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Case Report

Palmar-divergent dislocation of the scaphoid and lunate: A Case Report

Ahmadreza Afshar [1], Ali Tabrizi*[1]

[1] Department of Orthopedics, Imam Khomeini hospital, Urmia University of Medical Sciences, Urmia, Iran.

*** Corresponding Author**
Ali Tabriz, MD. Urmia University of Medical Sciences, Department of Orthopedics, Imam Khomeini Hospital, Modaress Street, Ershad Boulevard, Urmia, 57157 81351, Iran Mobile: (+98) 9143130829
Email: Ali.tab.ms@gmail.com

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Abstract

A 65-year-old farmer fell from a three-meter-high tree and sustained a palmar-divergent dislocation of the scaphoid and lunate. The patient was treated with open reduction of the scaphoid and lunate through the volar approach. The volar wrist capsule including the radioscaphocapitate ligament and Poirier space were repaired, and the scapholunate joint was fixed with two K-wires. Palmar-divergent dislocation of the scaphoid and lunate suggests a more severe injury to the soft tissue and ligaments of the wrist than a Mayfield stage IV perilunate dislocation. It seems that Mayfield's classification on perilunate injuries can be extended to include palmar-divergent dislocation of the scaphoid and lunate as type V.

Keywords: Palmar-Divergent Dislocation; Perilunate Injury; Lunate Dislocation; Scaphoid Dislocation; Wrist Dislocation.

Introduction

Concomitant palmar dislocation of the scaphoid and lunate is a very exceptional injury. The scaphoid and lunate may dislocate as one unite if the scapholunate ligament remains intact. Also, the scaphoid and lunate may sustain a divergence dislocation if the scapholunate ligament tears.[1-3] A few case reports are described palmar-divergent dislocation of the scaphoid and lunate bones. We were able to find fourteen case reports describing palmar-divergent dislocation of the scaphoid and lunate from 1965 to 2020.[4-17] This case report adds another case of palmar-divergent dislocation of the scaphoid and lunate to the literature.

Case Report

A 65-year-old farmer presented with an inflated painful right wrist because of a fall from a three-meter-height tree on his wrist while he was picking fruits three days ago. He could remember that his wrist position was outstretched and hyperextended at the time of impact. He had paresthesia in the median nerve territory. An anteroposterior plain radiograph of the right wrist demonstrated a triangular shape of the lunate, a large gap between the scaphoid and lunate, and enucleation of the proximal pole of the scaphoid from the radiocarpal joint that was overlapped on the radial styloid. (Fig.1) A lateral wrist plain radiograph demonstrated palmar dislocation of the lunate and proximal pole of scaphoid from the radiocarpal joint. The distal attachments of the scaphoid to trapezium and trapezoid joints were preserved (Fig.2).

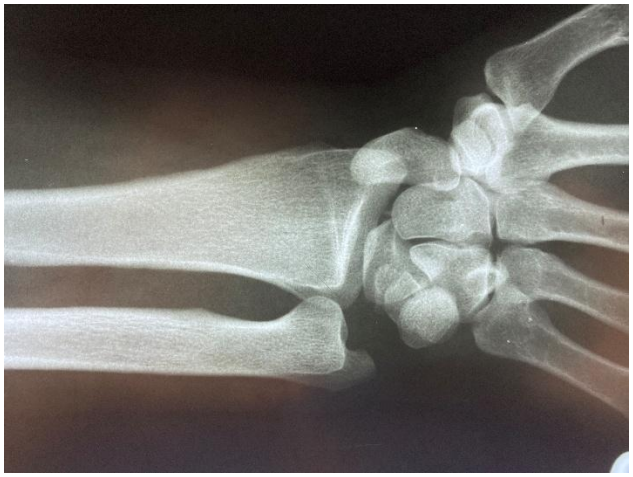

Figure 1: Anteroposterior view of the right wrist demonstrates divergent dislocation of the scaphoid and lunate bones.

Figure 2: Lateral view of the right wrist demonstrates palmar dislocation of the scaphoid and lunate bones.

Under general anesthesia, initially, the wrist was manipulated to obtain a closed reduction; however, it was not successful. Open reduction was proceeded through a volar "V" approach. The median nerve was decompressed, and the volar wrist capsule from the radial to the ulnar side was completely torn. The short radiolunate ligament and distal soft-tissue attachment of the scaphoid at the scaphotrapeziotrapezoid joint were preserved. Open reduction of the scaphoid and lunate was performed. The volar wrist capsule contains the radioscaphocapitate ligament, and Poirier space was repaired with a nonabsorbable braided suture. The scapholunate joint was fixed with two K-wires. Intraoperative fluoroscopy demonstrated suitable position and alignment of the scaphoid, lunate, and wrist. The wrist was immobilized with a cast for eight weeks, then the K-wires and cast were removed, and the patient began intensive rehabilitation (Fig. 3,4).

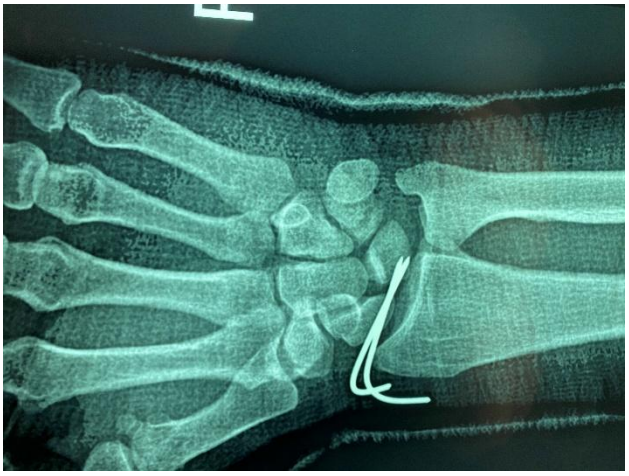

Figure 3: Immediate post operation anteroposterior view of the right wrist demonstrates satisfactory alignment of the scaphoid and lunate bones.

Figure 4: Immediate post operation lateral view of the right wrist demonstrates satisfactory alignment of the scaphoid and lunate bones.

The patient was satisfied with the function of his right wrist after six months. The patient had no pain and was able to perform his daily living activities. The right wrist flexion/extension arc was 120 degrees, and grip strength was 30 kg (80% left wrist). Plain anteroposterior radiographs demonstrated increased distance between lunate and scaphoid (Terry Thomas sign) (Fig.5). After six months, MRI demonstrated no sign of avascular necrosis (AVN) of the lunate and scaphoid (Fig. 6). We

discussed the results of an increased scapholunate gap on the plain wrist radiograph with the patient and the potential need for a salvage procedure in the future.

Figure 5: At one year follow up plain anteroposterior radiograph demonstrates increased distance between lunate and scaphoid (Terry Thomas sign).

Figure 6: A T1 weighted MRI at one year follow up demonstrates no sign of avascular necrosis of the lunate and scaphoid.

Discussion

Mayfield demonstrated that in perilunate injuries as the deforming force increases the intercarpal ligaments and bones disrupt in a stereotyped sequence around the lunate from radial to the ulnar side.[18] As Mayfield has described, the mechanism of palmar-divergent dislocation of the scaphoid and the lunate injury is considered as an extreme extension, ulnar deviation, and intercarpal supination.[1,8] In the current case, although the distal attachments of the scaphoid at the scaphotrapeziotrapezoid joint were preserved; however, dislocation of the proximal pole of the scaphoid and lunate from the radiocarpal joint suggests a more severe injury to the soft tissue and ligaments of the wrist than a Mayfield stage IV dislocation. This study and other case reports showed that palmar-divergent dislocation of the scaphoid and lunate could be considered a Mayfield type V injury. [13-15]

Phan et al. described a case palmar-divergent dislocation of the scaphoid and lunate with complete soft-tissue avulsion of the lunate and scaphoid. The scaphoid was floating in the volar soft tissue.[17] Domeshek et al. described a case of open palmar-divergent dislocation of the scaphoid and lunate. The scaphoid was completely extruded and missed from the wrist joint and wound at the time of injury.[8] Complete (total) dislocation of the scaphoid along with lunate dislocation described by Phan et al. and Domeshek et al. may be considered as type VI Mayfield injury.[8,17]

In the current patient, the main purpose of treatment was to obtain carpal stability and normal alignment. Because of the rarity of palmar-divergent dislocation of the scaphoid, lunate, and the insufficient number of reported cases, opinions on its treatment are contrasting. The treatments range from closed reduction and percutaneous fixation to open reduction and ligamentous repair through dorsal and palmar approaches. Domeshek et al. performed a proximal row corpectomy for a palmar-divergent dislocation of the scaphoid and lunate because

the scaphoid was extruded and missed and concerned lunate AVN.[8]

A major concern in palmar-divergent dislocation of the scaphoid and the lunate with extensive soft tissue and ligamentous injuries is development of AVN of the lunate and scaphoid.[16] It seems that in the current case the preserved ligament attachments to lunate and distal scaphoid at the scaphotrapeziotrapezoid joint provided enough vascular supplies to the bones that prevented the development of AVN.

A long-term follow-up study of perilunate dislocations and fracture-dislocations has demonstrated a high rate of posttraumatic degenerative joint disease, with strength and range-of-motion arc reported to be 87% and 76% respectively of the figures for the contralateral side[19]. The current patient with a short follow-up had no pain and satisfactory outcomes. However, he had suffered a more severe injury than a stage-IV dislocation, and the degenerative joint disease will probably develop, but whether it will become symptomatic is unclear. We intend to follow up on his condition.

Conclusion

It seems that Mayfield's classification on per lunate injuries can be extended to include palmar-divergent dislocation of the scaphoid and lunate as type V.

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None.

Conflict of Interest Disclosures

There is no conflict of interest of any kind in preparing of this study.

Authors' Contributions

All of the authors contributed equally.

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Ethical Statement

The case report was confirmed by the ethics committee of Urmia University of Medical Sciences.

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