

Segmental Scaphoid Fracture treated with One Headless Screw: A Case Report

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Background: The scaphoid is the most frequently fractured carpal bone, accounting for 71% of all carpal bone fractures. Scaphoid fractures often occur in young and middle-aged adults, typically those aged 15-60 years, after a fall on an outstretched arm that results in acute dorsal flexion of the wrist. Early diagnosis of a scaphoid fracture is important because nonunions is more likely if treatment is delayed.

Aim: To report a case presented with Segmental scaphoid fracture treated with one headless Screw.

Results: A 38 Saudi female present as case of left-hand swelling and pain for 1 day ago. The pain localized at volar of left hand at wrist which started after falling down. Clinical examination revealed inception with swelling close injury but no change in color. palpation revealed soft distal compartment tenderness distal with intact movement and limit rom. The patients undergone X-ray at ER and diagnosed to have Segmental scaphoid fracture. Started by conservative treatment with long arm spica. After 1 month, treating team decided for surgical intervention through dorsal approach to scaphoid and fixation by headless screw.

Keywords: Scaphoid Fracture; Displacement; Segmental; Fixation; Screw; Outcome

Introduction

Fractures of the scaphoid bone are not rare and infrequently difficult to treat. Subsequently the fracture site may have an effect on outcome [1], fracture patterns have been well described and may dictate management [2]. Segmental fracture is a fracture composed of at least two fracture lines that together isolate a segment of bone, usually a portion of the diaphysis of a long bone. This fracture pattern is frequently associated with high energy mechanism and devascularisation of the segmental fracture fragment (s) meaning these injuries are associated with increased morbidity and long-term complications such as: delayed union, non-union and/or infection [3-6].

Case Report

A 38 Saudi female present as case of left-hand swelling and pain for 1 day ago. The pain localized at volar of left hand at wrist which started after falling down. The pain severity was 8 in scale of 10 but not radiating to anywhere> the pain was aggravated by movement with no other no associated symptoms. The female had no medical

illness, no history of allergy, no previous surgeries, and systematic assessment was unremarkable.

Clinical examination

Inception with swelling close injury but no change in color. palpation revealed soft distal compartment tenderness distal with intact movement and limit rom. The patients undergone X-ray at ER and diagnosed to have Segmental scaphoid fracture (Figure 1).

Treatment

Started by conservative treatment with long arm spica. After 1 month, treating team decided for surgical intervention through dorsal approach to scaphoid and fixation by headless screw.

Follow-up

After 2 years, X ray and CT were done and showed complete healed scaphoid bone. Treatment team decided to remove screw and start physiotherapy. Now patient had full rom with no pain or tenderness She can do full flexion and full extension at wrist joint without pain. The patient feels good (Figures 2 to 6b).

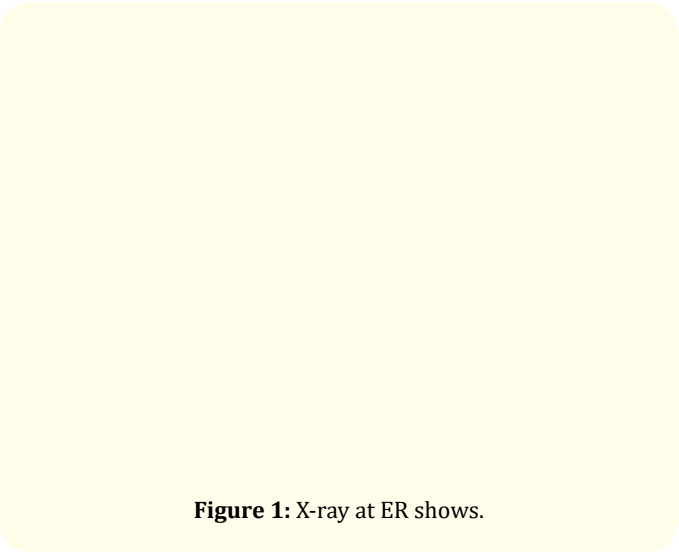


Figure 1: X-ray at ER shows.

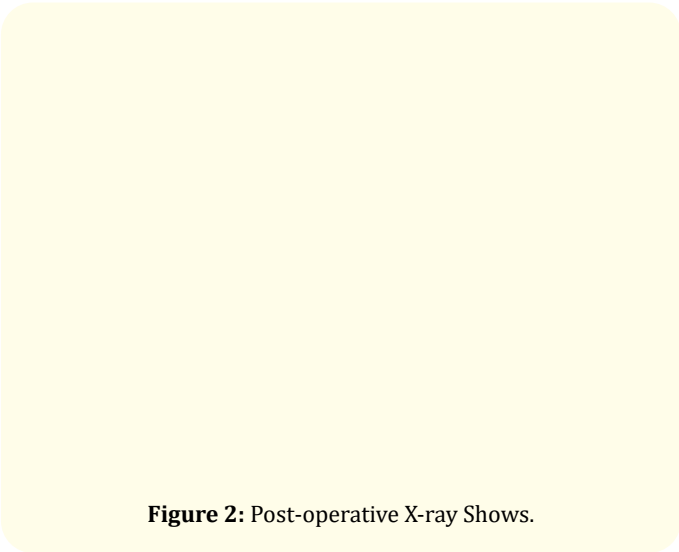


Figure 2: Post-operative X-ray Shows.

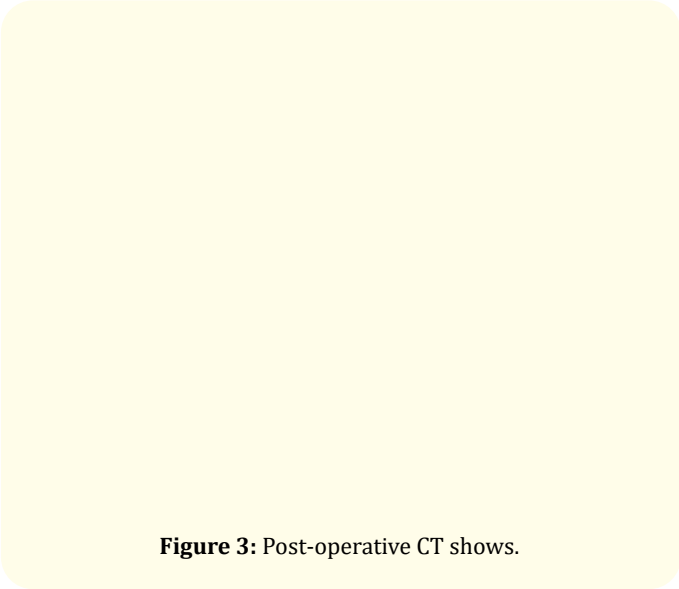


Figure 3: Post-operative CT shows.

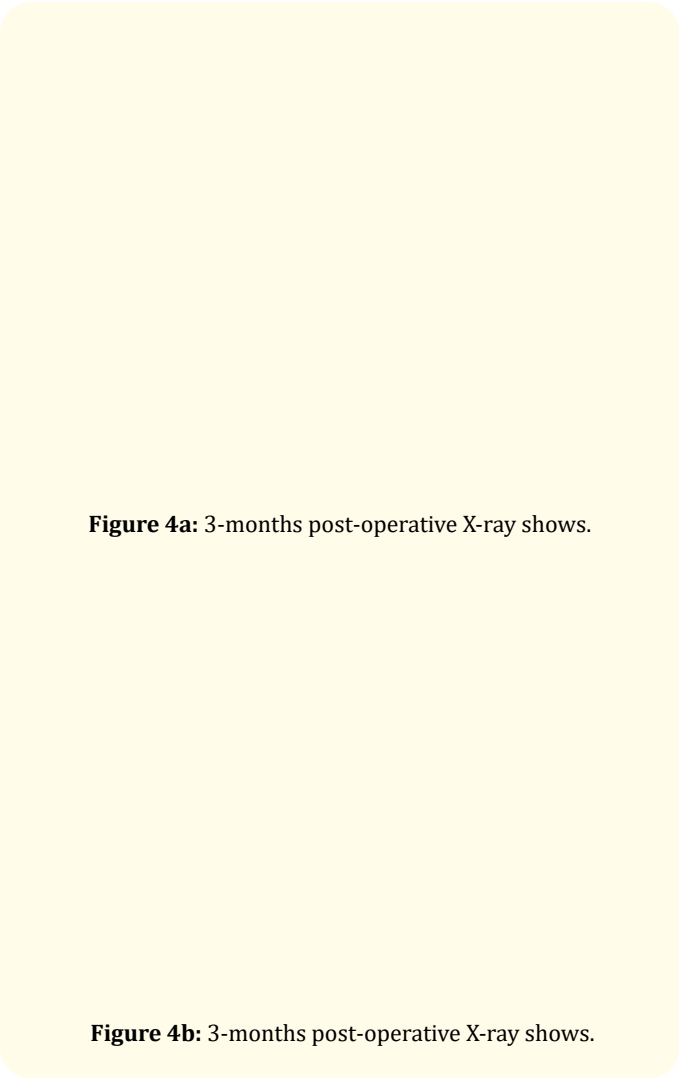


Figure 4a: 3-months post-operative X-ray shows.

Figure 4b: 3-months post-operative X-ray shows.

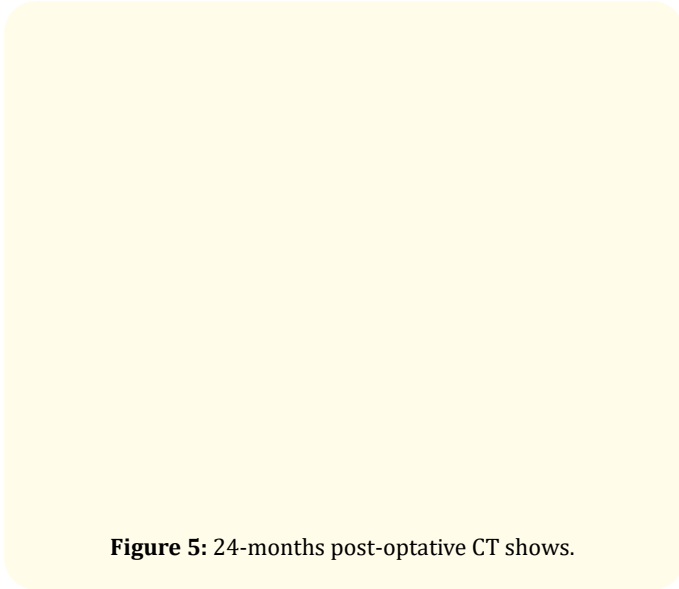


Figure 5: 24-months post-optative CT shows.

Figure 6a: 24-months post-operative X-ray after removal of screw shows.

Figure 6b: 24-months post-operative X-ray after removal of screw shows.

Discussion

Scaphoid bone fracture occurs mostly through the waist (12-86% of all scaphoid fractures) and less frequently through the proximal pole (1-27% of all scaphoid fractures) [7,8]. Other studies with higher precision reported an incidence of waist fractures >60% [7]. These patterns prove notable reliability, possibly due to a communal mechanism of injury in amalgamation with the exceptional anatomy of the scaphoid. Empirically, the main mechanism for injury may be hyperextension of the wrist with contributory but different degrees of radial or ulnar loading [8,9]. Fractures occur through the “surgical” waist (transverse to the long axis), the dorsal sulcus (oblique to the long axis) or through the proximal pole [10,11]. Dodds SD, *et al.* [12] conducted a study with hypothesis that increasing screw length and augmenting fixation with a K-wire would improve fracture fragment stability, individually and in com-

bination. Authors found that the long screw provided significantly greater stability than the short screw with using physiologically applied loading of cadaveric wrists with unstable scaphoid waist fractures. Also, the augmentation in K-wire in the long-screw group showed insignificant improved stability.

In the current case, after diagnosing the female with segmental scaphoid fracture, the treating team decided to use one 1 headless screw agist common surgical intervention with high success rate by returning to the normal movement range for the wrist with no pain. This was unlike to what reported by Goodwin JA, *et al.* [13] who reported that “in scaphoid fractures with segmental defect, plate and screw fixation demonstrate similar loads to failure, but plate fixation performs superiorly to screw fixation for gap recovery after an applied load to failure”. Also, Mandaleson A, *et al.* [14] found that double screws or plate fixation demonstrated significantly greater stability, stiffness, and energy absorption when compared with a single compression screw.

Some studies revealed that forgoing grafting may end with less surgical morbidity [15-17] and may minimize surgical times. Furthermore, it is supposed that percutaneous reaming may adequately debride the nonunion site and may be effectively used instead of open debridement [18,19]. Several studies have concluded that stable, well-aligned and vascular nonunions only needs rigid fixation to attain union [17,19,20]. In much the same way that cannulated headless compression screws have expanded surgical indications to include even nondisplaced acute scaphoid fractures by making the procedure more simple and less invasive, several authors [21-24] reported that this less invasive method may also end with some conventional scaphoid fracture nonunions.

Conclusions and Recommendations

In conclusion, though all methods of fixation of segmental scaphoid bone fracture, where plate fixation performs superiorly to screw fixation, the current study is one of those which prove the efficacy of screw fixation with no disability or nonunion. Though efficacy, the clinical relevance of these results cannot be determined conclusively. It can be inferred from this study that headless screw fixation in a scaphoid fracture with segmental defect is at least equivalent to locking plate fixation.

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