a cricket player, presented with pain and swelling over right hand, around index
finger, when he sustained injury to volar aspect of outstretched finger while catching ball. On examination there was hyperextension at 2nd metacarpophalangeal joint, and distal digit was slightly deviated towards middle finger. The distal and middle IP joints were flexed, and extensor tendons were relaxed. On volar aspect of hand there was a smooth round shaped bony mass formed by the head of 2nd metacarpal with puckering bilaterally. There was no distal neurovascular deficit.

X-rays was suggestive of dorsal dislocation of proximal phalanx of the right index finger. with the patient under general anesthesia, closed manipulation was tried multiple times with no success. Based on this picture this complex metacarpophalangeal joint dislocation was subjected to dorsal open reduction.

Patient was taken to operative table under general anesthesia, supine position, hand kept in pronated position on side trolley. Tourniquet applied and usual scrubbing painting and draping done. Incision taken over dorsum of 2nd metacarpophalangeal joint. Dissection done volar fibrocartilagenous plate identified carefully, which causes main hurdle in reduction. It was longitudinally cut. With the division of volar plate the proximal phalanx was restored to its normal position. After achieving reduction there was freedom of movement at 2nd metacarpophalangeal joint and other joints. Under c-arm guidance the position of joint and evidence of any fracture was evaluated. No fracture was identified. Wound wash given and closure done with vicryl and ethilon. Dressing done tourniquet released.

The patient was given cock-up slab for 10 days. Early protected mobilization with a gutter-type splint is initiated after a few days to allow early wound healing. Strengthening exercises at 6 weeks were started to allow for ligamentous healing.
Results:
As follow-up after 6 weeks, the patient’s active range of motion consisted of metacarpophalangeal joint hyperextension to 8° and 60° of flexion, proximal interphalangeal joint extension to 0° and flexion to 70°, and distal interphalangeal joint extension to 0° and flexion to 60°. He had 36 lb of grip strength on the left compared to 63 lb on the right. Neurovascular evaluation was within normal limits. X-rays confirmed maintenance of reduction. Further follow up to patient was lost.

Discussion:
Kaplan and other authors described a volar approach to complex MP joint dislocations; which has certain disadvantages. Digital nerves are easily damaged during exposure and there is limited view of entrapped fibrocartilageous volar plate dorsal to metacarpal head. other authors

Figure 2: Longitudinal split of volar plate

Figure 3: lateral view of hand with Kaplan’s dislocation
promoted the dorsal approach due to the increased risk of extensive release of volar structures in the volar approach. Becton et al\(^3\) reported a series of 13 complex MP joint dislocations of the index finger using both volar and dorsal approaches. Those who underwent a dorsal approach had normal function, in two of their patients in whom they volar approach was used, the radial digital nerve was damaged and the patient had no return of sensation to radial side of index finger.

The dorsal approach for this complex dislocation has advantages over volar approach viz: 1) digital nerves are not risked to injury while operating\(^4,5,10\); 2) accurate management of osteochondral fracture of metacarpal head, which is a frequent association, is easily possible\(^3,5\); 3) there is complete exposure of fibrocartilagenous volar plate the main structure blocking reduction. A direct dorsal longitudinal incision for reducing this complex dislocation involves splitting of volar plate longitudinally. This splitting sometimes cause delay in recovery and cause instability to the joint under treatment. This is the only disadvantage of this approach.

**Conclusion:**

The complex dislocations of MCP joint can be managed with dorsal as well as volar approach. The dorsal approach has advantages over the other as discussed above. Though, further clinical evaluation is to be done to assess the effectiveness of both methods.

**References:**