

ORIGINAL ARTICLE

KAPLAN'S LESION: A CASE REPORT ON THE COMPLEX DISLOCATION OF THE INDEX FINGER IN A WEIGHTLIFTER

Yuvraj Arora¹, Ashutosh Mohapatra², Priyam Choudhury³, Rajat Jangir⁴¹Department of Orthopaedics, Arora Multispecialty Hospital, Bharatpur, Rajasthan- India²Department of Orthopaedics, Mohapatra Hospital, Uhasnagar-India³Department of Radiology, Mayo Clinic, Jacksonville, Florida-United States⁴Department of Orthopaedics, Mahatma Gandhi Medical College and Hospital, Jaipur, Rajasthan- India

Background: Complex Dislocation of the metacarpophalangeal joint of the hand is a rare and unusual injury. These are also called as Kaplan's Lesion. They are divided into complex/irreducible and simple/reducible dislocation. Two approaches exist regarding their surgical intervention. We present a case of a 36-year-old weightlifter who presented to us with this uncommon entity and who was successfully treated with a dorsal approach. This case is presented to highlight the occurrence of this dislocation along with a brief discussion on its etiopathogenesis and management.

Keywords: Fracture Dislocation, Kaplan's Lesion, Complex, Metacarpophalangeal Joint, Dorsal Approach

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INTRODUCTION

Though hand and wrist injuries account for approximately 20% of the visits to the emergency department (ED), the incidence of metacarpophalangeal (MCP) dislocation is unusual and rare with less than 1/100,000 cases seen annually. MCP joint dislocations are rare because of the strong connective tissue support around the joint and the basal location in the hand.¹ Index finger is the most affected followed by the thumb. They are divided into simple/reducible and complex/irreducible dislocation, where simple constitutes reduction without surgical intervention and complex entails surgical intervention.² Complex dislocations typically result from forced hyperextension of the digit on an outstretched hand.³ We report a case of complex MCP dislocation of the left index finger in a 36-year-old male who was successfully treated with the dorsal approach.

CASE REPORT

A 36-year-old man presented to the Emergency Department (ED) with complains of swelling, pain and deformity of the left hand for 1 hour. A weightlifter by profession, he was practicing for an upcoming event and had weight lifted approximately 400Lbs on a barbell when suddenly he lost his grip resulting with the barbell falling on him. He felt an instant pain followed by swelling and deformity of the dorsum of the left hand. Clinical findings included swelling, tenderness on palpation and restricted movement

of the index finger. Tenting of the skin over the base of the index finger was seen. Digital radiographs of the left hand revealed dorsal dislocation of the metacarpophalangeal (MCP) joint of the left index finger (Anteroposterior (AP) view) (Figure-1) with presence of a sesamoid bone and an osteochondral fracture of the metacarpal head (lateral view) (Figure-2). No other associated osseous deformity was seen. Under digital block anaesthesia, closed reduction was attempted by the ED physician initially and then later by the Orthopaedician. Both the attempts were unsuccessful. After consultation with the relatives, a decision to surgically reduce was taken.

A longitudinal incision was made over the dorsal aspect of the MCP joint of the left index finger. Both the extensor mechanism and joint capsule were split. Following a thorough dissection, the phalangeal head was found to have been intercepted through the volar plate. The proximal phalanx head was reduced through the volar plate and the osteochondral fragment was fixed using a lag screw (14mm x 2mm) (Figure 3). The wound was closed in layers after the satisfactory reduction of the fragment was checked under fluoroscopy (Figure 4). Post operatively the hand was placed in a dorsal splint. He was discharged the same day and instructed to follow up two weeks later. Unfortunately, we lost the patient to follow up since he tragically met with a road traffic accident leading to his untimely death.



Figure-1: Preoperative (Anteroposterior) view showing dorsal dislocation of the second metacarpophalangeal joint of the index finger with the osteochondral fracture of the metacarpal head



Figure-2: Lateral view of the hand showing the presence of sesamoid bone (red arrow) and osteochondral fracture of the metacarpal head (yellow arrow) and the dorsal dislocation of the proximal phalynx of the index finger.



Figure-3: Intraoperative picture showing reduction of the osteochondral fracture fragment with lag screw (green arrow)



Figure-4: Satisfactory reduction of the metacarpophalangeal joint of the index with lag screw in situ (red arrow).

DISCUSSION

The metacarpal joints of the index and the middle finger are termed as the “anchor” of the hand representing the immobile part of the hand. This stable configuration is caused by the combination of the articular surface of the involved bones and the stout ligaments surrounding the area. For a MCP dislocation to occur, it must be caused by an excessive amount of force which are caused by hyperextension injuries.^{3,4} Dorsal dislocations are common than volar since the MCP joint is the weakest dorsally. Displacement of the metacarpal head in the palm makes them easily palpable in dorsal dislocations.⁵ Closed reduction is prevented by the displaced volar plate along with the surrounding tendons and ligamentous structures forming a tight noose around the metacarpal neck. In the Index finger, these structures comprise of the flexor tendons and the lumbrical muscle which displace ulnarly and radially respectively.⁵ The index finger is more prone to dislocation because of increased vulnerability to trauma and lack of stability by two adjacent deep transverse metacarpal ligaments.^{6,7}

Radiographs help in the confirmation of diagnosis. A widened joint space on AP radiograph plus interpolation of the volar plate suggests a complex dislocation, but AP radiographs can be misleading showing an unclear joint disruption.

Hence lateral films too should be looked at since they clearly show the dislocation of the proximal phalynx.⁸ Fifty percent of the cases present with a concomitant fracture of the metacarpal head which was seen in our case too.⁶ If radiographs are unable to provide a clear diagnosis, Computed Tomography (CT) scans can also be used. Two previous reports mention the use of CT scans for confirmation of the diagnosis.^{2,9} CT scan was not necessary in our case since the radiographs provided conclusive evidence.

Repeated attempts at closed reduction should be avoided at all costs since they pose a threat of osteonecrosis of the metacarpal head or early degenerative arthritis.¹⁰ Presence of the sesamoid bone in the joint is characteristic of a volar plate entrapment. Recognition of this fact should alert the treating physician to the inevitability of open reduction for anatomical repositioning of the joint.^{7,11} As soon as our patient presented to us, a radiograph was done which revealed the presence of a sesamoid bone within the joint. This gave us a clear indication of the dislocation being complex/irreducible and requiring surgical interventions. Two unsuccessful attempts at closed reduction under local anaesthesia confirmed our suspicion. Though four previous reports mention repeated unsuccessful attempts, majority of the literature have attempted close reduction just once or twice as was the scenario in our case.^{2,8,12,13} All the cases that attempted multiple closed reductions clearly showed the presence of a sesamoid bone and it should have dissuaded them from these attempts.

While traditionally two approaches—“volar” and “dorsal” are being used for the surgical intervention, the debate as to which is a superior one still exists.¹⁰ Both the approaches have their share of advantages and disadvantages. Farabeuf first described the dorsal approach in 1857, while the volar approach was described by Kaplan in 1857.¹⁴ Direct access to the joint, better visualization of the structures, anatomical restoration of the joint and repair of the volar plate are the benefits that the volar approach offers. On the other hand, the dorsal approach allows the safe passage of the neurovascular bundle, excellent exposure of the volar plate and restoration of the osteochondral fragments of the metacarpal head.¹⁵ Pitfalls of the volar approach are risk to the neurovascular bundle and difficult access to the volar plate which tents over the metacarpal head while that of the dorsal approach is repair of the volar plate which must be slit longitudinally during this approach.¹⁰ Although an unrepaired volar plate poses a theoretical risk of late instability, this complication has not been reported for the dorsal approach.⁸ One of the authors, is a hand surgeon (A.M) who has performed both the approaches. The

rationale of using dorsal approach in our patient was to restore the osteochondral fragment. Also, in his experience he feels that dorsal approach provides the added benefit of reduced operative time. This has also been reiterated previously.¹⁴

Recently there have been reports of the use of newer techniques like the lateral approach, arthroscopy and a percutaneous technique using skin hook for complex dislocation of the index MCP joint.^{12,14,15} The authors of that report state that the lateral approach provides a better visualization and treatment of both volar and dorsal structures along with an easy accessibility to fixation of the osteochondral fragment of the metacarpal head. But it presents with a high risk of injury to the neurovascular bundle.¹⁰ In arthroscopy a probe is used to push the volar plate palmarly while the metacarpal head is pushed dorsally. The use of two mini portals makes arthroscopy less damaging to the structures than open surgery but it only permits vision of the intraarticular anatomy, thereby limiting the repair of any extraarticular pathology or osteochondral fractures.¹¹ Skin hook was used for traction of the volar structures thus resulting in a successful reduction on first attempt. The authors stated that the traction may have moved the obstructing palmar structures forward and allowed for closed reduction. This method can be used prior to more invasive procedures.⁹ The percutaneous techniques are quick, can be performed in the ED under local anesthesia. But a point to remember with percutaneous technique is that they were performed without the visualization of pathologic anatomy.^{7,8}

Postoperative protocol states dorsal splinting for up to three weeks since longer immobilization periods may cause degenerative arthritis and decreased range of motion.^{3,15} We also used a dorsal splint for our patient since the reduction stays stable if hyperextension is avoided in the early weeks.⁸ Unfortunately, we could not further elaborate on our case since the patient did not show up two weeks post his surgery as instructed by us. On further inquiry it was revealed that he had met with a road traffic accident causing his untimely death.

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Address for Correspondence:

Ashutosh Mohapatra, Department of Orthopaedics, Mohapatra Hospital, Ulhasnagar-India
Email: ashutoshmohapatra11.am@gmail.com