



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 8, Issue, 3, pp. 16153-16155, March, 2017

**International Journal of
Recent Scientific
Research**

DOI: 10.24327/IJRSR

Research Article

OPEN REDUCTION AND FIXATION OF SCAPHOID FRACTURE WITH BONE GRAFTING TO AVOID NONUNION

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DOI: <http://dx.doi.org/10.24327/ijrsr.2017.0803.0087>

ARTICLE INFO

Article History:

Received 17th December, 2016

Received in revised form 21th

January, 2017

Accepted 28th February, 2017

Published online 28th March, 2017

Key Words:

Scaphoid Fracture,
Avascular Necrosis and
Nonunion of Scaphoid.

ABSTRACT

Fractures of the scaphoid bone mainly occur in young adults and constitute 2-7% of all fractures [1]. The specific blood supply in combination with the demanding functional requirements can easily lead to disturbed fracture healing, scaphoid fractures are more prone for AVN. Undisplaced scaphoid fractures are not seen on radiographs hence the diagnostic strategy of suspected scaphoid fractures is surrounded by controversy and may require bone scintigraphy, magnetic resonance imaging and computed tomography which have their shortcomings. Early treatment leads to a better outcome. Scaphoid fractures can be treated conservatively and operatively. Proximal scaphoid fractures and displaced scaphoid fractures have a worse outcome and might be better off with an open or closed reduction and internal fixation. We describe the case of a 25 year old male presenting with undisplaced scaphoid fracture of right hand which was treated with ORIF and Bone grafting.

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INTRODUCTION

Scaphoid is a boat shaped carpal bone situated radial most and in the proximal row of carpal bones, it articulates with five surrounding bones i.e., distal radius, lunate, trapezium, trapezoid and capitate. Anatomically scaphoid bone is divided into Proximal pole, Distal pole, Waist and Tubercle

The major vascular supply is derived from scaphoid branches of the radial artery entering the dorsal ridge and supplying 70% to 80 % of the scaphoid, including proximal pole, the remaining distal aspect is supplied through branches entering through the tubercle (Fig 1).

Many classifications are used to classify the scaphoid fractures such as Russe classification [5], Mayo classification[4] and Herbert's classification.

Herbert classification [2] is based on stability:

- A. Stable (non displaced fractures with no step off in any plane)

B. Unstable

- less than 1 mm displacement
- less than 10 degree angular displacement
- Fracture comminution
- Radio lunate angle > 15 degrees,
- Scapho lunate angle > 60 *degrees*,
- Intrascaphoid angle > 35 *degrees*

Case presentation

A 25-year-old male patient presented to the emergency department with pain and swelling in the right wrist with difficulty to hold objects right hand following a fall over an out stretched hand at his work place. On local examination there was a gross swelling over right wrist with no external injuries with tenderness in the anatomical snuff box region, with restricted range of wrist movements and provocative tests like scaphoid shift and Watson shift tests were positive. Both anteroposterior and lateral radiographs [Fig 2,3] revealed an Undisplaced Herbert's type B2 scaphoid fracture.

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Figure 1 Blood supply of Scaphoid bone

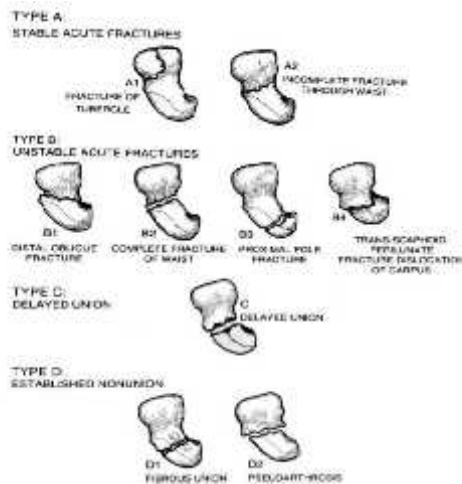


Figure 2 Plain radiograph of Right wrist AP Lateral view showing Scaphoid fracture.



Figure 3 Plain radiograph of Right wrist View showing Herbert's Type B2 fracture.

Rest of the routine blood investigations were normal. Many studies showed that open reduction with Herbert screw fixation is the better choice for such type of scaphoid fractures, but it was observed that Herbert screw fixation has disadvantages such as prolonged surgical time, implant failure, chronic pain and non union in view of all the above complications we planned for an open reduction and K-wire fixation with bone grafting through dorsal radial approach and fixed with 2 K-wires[Fig 4].



Figure 4 Plain radiograph of Right wrist AP view showing Herbert's Type B2 fracture fixed with K-wires.

Patient was immobilized with a below elbow scaphoid cast and was advised for regular follow ups with plain radiographs which showed appropriate callus formation [Fig 5]. K-Wires were removed at the end of 5th week and immobilization was continued for three more weeks following which the cast was removed and wrist mobilization exercises were advised. Patient achieved near normal painless range of movements after which he was able to carry out his daily routine activities comfortably.



Figure 5 Post-operative Plain radiograph of Right wrist AP view showing united Scaphoid fracture after K-wire removal.

DISCUSSION

Fractures of scaphoid are common and account for 50% to 80% of carpal injuries [3]. Scaphoid fractures are more prone for osteonecrosis. Undisplaced and Unstable fractures probably are treated with cast immobilization but it increases the healing time and hence needs definite surgical intervention it may be

percutaneous/open, Herbert screw fixation/K-wire fixation, with or without bone grafting. For early healing of the fracture, fixation with bone grafting is a better choice of the treatment. Many studies showed that open reduction with Herbert screw fixation is the better choice for scaphoid fractures, but we noticed that there are some limitations with Herbert screw fixation which include prolonged surgical time, implant failure, chronic pain and non union.

CONCLUSION

Open reduction and K-wire fixation with bone grafting decreases the chances of non-union, Avascular necrosis, short period of hospital stay, early mobilization and better anatomical reduction. In this case the young patient with 25 years old ,with fracture of right scaphoid of Herbert's type B2, open reduction and K-wire fixation with bone grafting was most useful and apt procedure as the chances of union are high with attainment of early painless movements of wrist.

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How to cite this article:

Mazharuddin Ali Khan *et al.* 2017, Open Reduction And Fixation of Scaphoid Fracture With Bone Grafting to Avoid Nonunion. *Int J Recent Sci Res.* 8(3), pp. 16153-16155. DOI: <http://dx.doi.org/10.24327/ijrsr.2017.0803.0087>
