



Late diagnosis of trans-scaphoid perilunate dislocation: A case report

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ARTICLE INFO

ABSTRACT

Article History

Received 22 / 06 / 2013

Accepted 03 / 08 / 2013

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Perilunate fracture dislocations are rarely seen severe injuries among wrist traumas. Trans-scaphoid perilunate fracture dislocation and dorsal perilunate dislocation are the most commonly encountered types of these injuries. In addition, other pathologies may also accompany in the same extremity. As they are rarely seen, they may be diagnosed late. When these cases are overlooked and not treated in the early stages, there is a high possibility of the development of limited wrist movements and chronic pain. In this respect, the importance of early diagnosis and treatment is evident. With accompanying literature, we present a case of 41-years old male operated for a diagnosis of perilunate dislocation due to falling down.

J. Exp. Clin. Med., 2014; 31:59-61

Keywords:

Carpal injury
Open reduction
Perilunate dislocation
Surgical treatment

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1. Introduction

Carpal dislocations and fracture dislocations are rare injuries which occur after high-energy traumas with the weight on the wrist in hyperextension (Witvoet and Allieu, 1973). Apart from children and the elders, it is seen frequently in young males in their twenties (Ball et al., 2012). Trans-scaphoid perilunate fracture dislocations and dorsal perilunate dislocations are the most frequently seen types of these injuries (Ball et al., 2011). With similar findings in the physical examination of wrist sprain and fractures which do not require emergency surgery, varying degrees of swelling, widespread sensitivity, deformity and restricted wrist movements may be seen (Weil et al., 2006).

In radiological imaging, there should be anteroposterior and lateral wrist direct radiographs and if there are clinical indications of other special imaging methods such as scaphoid radiographs should be selected. On the lateral radiograph, the appearance of the volar angle lunatum as 'spilled tea glass' is a diagnostic sign (Gilula et al., 1984). In addition, com-

puterized tomography (CT) and magnetic resonance imaging (MRI) examinations give detailed information about bone and soft tissue. An emergency method for carpal dislocation is closed reduction of the dislocation under regional block or general anaesthesia (Ball et al., 2012). Although good functional results are obtained from early diagnosis and closed treatment, degenerative changes are often seen. For better functional results, bone fixation with open reduction and soft tissue repair with a dorsal or volar approach is recommended, although the situation requires serious anatomic information together with clinical and surgical experience (Fonseca et al., 2012).

2. Case presentation

A 41-year old male was evaluated in the emergency department with complaints of pain on the left wrist. From the patient's history, it was learned that he had fallen from a height of approximately two meters on his left wrist. At the emergency department of another centre, a short arm brace had



Fig. 1. Preoperative wrist anteroposterior and lateral direct radiographs (Arrow shows 'spilled tea glass' sign)

been applied and he had been referred to the orthopedics clinic. With an initial diagnosis of perilunate fracture dislocation the patient had been referred to our hospital. In the physical examination, there were swelling, sensitivity and pain on movement of the left wrist. Neuromotor and vascular examination results were normal. The patient had no additional diseases. In the two-direction direct radiograph, dislocation to the volar in the lunate and a suspected fracture line in the scaphoid were observed (Fig. 1). On CT, dislocation to volar in the lunate and that the scaphoid had changed rotational place were observed. As two days had passed, closed reduction was not attempted. Open reduction with a volar approach was applied and by placing a kirschner wire (K-wire) in the direction of radius-lunatum-hamatum, fixation was achieved. Following soft tissue repair, the incision was closed and a scaphoid plaster cast was applied (Fig. 2). After four weeks, the plaster cast and the K-wire were removed and exercises were started. In the eighth month of follow-up the patient was healthy with pain-free but restricted wrist movements and continued his normal daily life.



Fig. 2. Postoperative wrist anteroposterior and lateral direct radiographs inside the plaster cast.

3. Discussion

The position of the lunate is defined by several ligaments such as the radiolunate, scapholunate, radioscapolunate and lunotriquetral. These ligaments provide stability between the radioulnar joint and the carpal joints. As the lunate has this degree of stability, a high energy trauma is required for injury to occur. Lunatum dislocation is generally a part of a perilunate carpal dislocation. It mostly dislocates in a dorsal direction. After impairment of the stabilising ligaments, the dorsal dislocation locates behind the lunate fossa of the lunatum (Mayfield, 1980).

Incorrect alignment of the ligaments stabilising the lunatum may result in semi-dislocation or full dislocation. Ligament injuries were defined by Mayfield (1980) in four stages. The first stage shows scaphoid dislocation/instability with scapholunate and radioscapoid ligament injury. The second stage has capitate dislocation including impairment of the 'space of poirier'. In the third stage, there is radiotriquetral ligament rupture and triquetrum dislocation. In the final stage, full failure of the radiocapitate, radiotriquetral and dorsal radiocarpal ligaments occurs. The Mayfield classification is used to understand the mechanism of ligament damage in the planning of repair and that the weakness in the ligaments may cause dislocation in other carpal bones such as the lunatum and the triquetrum (Mayfield, 1980). It has been reported that entrapment neuropathies occur from affected ulnar and median nerves following volar lunatum dislocation. Carpal tunnel syndrome is generally seen together with late diagnosed volar lunatum dislocation. For those with median nerve indications, emergency carpal tunnel decompression may be necessary in acute situations (Shariff et al., 2009). Herzberg and Forissier (2002) showed acute median nerve dysfunction in 4 of 23 patients with carpal dislocation. While evaluating the location of the carpal bones on direct radiographs, it is useful to start from the Gilula arcs. Gilula (1979) established three plain radiographic arc models by comparing anteroposterior direct radiographs of 90 patients showing dislocation together with carpal fracture, with normal direct radiographs. It was reported that the impairment of the arc shape of one or more carpal bones may not always be pathological, but may occur as a result of incorrect alignment or taking the wrong radiograph. When evaluating the patients in that study, it was shown that in cases where the three arcs model was impaired, after surgery the three arcs were within normal limits and the joint had been restored. In a study by Kömürçü et al. (2008) in which lunatum dislocation and scapholunate ligament damage were defined together with scaphoid dislocation, open reduction was seen to be appropriate for patients with ligament injury together with fracture and dislocation. It was also shown that for a fall on an open hand to result in a fracture in the scaphoid and damage to surrounding ligament structures, a high energy trauma would be required.

The mean carpal height can be estimated using the technique described by Youm et al. (1978) in that the carpal height of the distal radius joint surface is proportional to the length of the third metacarpal and this rate is 0.5 (0.54 +/- 0.03). Loss of carpal height shows a decrease in this rate. Bilos and Hui (1981) reported the case of a boxer with dorsal dislocation of the lunatum, who was treated with open reduction with K-wire fixation and multiple ligament repair followed by two months follow-up in a plaster cast (Bilos and Hui,

1981). Seidenstein (1956) reported a case where 75% of the lunatum bone was dislocated following a truck accident and the lunatum had to be excised. Several cases have been reported of lunatum dislocation together with another bone and more than one ligament injury (Bjerregaard and Holst-Nielsen, 1988; Schwartz et al., 1990; Neavin et al., 2009). A case was presented by Bjerregaard and Holst-Nielsen (1988) of lunatum dislocation together with radius styloid fracture following a truck and train collision. Neavin et al. (2009) reported a case of 5th metacarpal fracture and radius styloid fracture extending intra-articularly following a truck accident.

Early mobilisation of wrist injuries has been shown to be useful by reducing swelling, pain and stiffness to a minimum and thus accelerating functional recovery. In patients with a minimal level of soft tissue damage, after closed reduction and fixation with K-wire, the short-arm brace was removed after only three weeks and thus early return to work was achieved (Dias et al., 1987; McAuliffe et al., 1987). In a case with an old dorsal lunatum dislocation, multiple tendon transfer and proximal row carpectomy was performed (Schwartz et al., 1990). Viegas et al. (1987) applied open reduction and osteosynthesis with Herbert screws to five dorsal trans-scaphoid fracture dislocations and the results obtained from Green and O'Brien clinical and radiological scoring were three excellent, one good and one fair. Using the same

scoring system, Fernandez and Ghillani (1987) obtained scores of seven fair and three poor after having applied open reduction and K-wire osteosynthesis to 10 cases of perilunate fracture dislocation. In the case presented here, the lunatum was observed to have dislocated towards the volar on direct radiograph and on CT, the rotational place of the scaphoid was seen to have changed together with the dislocation. As the diagnosis was made two days later, closed reduction was not attempted. Open reduction with a volar approach was applied and fixation was achieved with one K-wire placed in the direction of radius-lunatum-hamatum. Following soft tissue repair, the incision was closed and a scaphoid plaster cast was applied. At the end of four weeks, the plaster cast and the K-wire were removed and exercises were started. The patient's rehabilitation continued through eight months of follow-up with pain-free but limited wrist movement.

Perilunate fracture dislocations are rarely seen, in severe wrist traumas and are often diagnosed late. Careful physical and radiological examination are important in the diagnosis. It should certainly be suspected and ruled out which is the purpose of the text. Even if closed reduction is successful in cases diagnosed early, subsequent collapse and arthritis are often seen. Therefore, it can be considered that it is necessary to select treatment of open reduction with fixation and soft tissue repair.

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