INTRODUCTION

Hand fractures are the second common fracture in general population but dislocation of carpometacarpal joints are rare injuries. They represent less than 1% of injuries of wrist and hand region. Upto 70% of carpometacarpal joint dislocations are missed or misdiagnosed especially in polytrauma patient when treating physician may be overwhelmed by other injuries. Volar carpometacarpal joint dislocations are even less common than their dorsal counterpart. This case report describes this rare injury pattern occurring after a road traffic accident.

CASE REPORT

A right handed, healthy young school teacher of 23 years of age, riding on bike collided with a van and injured his non-dominant hand. Patient presented in the Accident and Emergency Department with swelling, pain and abrasion on left hand in mid November 2009. He was evaluated according to ATLS protocol. No other significant injury was detected. The patient was made comfortable with analgesics. His left hand was deformed and tender at wrist area. Range of motion at wrist was limited, distal neurovascular status was intact and there was no evidence of tendon rupture. X-ray wrist with hand showed multiple volar carpometacarpal joints dislocation of medial four joints without any fracture or avulsion injury (Figure 1).

Under general anesthesia closed reduction was successful in all carpometacarpal joints except the 2nd (index finger). Open reduction was done and carpometacarpal joints were fixed with K-wires. Wound closed, antiseptic dressing and slab applied (Figures 2 and 3).

Range of motion was started on the 3rd day. Stitches were removed after 2 weeks. K-wires and slab were removed after 8 weeks. Extensive physiotherapy was started. Hand function is good and patient is pain-free on the last follow-up.

DISCUSSION

Carpometacarpal joints are stable anatomically because of interlocking saddle joints, supported by volar and dorsal ligaments, long flexors and extensor tendons and intrinsic muscles. Third carpometacarpal joint is more stable because it is more proximal and providing key stone phenomenon with other carpometacarpal joints. It is fixed and relatively rigid so its dislocation is rare as compared to other carpometacarpal joints.

Direct violence is the most common mechanism of injury. Whether volar or dorsal dislocation occurs it is determined by direction of force. Carpometacarpal dislocation may occur due to high energy trauma like motor vehicle accident, crushing injuries, fall from height.
or low energy injury e.g. fist fight or fall on hand.² Mostly motor cycle accident (firm gripping to hand bar at the time of injury) results in carpometacarpal joint dislocation.⁶

Traumatic injury to carpometacarpal joint was first described by Bladin (1844) when he noted dorsal dislocation of base of middle and index fingers.³ In 1918, Whorton described volar dislocation and in 1968 Nalebuff noticed volar radial dislocation of 5th carpometacarpal joint.⁵

Carpometacarpal joint dislocations are uncommon injuries and constitute less than 1% of wrist/hand injuries.² Volar dislocations are extremely rare and less common than dorsal carpometacarpal joint dislocation, due to short and thick volar capsule.²,⁶,⁷ Dorsal carpometacarpal joint dislocation of thumb alone and associated with trapezium and Bennett's fracture, middle finger, little finger, fourth and fifth carpometacarpal joint dislocation had been notified.²,⁸,⁹ Multiple carpometacarpal joint dorsal dislocation has been reported by Kirkham.¹⁰ Similarly medial four carpometacarpal joint dislocation (multiple) has been described by Kent et al. with fracture base of 5th metacarpal.⁶ Three cases of multiple dorsal carpometacarpal joint dislocation has been registered by Robert et al. which include multiple but mixed carpometacarpal joint dislocation in one patient i.e. 2nd and 3rd finger dorsal dislocation and 4th and 5th volar dislocation.⁴ Volar dislocation is extremely and exceedingly rare.³ Volar dislocation of thumb carpometacarpal joint, index, 4th and 5th carpometacarpal joint, volar dislocation of 5th carpometacarpal joint has been reported.³,⁵,⁷ Multiple volar carpometacarpal joint dislocations are even more rare and only few examples in literature are available of this type of injury.¹⁰ This case was reported for the rare injury pattern i.e. multiple volar carpometacarpal joint dislocations of all the four fingers.

Carpometacarpal dislocation whether dorsal or volar can have severe consequences if not identified and treated adequately.⁵ It may include close reduction and splintage, close reduction and K-wire fixation or open reduction and K-wire fixation. Choice of treatment depends upon severity, stability of carpometacarpal joint and experience of attending physician.²

Open reduction is not justified in all the cases. Immediately, close reduction and immobilization can be sufficient.⁶,⁷ Close reduction is achieved by longitudinal traction and pressure at metacarpal base. This is successful if dislocation is less than 10 days old. The disadvantage in this technique is non-anatomical reduction, difficulty in pinning and risk of tendon transfixation.² However, some cases require open reduction and internal fixation. Prokush in 2001 also supported open reduction and internal fixation as close reduction is difficult.⁶ Open reduction is indicated in metacarpal overlapping, massive edema, entrapment of ligament or bone fragments and failed close reduction or dislocation more than 3 weeks old.²,⁴ In open reduction and internal fixation of multiple dislocations it is critical to first reduce and stabilize 3rd metacarpal and then other carpometacarpal joints. Open reduction and internal fixation is done through dorsal approach. K-wires remain in place for 6-12 weeks.²

About 87% patients having carpometacarpal joint dislocations will return to full work and sports activities with negligible pain by appropriate treatment. Early diagnosis and prompt treatment is essential for functional outcome.² With restoration of normal anatomical reduction excellent results may be expected. Movements at carpometacarpal joints may be compensated by adjacent joints. This all should be backed-up by extensive and intensive physiotherapy and rehabilitation. Pain free wrist is expected by doing all this but late diagnosis and improper reduction may diminish grip strength, continuous pain or arthritis.³,⁵

REFERENCES

