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CASE REPORT

Fracture of hamate body was accompanied with 3-4 intermetacarpal dissociation: A case report

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ABSTRACT
Introduction: Hamate body fractures are rare hand injuries and are accompanied by serious complications. Our study is one of the rare case reports reported in the literature. Case report: Our case is an industrial injury case of a 51-year-old male patient who was working as a printing machine operator and got his hand stuck between the wheels of the machine. It has been observed that hamate bone fracture accompanying the intermetacarpal decomposition after the accident has developed. Reduction and fixation of hamate bone fractures and intermetacarpal dehiscence were performed, and fasciotomy was performed due to compartment syndrome. Adequate recovery was achieved after the treatment of the patient. Conclusion: As far as we know, no carpal bone injury similar to our case has been reported in the literature before. We recommend rigid screw fixation for fracture osteosynthesis, K-wire fixation for metacarpal dissociation, and early fasciotomy to prevent the development of compartment syndrome in intermetacarpal separation injuries accompanied by hamate bone fractures.

Keywords: Carpal Bone, Compartment Syndrome, Hamate Fracture, Hand Injury.

ÖZET
Hamat Kırığına Eşlik Eden 3-4 İntermetakarpal Ayrışması. Olgu Sunumu
Giriş: Hamate cisim kırıkları nadir görülen el yaralanmalarıdır ve ciddi komplikasyonlar eşlik eder. Çalışmamız literatürde bildirilen nadir olgu sunumlarından biridir. Olgu sunumu: Olgumuz, matbaa makinesi operatörü olarak çalışan ve elini makinenin çarkları arasına sıkıştıran 51 yaşındaki bir erkek hastaya ait endüstriyel yaralanma vakasıdır. Kaza sonrası intermetakarpal ayrışmaya eşlik eden hamat kemik kırığı geliştiği görülmüştür. Olgunun hamat kemik kırıklarının ve intermetakarpal ayrışmasının redüksiyonu ve fiksasyonu gerçekleştirilmiş olup, kompartman sendromu nedeniyle fasiyotomisi gerçekleştirilmiştir. Hastanın tedavisi sonrası yeterli bir iyileşme elde edilmiştir. Sonuç: Bildiğimiz kadarıyla daha önce literatürde bizim olgumuza benzer karpal kemik yaralanması bildirilmemiştir. Hamate kemik kırıklarının eşlik ettiği intermetakarpal ayrışma yaralanmalarında kırık osteosentezi için rijit vida tespiti, metakarpal disosiasyon için K-teli tespiti ve kompartman sendromu gelişimini önlemek için erken fasyotomi öneriyoruz.

Anahtar kelimeler: Karpal Kemik, Kompartman Sendromu, Hamat Kırığı, El Yaralanması

INTRODUCTION

Hamate bone fractures are uncommon carpal injuries, responsible for 2–4% of all carpal fractures[1,2]. A hamate body fracture with metacarpal dissociation is a very rare injury and it is rarely associated with compartment syndrome.[3,4]. The term hamatometacarpal fracture–dislocation refers to a wide spectrum of complex hand injuries which is sometimes known as combined fourth and fifth carpometacarpal fracture-dislocation[3].

Some case reports are about carpal bone fracture with metacarpal dissociation in the literature.[4,6]. However, to the best of our knowledge, no previous cases of hamate body fracture with an associated 3rd and 4th intermetacarpal dissociation and compartment syndrome have yet been published in literature. This

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article reports a divergent hamatometacarpal fracture that consists of a combination of the third to fourth intermetacarpal dissociation and compartment syndrome with a longitudinal fracture of the hamate.
The patient was informed that data concerning the case would be submitted for publication, and he provided consent.

CASE REPORT

This is an industrial injury case of a 51-year-old man who was working as an operator of a printing press machine and unfortunately got his hand caught in between the rolling pins of the machine. He presented at the emergeny service 1 hour after sustaining the right hand injury. At the emergency room the patient was noted to have severe ulnar sided pain on the right hand, swelling and echymosis. There was hypoesthesia in the 3rd to the 5th fingers. However, capillary filling was good. The patient had no known comorbidities.
Radiographs were immediately taken and showed an expansion of the fourth intermetacarpal joint space and displaced hamate bone fracture on the anteroposterior view and bulking of the hamate on lateral view, respectively (Figure 1).

Figure 1: Pre-operative x-ray images

Furthermore, CT scans revealed a displaced coronal hamate fracture,non-displaced trapezium bone fracture and intermetacarpal dissociation (Figure 2).

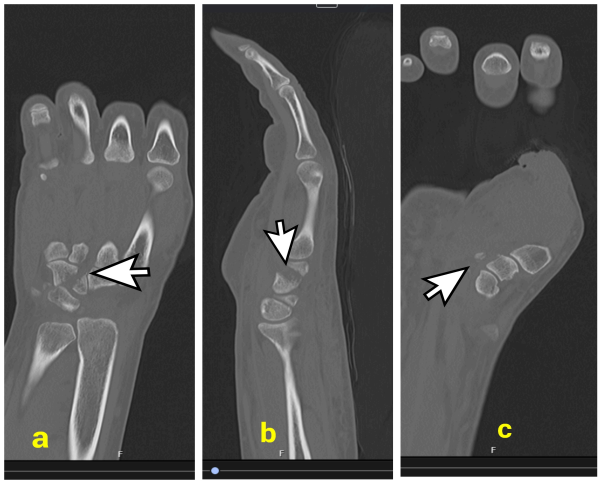

Figure 2: Pre-operative Computer Tomography (CT) cross-section images: a. Coronal Section b. Sagittal Section c. Trapezoidal Bone Fracture

Compartment syndrome was also noted on the patient presenting with all the classic symptoms of compartment syndrome which are: hypoesthesia, increased skin swelling and tightness, and pain with passive flexion.
Patient was immediately rushed to the operating room for a stat procedure under axillary nerve block anesthesia. As for the conduct of surgery, debridement was done initially and the wound was washed with 3000cc saline. Fasciatomies were performed on the dorsal 2nd and 4th web space and on the volar aspect of the hand (Figure 3).

Figure 3: Peri-operative carpal fasciotomy view a. Dorsal b. Volar

Fracture reduction was performed through the fasciotomy incision. Primary osteosynthesis of hamate bone fracture was performed with 1 headless cannulated screw. Intra-operatively, it was observed that there was persistent intermetacarpal instability despite hamate fracture osteosynthesis hence, the intermetacarpal instability was resolved using a Kichner(K) wire and a splint was applied to the affected extremity (Figure 4).

Figure 4: *Post-operative* x-ray images a.Anterior-posterior *view* b. Lateral *view*

Post operatively, the patient was placed in the orthopedic service wing. IV antibiotics were continued (cefazole 1 g/day), analgesic (contra mal and paracetamol) were given. The hand was kept elevated. The fasciotomy site was closed on the 3rd post-operative day and the patient was discharged on the 4th postoperative day. The patient followed up at the 2nd, 4th, and 6th weeks at the outpatient clinic. The splint of the patient was removed in the 4th week, and the Kirschner wires were removed in the 6th week.

DISCUSSION

To the best of our knowledge, no carpal bone injury similar to our case has been reported in the literature before. We recommend rigid screw fixation for fracture osteosynthesis in intermetacarpal dissociation injuries accompanied by hamate bone fractures, K-wire fixation for metacarpal dissociation, and we suggest early fasciotomy to avoid the development of compartment syndrome.

Hamate bone fractures are rare (4 % of all carpal fractures) and are frequently missed carpal bone fractures[1,7]. Coronal fractures occur as a result of axial forces, and transfer hamate bone fractures occur as a result of compressive forces. Standard X-ray tecniques may fail to show hamate bone fractures. Additional protocols may be needed, such as carpal tunnel radiography, or computerized tomography (CT) may be needed[2].

Hamate bone fractures may be associated with metacarpal joint dislocations and other carpal bone fractures[4,5,8]. Our case was in the form of a coronal displaced hamate fracture that developed after rotational forces. In addition to the accompanying carpometacarpal dislocation, there was an intercarpal dissociation and non-depleted trapezoidal bone fracture.

The presence of the intercarpal dissociation distinguishes our case from other cases found in the literature. Displaced hamate fracture and intermetatarsal dissociation were detected on x-ray, and the CT scan was required for the diagnosis of concomitant non-displaced trapezium fracture. We recommend performing CT after x-ray in order not to miss the accompanying carpal bone fractures in hamate bone fractures. There is a metometacarpal fracture–dislocation classification in the literature[3].However, we suggest that new classifications be developed since it does not cover an injury like our case.

Anatomical reduction and rigid fixation of displaced intra-articular fractures are recommended because osteoarthritis develops in the hamate and metacarpal joints, which eventually leads to decreased hand grip in the long term status[1]. In the literature, studies are using K (Kirchner) wire or screw for fracture fixation of the hamate bone[6,8]. In our study, we performed the anatomical osteosynthesis of the carpal-metacarpal joint by rigid fixation of the hamate bone. We think that rigid fixation of hamate bone fractures using screws is more effective compared to K-wires. Prospective studies should be conducted to examine the clinical outcomes of the two techniques. We applied k-wire for intercarpal dissociation fixation. We observed that the K-wire application provided sufficient healing. We recommend the K-wire application because it is easy to apply and easy to remove the implant after healing.

Carpal injuries should be closely monitored for symptoms of compartment syndrome. Many studies in the literature have reported the use of early fasciotomy for upper extremity compartment syndrome to prevent irreversible contractures[9]. In our case, we performed volar and dorsal carpal fasciotomy as recommended in the literature[10] for compartment syndrome. We performed delayed primary skin repair in the postoperative period. We recommend that fasciotomy be considered in hamate bone fractures accompanied by inter-metacarpal dissociation.

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