



Operative Versus Non-Operative Management of Distal Radius Fractures, in Elderly Patients: A Retrospective Study

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ABSTRACT

Introduction: One of the major public health concerns across the world is the fractures occurring at the distal end of radius with an incidence rate of 25.4 per 10000 elderly people who are of about 65 years of age. These fractures are the most common fractures occurring in the upper extremities of elderly patients. More than 210 million dollars are regularly spent on the management of radial fractures of the distal ends which are expected to increase every year, however, the process of managing radial distal fractures is still controversial.

Aim: To compare the outcomes of surgical and non-surgical management of distal radial fractures in elderly patients.

Methodology: The current study involved 90 patients who were more than 65 years of age and were treated either surgically or non-surgically. Patients who were treated non-surgically were treated with cast immobilization whereas patients who underwent surgery had either plate or external fixation. Functional scores and baseline radiographs were recorded before treatment, and follow-up was conducted at 2, 6, 12, 24, and 52 weeks. Radiographic and clinical follow-ups were observed along functional scores were calculated and observed.

Results: Patients who were treated without surgery had a mean age of 76 years, whereas 44 patients who were treated with surgery had a mean age of 73 years. No significant differences were observed between the groups in terms of other demographic factors. No differences in the functional status were observed in terms of arms, hands, and shoulders whereas pain scores also exhibited no significant differences.

Conclusion: It is suggested that minor limitations exist between wrist motion range and grip strength which was diminished with the non-operative care, but functional recovery was not limited during 12 months follow-up.

Key Words: Distal radial fractures, Surgical treatment, Non-surgical treatment, Cast immobilization, Functional recovery, Radiographic and clinical follow-ups

INTRODUCTION

One of the major public health concerns across the world is the fractures occurring at the distal end of radius with an incidence rate of 25.4 per 10000 elderly people who are of about 65 years of age.¹ These fractures are the most common fractures occurring in the upper extremities of elderly

patients. More than 210 million dollars are regularly spent on the management of radial fractures of the distal ends which are expected to increase every year, however, the process of managing radial distal fractures is still controversial.² The independent predictive factors of distal radial fractures include malunion, instability, and older age. People who are over 65 years of age have exhibited treatment satisfaction

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and acceptable functional outcomes despite the existence of loss of reduction on radiographic imaging or the existence of malalignment.³ To manage distal radial fractures properly and effectively it is observed since the last decade in the application of open reduction and internal fixation, however, it is associated with a high rate of complications. No existing literature is available that supports the single type of management for distal radial fractures.⁴ The current study is conducted to assess different treatment modes of distal radial fractures, in which a particular focus was given to the non-operative management of such fractures and comparing it with the operative management of distal radial fractures.

Study design: A retrospective study

Place and Duration: This study was conducted at Gambat Medical College, Pir Abdul Qadir Shah Jeelani Institute of Medical Sciences GIMS Gambat Pakistan from June 2020 to June 2021

METHODOLOGY

The current retrospective study investigated the data of patients admitted in our hospital. Permission was taken from the ethical review committee of the institute. The data of 90 patients were assessed who were more than 65 years old and were divided into the surgical treatment group and others were treated non-operatively. All the individuals having displaced fractures had undergone closed reduction and a sugar-tong splint was applied on them. Informed consent was obtained from all the participants and interviews were conducted to obtain demographic data, injury information, and a baseline functional score was given to all of them. The score was given in a thirty-item questionnaire that assesses the disabilities of upper extremities by observing the physical symptoms and functions. Neurovascular status and open wounds status were also recorded. Radiographs were obtained at different time points, and they were compared. According to the orthopedic trauma association's system, fractures were classified whereas open wounds were classified according to Gustilo et al. After discharge, the follow up of the patients was also recorded, which included the assessment of different variables, and patients were reexamined radiographically and clinically every week for three consecutive weeks to assess reduction maintenance. Once the follow-up of initial weeks was completed, patients were observed at 6, 12, 24, and 52 weeks, and all the parameters were measured. Patients having open fracture or inherently disabled fractures surgery was suggested. Out of the total individuals, 46 patients were treated with a cast, whereas patients who had their surgeries were treated with bridging external fixation along with Kirschner wire fixation or a volar locked plate. The patients who

were treated with surgery had their follow-ups at 2, 6, 24, and 52 weeks. All the patients had the application of a volar plaster splint. All the patients were observed by their surgeon treating them and the data was collected by a trained researcher on every visit. Follow-up examinations were also conducted at 3, 6, and 12 months in which wrist measurements and motion range of finger, measurement of grip strength using a dynamometer, and functional outcomes were assessed. Grip strength was also measured on the site which was not injured and was assessed three months after surgery. The pain was recorded on a 10-point visual analog scale, along with radiographic outcome was assessed with reference to fracture union, reduction loss, and arthritis development on every visit. For statistical analysis, SPSS version 23 was used and a p-value less than 0.05 was considered significant.

RESULTS

Out of the 90 patients who met the inclusion criteria, 46 patients were managed non-operatively, and 44 were treated operatively. The mean age of non-operative patients was 66 years whereas the mean age of patients who had undergone surgery was 63 years. The demographic details of patients are given in Table number 1. The functional and clinical results of the individuals included in the study are given in Table number 2.

After 3 months of follow-up, no differences were observed in the wrist motion range, however, after 6 months, patients who were treated without surgery observed better wrist extension whereas no differences were observed in the ulnar or radial deviation and wrist flexion. After 12 months, patients who had undergone surgery exhibited significantly better grip. Better supination was seen in patients who were treated non-surgically. Low pain and DASH scores had no significant differences between the groups. At every follow-up interval, it was observed that radial length and radial inclination were better significantly in the group who were operated on when compared with the non-operative group. In Table number 3, about 70% of patients who were treated without surgery had grade 1 arthritic change which when compared with the surgical treatment group, 20% of patients had grade 1 arthritic change. The list of complications is presented in Table number 4.

It was observed that the patients who had surgery, three patients had exhibited compression of the median nerve within 6 weeks after surgery. In the without surgery group, 3 patients exhibited carpal tunnel syndrome which was resolved within three months. None of the patients were surgically treated for the complications associated with radial fractures of the distal part.

Table 1: Demographic characteristics of study participants

Characteristics	The group with surgical treatment (N=44)	The group without surgical treatment (N=46)	P-Value
Age in years	63 ± 6.2	66 ± 7.0	0.03
Females	36 (82)	40 (87)	Non-significant
Body mass Index	25 ± 3.9	25 ± 5.0	Non-significant
Baseline DASH score	12 ± 13.8	16 ± 21.1	Non-significant
Orthopedic trauma association			
A	20 (45)	23 (50)	Non-significant
B	5(11)	4(9)	Non-significant
C	19 (44)	19 (41)	Non-significant

Table 2: Functional outcomes of the two groups

Outcomes	The group with surgical treatment	The group without surgical treatment	P-Value
After three months			
Pain score	2.0 ± 2.2	2.4 ± 2.6	NS
Extension	46.2 ± 18.2	41.7 ± 15.9	NS
Flexion	40.9 ± 13.8	42.1 ± 15.4	NS
Supination	71.6 ± 20.4	70.6 ± 18.0	NS
Pronation	83.2 ± 8.7	79.8 ± 8.9	NS
Ulnar deviation	20.6 ± 9.2	22.3 ± 12.1	NS
Radial deviation	17.1 ± 9.9	14.4 ± 7.2	NS
Grip strength	30.5 ± 46.2 (13.8 ± 20.9)	17.2 ± 13.7 (7.8 ± 6.2)	NS
Volar tilt	3.8 ± 7.0	-1.1 ± 13.1	0.04
Radial inclination	20.3 ± 3.8	17.0 ± 6.1	0.005
Radial length	9.8 ± 2.7	7.9 ± 3.1	0.004
Ulnar variance	1.4 ± 2.6	2.5 ± 2.5	NS
DASH	21.3 ± 25.8	27.2 ± 27.8	NS
After six months			
Pain score	2.2 ± 2.4	1.8 ± 2.2	NS
Extension	50.2 ± 16.1	58.7 ± 17.1	0.04
Flexion	48.9 ± 14.5	49.0 ± 15.8	NS
Supination	80.0 ± 10.5	76.1 ± 14.4	NS
Pronation	80.7 ± 12.8	80.6 ± 11.6	NS
Ulnar deviation	25.5 ± 9.0	21.9 ± 9.2	NS
Radial deviation	17.3 ± 7.2	18.7 ± 8.6	NS
Grip strength	27.2 ± 17.2 (12.3 ± 7.8)	24.0 ± 15.7 (10.9 ± 7.1)	NS
Volar tilt	6.8 ± 11.2	-2.3 ± 13.7	0.008
Radial inclination	21.1 ± 3.5	16.7 ± 4.9	NS
Radial length	9.8 ± 2.2	7.6 ± 3.0	0.003
Ulnar variance	2.3 ± 4.1	2.4 ± 2.7	NS
DASH	18.1 ± 23.3	17.4 ± 28.0	NS
After 12 months			

Table 2: (Continued)

Outcomes	The group with surgical treatment	The group without surgical treatment	P-Value
Pain score	1.2 ±1.7	1.5 ±2.1	NS
Extension	54.8 ± 18.7	54.6 ± 14.9	NS
Flexion	47.8 ± 13.1	51.8 ± 11.1	NS
Supination	80.6 ±8.1	83.9 ± 3.0	0.03
Pronation	82.9 ± 6.8	84.4 ± 3.8	NS
Ulnar deviation	29.9 ± 8.8	30.3 ±7.1	NS
Radial deviation	18.7 ± 7.9	22.9 ± 13.4	NS
Grip strength	39.0 ± 16.1 (17.7 ± 7.3)	27.9 ± 14.3 (12.7 ± 6.5)	0.005
Volar tilt	6.2 ± 9.2	-5.8 ± 10.4	<0.0001
Radial inclination	22.3 ± 4.7	18.0 ± 4.0	0.0001
Radial length	10.6 ± 2.5	8.7 ± 1.6	0.0008
Ulnar variance	1.5 ±2.2	2.8 ±1.8	0.007
DASH	10.0 ± 20.3	12.1 ± 29.6	NS

Table 3: Comparison of osteoarthritis grade between the groups

Osteoarthritis grade	The group with surgical treatment (N=44)	The group without surgical treatment (N=46)	P-Value
After 3 months			0.71
0	30	28	
1	12	14	
2	2	4	
3	0	0	
After 6 months			0.09
0	29	19	
1	10	20	
2	3	7	
3	2	0	
After 12 months			<0.001
0	29	9	
1	9	32	
2	4	5	
3	2	0	

Table 4: Complications between the groups

Complications	The group without surgical treatment	The group with surgical treatment
Carpal tunnel	3(7)	3(7)
Symptoms		
Tendinitis	1(2)	1(2)
Infection	0	0
Severe finger	0	1(2)
Stiffness		
Severe ulnar-sided	0	1(2)
wrist pain		
Tendon rupture	0	0
Prominent hardware	NA	1(2)

DISCUSSION

In the current study, it was found that there were no differences existed in the functional status or pain reported between the two groups. When surgeons are opting for a particular type of treatment they must assess the benefits, alternatives and risks of all the treatments and then opt for the treatment of choice. Different clinical papers are in the support of the idea that distal radial distal fractures require anatomic restoration essentially for better results.⁵ It has been observed that wrist deformity is often considered as an outcome predictor for radial distal fractures in elder patients. No significant differences were present in the outcomes of healed fractures that were under the accepted radiographic parameters and the ones which were not under the parameters.⁶ Our results exhibited no correlation between poor functional results and malunion. Radiographic evaluation was observed by standard wrist series and functional scores were recorded by using DASH. The current study had patients who were elderly and had type A, B and C patterns of fractures. Our results also supported that malunion is not generally associated with poor functioning. The major limitation in this study was that the individuals' non-operative was significantly older than the operative group which may have an impact on the biasness of results. However, no difference in baseline function was observed which proved that functional age and chronological age had no correlation between each other. We have also observed variation in different radiographic parameters which could either be due to human error or differences associated with radiographic techniques. Similarly, bias could also be introduced in the study by the research assistants as well, and short follow-up length could also be a limiting factor. Longer follow-up can result in post-traumatic arthritis which currently can't be assessed with this study.

CONCLUSION

To conclude this study, it was observed that elderly patients function quite well when their distal radial fractures were

managed non-operatively but the functional and pain scores were equivalent among both groups.

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REFERENCES

1. Lofthus CM, Frihagen F, Meyer HE, Nordsletten L, Melhuus K, Falch JA. Epidemiology of distal forearm fractures in Oslo, Norway. *Osteoporosis international*. 2008 Jun;19(6):781-6.
2. Baron JA, Karagas M, Barrett J, Kniffin W, Malenka D, Mayor M, et al. Basic epidemiology of fractures of the upper and lower limb among Americans over 65 years of age. *Epidemiology*. 1996 Nov 1:612-8.
3. Cowie J, Anakwe R, McQueen M. Factors associated with one-year outcome after a distal radial fracture treatment. *J Orthop Surg*. 2015 Apr; 23(1):24-8.
4. Valecha NK, Keerio NH, Qureshi MA, Noman N, Abro AA, Noor SS. Incidence of early complications of close reduction and manipulation of Colles' fracture, Our experience. *JPUMHS*. 2020; 10(1), 79-83.
5. Niaz HK, Muhammad FJ, Najeeb UR, Mohsin AS, Raheel AB, Ajmal KS, et al. *Int. J. Res. Pharm. Sci.*, 2021, 12(3), 1939-1942.
6. Anzarut A, Johnson JA, Rowe BH, Lambert RG, Blitz S, Majumdar SR. Radiologic and patient-reported functional outcomes in an elderly cohort with conservatively treated distal radius fractures. *The Journal of hand surgery*. 2004 Nov 1; 29(6):1121-7.