



FUNCTIONAL EVALUATION OF VOLAR BARTON FRACTURES MANAGED WITH ANATOMICAL PLATING AT A TERTIARY CARE CENTER IN NEPAL: A RETROSPECTIVE REVIEW OF RECORDS.

Orthopaedics

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ABSTRACT

Introduction Distal end radius fractures have been extensively studied in literature and yet many aspects of management remain controversial. Volar Barton fractures have been treated surgically with volar locking plates. Very few dedicated studies have been conducted in Nepal. The aim of this study was to describe the functional outcomes of Volar Barton fractures managed with open reduction and internal fixation (ORIF) and Volar plating at a high volume tertiary care centre in Nepal. **Methodology** This retrospective review of patients was conducted after approval of the institutional ethics committee. A review of records of patients operate in the last 24 months was performed. Patients aged 18 to 65 years who had been operated for Volar Barton fractures (AO type B3) within 3 weeks of injury with ORIF and Volar plating with a minimum of 12 months follow up were included in the study. Data regarding demographics, side of injury, functional outcomes using the Patient rated wrist evaluation (PRWE), Modified Mayo Wrist score and Radiological parameters. Statistical analysis of the data was done. Proportion, percentage, mean, standard deviation was calculated. **Results** A total of 180 records of patients who underwent ORIF and plating between 1st April 2021 to 31st March 2021 were identified. Of these 50 patients met the inclusion criteria and were included in the analysis. The mean age of the patients was 36.4 ± 1.4 years (18- 62 years). All fractures united with a mean union time of 5.7 ± 3.2 weeks. On radiographic assessment at 12 months the Volar tilt was $5.23 \pm 2.41^\circ$, mean radial height was $9.23 \pm 2.2^\circ$. Radial inclination was $22.9 \pm 5.0^\circ$. The mean articular step was 0.3 ± 0.5 mm. Functional outcomes using the PRWE at 12 months was 3.5 ± 1.3 . The Modified Mayo score was 82.12 ± 7.3 . **Conclusion** Volar plating provides good functional and radiological outcomes in our study population. It has good union rates and a relatively low complication rate.

KEYWORDS

Volar plating, Volar Barton, Distal radius fractures

INTRODUCTION

Distal end radius fractures have been extensively studied in literature and yet many aspects of management remain controversial. Stable fracture patterns can be considered for non-operative treatment, Volar Barton fractures have been treated surgically with volar locking plates. Advantage of plating is that theoretically there is no further need of immobilization in the post operative period. (2)

The challenges and forces acting on the fracture render closed reduction as an unacceptable option most of the time. This restores articular congruity and allows early rehabilitation of the patient (3) Good clinical and radiological outcomes have been reported by authors for fractures treated using this method of fixation. (4-7) Very few dedicated studies have been conducted in Nepal. (1)

The aim of this study was to describe the functional outcomes of Volar Barton fractures managed with open reduction and internal fixation (ORIF) and Volar plating at a high volume tertiary care centre in Nepal.

METHODOLOGY

This retrospective review of patients was conducted after approval of the institutional ethics committee. A review of records of patients operate in the last 24 months was performed. Patients aged 18 to 65 years who had been operated for Volar Barton fractures (AO type B3) within 3 weeks of injury with ORIF and Volar plating with a minimum of 12 months follow up were included in the study.

Open fractures, fractures presenting 3 weeks after injury, other associated fractures of the ipsilateral limb and previous history of surgical procedure, deformity in the ipsilateral limb were excluded.

The patient records were searched and entered into a data extraction proforma in an anonymised manner. Data regarding demographics, side of injury, functional outcomes using the Patient rated wrist evaluation (PRWE), Modified Mayo Wrist score and Radiological parameters.

Statistical analysis of the data was done. Proportion, percentage, mean, standard deviation was calculated. (Figure 1 and 2)



Figure 1: Pre and post op radiographs



Figure 2: Pre and post op fixation with locking plate

RESULTS

A total of 180 records of patients who underwent ORIF and plating between 1st April 2021 to 31st March 2021 were identified. Of these 50 patients met the inclusion criteria and were included in the analysis. The mean age of the patients was 36.4 ± 1.4 years (18- 62 years). Of which 79.6% (n=40) were males. 55% were injured following road traffic accident, 32% following falls and the rest (13%) by machinery accidents.

The average time from injury to surgery was 2.3 ± 1.2 days. There were 3 patients who developed superficial infection in the post operative

period, all resolved using antibiotics and regular dressing of the surgical site. All fractures united with a mean union time of 5.7 ± 3.2 weeks. On radiographic assessment at 12 months the Volar tilt was $5.23 \pm 2.41^\circ$, mean radial height was $9.23 \pm 2.2^\circ$. Radial inclination was $22.9 \pm 5.0^\circ$. The mean articular step was 0.3 ± 0.5 mm.

Functional outcomes using the PRWE at 12 months was 3.5 ± 1.3 . The Modified Mayo score was 82.12 ± 7.3 . A summary of results is given in table 1.

Mean age 36.4 ± 1.4 years
 Average time from injury to surgery 2.3 ± 1.2 days
 Mean union time 5.7 ± 3.2 weeks
 Radiographic parameters
 Volar tilt $5.23 \pm 2.41^\circ$
 Mean radial height $9.23 \pm 2.2^\circ$
 Radial inclination $22.9 \pm 5.0^\circ$
 Mean articular step 0.3 ± 0.5 mm
 Functional outcomes
 Patient reported wrist evaluation 3.5 ± 1.3
 Modified Mayo score 82.12 ± 7.3

Table 1: Summary of results

DISCUSSION

Volar Barton fracture represent an unstable configuration and most need surgical fixation. Improper reduction or delayed treatment lead to poor functional and radiological outcomes. The aim of treatment is to restore radiological parameters to prevent post-traumatic osteoarthritis.

Our study demographics show that the average age was 36.4 ± 1.4 years (18- 62 years) which is similar to those described by other authors.(2, 8) The male: female ratio in our study was similar to other described studies. (9) The mechanism of injury was also similar to a study conducted by Harish et al.(9)

Fracture union was noted in 5.7 ± 3.2 weeks in this study. These findings are concurrent with studies conducted by Chung et al (6, 10) The infection rate in this study was 6%. Other authors have reported similar rates of infection in their studies.(10) Volar approach is preferred over the dorsal approach due to a better soft tissue cover of the plate, less incidence of impingement of tendons and decreased skin complications.

Functional outcomes using PRWE were also similar to studies by Boretto et al, (11) the modified Mayo wrist score was also similar to other authors.

CONCLUSION

Volar plating provides good functional and radiological outcomes in our study population. It has good union rates and a relatively low complication rate.

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