

Carpometacarpal Joint Concurrent Dislocation of Four Long Finger: Results of A Non-Operative Management

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Abstract

Simultaneous carpometacarpal (CMC) dislocation of the all long fingers represent a rare injury. The injury is often overlooked because clinical deformity is often obscured by swelling of the dorsum of the hand. Postero-anterior (PA) radiograph view typically shows loss of parallelism at the CMC joints with an overlap of joints surfaces. Various treatments described in the literature include closed reduction and cast immobilization, closed reduction with percutaneous fixation, open reduction and internal fixation but there is no consensus in treatment approach.

We are sharing a case with concurrent dislocation of four long fingers carpometacarpal joint. The patient was managed successfully with closed reduction and cast immobilization with a follow-up of 9 months.

Keywords: Carpometacarpal, Long Finger, Fracture-dislocation

Introduction

The dislocations of the carpometacarpal (CMC) joints excluding the thumb are uncommon. The CMC joints are stabilized by strong ligaments and this explains the higher frequency of fracture-dislocation with respect to pure dislocations as well. The CMC joint has an intrinsic stability. Static and dynamic stabilizers of the CMC joints are joint congruity, capsular insertion, ligaments and muscle attachments. The dorsal interosseous ligaments are more resistant than those volar and this explains the higher frequency of dorsal CMC dislocations.

There is no consensus regarding the treatment and the debate is still open. The publications consist mainly of case reports or small series analysis. The treatments described in the literature include closed reduction and cast immobilization, closed reduction with percutaneous fixation, open reduction and internal fixation. Closed reduction and percutaneous fixation with pinning is the preferred treatment because the unstable nature of these injuries [1-5]. The reduction is obtained by longitudinal traction and direct pressure applied to the bases of the metacarpals. In some cases, joint capsule, ligaments or tendons are entrapped in the CMC joints and can prevent the reduction. In these patients, an open technique is necessary [3,5,6]. Furthermore, late diagnosis and treatment makes closed reduction difficult.

We are presenting a case with concurrent dislocation of four long fingers carpometacarpal joint which was managed successfully with closed reduction and cast immobilization. The objective to present this case report is to highlight clinical and radiological findings to diagnose this rare injury which if managed early has very good functional outcome. On the contrary, delay in diagnosis and management may lead to compromise functional outcome.

Case

A 36-year-old man, presented at the emergency room for pain and swelling dorsal to the right hand, the patient reports fall from the bike the day before. The clinical examination showed significant swelling and disruption of the normal anatomic contour of the back of his right hand and a small bruise over ulnar forearm (Figure 1). Distal neurovascular status was unremarkable. The patient was subjected to X-rays of the right hand that showed dorsal dislocation of the second, third, fourth and fifth metacarpals (Figure 2a and 2b). A reduction maneuver was performed by applying a longitudinal traction from the fingers and back pressure at the base of the metacarpal. In view of the good stability of the reduction it was decided to apply a Edinburgh style plaster cast with wrist extension of about 30° for 4 weeks. Post reduction in plaster cast radiographs showed the articular congruence of all carpal-metacarpal joints (Figure 3). A CT scan was performed after one week of injury to look for reduction and other missed injuries (Figure 4). There was satisfactory reduction of CMC joint with minor fracture fragments at the bases of III, IV, V metacarpals on volar side.



Figure 1: Photograph showing swelling and deformity of the dorsum of the hand after trauma.



Figure 2a: Anterior-posterior view.



Figure 2b: Lateral view of the hand showing dorsal dislocation of four ulnar CMC joints.



Figure 3: Lateral view after successful closed reduction and casting including MF joints with wrist in 30° of extension.



Figure 4: CT sagittal scan showing CMC reduction and little fragments of the bases of III, IV, V metacarpals on volar side.

Result

At 4 weeks, the cast was removed. Radiograph showed satisfactory reduction. Full active and passive fingers and wrist motion was encouraged. The patient returned to work at 40 days. At final follow-up, at 9 months, the patient was invited to complete the DASH Score and was clinically evaluated for residual deformity, subjective grip strength and range of motion measurements. His DASH Outcome Measure score was 2,5. The patient was pain free, he reported occasional activity related pain when he make a fist. He had a full range of wrist and fingers movements compared to the opposite side, and he had full subjective grip strength. He returned to his previous occupations and full work activities with no residual pain.

Discussion

The dislocations of the carpometacarpal joints excluding the thumb are uncommon. They occur in less than 1% of the osseous injuries [7]. The diagnosis was easily missed especially in acute injuries [8]. The CMC joints are stabilized by strong ligaments and this explains the higher frequency of fracture-dislocation with respect to pure dislocations as well [9,10]. The CMC joint has an intrinsic stability. Static and dynamic stabilizers of the CMC joints are joint congruity, capsular insertion, ligaments and muscle attachments. The author traditionally distinguish between mobile metacarpal (M1, M4, M5), and fixed metacarpal (M2, M3). Dislocation of the ulnar metacarpal (fourth and fifth) are the most frequent as a result of high mobility [11]. The dorsal interosseous ligaments are more resistant than those volar and

this explains the higher frequency of dorsal CMC dislocations. Simultaneous carpometacarpal dislocation (without fractures associated) of the all long fingers represent a rare injury and there are only few cases reported in literature [1-6,12-18]. This pattern of lesion can be caused by a high-energy trauma, such as motorcycle accident or low energy trauma, such as fist fights or a fall on the hand, as a result of axial load transmitted along the metacarpal shaft.

In emergency management, this injury is often overlooked because clinical deformity is often obscured by swelling of the dorsum of the hand. Radiographs should be systematic and include the posterior-anterior (PA), oblique and true lateral views of the hand. The PA view show loss of parallelism at the CMC joints with an overlap of joints surfaces. The lateral view is important to determinate the direction (dorsal or volar) of the dislocation. Oblique views in 30° of pronation and that in 20° of supination allows to avoid the superimposition of CMC joints. CT scan be helpful for complete diagnosis and for identification of unrecognized associated fractures.

Fortunately, as our patient was diagnosed early, closed reduction was achieved easily and was stable, consequently we decided for a plaster cast immobilization. This treatment is described in literature and seems to be sufficient in some cases with pure stable dislocation [10-12]. Subsequent recovery and rehabilitation of the patient was smooth with a good functional outcome. Timely treatment of this injury is crucial to ensure stable reduction and good prognosis.

Conclusion

CMC dislocations are very rare and a dislocation of all CMC joints of the long fingers are extremely rare and are described as isolated cases. In literature, there is still no consensus on the treatment, however, the authors agree that the therapeutic success depends on early diagnosis. Especially timely diagnosis allows effective treatment with non-invasive techniques. It is important to perform a complete and accurate check of injuries in the different radiographic views and with the help of a CT scan to highlight any associated fractures. Equally important is the technique of reduction that may need local or general anesthesia in less compliant patients. The goal of treatment is to obtain an anatomic and stable reduction which allows the ligament healing using a plaster cast. Non-operative treatment in this case ensured an anatomic reduction and stable over time with excellent functional outcome at 9 months.

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