

Thumb Carpometacarpal joint dislocation: Case report and short review

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ABSTRACT

Thumb carpometacarpal (CMC) joint dislocation is rare, and the treatment options may vary from conservatives' strategies to open reduction and fixation. In face of pain and joint instability persistence, surgical intervention is required. We present the case of a 67-year-old male that was referred to our hospital with pain and edema of the left hand, after the failure of a conservative treatment. After initial refusal of open surgery, due to the persistent joint instability, open reduction of the CMC joint dislocation was performed, and stabilized using two percutaneous Kirschner wires after repairing the joint capsule and dorsoradial ligament. Immobilization was required for 4 weeks. After that, the Kirschner wires were removed. Along with physiotherapy, the follow-up showed no pain persistence nor CMC joint luxation reoccurrence while the joint recovered its mobility. Further studies are required in order to determine the optimal therapy for such cases and to provide standardized recommendations, taking into account that the restoration of thumb CMC joint mobility is one of the most important goals in hand surgery.

Keywords: hand trauma, thumb carpometacarpal dislocation, carpometacarpal ligament, surgical treatment, Kirschner wires

INTRODUCTION

Closed injuries of the first carpometacarpal (CMC) joint are rare, representing less than 1% of hand trauma [1,2]. Also called trapeziometacarpal joint luxation, thumb CMC joint dislocation was first described by Blandin in 1844 [3, 4] and Faucher in 1856 [3,5]. It usually occurs during axial compression with a partially flexed thumb, in contact sports or activities with a high incidence of falling such as football, biking, or skiing, leading to a complete or partial thumb dislocation [6,

7]. Another mechanism that may lead to dislocation is commissural shearing, for example, due to a bike handlebar, as in Bennett's fracture, but when the thumb is not fully abducted [3]. On the other hand, in Rolando or Bennett metacarpal fractures, thumb CMC joint dislocation is usually associated [6].

With reference to the treatment of trapeziometacarpal joint luxation, this ranges from conservative options (reduction and splinting) to percutaneous pinning or open reduction with repairing or reconstructing the joint stability [1]. The literature offers different points

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of view regarding the superior outcomes of surgical treatment in this type of lesion compared to conservative strategies [6].

In this paper, we presented the case of a patient with a thumb CMC joint dislocation that was initially treated conservatively, but in the end it required surgical intervention due to the instability of the joint and pain persistence.

CASE REPORT

A 67-years-old male, with a history of asthma, hypertension, and gastroesophageal reflux disease, was referred to the emergency room of the Emergency Clinical Hospital of Bucharest with a thumb cast in full extension and abduction, presenting with pain and edema of the first finger of the left hand. His medical history revealed that a closed reduction and casting were performed in another hospital 7 days before, after falling off his bike and dislocated the base of his first left metacarpal dorsally. The radiographs of the left hand



FIGURE 3. Radiographic aspect of the left thumb CMC joint dislocation after 7 days of conservative treatment without the cast (oblique incidence)

revealed carpometacarpal (CMC) joint dislocation with no associated fracture (Figure 1-3). Admission and surgical treatment were proposed, but the patient refused it. Therefore, closed reduction and casting were performed, under regional anesthesia. A better result was



FIGURE 1. Radiographic aspect of the unstable left thumb CMC joint dislocation after 7 days of conservative treatment (antero-posterior aspect)



FIGURE 4. Immediate radiographic aspect of the left thumb CMC joint dislocation after closed reduction under regional anesthesia (antero-posterior incidence)



FIGURE 2. Radiographic view of the unstable left thumb CMC joint dislocation after 7 days of conservative treatment (lateral aspect)



FIGURE 5. Immediate radiographic aspect of the left thumb CMC joint dislocation after attempting closed reduction under regional anesthesia after casting (antero-posterior incidence)

gained, but the dislocation proved to remain unstable (Figures 4, 5). After one week, the patient was admitted for surgical treatment. The interposition of the soft tissue and restraining elements of the joint was suspected, therefore, open reduction was considered (Figure 6). Under brachial plexus block and surgical tourniquet, an incision was performed in the anatomical snuffbox of the left hand, which extended proximally and distally in order to explore the first CMC joint. During surgical exploration, the dorsoradial CMC ligament of the thumb was torn apart, and the joint capsule was breached, allowing the base of the first metacarpal to dislocate posteriorly and laterally, while the anterior oblique CMC, posterior oblique CMC, and intermetacarpal ligaments were elongated. The articular surface of each bone was found intact, while the dorsoradial CMC ligament was completely ruptured, leaving two ends with no bone



FIGURE 6. Radiographic aspect of the left thumb CMC joint dislocation after attempting closed reduction under regional anesthesia showing instability at 7 days (antero-posterior incidence)



FIGURE 7. Radiographic aspect of the left thumb CMC joint after open reduction, repairing of containing elements of the joint and fixation using two Kirschner wires (oblique incidence)



FIGURE 8. Radiographic aspect of the left thumb CMC joint after removing the Kirschner wires at 4 weeks (antero-posterior incidence)

avulsion. Open reduction of the CMC joint dislocation was performed and the joint capsule and the dorsoradial CMC ligament were repaired. The joint was stabilized using two percutaneous oblique Kirschner wires (Figure 7). The surgical wound was closed in anatomical layers with absorbable suturing materials. A spica splint was applied. After 4 weeks and radiographic control, the Kirschner wires were removed (Figure 8). With medical rehabilitation, the patient regained full motion of the thumb. No intensive activities or sports were allowed in the first 3 months. Afterwards, progressive effort was recommended. At 5 months follow-up, the patient presented with no pain nor the recurrence of the luxation, and recovered full joint mobility.

DISCUSSION

First CMC joint dislocations treated in emergency settings often lead to good results, when a proper technique is used [3]. Usually, in this kind of injury, the ligaments dictate the prognosis. If they are elongated, there will be a lack in stability between the first metacarpal base and the trapezium [8,9]. Until recently, there were a series of authors that considered the anterior oblique ligament of the first CMC joint the most important [1,8]. For others, the radial, ulnar and palmar ligaments were all important in the dynamic stability of the thumb CMC joint [8,10]. A cadaver study conducted by Strauch et al., and a clinical one by Shah and Patel revealed that the lack of integrity of the dorsoradial ligament is associated with dorsal dislocation of the metacarpal base [8,11,12]. Other studies highlighted the importance of the dorsoradial ligament complex in providing a stable CMC joint during movement [6,10,13, 14]. In our case, the lack of integrity of this complex led to unstable closed reduction after several attempts, even if a spica splint was properly used.

There are several options for treating this pathology. Reduction by axial traction of the abducted thumb followed by pressure in a volar direction at the base of the first metacarpal in the anatomical snuffbox, under radiographic control, followed by thumb casting or splinting for 4-6 weeks in the abduction position and full extension is the first treatment option [3, 4]. If this proves to be unstable, it may benefit from minimally invasive percutaneous pinning using Kirschner wires, under fluoroscopic control and 4-6 weeks of immobilization [1,6,16]. Zhang et al. reported a series of 13 cases with acute thumb CMC joint dislocation or subluxation repaired through tenodesis, an alternative technique for ligament reconstruction, using part of flexor carpi radialis [17].

For complex thumb CMC joint dislocation with important instability, Shimura et al. showed, in a report including 8 patients, that surgical repair of the dorsal capsule-ligamentous complex using anchors and sutures is a reliable technique [18]. Joint stability can be surgically obtained through dorsal ligament tightening, using sutures or anchors for ligament imbrication [19, 20].

When important injuries, such as complete rupture or avulsion of the ligamentous structures, are suspected, open reduction, repairing, or reconstructing of these structures and Kirschner wires fixation may be required [1,6]. In our case, after the failure of the conservative treatment, open reduction with the direct repair of the dorsoradial ligament, capsuloraphy, and Kirschner wire fixation leads to full motion regain and stability of the first CMC joint, with immediate recovery and resuming of the normal activities.

Regarding postoperative measures, standard recommendations are immobilization for 4-6 weeks, physiotherapy with controlled exercises to preserve soft-tis-

sue flexibility, and restore joint strength [6,21]. Our case is consistent with published data showing that allowing early resumption of light movement during physiotherapy promotes recovery of joint mobility and strength, while reducing the incidence of dislocation recurrence and pain persistence.

Various postoperative complications can appear in such cases, especially the range of motion limitation, tendinous adhesions, joint instability, dislocation recurrence, subluxation, trapeziometacarpal arthropathy, and arthritis [3,6,22,23]. In limited cases, the long-term complications may lead to the need for trapeziometacarpal prosthesis [24,25].

CONCLUSIONS

Surgical treatment may lead to better results in unstable reduced thumb CMC joint dislocation, even if it is not performed in an emergency setting. Radiographic monitoring of the conservatively treated patients may allow rapid and efficient conversion to surgical treatment in this type of hand injury. Current recommendations are scarce; therefore, more studies are required in order to establish if repairing/reconstructing the ligaments of trapeziometacarpal joint may represent the standard of care in this type of lesions. The primary goal of the therapeutic management in patients with thumb CMC joint dislocation is the restoration of joint mobility, while reducing the risk of long-term complications.

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All the procedures of this study respect the ethical standards in the Helsinki Declaration of 1975, as revised in 2008 [5], as well as the national law. Informed consent was obtained.

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