Original Article

COMPARISON OF MEAN DASH SCORE AFTER CLOSE REDUCTION AND EXTERNAL FIXATION VERSUS OPEN REDUCTION INTERNAL FIXATION (ORIF) WITH PLATING FOR TREATING INTRA-ARTICULAR FRACTURE OF DISTAL RADIUS

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ABSTRACT:

OBJECTIVE: To compare the mean DASH score after close reduction and external fixation versus ORIF with plating for treating intra-articular fracture of distal radius.

MATERIALS & METHODS: Total 60 subjects having fracture of intra-articular distal radius having age from 20-60 years either male or female were selected for present study. Patients with rheumatoid arthritis, neurovascular injury, diabetes mellitus, chronic liver disease, chronic renal failure, chronic steroid use were excluded. Two equal study groups A and B were made by randomization. In group A patients, ORIF with plating was done while in group B, external fixation was done. At the end of 6 months of surgery, DASH score was evaluated in both groups.

RESULTS: Average age in study group A & B was 31.90 ± 7.86 years and 33.53 ± 8.49 years respectively. Total 41 (68.33%) patients were male and 19 (31.67%) patients were female.
The mean duration of fracture in group A was 34.47 ± 17.67 hours and in group B was 35.10 ± 17.33 hours. Mean DASH score in Group A (ORIF with plating) was 28.04 ± 10.47 while in Group B (external fixation) was 52.17 ± 8.73 (p-value<0.0001).

CONCLUSION: Findings of present study showing that mean DASH score is less after ORIF with plating as compared to external fixation technique for treating intra-articular fracture of distal radius.

KEYWORDS: Distal, radius, fracture, external, reduction, plating

INTRODUCTION:

Distal radius fracture (DRF) is one of the most common fracture of forearm. It can be caused by either fall or road side accident.[1] Most commonly DRF can be caused by fall on to outstretch hand. It can be classified as volar or dorsal or intra or extra articular.[2] Prognosis of intra articular DRF is usually not good due to post traumatic arthrosis, ,midcarpal dislocation and associated ligament injuries.[3]
DRF are usually named by Colles' (dorsal displacement of fracture). There can be smith fracture as well (volar displacement of fracture). Sometimes fractures are caused by high velocity injury in which there is much more comminution (fracture is like broken glass piece).
Our objective in distal radius fracture is functional capacity of wrist. We cannot achieve it in all patients, so treatment is based according to patient, fracture geometry and

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socio economic status of patients. Our treatment goal should be no pain and gain full range of motion. There are two management methods either close reduction and pop cast or open reduction and internal fixation with plate. In this modern world now there are different categories of plate, we are using most commonly fixed angle volar locking plate. After the operation, range of motion is assessed by DASH score. There are different studies on treatment modalities of fracture of distal radius, so a study is planned to compare the mean DASH score after external fixation versus volar plating for treating intra-articular fracture of distal radius. Then based on the results, these particular patients could be provided with a technique with better functional outcome (less mean DASH score), so these patients could resume their routine activities as early as possible. This would also help us to establish our routine practice guidelines in order to reduce the morbidity of these patients.

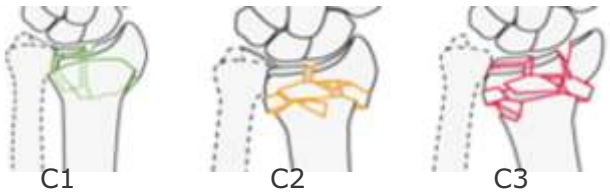
MATERIAL AND METHODS:

This randomized controlled trial was conducted in Department of Orthopaedic Surgery, Aziz Fatima Medical and Dental College Hospital from May 2014 to April 2016.

Total 60 patients with intra-articular distal radius fracture of AO type C2 and C3 presenting within 72 hours of trama, having age from 20 years to 50 years both male or female were selected for this study. All the patients with fractures of distal radius other than AO type C2 and C3, patients with rheumatoid arthritis (assessed on history), patients with neurovascular injuries (assessed on examination), diabetes mellitus, chronic liver disease, chronic renal failure, chronic steroid use were excluded from the study.

Complete articular

C1. Simple, metaphyseal simple
C2. Simple, metaphyseal multifragmentry
C3. Multifragmentary



C1 C2 C3

Two equal study groups A and B were made by randomization. Pre-operative X-ray of all the patients was taken to assess the type of fractures. In groups A, patients, ORIF with plating was done while in group B, external fixation was done. In group A immediate post-operative active range of motions exercises at wrist and fingers started. In group B, only fingers and thumb movements are allowed. In both groups first post-operative X rays were taken on first day of surgery to check reduction of fracture fragments and repeat x rays were taken on six weeks post-operatively to acess fracture healing. In group B external fixator usually removed between eight to twelve weeks after having evidences of radiological bone healing, followed by active range of motion exercises at wrist joint. After surgery, all the selected patients were followed up regularly and DASH score was noted by the researcher at the end of 6 months. All this information was collected through pre-designed performa. Demographic profile of the patients was also entered in performa.

Data was analyzed by using SPSS version 23. Age, duration of injury, DASH score and BMI was presented as mean and SD. Frequency and percentage were calculated for the gender. Student 't' test was used to compare study variable i.e. mean DASH score.

RESULTS:

In present study, in group A (ORIF with plating) mean DASH score was 28.04 ± 10.47 while in group B (external fixation), mean DASH score was 52.17 ± 8.73. Significantly (P = 0.0001) higher mean DASH score was noted in study group B as compared to study group A. (Table 1)

Stratification in relation to age was done and three age groups were made i.e. 20-30 years, 31-40 years and 41-50 years.

In study group A, total 10 (33.33%) patients, 12 (40.0%) patients and 8 (26.67%) patients belonged to age group 20-30 years. Total 12 (40.0%) patients and 11 (36.67%) patients of study group A and B belonged to age group 31-40 years. Total 8 (26.67%) patients of group A were belonged to age group 41-50 years and 11 (36.67%) patients of group B were belonged to age group 41-50 years.

In age group 20-30 years of age, mean DASH score of study group A was 24.90 ± 8.02 and mean DASH score of study group B was 53.25 ± 10.01. Statistically significant difference between mean DASH score between the both study groups was observed with p value 0.0001. In age group 31-40 years, mean DASH score was 27.77 ± 9.18 and 51.32 ± 9.20 respectively in study group A and B. Difference of mean DASH score was statistically significant with p value 0.0001. In age group 41-50 years, mean DASH score of study group A was 30.38 ± 12.69 and mean DASH score of study group B was 53.64 ± 8.05 and the difference was statistically significant with p value 0.0001. (Table 2)

In male patients, mean DASH score was 29.71 ± 9.40 and 51.85 ± 9.08 respectively in study group A and B. Statistically significant (P = 0.0001) difference of mean DASH score between both study groups was observed. In female patients, mean DASH score of study group A was 25.56 ± 11.56 and in study group B was 52.80 ± 8.40. Difference of mean DASH score between the both groups was statistically significant with p value 0.0001. (Table 3)

Stratification in relation to duration of fracture was done and two groups were made i.e. ≤36 hours duration of fracture and >36-72 hours duration of fracture. In ≤36 hours duration of fracture group, mean DASH score was 25.35 ± 10.25 in study group A and 52.25 ± 8.61 in study group B. Difference of mean DASH score between both study groups was statistically significant with p value 0.0001. In >36-72 hours duration of fracture group, mean DASH score was 32.54 ± 8.55 and 52.07 ± 9.18 respectively in study group A and B and the difference was statistically significant (P = 0.0001). (Table 4)

In patients with C2 type of fracture, mean DASH score was 29.11 ± 9.90 and 51.94 ± 6.27 respectively in study group A and B. Statistically significant difference between both groups was observed with p value 0.0001. In patients with type C3 fracture, mean DASH score of study group A was 27.36 ± 10.76 and mean DASH score of study group B was 52.46 ± 11.46 and the difference was statistically significant with p value 0.0001. (Table 5)

Table 1
Comparison of mean DASH score between group A and B

Study Group	DASH score		P-value
	Mean	SD	
A (ORIF with plating)	28.04	10.47	**0.0001**
B (External fixation)	52.17	8.73	

Table 2

Stratification of DASH score with respect to age groups.

Age of patients (years)	Group A (n=30)			Group B (n=30)			P-value
	N (%)	DASH score		N (%)	DASH score		
		Mean	SD		Mean	SD	
20-30	10 (33.33)	24.90	8.02	8 (26.67)	53.25	10.01	**0.0001**
31-40	12 (40.0)	27.77	9.18	11 (36.67)	51.32	9.20	**0.0001**
41-50	8 (26.67)	30.38	12.69	11 (36.67)	53.64	8.05	**0.0001**

Table 3

Stratification of DASH score with respect to gender.

Gender	Group A (n=30) DASH score		Group B (n=30) DASH score		P-value
	Mean	SD	Mean	SD	
Male	29.71	9.40	51.85	9.08	**0.0001**
Female	25.56	11.56	52.80	8.40	**0.0001**

Table 4

Stratification of DASH score with respect to duration of fracture.

Duration of fracture (in hours)	Group A (n=30) DASH score		Group B (n=30) DASH score		P-value
	Mean	SD	Mean	SD	
=36 hours	25.35	10.25	52.25	8.61	**0.0001**
>36-72 hours	32.54	8.55	52.07	9.18	**0.0001**

Table 5

Stratification of DASH score with respect to type of fracture.

	Group A (n=30) DASH score		Group B (n=30) DASH score		P-value
	Mean	SD	Mean	SD	
C2	29.11	9.90	51.94	6.27	**0.0001**
C3	27.36	10.76	52.46	11.46	**0.0001**

DISCUSSION:

We have conducted this randomized controlled study to compare the mean DASH score after close reduction and external fixation versus ORIF with plating for treating intra-articular fracture of distal radius.

In present study, minimum age was 20 years and maximum was 50 years and mean age was 32.67 ± 8.18 years. In younger age group, high energy injuries were common and in older age group, low energy injuries were common.[11,12]

In this study, mean DASH score in Group A (ORIF with plating) was 28.04 ± 10.47 while in Group B (external fixation) was 52.17 ± 8.73 (p-value<0.0001). A study by Pradhan U et al[10] has shown mean DASH score after 3 months of plating for treating intra-articular fracture of distal radius as 33.13±20.30 while after external fixation as 50.89±25.93.

In a clinical trial by Safdari M et al[13] mean post-operative baseline DASH score of 82±21 points, indicating significant function impairment. At the follow-up during the sixth week, volar plate group showing significantly (p=0.047) better DASH score as compared to external fixation group.

Aktekia estimated the DASH score in patients in the external fixator group to be 21.9, which was less than our findings.[14-15] Phandi et al. reported a score of 2.3 for the plate fixation group, which was also less than our result.[16]

In literature only few studies available on this topic.

Richard et al[18] reported that volar plates are associated with a statistically significant improvement in complication rate (p=0.021),

DASH score (p=0.002), range of movement (p=0.014) and grip strength (p=0.007). Gereli et al[19] reported an improvement in wrist flexion (p=0.012) and supination (p=0.003) following LP fixation but no difference in radiographic outcomes, grip strength, QuickDASH or Gartland-Werley scores between the groups. In one study by Schmelzer-Schmied N et al[20] the results demonstrated that the LP group had a better range of movement, radiographic outcomes, DASH score (p=0.007), Martini score (p=0.003) and VAS pain (p=0.03) compared to the EF group.

CONCLUSION:

Findings of present study showed that mean DASH score is less after open reduction and internal fixation with plating as compared to external fixation technique for treating intra-articular fracture of distal radius. We recommend that open reduction and internal fixation with plating should be used routinely for treating intra-articular fracture of distal radius, so these particular patients could resume their routine activities as early as possible and also their morbidity could be reduced.

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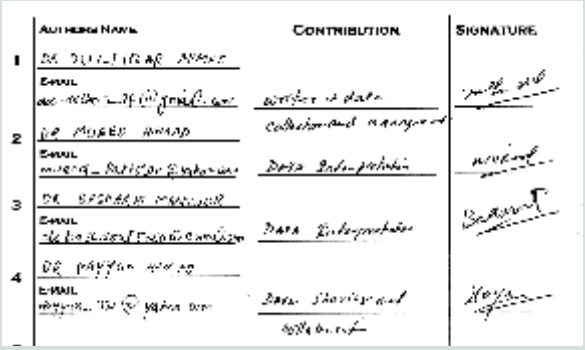

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After Revision

When you have to depart from this world and have to meet death (eventually), then why wish delay (why feel nervous about death).

Hazrat Ali (Karmulha Wajhay)