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Original Research Article

A Study of Outcome of Lower End Radius Fracture Treated with Open Reduction and Internal Fixation with Volar Platting

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Conflict of interest: Nil

Abstract:

Background and Aim: Most frequent bone injuries seen in orthopaedic practice is distal end radius fractures. The importances of fixation of the distal radius (DR) fractures have evolved over the past two decades. The purpose of this study was to evaluate the outcome of a fracture of the distal radius (DR) treated surgically by ORIF with a volar plate, and to prospectively follow the degree of recovery of wrist range of motion and patient functional outcomes.

Material and Methods: The present study was conducted on patients presenting with fracture of the distal end of radius, who were treated with open reduction and internal fixation with volar plating. The Gartland and Werley Scoring were used to evaluate the outcome. The study was carried out on 30 patients of closed distal radius fracture, operated with ORIF with volar plating. Information on the patients was compiled from clinical details, case files and operation theatre records that were followed up for the duration of 6 months.

Results: Majority of the patients were in age group 41-50 years with a mean age of 38.90 ± 12.21 years. Majority of the patients were males. At 6 months, 66.66% patients had excellent outcome and 33.33% patients had good outcome. 6.66% patient achieved union within 1month, 22 (73.33%) patients achieved union between1-2months and 6 (20%) patients achieved union by 2-3 months. Complex regional pain syndrome was seen in 2(6.66%) patient and stiffness in 4(13.33%) patients. In 24(80%) patients, no complications were seen.

Conclusion: We found that open reduction and internal fixation with volar plating provided excellent to good wrist outcome in patients with distal end radius fractures with minimal complications. Volar plating provides stable fixation for early mobilization, leading to early resumption to pre-trauma functional level.

Keywords: Distal Radius Fracture, Internal Fixation, Open Reduction, Volar Platting.

Introduction

Most frequent bone injuries seen in orthopaedic practice is distal end radius fractures. [1] It occurs most frequently in adult patients after the fourth decade of life and comprises around10%to 20% of all the fractures attended as emergencies. [2]

Distal radius fracture however have a bimodal age distribution among these one with younger age group results due to high-energy trauma and another group of elderly patients resulting with low energy trauma. [3,4] The causes of the injury are fall on outstretched hand/work related accidents/car accidents/sports injuries. The importance of fixation of the distal radius (DR) fractures has evolved over the past two decades. Cast immobilization was the initial method, followed by K-wire fixation and then internal fixation with a variety of plates. [4] After using a variety of the available volar locking plates to fix intra-articular fractures, a significant improvement in wrist function was observed. In addition, surgical technique has improved, resulting in less disfigurement.

By immediately reconstructing the anatomy, plating allows stable internal fixation and rapid recovery of wrist function. [5] The antiglide effect of the support plate helps to reduce and stabilize intra-articular fractures. [6] The purpose of this study was to evaluate the outcome of a fracture of

the distal radius (DR) treated surgically by ORIF (open reduction and internal fixation) with a volar plate, and to prospectively follow the degree of recovery of wrist range of motion and patient functional outcomes.

Material and Methods

This was an observational type of study. The Gartlandand Werley Scoring was used to evaluate the outcome. The study was carried out on 30 patients of closed distal radius fracture, operated with ORIF with volar plating. Information on the patients was compiled from clinical details, case files and operation theatre records that were followed up for the duration of 6 months.

Inclusion Criteria involves Patients with age 18 and above and Patients with closed distal radius fracture .Patient with distal end radius fracture both intra-articular and extra-articular.

Exclusion criteria involve Patient with associated distal ulna fractures and with open fractures or pathological fracture. Patient and/or his/her legally acceptable representative not willing to provide their voluntary informed consent form for the participation in the study Post-operative radiograph (Anteroposterior and lateral) views were taken of wrist to see the alignment of fracture reduction. Follow up was done at 2 weeks, 1 month, 3 months, and 6 months.

Statistical analysis

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2007) and then exported to data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA).

Quantitative variables were described as means and standard deviations or median and interquartile range based on their distribution. Qualitative variables were presented as count and percentages. For all tests, confidence level and level of significance were set at 95% and 5% respectively.

Results

Table 1: Distribution of patients according to age

Age	Frequency	Percentage (%)
18-20years	3	10
21-30years	7	23.33
31-40years	6	20
41-50years	8	26.66
>50years	6	20
Total	30	100

The above table shows the distribution of patients according to age. 3(10%) patients were in age group 18-20 years,7(23.33%)were in age group 21-30years, 6(20%)were in age group 31-40years,8(26.66%)were in age group 41-50years,and 6(20%)patients were in age group more than 50years. Most patients were in age group 41-50years.

Table 2: Distribution of patients according to sex

Sex	Frequency	Percentage (%)
Female	8	26.66
Male	22	73.33
Total	30	100

The above table shows the distribution of patients according to sex. 8(26.66%) patients were females and 22(73.33%) patients were males.

Table 3: Distribution of patients according to side involvement

Side	Frequency	Percentage (%)
Left	18	60
Right	12	40
Total	30	100

The above table shows the distribution of patients according to side involvement. In 18(60%) patients, left side was involved and in12 (40%) patients, right side was involved. Left side involvement was more common than right side involvement.

Table 4: Distribution of patients according to time taken for achievement of union

Time	Frequency	Percentage (%)
1 Month	2	6.66
1-2 Month	22	73.33
2-3 Month	6	20
Total	30	100

The above table shows the distribution of patients according to time taken for achievement of union. 2(6.66%) patient achieved union within 1month, 22(73.33%) patients achieved union between1-2months and 6(20%) patients achieved union by 2-3 months. Majority of the patients achieved union between 1-2 months.

Table 5: Outcome at 6 months according to Gartland & Werley Score

Outcome	Frequency	Percentage (%)
Excellent	20	66.66
Good	10	33.33
Fair	0	0
Poor	0	0
Total	30	100

The above table shows the outcome at 6 months according to Gartland & Werley Score. At 6months, excellent outcome was seen in 20(66.66%) patients and good outcome in 10(33.33%]

Table 6: Distribution of patients according to complications

Complication	Frequency	Percentage
CRPS	2	6.66
Stiffness	4	13.33
None	24	80
Total	30	100

The above table shows the distribution of patients according to complications. Complex regional pain syndrome was seen in 2(6.66%) patient and stiffness in 4(13.33%) patients. In 24(80%) patients, no complications were seen.

Discussion

Distal end radius fractures are most common skeletal injuries, which has a bimodal age distribution. In younger age group, it occurs due to high-energy trauma, while in elderly it occurs due to low energy trauma. Over a century, the treatment of fracture distal end radius has evolved from cast immunization to K-wire fixation. At present internal fixation with various plates has not only proved to be effective in early return of the wrist function, but because of improvement in surgical technique, it has led to lesser disfigurement. Present study was undertaken to evaluate the functional outcome of distal radius fractures treated with open reduction and internal fixation with volar plate.

We had included 30 patients who underwent open reduction and internal fixation with volar plate for fracture of distal end of radius. Majority of the patients were in age group 41-50years with a mean age of 38.90 ± 12.21 years. The youngest patient was 18 years old and oldest one was 58 years old. The mean age of the patients was 64.4 years. Our mean age is less in compared to the studies done by Minegishi et al8, Santhosh et al [9] and Sharma et al [10]. The reasons were, in our study, majority of the patients were of younger age. Majority of the patients were males. Males outnumbered the females, similar studies done by Santhosh et al [9], Pradhan et al. [11], Ojha et al [12], Ahmed et al [13] and Gowda et al [14]. The fractures of the distal end of radius are more common in men in comparison to the females till age of 49 years and beyond that these are more commoner in women.

In majority of the patients, left side involvement was seen in comparison to right side involvement. Contrary to our findings, a study done by Sanaboyina et al [15] reported right side involvement in majority of the patients.

All these patients underwent open reduction and internal fixation with volar plating. Majority of the patients (73.33%) achieved fracture union between 1-2 months, while 20% achieved it between 2-3 months. 2 patient (6.66%) was able to achieve the union within a month of surgical intervention. The fracture union was achieved in a short time. According to the study done by Sharmaetal [10] the mean time to union was 7.96 weeks. In Chavhan et al [6] study, the mean union time was 7 weeks. Our mean union time was comparable with these studies, while study done by Ahmed et al [13] reported theme an union time to be11.98±1.64 weeks, which is longer than that seen in our study and studies done by other authors.

The wrist function was assessed using Gartland and Werley score. At 6 months, 66.66% patients had excellent outcome and 33.33% patients had good outcome. In Santhosh et al [9] study, 40% patients had excellent, 46.66% had good, 6.66% had fair and 6.66% had poor results, according to Gartland and Werley Scoring system. Similarly, another study done by Keizer et al [16] reported excellent outcome in 53.8%patients, 42.3% good and 3.8% fair results. Gowda et al. [14] reported excellent outcome in 50% patients, 43.3% good and 6.7% fair results. The results achieved in our study are much better than that reported by Santhosh, Keizer and Gowda.

Complications were seen in 6 (20%) patients. Of them 2 patient complained of complex regional

pain syndrome and 4 patients complained of wrist stiffness. Sharma et al [10] reported an overall complication rate of 15.22%. Study done by Singh et al. [17] reported no complications after open reduction and internal fixation with volar plating. In our study, we found a slightly higher rate of complications, when compared with the other studies.

The limitation of present study was that, the surgeries were performed by different surgeons; hence there may be variation in the results obtained. Even though present study has a limitation, the results of our study are comparable with the available literature.

Conclusion

We found that open reduction and internal fixation with volar plating provided excellent to good wrist outcome in patients with distal end radius fractures with minimal complications. Volar plating provides stable fixation for early mobilization, leading to early resumption to pre-trauma functional level. Although we obtained excellent to good results with open reduction and internal fixation with volar plating in distal end radius fractures, the results cannot be extrapolated to the general population as the sample size was small. Hence, we recommend that large multi-centric studies be performed before generalizing the results.

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