EMERGENCY CASEBOOK

Volar dislocation of the index carpometacarpal joint in association with a Bennett's fracture of the thumb: a rare injury pattern

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We describe a case of volar dislocation of the index carpometacarpal (CMC) joint in association with a Bennett's fracture of the thumb following a motorcycle accident. Volar dislocation of the index carpometacarpal joint is an exceedingly rare but easily missed injury, with only a few reported cases in the literature. This report highlights the importance of a true lateral radiograph and close scrutiny of the film to detect this injury. Closed reduction supplemented with Kirschner wire fixation restored normal anatomical relations and achieved an excellent clinical result.

A 23 year old general operative presented following a motorcycle accident with crush injuries to his non-dominant, right hand. Clinical examination revealed generalised swelling of his right hand and wrist. There was no clinical angular or rotational deformity of the digits. There was no evidence of neurovascular deficit or clinical evidence of tendon disruption. He also sustained a splenic injury and a stable fracture of his eighth thoracic vertebra.

Routine radiographs of the injured hand revealed a Bennett's fracture of the right thumb metacarpal and volar dislocation of the index carpometacarpal joint (fig1). The dislocation was reduced under general anaesthetic and reduction maintained with transverse percutaneous Kirschner wires (fig 2). The hand and wrist were immobilised in cast for six weeks. Following this period, the cast and wires were removed and an intensive physiotherapy rehabilitation programme was commenced.

Six months after surgery, he had a full range of finger and wrist movements and was functioning in his previous occupational capacity. His mean grip strength was found to be 30 kg in the right hand and 34 kg in the left.

DISCUSSION

Traumatic injury to the carpometacarpal joints was first described by Blandin in 1844, when he reported a case that involved a dorsal dislocation of the index and middle metacarpal bases. While there have been a number of subsequent reported carpometacarpal dislocations, these have predominantly been dorsal in direction. Volar dislocation, particularly of the index and long fingers, is extremely rare, with only a few cases cited in the hand literature.¹

The base of the transverse metacarpal arch of the hand is formed by the carpometacarpal joints of the digits. The fixed central unit of the arch, the index and long metacarpals, is relatively rigid, and has interdigitating articulations with the trapezoid and capitate. These joints are further supplemented by the inter-metacarpal and interosseous ligaments, which add soft tissue support to the stable bony architecture. The articulation of the third metacarpal with the capitate is located more proximal than the other carpal articulations and

produces the so called "keystone" effect. This is one of the reasons why the CMC joints of the ring and little finger metacarpals are more commonly injured than the second and third CMC joints. A significant degree of force is required to disrupt the CMC articulation, and the majority of dislocations are accompanied by avulsion fractures of the involved bones.²

While CMC joint dislocations have been well described, review of the literature shows that the ring and little finger metacarpals are most commonly injured and are typically dorsally displaced. De Beer *et al* reviewed 10 patients with closed multiple CMC dislocations and found all 10 dislocations to be in the dorsal direction.³ Volar dislocation is far less common, particularly of the index and middle finger CMC joints. When diagnosed early, carpometacarpal dislocations are usually managed by closed reduction and stabilisation with Kirschner wires. However, associated basal metacarpal fractures may prevent closed reduction and necessitate open reduction. Diffuse swelling may obscure the deformity and the absence of a true lateral radiograph can make recognition of this injury pattern difficult. Garcia-Elias *et al* reviewed 13 cases of multiple carpometacarpal fracture dislocations and found that an inaccurate diagnosis was made in five cases, resulting in less favourable outcomes.⁴ Consequently, a high index of suspicion is required when examining the true lateral radiographs of the hand in the presence of a painful and swollen hand. A delay in diagnosis often mandates open reduction while failure to diagnose the dislocation inevitably results in diminished grip strength, post-traumatic CMC arthritis, and a suboptimal outcome. With restoration of normal anatomical relations, an excellent functional result can be expected, as any associated loss of mobility can be compensated by the adjacent joints.

In summary, we report an extremely rare case of volar dislocation of the index carpometacarpal joint. This can be easily missed because superimposition of the adjacent metacarpals can obscure the diagnosis, and a high index of suspicion is required in detecting this injury. Early closed reduction and Kirchner wire stabilisation followed by intensive rehabilitation yielded a pain free carpus and an excellent functional result.

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Abbreviation: CMC, carpometacarpal

Figure 1 (A) Anterior posterior view; (B) lateral view. (C) Anterior posterior view; (D) lateral view.

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