ORIGINAL ARTICLE

Functional Outcome of Volar Locking Plate Fixation in Distal Radius Fracture

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ABSTRACT

Aim: To determine the frequency of good to excellent functional outcome of volar locking plate fixation in distal radius fracture in terms of excellent, good or satisfactory using MAYO wrist scoring system.
Study Design: Descriptive case series
Setting: Department of Orthopedics Unit Al-Khidmat Teaching Hospital Mansoorah, Lahore
Duration of Study: Study was completed in Six months i.e., from 3rd October 2014 to 2nd April 2015.
Methods: Eighty patients with distal radius fracture were included. Volar approach was used for all cases. At 24 weeks postoperatively, the functional outcome was assessed using MAYO's wrist score and categorized as good to excellent.
Results: Eighty patients were included with mean age of 35.4±13.1 years ranged from 18 to 60 years. Out of 80 patients, 69 (86.3%) were male patients and 11(13.8%) were female patients. 29 patients (36.3%) showed good to excellent functional outcome. There was no effect of age or gender on functional outcome.
Conclusion: It is concluded that frequency of good to excellent functional outcome after volar locking plate fixation using MAYO wrist scoring system is acceptable (36.3%) and comparable with international studies.
Keywords: Volar locking plate fixation, Functional outcome, Distal radius fracture, MAYO wrist scoring system

INTRODUCTION

Distal radius is common location for fractures and it accounts for 17% of all fractures. Displaced and intra articular fractures usually require reduction and fixation[1].the incidence is increased in old population due to osteoporosis and in young population due to increased outdoor activities[2].

There is diversity in the treatment of these fractures. Common mode of treatment in these fractures is conservative management in the form of casting.in case of mal-alignment and loss of reduction, operative fixation is needed[3].

Now a days the preferred mode of treatment of distal Radial fracture is open reduction and Volar Plate osteosynthesis, which allows acceptable reduction, early rehabilitation, less pain , early return to normal function of upper extremity ,decreased risk of loss of reduction and cost effective compared with other methods of fixation[4].

Volar locking plate is superior to external fixation with regard to complication rates and anatomical outcomes[5].

In middle age patient the treatment of choice for distal radial intra-articular fractures is locking plate osteosynthesis .and is better than pin and plaster[6]. In one of the studies, fortysix patients (mean age: 48.7 years) with Type-C distal radius fractures were treated with volar locking plates. Postoperative MAYO scores revealed 14(30.4%) excellent results, 11(23.9%) good, 20(43.5%) satisfactory and 1(2.2%) with poor result. They concluded that volar locking plate fixation of unstable distal radius fractures gives good stability and satisfactory clinical outcome[7].

The rationale of my study is to ascertain the functional outcome of volar locking plate in fixation of distal radius fracture in local population which is deficient in Calicum and Vitamin D[3]. Moreover, no local data is available and previous international studies entail small populations. If results turn out to be favourable, better practices for distal radial fracture could be established locally with increased benefits to patients in terms of less pain, optimum range of motion and early return to work.

MATERIAL AND METHODS

Good to excellent functional outcome: Functional outcome was assessed in terms of MAYO wrist score encompassing four variables: Pain, Range of motion, Patient satisfaction and Grip strength. The MAYO wrist score ranges from 0 to 100. A score of 80-100 at 24 weeks was considered as good to excellent.

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Category	Score	Findings
Satisfaction points)	25 20 15 10 5 0	no pain or mild pain with activity moderate pain with vigorous activity mild pain with routine activity moderate pain with daily activity pain at rest
Range of motion (25 points)	25 20 10 0	Highly satisfied (76-100%) Moderately satisfied (51-75%) Not satisfied, but working (26-50%) Not satisfied, unable to work (<25%)
	25 20	100% of normal 75-99% of normal
Grip strength points)	10 5 0	50-74% of normal 25-49% of normal 0-24% of normal
	25 15 10 5 0	100% of normal 75-99% of normal 50-74% of normal 25-49% of normal 0-24% of normal

MATERIALS AND METHODS

This descriptive case series was conducted in the Department of Orthopedics Al-Khidmat Teaching Hospital Mansoorah Lahore which was completed in six months i.e., from 3rd October 2014 to 2nd April 2015.

Sample Size: To estimate a proportion with confidence level of 95%, acceptable difference of 0.10 and assumed proportion of excellent response. 0.30. Required sample size was 80. Non-probability consecutive/ purposive sampling technique was used.

Inclusion Criteria:

Age ranging from 15 to 80 years.

Distal radial fractures with intra-articular step off more than 2 mm.

Decreased in Radial height of more than 3 mm or more than 15 degrees of angulation in saggital plane.

Fractures with metaphyseal comminution and unsatisfactory alignment were treated surgically.

Patients who were managed conservatively with plaster and subsequently lost reduction and fit to the criteria of open reduction and fixation were included in the group of volar plate fixation.

Exclusion Criteria:

Already fixed fractures determined on x-ray.

Four weeks old fractures at the time of surgery determined on history and clinical examination.

Open fractures determined on clinical examination.

Mal-united fractures which needs corrective osteotomies determined on history and clinical examination.

Data collection procedure: Eighty patients those fulfilling the inclusion criteria were recruited for the study after approval from ethical review board and informed consent. The study was carried out in Orthopedic Unit-II for a period of 6 months. A detailed demographic history was collected and patient underwent surgery under general or regional anesthesia with administration of antibiotics according to protocol and policy by a consultant orthopedic surgeon. Volar approach was used for fixation. Same type of volar locking plate was used for all cases and patient discharged on the next day.All operated limbs were protected with volar slab for two weeks. An active, passive, and active-assistive program was started, supported by a removable splint. At 6 weeks postoperatively, the splint was discarded and strengthening exercises were initiated. The patient was followed up at 24 weeks for the functional outcome. It was assessed using MAYO's wrist score and was categorized as good to excellent. All the information was recorded in a structured questionnaire.

Data analysis: Data was collected andanalyzed in latest SPSS version. Numerical variables like age, duration of surgery were presented as mean and standard deviation. Frequency and percentages were calculated for gender and good to excellent functional outcome. Collected data for age and gender was stratified, chi-square test was applied ,<0.05 p- value was considered as standard.

RESULTS:

Eighty patients were included in our sampled population with mean age of 35.43±13.131 ranged from 18 to 60 years (Table I).

Among our sampled population 35 patients (43.8%) were below 30 years of age whereas 40 patients were either 30 years or above (Table II).

Out of 80 patients, 69(86.3%) were male patients and 11(13.8%) were female patients (Table III)

Twenty nine patients (363%) showed good to excellent functional outcome while remaining 51 patients (63.8%) didn't show such results. (Table IV)

When we cross tabulated between sex and good to excellent functional outcome results were non-significant (p=0.993). 25 male patients and 4 female patients were having function outcome good to excellent (Table V).

To determine the trend in different age groups, we cross tabulated age groups with good to excellent functional outcome results were non-significant (p=0.538). All of 29 patients with good to excellent functional outcome were having 14 patients below 30

years of age and 15 patients either 30 year or above. (Table VI)

Table I: Age distribution of sampled population

N	Min.	Max.	Mean	Std. deviation
80	18	60	34.43	13.131

Table II: Frequency distribution of sampled population by Age Groups

Valid	Frequency	%
Below 30 yrs of Age	35	43.8
Above 30 yrs of Age	45	56.3
Total	80	100.0

Table III : Frequency distribution of sampled population by gender

Valid	Frequency	%
Male	69	86.3
Female	11	13.8
Total	80	100.0

Table IV: Frequency distribution of sampled population by Good to excellent functional outcome

Valid	Frequency	%
Yes	29	36.3
No	51	63.8
Total	80	100.0

Table V: Cross tabulation between Sex and Good to excellent Functional Outcome

Gender	Good to excellent Functional Outcome		Total
	Yes	No	
Male	25	44	69
Female	4	7	11
Total	29	51	80

Using Fischer exact test, p value =99 (non-Significant)

Table VI: Cross tabulation between Age Groups & Good to excellent Functional Outcome

Age groups	Good to excellent Functional Outcome		Total
	Yes	No	
Below 30 yrs of age	14	21	35
Above 30 yrs of age	15	30	45
Total	29	51	80

Using Fischer exact test, p value =.53 (non-Significant)

DISCUSSION

Increasing incidence of distal radius fracture may be attributed to an old age (fragility fractures) and the young population in outdoor daily activities and trauma[2]. Distal radius fracture are common in our emergencies.

There are difference of opinion regarding the optimal management and surgical approaches .most of the time these fractures are managed conservatively in the form of cast however if the anatomical alignment is not achieved with conservative methods then operative modes of fixation are mandatory[3].

Functional outcome in terms of MAYO wrist scoring system may provide a better outlook and impact of volar locking plate fixation, the most common and well known surgical technique for fixation. In our study, 29 patients (36.3%) showed good to excellent functional outcome after 24 weeks. In a previous study Post-operative MAYO score revealed 30.4% excellent results, 23.9% good. Our results are a bit lower in these terms. Reasons may be delayed presentation, delayed opting for surgical option. However these results are acceptable for mal united fractures of distal radius.

Eighty patients were included in our sampled population with mean age of 35.43±13.131 ranged from 18 to 60 years. In our study we found that most of the patient affected are from younger age group i.e. the mean age group of 35 years. It also shows that there should be some preventions, strategies to reduce the accidents and decrease the burden of these non-communicable diseases in our population which is on rise.

Out of 80 patients, 69(86.3%) were male patients and 11(13.8%) were female patients. And among all these there is some social discrepancy that more male presented to us of showing that they are more at risk of having accidents.

We also compared the effect of gender on good to excellent functional outcome of volar locking plate osteosynthesis for distal radius fracture using MAYO wrist scoring system and it was found that there was no statistical difference in its distribution of in both male and female.

To determine the trend in different age groups, we cross tabulated age groups with good to excellent functional outcome results were non-significant (p=0.538). All of 29 patients with good to excellent functional outcome were having 14 patients below 30 years of age and 15 patients either 30 year or above. So we may conclude that although age was found a non-significant factor for good to excellent functional outcome but patients in younger age group showed better results.

CONCLUSION

It is concluded that frequency of good to excellent functional outcome after volar locking plate fixation using MAYO wrist scoring system is acceptable (36.3%) and comparable with international studies. Further randomized control trials will be helpful to compare its efficacy with other studies.

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