

Concomitant Distal Radius Fracture with Scaphoid Fracture-Dislocation and Carpal Instability: A Case Report

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Learning Point of the Article:

Concomitant distal radius fracture with scaphoid fracture-dislocation and carpal instability is a rare high-energy injury pattern. Careful assessment of the scaphoid and carpal alignment is essential in high-energy distal radius fractures to identify associated instability and guide comprehensive surgical management.

Abstract

Introduction: Concomitant ipsilateral fractures of the distal radius and scaphoid are uncommon and are typically associated with high-energy trauma. The combination of a comminuted intra-articular distal radius fracture with scaphoid fracture-dislocation and carpal instability represents a particularly rare and complex injury pattern. Early recognition of associated carpal injuries is important to restore and maintain anatomical alignment.

Case Report: A 32-year-old right-hand-dominant man presented with severe pain, swelling, and deformity of the left wrist following a high-energy motorcycle road traffic accident. Radiographs demonstrated a comminuted intra-articular distal radius fracture associated with a displaced scaphoid fracture-dislocation and disruption of carpal alignment. Neurovascular status was intact. Following initial immobilization and resolution of soft-tissue swelling, definitive surgery was performed on day 3. The distal radius was reduced and stabilized through a modified Henry approach using volar locking plate fixation supplemented by dorsal plating. The scaphoid fracture was reduced and stabilized with a Herbert screw, while the associated carpal instability was addressed with Kirschner-wire fixation. Wrist range-of-motion exercises were initiated at 4 weeks, and the carpal Kirschner wires were removed at 6 weeks. At 8 months, radiographs demonstrated complete union of the distal radius and scaphoid with maintained carpal alignment. The patient achieved 40° of wrist flexion and 60° of extension, with a pain score of 3/10 and no limitation in activities of daily living.

Conclusion: This case highlights the importance of carefully evaluating carpal alignment in high-energy distal radius fractures to identify associated scaphoid and intercarpal injuries. Comprehensive operative stabilization of the distal radius, scaphoid, and unstable carpal relationships can restore anatomical alignment and provide a stable construct for rehabilitation.

Keywords: Distal radius fracture, scaphoid fracture, carpal instability, wrist injuries, fracture fixation.

Introduction

Concomitant fractures of the distal radius and scaphoid are uncommon injuries, representing a small proportion of wrist fractures and typically resulting from high-energy trauma [1,2].

The distal radius fracture is frequently intra-articular, while the associated scaphoid fracture may be overlooked on initial radiographs, particularly when displacement is minimal [2]. Advanced imaging with computed tomography (CT) is therefore valuable when the injury mechanism or radiographic

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Figure 1: Preoperative anteroposterior (a) and lateral (b) radiographs of the left wrist demonstrating a comminuted intra-articular distal radius fracture involving the lunate facet with volar displacement, associated with a scaphoid waist fracture and volar dislocation of the scaphoid–carpal complex.

appearance raises suspicion of an associated carpal injury [2,3].

The combination of a comminuted intra-articular distal radius fracture with a scaphoid fracture-dislocation is considerably more unusual and presents a challenging injury pattern due to the potential for carpal malalignment and instability. High-energy mechanisms have been associated with greater fracture displacement and more complex intra-articular patterns in patients sustaining concomitant distal radius and scaphoid fractures [4].

Although the optimal management of simultaneous distal radius and scaphoid fractures remains incompletely established, early operative fixation has been reported to provide satisfactory radiological and functional outcomes in appropriately selected patients [2,4,5]. Recent clinical evidence suggests that operative management of the scaphoid in this setting may facilitate earlier radiographic union and earlier restoration of wrist motion [4,5].

We present a rare case of a high-energy Arbeitsgemeinschaft für

Osteosynthesefragen/Orthopaedic Trauma Association (AO/OTA) 23-B3 intra-articular distal radius fracture associated with scaphoid fracture-dislocation and carpal instability, managed with combined volar and dorsal plating of the distal radius and Kirschner wire (K-wire) stabilization of the carpal injury.

Case Report

This case report describes a 32-year-old right-hand-dominant male who sustained a high-energy injury to the left wrist following a motorcycle road traffic accident. The patient was thrown from the motorcycle and landed on his outstretched left hand.

On presentation, he had severe pain, swelling, deformity, and marked restriction of wrist movements. There was no open wound, and distal neurovascular status was intact.

Initial anteroposterior and lateral radiographs demonstrated a comminuted intra-articular distal radius fracture (AO/OTA 23-B3) associated with a displaced scaphoid fracture and disruption of normal carpal alignment. Given the high-energy mechanism and radiographic evidence of carpal instability, careful assessment of the associated scaphoid and carpal injury was undertaken, as concomitant scaphoid fractures may be overlooked on initial assessment [1,2]. (Fig. 1).

The wrist was initially immobilized in a below-elbow slab to allow subsidence of soft-tissue swelling. Definitive surgical management was performed on the 3rd day following injury under regional anesthesia. Operative stabilization was selected due to the intra-articular, comminuted distal radius fracture and associated displaced scaphoid fracture-dislocation with carpal instability. Previous literature supports operative management

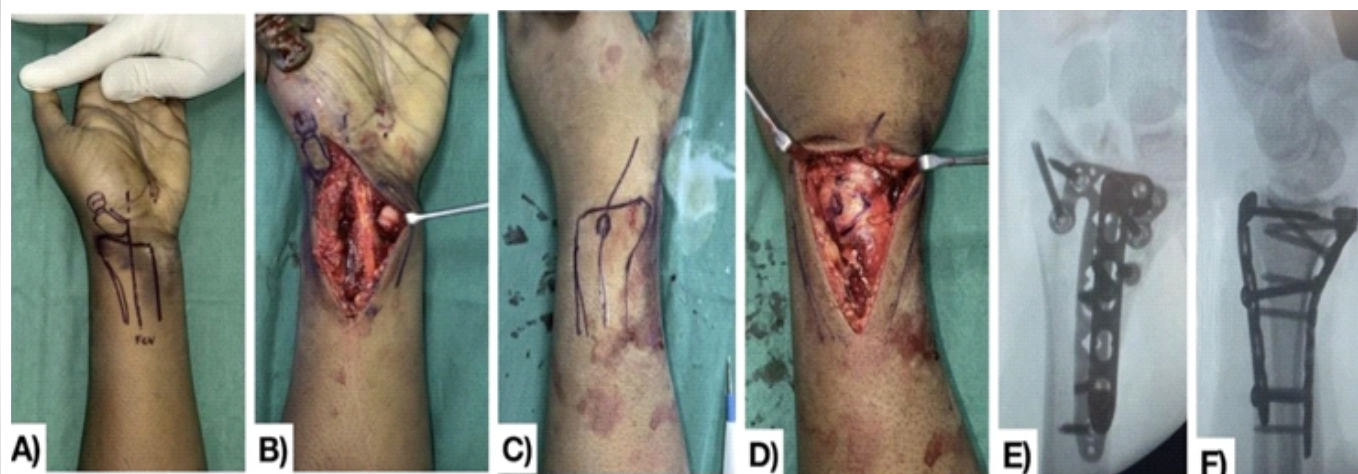


Figure 2: Surgical sequence (distal radius fixation). (a) Preoperative soft-tissue contusion and swelling. (b) Volar exposure through the modified Henry approach showing the displaced scaphoid fragment. (c) Marking of the planned dorsal approach. (d) Dorsal exposure of the distal radioulnar joint and carpal region. (e and f) Intraoperative anteroposterior and lateral fluoroscopic views showing volar and dorsal plate fixation of the distal radius.

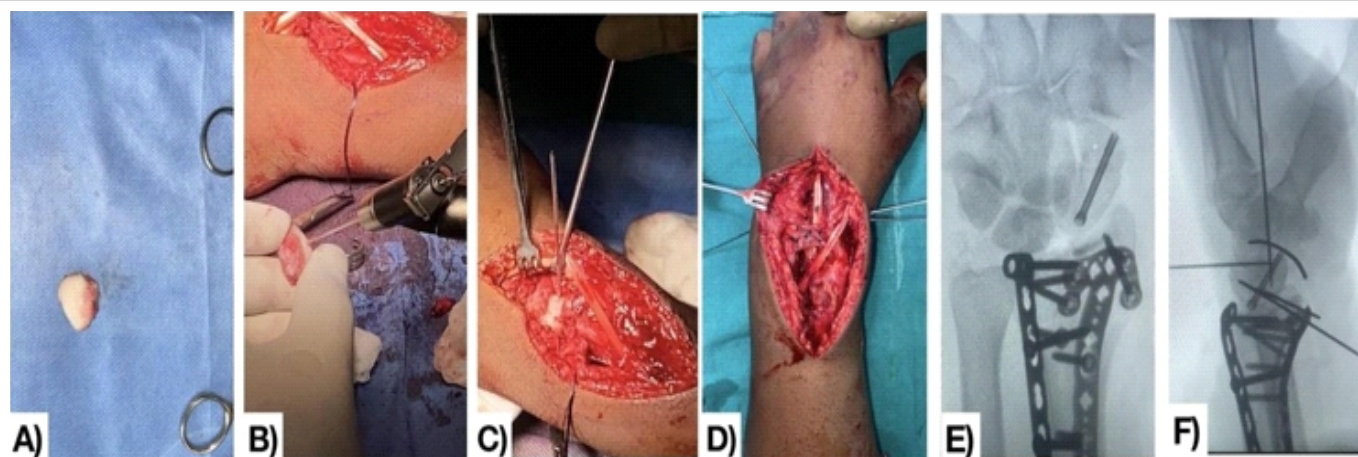


Figure 3: Intraoperative sequence demonstrating scaphoid and carpal stabilization. (a) Retrieved scaphoid fragment after preparation. (b) Kirschner-wire (K-wire) fixation of the scaphoid fragment. (c) Reduction and restoration of the scaphoid articulation for fixation. (d) Dorsal exposure showing the intercarpal region, with the extensor pollicis longus (*) and extensor carpi radialis brevis (#) identified and protected, repaired intercarpal ligaments (++), and Kirschner wires stabilizing the carpal rows. (e) Scaphoid fixation with a Herbert screw. (f) Final lateral fluoroscopic view demonstrating K-wire stabilization of the carpal rows with maintained carpal alignment.

in selected patients with displaced concomitant distal radius and scaphoid fractures [2, 3, 6].

A modified Henry approach was used for exposure and reduction of the distal radius. Following restoration of the articular anatomy, the distal radius was stabilized using a volar locking plate. Due to the fracture comminution and residual instability, supplementary dorsal plating was performed (Fig. 2).

The associated scaphoid fracture-dislocation was reduced under fluoroscopic guidance and stabilized with a Herbert screw. The associated carpal instability was reduced and stabilized using K-wire fixation. Intraoperative fluoroscopy confirmed satisfactory reduction and restoration of distal radius alignment, scaphoid position, and carpal relationships. The wrist was immobilized in a functional slab postoperatively. Following 4 weeks of immobilization, the slab was removed, and wrist range-of-motion exercises were initiated. The carpal K-wires were removed at 6 weeks, with radiographs

demonstrating maintained carpal alignment (Fig. 3).

Serial post-operative clinical and radiological assessments were performed to evaluate fracture union, maintenance of carpal alignment, wrist range of motion, and functional recovery. Approximately 40° of flexion and 60° of extension at the end of 8 months in final follow-up (Fig. 4).

Results

At 8 months postoperatively, radiographs demonstrated complete union of the distal radius and scaphoid fractures with maintained reduction and carpal alignment. The patient achieved 40° of wrist flexion and 60° of extension, providing a total flexion–extension arc of approximately 100°. The Visual Analog Scale (VAS) pain score was 3/10, and the patient reported no limitation in activities of daily living. There was no residual neurovascular deficit or clinically evident carpal instability at final follow-up. Overall, the patient demonstrated satisfactory radiological and functional recovery despite the



Figure 4: Serial radiographic follow-up of the left wrist. (a) Immediate post-operative anteroposterior and lateral radiographs showing maintained reduction and fixation with volar and dorsal plates, Herbert screw, and carpal Kirschner-wire (K-wires). (b) Six-week follow-up radiographs demonstrating maintained alignment following K-wire removal. (c) Eight-month follow-up radiographs showing radiological union of the distal radius and scaphoid with maintained carpal alignment.

complexity of the initial injury.

Discussion

Concomitant ipsilateral fractures of the distal radius and scaphoid are uncommon, with reported prevalence ranging from approximately 0.5% to 5% among distal radius fractures [1, 2]. These injuries are predominantly associated with high-energy trauma. In a systematic review of 178 patients with 182 simultaneous fractures, most injuries resulted from high-energy mechanisms, and the majority of distal radius fractures were intra-articular [2].

The present case represents an unusual injury pattern due to the combination of an AO/OTA 23-B3 comminuted intra-articular distal radius fracture with a displaced scaphoid fracture-dislocation and carpal instability. Simultaneous distal radius and scaphoid fractures may occur as part of a greater-arc carpal injury, including perilunate fracture-dislocation patterns [2, 4]. Consequently, careful assessment of carpal alignment is essential, particularly following high-energy trauma.

The management of these combined injuries remains challenging because treatment must restore distal radius anatomy while simultaneously addressing scaphoid stability and associated carpal malalignment. A systematic review by Blackburn et al. found that the available literature is predominantly composed of retrospective case series, with no high-level comparative evidence establishing a single optimal treatment strategy [2]. Nevertheless, the review reported high union rates following both operative and non-operative treatment, while acknowledging that operative fixation is increasingly favored for displaced or unstable injuries [2, 7, 8, 9].

More recent evidence further supports operative stabilization in selected cases. Verlinsky et al. [4] reviewed 31 concomitant distal radius and scaphoid fractures and found that 87.2% were associated with high-energy trauma, while 71% involved AO/OTA Type C distal radius fractures [4]. Among patients treated operatively for the scaphoid fracture, radiological union occurred significantly earlier than in the non-operative group (6.0 ± 2.0 versus 13.7 ± 11.7 weeks) [4]. These findings support consideration of operative stabilization when the scaphoid

fracture is displaced or associated with instability [4, 6]. Similar favorable outcomes following surgical fixation of concomitant distal radius and scaphoid fractures have been reported in clinical series, supporting early stabilization in appropriately selected unstable injuries [6, 10].

In the present case, the distal radius was stabilized using combined volar and dorsal plating, while the associated carpal instability was addressed with K-wire fixation. This allowed restoration and maintenance of the distal radius and carpal alignment during healing. At 8 months, radiological union was achieved with a 100° flexion–extension arc, a VAS pain score of 3/10, and no limitation in activities of daily living.

The favorable outcome in this case emphasizes the importance of identifying associated scaphoid and carpal injuries in high-energy distal radius fractures. Advanced imaging, particularly CT, can assist in defining complex scaphoid fracture morphology, carpal alignment, and associated instability when plain radiographs are inconclusive [5, 9, 10].

Conclusion

Concomitant distal radius fracture with scaphoid fracture-dislocation is a rare and potentially unstable high-energy wrist injury. Accurate assessment of the distal radius, scaphoid, and carpal alignment is essential for appropriate treatment planning. Combined stabilization addressing both the comminuted distal radius fracture and associated carpal instability can restore and maintain anatomical alignment. In this case, combined volar and dorsal plating with K-wire stabilization resulted in radiological union at 8 months, satisfactory wrist motion, low residual pain, and unrestricted activities of daily living. Early recognition and comprehensive stabilization of this complex injury pattern may help achieve satisfactory radiological and functional outcomes.

Clinical Message

High-energy distal radius fractures with abnormal carpal alignment should prompt careful evaluation for associated scaphoid and intercarpal injuries, as early stabilization of both the fracture and carpal instability can restore and maintain wrist alignment.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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