COMPLEX DISLOCATION OF THE METACARPOPHALANGEAL JOINT OF THE LITTLE FINGER: ABOUT TWO CASES

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Abstract

Complex metacarpophalangeal dislocation of the little finger is a rare pathology. Only few cases have been found in the english literature. We report two additional cases occurred on an outstretched hand with hyperextension of the concerned metacarpophalangeal joint. Both patients were reduced using a volar approach which allows either reduction and reparation of the split volar plate preventing an ulterior instability. At follow-up, both patients recovered normal joint movement with no instability or neurovascular deficit. We review the diagnostic criteria, pathology and management of this pathology which remains a subject of controversy. We advocate the volar approach.

Keys words: Complex dislocation; Metacarpophalangeal joint; Fifth finger; Irreducible; Volar plate; Open reduction; Volar approach.

Résumé

Les luxations complexes de la métacarpo-phalangienne du cinquième doigt représentent une entité rare et nécessitent une réduction chirurgicale en vue de libérer l’incarcération des parties molles. Nous rapportons les cas de deux jeunes patients ayant présenté une luxation dorsale complexe de la métacarpo-phalangienne du cinquième doigt suite à un traumatisme direct le doigt en hyperextension. Les 2 patients ont été réduits chirurgicalement le jour même par voie palmaire qui a permis un accès direct aux structures incarcérées avec réparation de la plaque palmaire. La récupération fonctionnelle était excellente sans instabilité ni trouble vasculo-nerveux.

Mots clés : Luxation complexe; Articulation métacarpo-phalangienne; cinquième doigt; Plaque palmaire; Réduction chirurgicale; Voie abord palmaire.

INTRODUCTION

Dislocation of the little finger metacarpophalangeal joint is a rare injury, only sporadic cases have been reported in the literature [1]. These dislocations can be classified based on the direction of the proximal phalanx into dorsal or palmar, or based on ease of reduction into simple reducible or complex irreducible. Complex dislocations of the MCP joint are often caused by the entrapment of the palmar plate in the joint making closed reduction attempts futile [2], open reduction is then mandatory to free the soft tissues interposed between the metacarpal head and the proximal phalanx. The purpose of this report is to present two additional cases of complex dorsal dislocation of the MP joint of the little finger and to discuss the mechanism and the surgical management of this rare injury. We advocate the volar approach.

CASE REPORT:

Case I

A 22-year-old male carpenter injured his left little finger. He felt downstairs with reception on his outstretched hand. Physical examination showed pain, dimpling of the skin and swelling of the metacarpophalangeal joint. A marked prominence was palpable in the palm. Limited flexibility of the affected digit, with intact neuro-vascular functions (Figure1). Radiographs showed dorsal dislocation of the proximal phalanx of the little finger with an increased joint space as well as severe ulnar deviation of the affected digit (Figure 2). Attempt of closed reduction was predictably not successful. Under locoregional anaesthesia, a S-shaped volar incision was made over the prominent metacarpal head. The head was found to be trapped between the long flexors on the radial side and the tendon of the abductor digitii quinti on the ulnar side. The volar plate, avulsed from the neck of the metacarpal, was impacted in the joint between the metacarpal head and the proximal phalanx base to which it remained attached. Once a longitudinal incision in the volar plate and the adjacent fibres of the deep transverse metacarpal ligament was made as described by Kaplan, reduction was achieved after control of the articular surfaces by traction and flexion. Finally, the insertion of the volar plate at the neck of the metacarpal was repaired with non-absorbable sutures.

After the reduction, the radial collateral ligament was repaired. The left little finger had good resistance to ulnar subluxation forces from the radial collateral ligament. The hand was immobilised in a short arm brace with the MCP joint in 70° of flexion and the interphalangeal joints in full extension. At 3-weeks follow-up, the patient had no instability at the MCP joint, sensation and vascularity were intact. X-rays showed maintenance of reduction out of the splint with no subluxation then passive and active rehabilitation.
were began. At long term follow-up thirty-six months later, function and grip power were normal with no pain or instability of the joint.

Figure 1: Dorsal clinical photograph of the left hand demonstrating significant swelling and the little finger in ulnar deviation.

Figure 2: Pre-operative anteroposterior radiograph of the left hand with a dislocation of the fifth metacarpophalangeal joint:
- Widened MCP joint space of the little finger without a sesamoid bone within the joint space, indicating a complex dislocation.
- The ulnar deviation of the proximal phalanx suggests rupture of the radial ligament.

Case II:

A 19-year-old student injured his dominant right little finger secondary to a motorcycle accident and hurt his fifth finger metacarpophalangeal joint in hyperextension against the wheel while the brake. He complained pain and swelling. Radiograph showed dorsal dislocation of the metacarpophalangeal joint of the little finger. The widened joint space, indicated volar plate entrapment. Following an axillary block, a volar S-shaped incision was made over the metacarpal head, which formed a marked prominence in the palm. The head of the fifth metacarpal was found to be firmly trapped between the flexor tendons on the radial side, and the common tendon of the abductor and flexor digiti quinti muscles on the ulnar side. The volar plate was trapped in the joint. A longitudinal incision was made in the incarcerated volar plate, after which reduction of the proximal phalanx of the little finger was easily achieved. The volar plate, torn off at the insertion on the fifth metacarpal, was reinserted with non-absorbable sutures. The finger was immobilized for three weeks. At review, the motion of the joint was from 80° flexion to 30° extension. No hyperextension or lateral instability were present. Twenty-four months after the injury, the metacarpophalangeal joint was painless, with normal joint movement and no instability or neurovascular troubles.

DISCUSSION

An irreducible dorsal metacarpophalangeal joint dislocation was first reported by Malgaigne in 1855. In 1876, Farabeuf described in detail the difference between reducible and irreducible dorsal metacarpophalangeal joint dislocations of the thumb, and coined the phrase “complex dislocation” for irreducible dislocations [1, 3, 4]. McLaughlin (1965) found that complex dislocation most often involved the thumb, the little finger being very seldom affected [2]. The mechanism of injury is usually a fall on the outstretched hand with forced hyperextension of the metacarpophalangeal joint [2], this blocks the metacarpal head in the palm and results in a dorsal dislocation of the proximal phalanx [5]. In contrast to the index finger, whose carpo-metacarpal joint is relatively fixed, the little finger with its mobile carpo-metacarpal joint can absorb some of the force [6]. In simple dislocation of the little finger, the proximal phalanx is hyperextended to about 90° and is easily reducible, in complex dislocations the angle of hyperextension is considerably less (30-40°), dimpling of the palmar skin near the dislocated joint and slight ulnar deviation of the affected digit [7]. A prominence is felt and often seen in the palm, and radiographic appearances of a widened joint space with often a sesamoid within it, are pathognomonic of volar plate entrapment, since the sesamoid is embedded in the volar plate.

Closed reduction usually fails and repeated attempts of closed reduction may lead to degenerative arthritis of the concerned metacarpophalangeal joint with reduced final range of motion [1, 8]. Consequently, it is essential to precociously recognize patients with complex dislocation. Joint stiffness reveals to be the most common complication of this injury, possibly resulting from soft tissue trauma and the time of injury, prolonged immobilization or from osteochondral fracture and related degenerative changes [9]. Baldwin et al. described the structures trapping the metacarpal head: medially the tendon of the abductor digiti quinti, laterally the radially displaced flexor tendons, distally the natatory ligament and proximally the superficial and deep transverse metacarpal ligaments, the floor being formed by the displaced volar plate [10]. Most authors have considered that the main element preventing reduction is the interposition of the volar plate [2...
between the base of the proximal phalanx and the head of the metacarpal. However, Green and Terry concluded, on the basis of cadaver dissections that another element was that the deep transverse metacarpal ligament, although partly torn, may contribute, by virtue of its attachment to the volar plate, to the difficulty of the reduction [11]. If the partial lesion of the deep transverse ligament is completed by a small longitudinal incision, the plate can be manipulated out of the joint and reduction will automatically occur [2].

There is ongoing debate regarding the surgical approach to complex dorsal MCP dislocation [12, 13, 14]. The dorsal approach was first described by Farabeuf in 1876 and the volar approach by Kaplan in 1957 [13]. The advantages of the dorsal approach include excellent exposure of the volar plate, no risk of damage to the digital nerves or vessels, and accessibility to osteochondral fragments of the metacarpal head. Nevertheless, the volar plate, longitudinally split to reduce the MCP joint, cannot be repaired when using this technique in addition to the increased risk to extensor adhesions[10]. The volar approach allows direct access to the lesion, anatomical restoration of the joint and repair of the volar plate, decreasing the risk of late instability [2,12]. The reported disadvantages include difficulty in accessing the volar plate, which is tented over the metacarpal head, and danger of inadvertent damage to neurovascular structures [12]. For our two patients, the volar approach was preferred because it enabled to directly visualize the strangulated metacarpal head and volar plate which is split longitudinally to reduce the MCP joint and then repaired reducing the risk of residual instability. The potential disadvantage of iatrogenic neurovascular damage can be prevented by meticulous dissection, carefully protecting the digital nerve and vessels. To note that the stretched, palmarly displaced neurovascular structures comprise the ulnar digital nerve and artery in injury of the fifth digits, unlike the the second and third digits, in which the radial digital nerve and artery are concerned [15]. In a cadaveric and clinical study, Barry et al. showed that both volar and dorsal approaches were successful in repairing such injuries [12]. Their study found that the dorsal approach was simple and safe but, because the volar plate was longitudinally split, it was theoretically liable to late instability. They also indicated that the palmar approach was more suitable for restoring normal anatomy, but was risky with regard to damage to the digital nerves and vessels. Becton et al. [16] and Bohart et al. [13] have used the dorsal approach, described by Farabeuf in 1876, especially in the thumb and index finger and recommend it in order to avoid damage to neurovascular structures and to give better access to the volar plate and easier reduction and fixation of osteochondral fractures found in the index finger. We have found no reported cases of osteochondral fractures in connection with complex dislocations of the little finger. Better results were found to be correlated to the timeliness of surgical procedure during the first day from injury, and motion initiated within 3 days [12]. For our two patients, the operation had been done within the first day of injury but longer duration period of immobilization had been applied in order to enable soft-tissue and volar plate healing, with no limitation of range of motion, comparatively to what has been reported in the serie of Oguz and Bulent [18].

CONCLUSION

Complex dislocation of the fifth metacarpophalangeal joint are rare, they are diagnosed by physical findings of a palpable metacarpal head, slight hyperextension of the proximal phalanx and dimpling of the palmar skin. X-Rays often show a widened joint space and the presence of a sesamoid bone within this space. Early diagnosis and treatment provide satisfactory functional results. Closed reduction attempts are usually unsuccessful and repeated attempts often lead to further complications. Surgical approach to the dislocated MP joint is mandatory to allow joint healing without complications.

REFERENCES

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