

CASE REPORT

Unusual Complete Isolated Scaphoid Dislocation, Report of a Case

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Abstract

Isolated scaphoid dislocations are extremely rare injuries and are commonly associated with significant ligamentous disruptions. A dorsiflexion-supination force upon the hand is considered as the most common mechanism of injury. Different treatment options have been proposed for the management of this uncommon entity, ranging from conservative treatment with closed reduction and casting to a wide range of open or percutaneous surgical techniques. In this article, we reported on a case of this rare injury managed with open reduction and pinning along with ligamentous reconstruction.

Keywords: Carpal scaphoid, Complete, Dislocation, Isolated

Introduction

Isolated dislocation of the carpal scaphoid without the presence of an associated fracture or dislocation of the carpal bones is a rare injury and only case reports are available in the literature (1-3). These reports suggest that forced wrist dorsiflexion with the hand in ulnar deviation is the most common mechanism of injury (4, 5). Various treatment strategies have been presented in the literature, ranging from closed reduction and casting to closed reduction and percutaneous pinning (6). A various extent of ligamentous disruption can accompany these injuries, in which scapholunate, radioscaphocapitate and radiolunate ligament are considered as the major ones. In this article, a case of this injury treated with open reduction, K-wire fixation along with ligament reconstruction was reported as a primary treatment to restore carpal articulation and preserve motion.

Case presentation

A 27-year-old male was admitted to the department of upper limb and hand surgery and microsurgery of our hospital after sustaining a traumatic fall to his dominant right wrist during running. No additional injuries were noted at presentation.

The patient complained of severe pain at the affected area, the wrist was swollen and tender and range of motion

was significantly restricted. On physical examination, the skin was intact and an obvious hematoma at the volar side of the wrist was present. No signs of neuromuscular compromise were evident. Anteroposterior and lateral plain radiographs showed a volarly dislocated carpal scaphoid without evidence of displacement or fracture of the other carpal and metacarpal bones [Figure 1A-B].

Initially, closed reduction under general anesthesia was attempted. Longitudinal traction, dorsiflexion and ulnar deviation of the wrist joint with direct pressure over the scaphoid were applied. After failing to obtain anatomic reduction and alignment of the wrist joint, the patient was brought to the operative theatre for open reduction and internal fixation. A radiodorsal incision was chosen and hematoma was evacuated. The scapholunate ligament was found completely ruptured. After identifying bony structures, open reduction was easily obtained [Figure 2]. The torn ligament was sutured and augmented with a mini suture bone anchor [Figure 3]. The repair and anatomic carpal alignment were secured with the use of two 16mm K-wires, one drilled through the scaphoid and lunate and another through the scaphoid and the capitate [Figure 4A-B].

Postoperatively, a scaphoid type cast was applied for six weeks. K-wires were removed at six weeks and physical

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Figure 1A-B. Initial preoperative anteroposterior (A) and lateral (B) wrist radiographs demonstrating isolated complete volar scaphoid dislocation.



Figure 2. Intraoperative view of the complete dislocated bone after being mobilized dorsally.



Figure 3. A bone suture anchor is added to close the scapholunate junction and provide additional stability.

therapy was then initiated to restore motion and strength. The patient was back to work 4 months after the procedure. At the latest follow-up, 16 months after the sustained

injury, the patient was satisfied with the functional result and reported no pain at rest. Here turned to his previous occupation as a lorry driver and started to perform his



Figure 4A-B. Postoperative anteroposterior (A) and lateral (B) radiographs showing K-wire fixation and ligament repair.

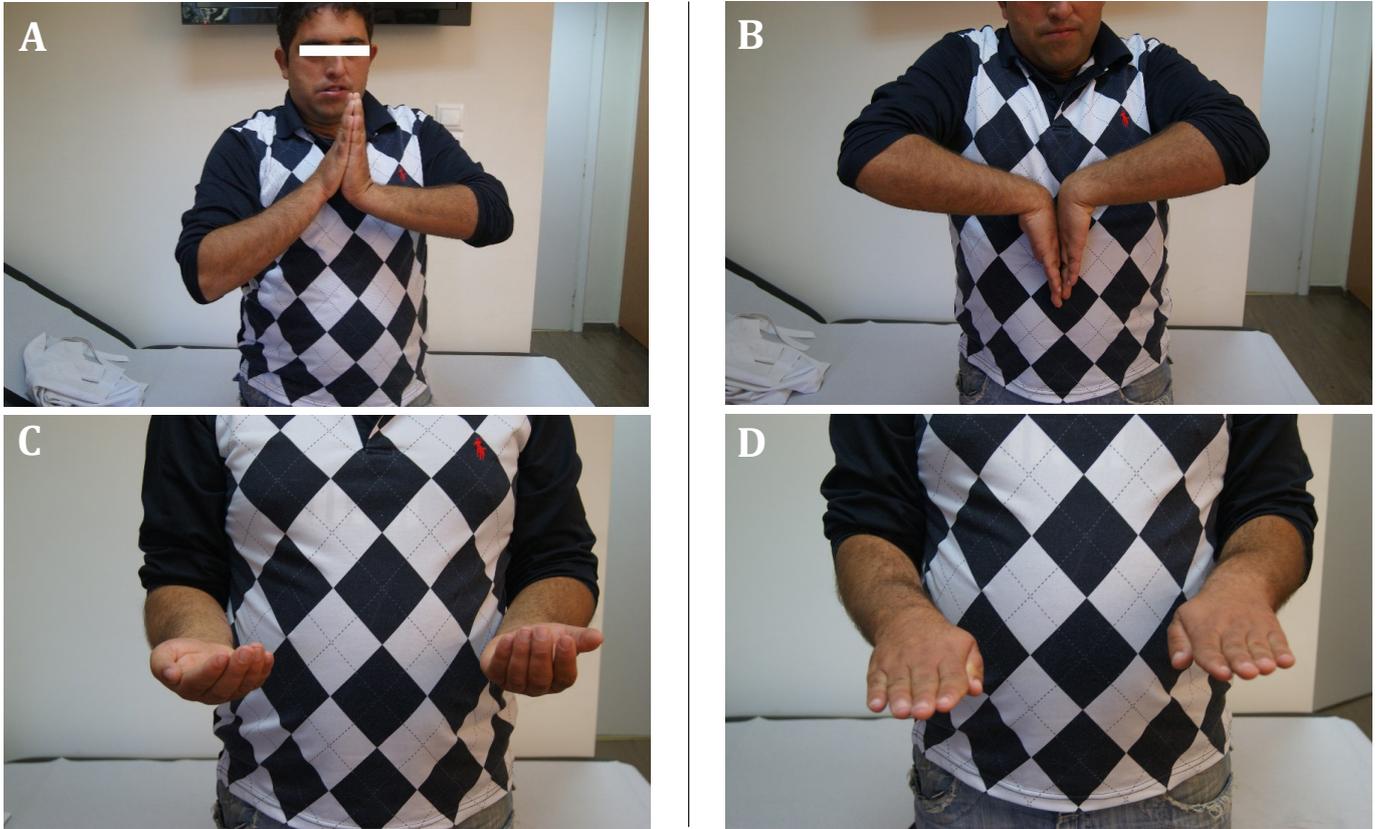


Figure 5A-D. Slight restriction of dorsiflexion of the affected wrist compared to the uninjured left hand. Pronation, supination as well as grip strength were equal on both sides at 16 months follow-up.

daily activities without a problem. Dorsiflexion was measured as 50 degrees on the affected side while it was 75 degrees on the uninjured left hand. Pronation, supination as well as grip strength were equal on both sides [Figure 5]. Radiographs demonstrated that anatomic carpal alignment

was well preserved and scaphoid was slightly sclerotic in relation to the rest of the carpal bones. No evidence of carpal instability or degenerative arthritis was noticed [Figure 6A-B]. At our latest follow-up, 16 months after the injury, MRI scan revealed slightly high intensity in scaphoid,

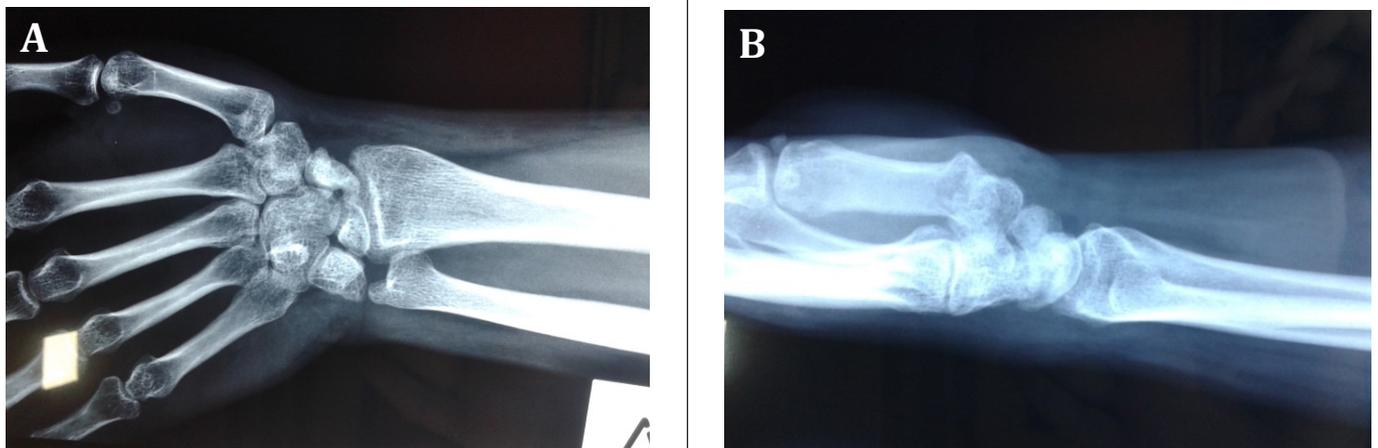


Figure 6A-B. Anteroposterior (A) and lateral (B) wrist radiographs 16 months postoperatively demonstrating preservation of the anatomic carpal alignment. Minor sclerosis of the scaphoid bone is shown.



Figure 7. The coronal STIR MRI image shows slightly high signal in scaphoid, lunate and capitate bone.

lunate and capitate bones in the coronal plane [Figure 7]. No clear evidence of avascular necrosis was demonstrated.

Discussion

Isolated carpal scaphoid dislocation is an extremely uncommon injury. Higgs described this injury in 1930 for the first time (1). Up to date, a small number of case reports have been published in the literature (2, 3).

Motor vehicle accidents and forced wrist dorsiflexion with the hand in ulnar deviation are the main mechanisms of injury (4, 5). The significant amount of force required to dislocate the scaphoid out of its fossa usually provokes a radial styloid fracture or a waist fracture of the scaphoid which describes the rarity of this traumatic event (7). The severity of injury is strongly dependent on the number of ligaments disrupted. It has been stated that the radioscapnocapitate and scapholunate ligament are ruptured initially followed by the radiolunate and the scaphotrapezium ligament (8). On plain radiographs the identification of the arcs of Gillula is essential to exclude a ligamentous injury. MRI and CT are also valuable tools to assess soft tissue damage.

Richard et al. divided scaphoid dislocation into simple and complex cases, based on the integrity of the distal carpal row (9). More recently, Leung et al. classified this injury into (4):

(i) Primary versus secondary. Primary dislocation is a direct result of the injury while the secondary type represents a persisting dislocation after closed reduction. It is mainly attributed to ligament interposition.

(ii) Simple versus complex. Complex cases consist of distal carpal row involvement. The simple type affects only scapholunate and radioscapnocapitate articulation.

(iii) Partial versus complete. In partial dislocation distal soft tissue attachments remain intact, whereas in the complete type there is no soft tissue attachment in its

anatomic position.

(iv) Several treatment options have been described based on the type of dislocation and time from injury. Chloros et al. created an algorithm for the management of this rare entity (9). They recommended closed reduction with cast immobilization in simple dislocations other than palmar-ularnar, presented less than a week from the traumatic event. Once scapholunate diastasis remains greater than 2 mm after closed reduction, open reduction and internal fixation is required. In simple dislocations with palmar-ularnar scaphoid displacement, ORIF and median nerve decompression is advocated since in all patients with this type of dislocation, the median nerve was found to be compressed intraoperatively.

Complex dislocations require ORIF to restore normal wrist alignment. Additional ligament reconstruction may offer additional stability which is dependent on the surgeon's preference.

In our patient with primary volar dislocation, ligament repair with bone suture anchor provided additional stability although it is not routinely employed when reviewing the current evidence.

Avascular necrosis after isolated scaphoid dislocation has only been described once. It seems that intraosseous channels within the intact bone promote revascularization from surrounding soft tissues, thus preventing this complication (4).

Other reported complications include degenerative joint disease and carpal instability and are mostly evident in neglected cases (9).

In conclusion, isolated scaphoid carpal dislocation is an extremely uncommon injury with good prognosis if there is no delay to treatment. We suggest open reduction and internal fixation with K-wires and ligament reconstruction with bone suture anchors in all complex cases in order to prevent late complications.

Efstathios G. Ballas, Konstantinos Raptis, Ioannis P. Stathopoulos, Nikolaos A. Stavropoulos and Sarantis-Petros G. Spyridonos declare that they have no conflict of interest.

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