

Original article :

Correlation between radiological and functional outcome of post operative intra articular distal end radius fracture

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Abstract:

Introduction: Various techniques have been described for the treatment of patients with intraarticular distal radius fractures; the common objective of these techniques is to restore upper-limb function. This prospective study was designed to correlate between clinical and radiological outcome of post-operative intra articular distal end radius fracture. Moreover, we evaluated alignment of fracture and post-operative range of motion of wrist joint.

Methodology: This Prospective study was conducted on 60 patients who were scheduled to undergo surgery for intra articular distal end of radius fractures. The patients of age 18 years of age and above, either sex with closed distal end of radius fractures were included in study. All patients were briefed about purpose of study and their written, valid, informed consent for surgery were taken.

Results: In our study, the mean values for Radiological Findings were as follows: Radial length - 11.55 ± 1.93 mm, Radial Inclination - 17.40 ± 3.82 degrees, Palmar tilt - 3.83 ± 4.72 degrees and Intra-articular step off - 0.13 ± 0.33 mm. In our study, the mean value for Dorsiflexion was 66.68 ± 9.18 degrees, Palmar flexion was 63.50 ± 13.64 degrees, Supination was 65.38 ± 11.79 degrees, Pronation was 67.98 ± 11.43 degrees, Radial deviation was 16.08 ± 3.02 degrees and Ulnar deviation 20.05 ± 4.74 degrees which was compared with contralateral side.

Conclusion: The radiological parameters have an effect on functional outcome in our study at six month of follow up. The more number of radiological parameters affected poorer is the functional outcome.

Introduction:

Various techniques have been described for the treatment of patients with intraarticular distal radius fractures; the common objective of these techniques is to restore upper-limb function. The therapy involving open reduction and internal fixation with volar plates are being preferred. Conventional non-locking has been reported to give effective treatment for displaced unstable intra-articular fracture of distal radius. Volar locked plating has gained vast popularity for treatment of both extra and intra articular fractures of distal

radius due to its favourable functional and radiological outcome. Traditionally, a common practice followed to manage intraarticular distal radius fractures and extra articular fractures. Percutaneous pins and external fixation were routinely used to reduce and maintain alignment. Prolonged immobilization and distraction were often required, and loss of wrist motion and soft-tissue complications was frequently reported as a result of the inherent instability of these fractures.

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Intra-articular fractures of the distal radius represent a therapeutic challenge as compared with unstable extra-articular fractures. Currently, majority of studies are retrospective in nature and use various classifications and inconsistent outcome tools, especially in regard to comminuted fractures with joint incongruity. There is scarcity of published clinical trials directly comparing treatment regimens of JESS with Plate Osteosynthesis for distal end radius fractures. The results of the currently published data are difficult to compare. This prospective study was designed to correlate between clinical and radiological outcome of post-operative intra articular distal end radius fracture. Moreover, we evaluated alignment of fracture and post-operative range of motion of wrist joint.

Materials and methods:

The study began after obtaining permission from the Institutional Ethics Committee of Dr. DY Patil Medical College, Hospital and Research Centre, Nerul, Navi Mumbai, Maharashtra, India. All patients were explained the purpose and rational of the study as well as their role as participants in the study. Written informed consent was obtained from all the patients prior to enrolling them in the study. Study Site: This Prospective study was conducted in Department of Orthopedics, Dr. DY Patil Medical College, Hospital and Research Centre, Nerul, Navi Mumbai.

Study Population:

This Prospective study was conducted on 60 patients who were scheduled to undergo surgery for intra articular distal end of radius fractures. The patients of age 18 years of age and above, either sex with closed distal end of radius fractures were included in study. All patients were briefed about

purpose of study and their written, valid, informed consent for surgery were taken.

INCLUSION CRITERIA

Patients with following criteria were selected for this study

- 1) Patients age > 18 years and above.
- 2) Subjects with closed fractures.
- 3) Patients with mild to moderate degree of comminution
- 4) Patients with intra-articular fractures.
- 5) Patients accept consenting process.

EXCLUSION CRITERIA

Patients with following criteria were excluded from study

- 1) Patients were less than 18 years of age.
- 2) Patients with open fractures.
- 3) Non consenting patients.
- 4) Grossly comminuted
- 5) Pre existing arthritis
- 6) Rheumatoid arthritis

Results:

There were 19 (31.67%) patients in the age group of 19-29 years, 8 (13.33 %) in the age group 30-39 years, 6 (10 %) in the age group 40-49 years, 23 (38.33%) in the age group 50-59 years and 4 (6.67%) between 60-69 years. In our study, 25(41.67%) patients were injured due to Road Traffic Accidents, while 35 (58.33%) were injured due to fall. Out of 60 patients enrolled in the study, Distribution as per AO Classification of fracture was 6 (10) for B1, 10 (16.67) for B2, 15 (25.00) for B3, 10 (16.67) for C1, 11 (18.33) for C2, 8 (13.33) for C3. Out of 60 patients, ORIF was used on 38 (63.33%) patients, CRIF with K wire on 18 (30.00%) patients and JESS on 4 (6.67%) patients. In our study, Bone grafting was done in 5 (8.33%) patients and k-wire fixation procedure. Was done on 1 (1.67%) patients

Table 1) Radiological Findings

Radiological Findings	Mean	Standard Deviation
Radial Length (mm)	11.55	1.93
Radial Inclination (degree)	17.40	3.82
Palmar Tilt (degree)	3.83	4.72
Intra-Articular step off (mm)	0.13	0.33

In our study, the mean values for Radiological Findings were as follows: Radial length - 11.55 ± 1.93 mm, Radial Inclination - 17.40 ± 3.82 degrees, Palmar tilt - 3.83 ± 4.72 degrees and Intra-articular step off - 0.13 ± 0.33 mm. In our study, the mean value for Dorsiflexion was 66.68 ± 9.18 degrees,

Palmar flexion was 63.50 ± 13.64 degrees , Supination was 65.38 ± 11.79 degrees, Pronation was 67.98 ± 11.43 degrees, Radial deviation was 16.08 ± 3.02 degrees and Ulnar deviation 20.05 ± 4.74 degrees which was compared with contralateral side.

Table 2) Correlation between clinical and radiological outcome

Clinical Findings	Radiological Findings			
	Radial length	Radial inclination	Palmar tilt	Intra-articular step off
Dorsiflexion	0.4976 (0.0011)	0.2011 (0.2133)	0.7096 (<0.0001)	-0.069 (0.6685)
Palmar flexion	0.5109 (0.0008)	0.5158 (0.0007)	0.4495 (0.0036)	-0.2385 (0.1384)
Supination	0.3841 (0.0144)	0.2214 (0.1698)	0.5816 (<0.0001)	-0.7701 (0.6362)
Pronation	0.3637 (0.0211)	0.3273 (0.0393)	0.4712 (0.0021)	-0.1331 (0.4128)
Radial deviation	0.4714 (0.0021)	0.4565 (0.0031)	0.4892 (0.0014)	-0.1107 (0.4963)
Ulnar deviation	0.3778 (0.0162)	0.3896 (0.0130)	0.5480 (0.0003)	-0.1333 (0.4123)
Correlation coefficient calculated using Pearson's correlation coefficient Value of <0.25 is considered weak correlation 0.25-0.75 is considered moderate correlation >0.75 is considered good correlation				

Discussion:

In our study, the mean values for Radiological Findings were as follows: Radial length - 11.55 ± 1.93 mm, Radial Inclination - 17.40 ± 3.82 degrees, Palmar tilt - 3.83 ± 4.72 degrees and Intra-articular step off - 0.13 ± 0.33 mm. The post-operative findings in a study by Geller L et al, 2009 reported that the mean radial length was 11 mm, radial inclination as -20.7° , palmar tilt as -3.1 . These findings were more or less similar to our study, although the study did not report the intra-articular step off findings.⁴

In our study, the grades for the Green and O'Brien score were found to be: Excellent in 14 (35%) patients, Good/Fair in 10 (25%) patients, Moderate/Fair in 14 (35%) patients, Poor in 2 (5%)

patients. Kenny K et al, 2011 reported the Green and O'Brien score which was found to be excellent in 88% patients and good in 8% patients. No patients were reported to have moderate and poor scores. The study reported more percentage of patients with excellent Green and O'Brien score as compared to our study while the percentage of patients with good score was comparable to our study. This may be due to the difference in the study population and area.^{5,6}

Conclusion:

The radiological parameters have an effect on functional outcome in our study at six month of follow up. The number of radiological parameters affected poorer is the functional outcome.

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