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Case Report

Functional outcome in case of surgically and conservatively treated bilateral distal end radius and scaphoid fracture: a rare case report

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ABSTRACT

Bilateral fractures of the distal radius and scaphoid are extremely rare injuries. Proper preoperative evaluation is a must to know the orientation of the fracture. Treatment must be based on displacement of the fracture. If fracture is displaced, internal fixation is needed but if its stable with minimal displacement, we can conserve it. A patient with displaced distal radius fractures and displaced scaphoid fracture on one side, along with displaced distal end radius fracture and undisplaced scaphoid fracture on the other side, was treated via internal fixation of the scaphoid fractures with Herbert screws and internal fixation of the distal radius fractures with locked volar plating on the right side and below elbow cast in cup holding position on the left side which was non-dominant. The approach to treating fractures hinges on several factors: the specific location and alignment of the fracture, the patient's characteristics, and the surgeon's expertise. For fractures in the distal radius and scaphoid, employing a rigid internal fixation method allows for the early initiation of active wrist rehabilitation, eliminating the necessity for wrist immobilization using a plaster cast or external skeletal fixation. On the other hand, a conservative treatment approach involving a below-elbow cast offers certain advantages, such as minimal blood loss and fewer complications related to wound healing, particularly for undisplaced fractures, especially when they occur in the non-dominant hand.

Keywords: Bilateral, Scaphoid, Distal end radius, Herbert screw, Volar plate

INTRODUCTION

The scaphoid bone is frequently involved in fractures, typically resulting from low-energy trauma to the hand, often occurring unilaterally.[1] Maintaining a high level of suspicion and utilizing diagnostic tools like X-rays and CT scans are instrumental in early diagnosis and management to prevent complications such as osteoarthritis, chronic pain, and reduced range of motion. Instances of bilateral scaphoid fractures are exceedingly rare. This report details an unusual case involving bilateral scaphoid fractures resulting from a road traffic accident, along with bilateral distal end radius fractures. When clinical suspicion of a scaphoid fracture is high despite negative initial X-rays, the conventional approach involves immobilizing the patient's hand in a thumb spica splint or cast and repeating the X-rays after approximately two weeks. Unfortunately, delayed diagnosis is a common issue with scaphoid fractures, contributing to their high prevalence of nonunion among fractures in the human body.[2]

Bilateral fractures involving both the distal radius and scaphoid are exceptionally rare injuries. We found very few such cases reported in the English-language medical literature, where the patient was treated using plaster immobilization.[1] This paper aims to compare the outcomes of the surgical and conservative methods and assess their impact on functional recovery.

CASE REPORT

A 30-year-old man was presented following a road traffic accident. He had intense pain in both wrists. There were no external injuries or damage to nerves and blood vessels. X-rays revealed fractures in both the scaphoid and distal radius bones of both wrists (unstable, displaced distal radius fractures and displaced scaphoid fracture on the right side, along with displaced distal end radius fracture with undisplaced scaphoid fracture on the left side) (Figure 1).

Figure 1: Pre-op X-rays depicting displaced distal radius fractures and displaced scaphoid fracture on A, B) right side and C, D) undisplaced distal end radius fracture with a scaphoid fracture on the left side.

The patient underwent surgery under general anesthesia. The former was managed using a volar plate and Herbert screw with bone grafting, while the latter was treated with a below-elbow cast since the patient refused surgery for the left side (Figure 2).

In 6 weeks, the fractures in the radius had healed, and it took approximately 8 weeks for the scaphoid fractures to heal.

After a year, on the right side, the average range of motion for flexion and extension of the wrist was 108 degrees, while the range of motion for radial and ulnar deviation was 28 degrees. Pronation and supination had a range of 136 degrees.

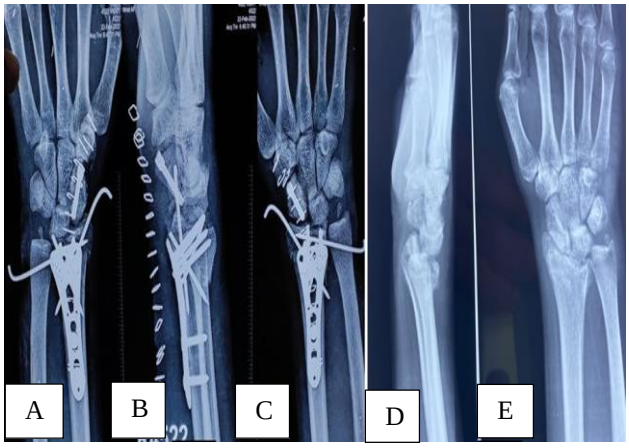

Figure 2: One month follow up post operative X-rays showing, A-C) Right and D, E) Left side wrist joints.

On the left side, the range of motion for flexion and extension was 100 degrees, for side-to-side movement it was 24 degrees, and for rotation, it was 130 degrees (Figure 3).

Figure 3: Post Operative 1 year follow up clinical image showing A) Range of motion for dorsiflexion and B) palmar flexion.

DISCUSSION

In a large majority of scaphoid fractures, specifically around 80%, the fracture occurs at the waist of the scaphoid.[3] The rationale behind this is that the distal pole of the scaphoid can move freely, while the proximal pole becomes trapped amidst the capitate, radius, and palmar capsule.[3]

While unilateral scaphoid fractures are a common occurrence, bilateral scaphoid fractures are relatively rare.[4] Ipsilateral fractures of the distal radius and scaphoid are more common, but to date, there has been only one reported case of bilateral fractures involving both the distal radius and scaphoid. In that particular case, plaster immobilization was the chosen treatment method. Cast immobilization may be suitable for children, but when dealing with distal radial fractures, reduction should be

performed with caution to avoid displacing the scaphoid fragments.

In adults, the presence of both displaced scaphoid and radius fractures is an indication for operative treatment. It's important to note that when managing an unstable distal radial fracture, it may be necessary to apply traction to the carpus. In cases where the scaphoid fracture is undisplaced but there is a displaced distal radius fracture, internal fixation of the scaphoid becomes essential. Unstable distal radial fractures offer several management options, including external fixation, dorsal plating, and volar plating.

The volar approach is favored due to its advantages over dorsal dissection, as it helps preserve the blood supply to the metaphyseal bone and causes fewer issues related to soft tissues and tendons.[4] Volar locking compression plates, which utilize threaded screws that lock securely into plate holes upon tightening, provide angular and axial stability with minimal screw loosening. These plates offer significant strength advantages compared to those used in dorsal plating.[5] Utilizing volar locking plates for distal radius fractures and Herbert screws for scaphoid fractures provides a strong and stable fixation. However, when the primary definitive fixation of the scaphoid is necessary, it doesn't allow for the correction of any misalignment in the carpus that may occur during the reduction of the distal radius. Therefore, it is advisable to first perform temporary K-wire fixation of the scaphoid. This initial step is followed by the screw fixation of the scaphoid after the distal radius has been stabilized. This approach is particularly crucial when dealing with preoperative carpal misalignment. Initiating an early rehabilitation program necessitates the use of rigid fixation for both these fractures. This was achieved through volar locking plating for distal radius fractures and Herbert screw fixation for scaphoid fractures. However, when the scaphoid requires primary definitive fixation, as in our case, it poses a challenge when attempting to correct any misalignment of the carpus following the reduction of the distal radius.

To address this issue, it is recommended to initially perform temporary K-wire fixation of the scaphoid. This temporary fixation serves as the first step, and after securing the distal radius, screw fixation of the scaphoid can be carried out. This approach is especially crucial when dealing with preoperative carpal misalignment.

CONCLUSION

The occurrence of bilateral fractures involving both the scaphoid and distal radius is an exceedingly uncommon event in traumatic injuries and is typically linked to high-energy traumas. While this exceptionally rare combination of injuries can lead to severe complications if not addressed promptly, it is often overlooked due to misdiagnosis on regular X-rays. Accurate diagnostic assessment through radiography, followed by appropriate surgical intervention and postoperative care, plays a crucial role in treating simultaneous bilateral fractures of the scaphoid and distal radius.

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