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Case Report

Delayed presentation of complex complete dorsal thumb metacarpophalangeal joint dislocation: a difficult case to manage and review of literature

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ABSTRACT

Metacarpo-phalangeal (MCP) joint dislocation is a rare occurrence which commonly involves index and little finger. Thumb MCP joint dislocation is a pretty rare pathology. MCP joint dislocations are classified into dorsal or volar types. They are further categorized as incomplete, simple complete and complex complete. Complex complete MCP joint dislocation requires surgical reduction most of the times because of tissue entrapment in joint. In the present case report, a case of two and a half months old complex complete thumb MCP joint dislocation left in 18-year old male encountered which was irreducible by closed means and required surgical intervention. Dorsal hand surgical approach was utilized for reduction of dislocation. This unusual, difficult and rare case of two and a half months old complex complete dorsal dislocation of the thumb MCP joint is presented in this case report.

Keywords: Complex complete, Dislocation, MCP joint, Surgical reduction, Thumb

INTRODUCTION

Metacarpophalangeal (MCP) joint dislocations are not uncommon.[1-5] They occur most commonly in the index and little fingers. MCP joint dislocation of thumb is a rare entity and exceedingly rare in middle or ring finger.[1,4] They can be classified into volar or dorsal dislocation on the basis of proximal phalanx position in relation to metacarpal head. Dorsal dislocation of the 1st MCP joint is more common than volar dislocation.[1] Dorsal dislocations are categorized into: incomplete, simple complete and complex complete with respect to their ease of reduction.[1,3]

This commonly occurs in young, active individuals involved in playing games/hard work. Incomplete dislocations are better described as subluxations because a portion of the joint remains congruous without any collateral ligament injury. Complete dislocations describe complete disassociation of the joint, and indicate a significant injury or rupture to the volar plate, joint capsule and at least part of the collateral ligaments. Closed reduction manoeuvre described by Mclaughlin is successful most of the times in incomplete and simple complete dislocation.[4] In comparison, complex complete dislocations are not easily reducible by closed means and often require surgical intervention.

This high rate of closed reduction failure in complex complete dislocation is usually due to the soft tissue interposition in joint which includes volar plate, sesamoid bones, bony fracture fragments or the flexor pollicis longus tendon etc.[6,7] But the most common culprit which precludes closed reduction is an entrapped volar plate.[8,9]

In the present study a case of a complex complete, dorsal, thumb MCP joint dislocation left in a patient presenting two and a half months post-injury is presented. There is only one case of chronic complex thumb MP joint dislocation that is described in the literature. This motivated the author to report the case.

CASE REPORT

An 18-year-old right hand dominant school going student presented to our outpatient clinic two and a half month after sustaining injury to his left thumb. He had pain and swelling over the volar aspect at the base of left thumb with no range of motion in first MCP joint fall on his hand after tripping on stairs two. He had history of a half months earlier.

On history taking, patient given history of head injury at the age of 10 years. Due to this patient had delayed mental development and was a neglected child. After sustaining injury, due to fear of his parents, patient reported to his parents after two and a half months of injury. On examination, left thumb MCP joint was hyper-extended with inter-phalangeal joint in slight flexion (Figure 1).

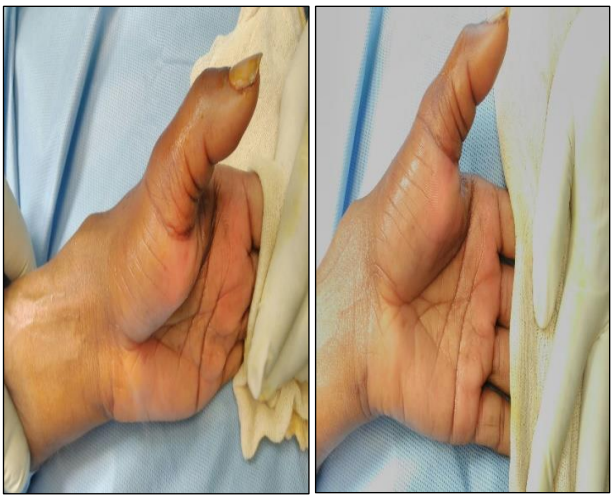

Figure 1: clinical picture of hand preoperatively.

Prominent bony swelling and tenderness present at the base of left thumb. On manipulation, he had essentially no thumb flexion. Patient had no other significant injuries.

Patient was advised to undergo plain radiographs in two orthogonal views which confirmed the presence of complete dorsal dislocation 1st MCP joint left with sesamoids over the dorsal surface of 1st metacarpal head (Figure 2). One unsuccessful attempt of closed reduction by McLaughlin technique was given under sedation and local anaesthesia in minor OT after admission. With diagnosis of complex complete dorsal 1st MCP joint dislocation left, patient was planned for open reduction in major OT after informed consent and prognosis well explained.

Figure 2: Plain radiographs showing first MCP joint dislocation with sesamoid dorsal to metacarpal head.

Under regional anaesthesia (Supraclavicular brachial block) and tourniquet control, a dorsal midline curvilinear incision was utilized to approach 1st MCP joint. The skin flaps should be manipulated/retracted gently to prevent margin necrosis in post-op period. The extensor apparatus was incised longitudinally, between the extensor pollicis longus and extensor pollicis brevis tendon. Base of proximal phalanx with attached capsule remnants were encountered after incising extensor apparatus. A lot of fibrous tissue was present below proximal phalanx base which was removed carefully. The volar plate was identified in the depth of wound in form of transverse band overlying head of metacarpal (Figure 3).

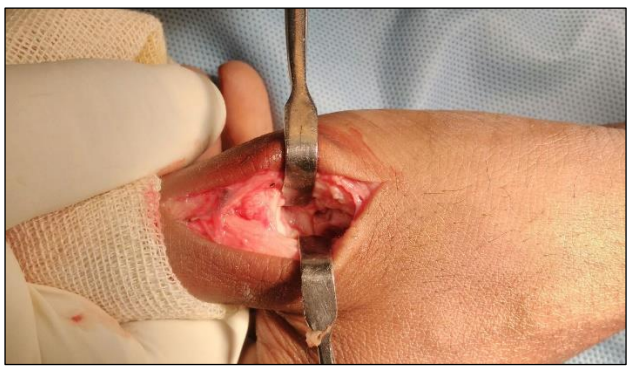

Figure 3: Intraoperative picture showing volar plate as transverse band in depth of wound.

Both the sesamoids were identified as well just above the volar plate. These two structures were found to be the obstructing agents in joint reduction of our case. A longitudinal incision was given over the volar plate and then the flaps of the volar plate were allowed to slip back to their original position, which is volar to the metacarpal head (Figure 4). For reduction of MCP joint, a curved osteotome was passed over the metacarpal head to

distract open the joint space and with utilization of lever mechanism gentle, distally directed pressure was applied to the base of the proximal phalanx.

Figure 4: Intraoperative picture after cutting volar plate longitudinally.

Anatomic reduction was confirmed under fluoroscopic guidance (Figure 5).

Figure 5: Intraoperative fluoroscopic picture showing reduced first MCP joint.

After obtaining the desired reduction, joint was found to be unstable. Single K-wire was applied utilizing retrograde technique for joint stability, with MCP joint in slight flexion (Figure 6).

Figure 6: Postoperative plain radiograph.

After fixation, wound was closed in layers. Joint capsule and extensor apparatus were closed with 4-0 prolene suture followed by skin closure with 4-0 silk. The tourniquet was deflated and dressing was done. A thumb spica plaster splint was given to the patient. At 3 weeks follow-up, sutures, K-wire and splint was removed and sent for pre-planned physiotherapy. Patient achieved 0-70 degrees of MCP joint flexion and comparable strength to that of opposite thumb at 6 weeks follow-up. At latest follow up of 1 year, patient having near normal range of motion 1st MCP joint left hand and able to do all daily routine activities involving right thumb.

DISCUSSION

Isolated 1st MCP joint dislocation is a pretty rare injury with dorsal dislocations being more common than volar dislocations.[6-10] Dorsal dislocation usually occurs due to hyperextension at MCP joint, either from direct injury or fall on an outstretched hand.[6] Clinical and radiological evaluation should always be done before going for closed reduction to identify the type of dorsal dislocation.

McLaughlin explained that for a successful closed reduction the joint should be hyper-extended, and the base of the proximal phalanx be pushed over the metacarpal head.[4] If this is not done properly and timely a simple dislocation can be made into a complex one. Closed reduction do well for incomplete and simple complete dislocation but complex complete dislocation/delayed presentation required open surgical reduction in most of the cases.

Dorsal dislocation of 1st MCP joint have been reported several times in literature but delayed presenting complex complete dorsal dislocation 1st MCP joint have been documented in literature a few times only as seen in our case.[6,9,11,12]

In a Japanese study, out of nine patients with a dorsal dislocation 1st MCP joint, only one patient required open reduction due to delayed presentation.[8] The predominant structure preventing closed reduction in complex complete dorsal dislocation 1st MCP joint is the volar plate.[8,9] Volar plate usually ruptures from proximal weak attachment at metacarpal head and become entrapped between proximal phalanx base dorsally and metacarpal head volarly as it remains attached to proximal phalanx base. Other culprits include flexor pollicis longus, adductor tendons, extensor expansion, collateral ligaments, sesamoid bones and the joint capsule which blocks closed reduction of complex complete dorsal dislocation.[6,7]

Ip et al and Takami et al, hypothesized that when the volar plate interposes the joint in MCP joint dislocation, radiographs show an increased distance between the palmar edge of the proximal phalanx base and dorsal edge of the metacarpal head, therefore high chances of closed reduction failure can be predicted.[6,9]

Two approaches - dorsal and volar approach have been documented in literature for MCP joint dislocation. Ideal

approach is still controversial as per literature.[2,3] Surgical approach utilized for reduction is mainly affected by surgeon's expertise, surgeon's experience and associated injuries. Volar approach involves higher risk of neurovascular injuries as compared to dorsal approach but having advantage of easy visualization and repair of volar plate.[13] Dorsal approach have several advantages over volar approach such as lower risk of neurovascular injury, better visualization of a dorsally entrapped volar plate and, better management of associated osteochondral fractures.[3,14,15]

Minimally invasive techniques ie., arthroscopic/ percutaneous methods have been reported in literature for MCP joint injuries.[16,17] These methods have advantages in terms of reducing the risks associated with the open methods but require a specialized skill set and skilled surgeon.

It is important to stress the MCP joint after reduction to assess the joint stability (collateral ligament injury).[18] If the joint is stable, early mobilization protocol can be followed up. If the joint does remain unstable after open reduction, splinting and/or K-wires fixation with capsule-ligamentous repair is required.

Post-operatively, period of immobilization is still a debate after surgical reduction. Some authors advocate for an early mobilization regime while others recommend three to four weeks of immobilization post-operatively followed by physiotherapy as followed in our case.[4,13,19]

CONCLUSION

Dorsal dislocation of 1st MCP joint should always be reduced early and properly by recommended methods. Dorsal approach is better for surgical reduction of dorsal dislocations. Three to four weeks of immobilization in splint after K-wire fixation have good results in unstable MCP joints post-reduction. Proper post-operative physiotherapy is key to the excellent functional outcome

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