Results over 2 years follow up of open reduction in Hamate body fracture with dorsal dislocation of hamatometacarpal joint

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Introduction

Although carpal bone fractures, in general, occur frequently, hamate fractures, specifically, are relatively uncommon injuries. Milch[1] was the first who stated that the hamate is subject to two types of fractures, a fracture involving the body of the hamate or a fracture involving the hook of the hamate. Hirano et al.[2] further classified coronal fractures of the hamate body into two subtypes (dorsal oblique and splitting). We classified the hamate body fractures into two types according to the hirano classification, and followed up for more than 2 years after open reduction. We report the radiological and clinical results.\(^*\)

Materials and Methods

The study group was comprised of 21 men (The cause of injury was all direct punching mechanism), aged 18 to 48 years (average 35 years). The type of fractures were all coronal fracture of the hamate body. There were 16 coronal dorsal oblique fractures, 5 coronal splitting fractures(Fig 1). All patients was performed open reduction (screw fixation on the hamate, K-wire fixation to the dorsal dislocation of the hamatometacarpal joint)(Fig 2). Mean follow-up time for the study group was 5 years (2 to 9 years). At the final examination, pain, tenderness, grip strength, range of motion of the wrist and fingers and Mayo wrist score were assessed. At the last follow-up, computed tomography was performed to analyze the remodeling pattern of the hamatometacarpal joint on the sagittal plane and the occurrence of post traumatic arthritis.\(^*\)

Figures

Fig. 1. There were 2 types of fractures of the body of hamate. A. coronal dorsal oblique fracture of the hamate body. B. Coronal splitting fracture of the hamate body.\(^*\)

Fig. 2. Open reduction and internal fixation was performed. Screw fixation to the body of hamate and K-wire fixation was performed to the dorsal dislocation of the hamatometacarpal joint. The pre-operative X-ray show that the tramline has disappeared(red arrow). But , the tramline appears in the post-operative X-ray (blue arrow).\(^*\)

Fig. 3. There were 3 types of remodeling pattern of the hamatometacarpal joint in Sagittal plane of the computed tomography. A. Round shape. B. V shape. C. Bumpy shape.\(^*\)

Results

At the final follow-up, none of the patients complained of pain, except for one patient who complained of pain at 2 points of VAS score. There were no patients complaining of surgical site tenderness. The grip strength showed an average of 98% (90-110%) on the contralateral side. The range of motion of the wrist joint and finger was not different from that of the uninjured side. The Mayo wrist score was excellent with an average of 98 points (95-100 points). There were 3 types of remodeling pattern of the hamatometacarpal joint in Sagittal plane of the computed tomography(Fig 3). In two cases, Kellgren-Lawrence's grade 2 osteoarthritis developed at the hamatometacarpal joint at the final follow-up. There was no statistical significance in terms of remodeling pattern, occurrence of osteoarthritis, classification of fracture, association with associated injuries with Fisher's exact test.\(^*\)

Discussion

Typically, injuries to the hamatometacarpal complex are the result of an axial load placed on the fourth and fifth metacarpal heads, most often with some degree of concomitant flexion or angulation force. The majority of these injuries are caused by striking an object with a closed fist(54%), but they also commonly occur in motor vehicle accidents(23%) and with falls(14%).\(^*\) It is a fracture in which the deformity of the joint surface is caused by the damage mechanism. However, there has been no radiographic analysis of the shape of the articular surface through long-term follow-up. Although there is no statistical correlation, it is meaningful that this study analyzed the remodeling pattern of the joint surface and investigated the relation with the final clinical symptoms.\(^*\)

References