Volar Dislocation of Second Metacarpophalangeal Joint-open Reduction with Volar Approach - A rare Case Report

Rohit Raj Patluri[1], Akhila Gummadi[1]

Learning Point of the Article:

Volar dislocation of metacarpophalangeal joint not being the most common type of presentation was challenging to deal with in the first place, due to site and side of presentation the most accessible volar approach was preferred, avoiding neurovascular injury and positive outcomes.

Abstract

Introduction: In most cases, the volar plate interposition renders the complex metacarpophalangeal joint dislocation, commonly known as Kaplan's lesion, intractable, necessitating open reduction. The capsuloligamentous attachments around the joint and the head of the metacarpal are buttonholed in this dislocation, limiting closed reduction.

Case Report: It is presented here a case of 42-year-old male with the left Kaplan's lesion with open wound. The dorsal technique would have decreased neurovascular compromise and prevented the reduction otherwise by exposing the fibrocartilagenous volar plate directly; however, in this case, the volar route was adopted since an open wound exposed the metacarpal head volarly rather than dorsally. After repositioning the volar plate, a metacarpal head splint was applied and physiotherapy was started a few weeks later.

Conclusion: Volar technique has been confidently employed because the wound was not related to a fracture and the open wound through which the incision was extended was already existing, allowing for easy access to the lesion and leading to positive outcomes, such as better range of motion postoperatively.

Keywords: Kaplan's lesion, open reduction, volar approach, natatory ligament, fibrocartilaginous plate.

Introduction

In comparison to interphalangeal dislocations, metacarpophalangeal (MP) dislocations are less frequent [1]. The initial description by Kaplan makes it abundantly evident that the pathoanatomy is what causes them to occur most frequently in the index finger [2-5]. The fibrocartilaginos plate avulses from its weakest attachment, the volar aspect of the second metacarpal neck. Distally, the natatory ligament and volar plate are situated dorsally to the metacarpal head. The superficial transverse ligament crosses the volar end of the metacarpal neck [3-8]. Between the superficial transverse ligament of the palmar fascia and the natatory ligament, the displaced metacarpal head is located [2]. For the aforementioned reasons, the surgeon must favor therapeutic approaches that increase joint stability and decrease complex dislocations. In the management of Kaplan's lesion, Prevailing surgical modalities and approaches including volar and dorsal approaches have been tried, there is no established protocol, since they only occasionally occur [6].

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Author's Photo Gallery

Dr. Rohit Raj Patluri

Dr. Akhila Gummadi

[1]Department of Orthopaedics, Viswabharathi Medical College, Kurnool, Andhra Pradesh, India.

Address of Correspondence:
Dr. Akhila Gummadi,
Department of Orthopaedics, Viswabharathi Medical College, Penchikalapadu, Kurnool, Andhra Pradesh, India.
E-mail: akhila27gummadi@gmail.com

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Figure 1: Metacarpal head exposed volarly through open wound at presentation.

Figure 2: Radiographs showing the dislocation.

Case Report

A hefty rod that fell on a 42-year-old man's left second metacarpal caused a 4 cm cut to be seen on the volar side of the MP joint of the left index finger. In the open wound, the metacarpal bone head was discovered to be displaced (Fig. 1). The patient's left index finger's distal and proximal interphalangeal joints could be moved, and the finger's sensation was unaffected. The index finger's MCPJ had a complicated volar dislocation, although there was no fracture, according to a hand X-ray (Fig. 2). Despite attempts at closed manipulation, the imposing tissue prevented closed reduction from being successful. Hence, open reduction was performed while brachial plexus block was in place. On the head of the metacarpal bone within the horizontal open wound, a 3 cm long extended horizontal incision was made (Fig. 3). Thorough saline wash and debridement were done. No fractures, tendon, or vascular damage were found on exploration of the MP joint. After repositioning the ruptured volar plate that was entrapped, the proximal phalanx was reduced, and the damaged volar plates were rebuilt. Joint congruity checked under fluoroscopy (Fig. 4). After using nylon sutures to close the skin, the procedure was finished (Fig. 5). Vascularity checked. No NVD. X-rays confirmed maintenance of reduction (Fig. 6). Results after 6 weeks of follow-up, the patient's active ROM at metacarpophalyngeal joint-showed extension 10° and 80° of flexion, proximal interphalangeal joint extension 0° and flexion to 90°, and distal interphalangeal joint extension 0° and flexion to 90°.[7].

Figure 3: Intraoperative image showing the extended volar incision-volar approach.

Figure 4: Intraoperative image checking the reduction.

Figure 5: Well healed surgical wound.

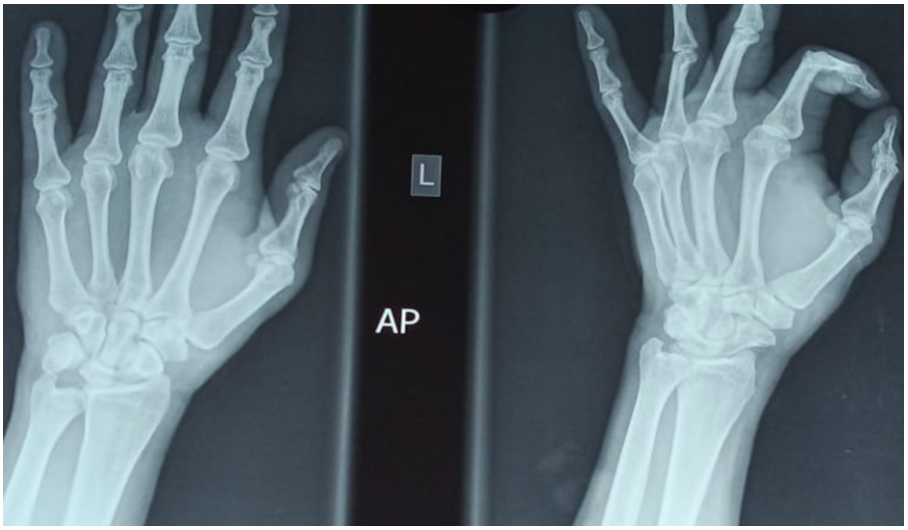

Figure 6: Post operative radiograph with congruent reduction.

Discussion

Dorsal dislocations measure the foremost common MP joint dislocations [1]. Reduction ought to be achieved with straightforward flexion of the joint in dorsal dislocations. The opposite type of MP joint dislocation could be a advanced dislocation, that is by definition irreducible, most frequently because of volar plate interposition. Complex dislocations occur most often within the index finger [2]. Longitudinal traction will convert an easy to a complex dislocation A simple dislocation will become difficult with longitudinal traction. They are typically caused by the forced hyperextension of a finger on an extended hand, rupturing the membranous, proximal region of the volar plate, the joint capsule, and part of the collateral ligaments [3]. The flexor muscle tendons will shift ulnarly, while the lumbricals shift radially to the side, trapping the volar plate between the base of the proximal phalanx and the dorsal metacarpal head [2]. These structures will form a noose-like structure around the metacarpal neck as they tighten, preventing closed reduction. Volar and dorsal are the two primary methods for open reduction; Kaplan and others [6, 10] have established literature on the former. In volar approach, there is higher risk of injury to neurovascular structures, that is, however, dorsal approach has gained significance wherever lesser risk of neurovascular structures was noted [4] Using this volar method, it is possible to recreate the anatomically sound MP joint as well as the area plate and nearby structures [9]. A1 pulley is released as part of a modified volar approach methodology to lessen the stress on the flexor muscle tendon, allowing the volar plate to revert to its native anatomical structure [8]. The primary goal of surgery for Kaplan's lesions is to release the metacarpal head from surrounding structures by removing the obtrusive structures in the dislocated space. The volar approach, which provides superior visualization to the dorsal approach, allows access to both the volar plate and the surrounding structures that are tying up the metacarpal head. Complications such as arthritis and osteonecrosis of the metacarpal head could cause fibrosis and scale back final range of motions during early or late reductions and prolonged immobilizations [6]. Failure to recognize the terribly superficial position of neurovascular bundle over the MP joint could cause division throughout surgical exploration operative care includes immobilize the joint in 30° of flexion for 2 weeks begin active range of motion with extension block splint at 10° of MP joint flexion for 2 more weeks buddy tape the digit to adjacent digit at 8 weeks unlimited activity at 12 weeks [6].

Conclusion

Advanced MP joint dislocation will be treated using both dorsal and volar techniques. From the above case report, we tend to conclude, volar approach can be confidently taken for quick access to lesion, good operative results, no wound complications, and good active range of motion despite of increase risk to neurovascular structures.

Clinical Message

This can be a rare case of complex region dislocation of second MP joint of the left hand with metacarpal head exposed through the open wound. This case report highlights the importance of volar approach in management of above said case, in such case extended volar incision, quick access to the lesion, full repair of volar plate, lesser risk of post-operative instability. The neurovascular structures harm will be prevented by with utmost care of dissection and supervised handling.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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