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A COMPARATIVE STUDY BETWEEN JESS FIXATOR AND VOLAR PLATE FOR THE TREATMENT OF COMMINUTED FRACTURE OF DISTAL END RADIUS.

Orthopedics

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ABSTRACT

INTRODUCTION-Fracture involving distal end of radius is the most common fracture of upper extremity and incidence increases with aging. **OBJECTIVES-**a study to compare the functional and radiological outcome of JESS fixator and volar T plate for comminuted fracture of distal end radius **METHODS AND MATERIALS-**hospital based prospective randomized comparative study between group of 25 patients (age 18 to 60 yrs of any sex) treated with jess fixator and another group of 25 patients (age 18 to 60 yrs)of any sex) treated with volar t plate as per AO classification(AO23C). **RESULT-** patient rated hand wrist evaluation score at 6 wks and 3 months with the help of clinical parameters and radiological assessment **CONCLUSION-**in highly comminuted fracture distal radius, jess has better outcomes otherwise volar plate is better.

KEYWORDS

JESS FIXATOR, VOLAR T PLATE, AO CLASSIFICATION, PRHW SCORE

INTRODUCTION:

Fractures of the distal radius continue to be one of the most common skeletal injuries treated by orthopedic surgeons. For many patients such as laborers, carpenters, musicians, surgeons and dentist, loss of hand function means loss of career. Distal radius fractures are very common injuries accounting for 16% of all fractures treated in emergency room and represent 74.5% of all fractures of the forearm. They have bimodal distribution with young people sustaining high energy trauma to upper extremity and an elderly group who sustains both high energy injuries and insufficiency fractures. The fractures of distal radius are caused by severe high energy trauma, resulting in intra-articular involvement and comminution. These fractures are often unstable, are difficult to reduce anatomically, and are associated with a high prevalence of complications. Restoration of normal alignment and articular congruity after a displaced fracture can be difficult but it is essential for a good functional outcome.

MATERIAL AND METHODS:This study was included the patients admitted in Department of Orthopedics, R.N.T. Medical college from June 2016 to November 2017. We included 50 patients of both sexes presented with unstable distal radius fracture AO Type 23C, randomized into JESS with K wires and Volar locking plate group with 25 patients each. External fixation after closed reduction was done with Joshi's External stabilization system (JESS), with augmentation by k-wires. The plates used were 3.5 mm T or oblique plates and a volar approach was used.

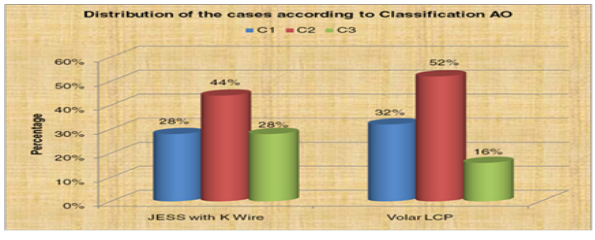
INCLUSION CRITERIA:

1. Patients with unstable distal radius fractures (open/closed).
2. Patients of any sex in the age group of 18 to 65 years.
3. Patients who are fit for surgery.
4. Patients giving informed consent for the study.

EXCLUSION CRITERIA:

1. Patients with open physis.
2. Patients with pathological fractures.
3. Patients with pre-existing arthritis compromising wrist function.
4. Patients with associated neurovascular injuries.
5. Patients who refused to give consent for the study.

The AO classification of the study cases indicated that type C2 was maximum in 11 cases (44%) in JESS group and 13 cases (52%) of volar LCP group. Type C3 (intra articular and comminuted type) was present in 7 cases (28%) in JESS group and 4 cases (16%) in volar LCP group. This indicates that JESS with k wire was preferred over volar LCP in highly comminuted intra articular type fractures (C3). Type C1 fractures were present in 7 patients (28%) of JESS with k wire group and 8 patients (32%) of volar LCP group.



EVALUATION OF RESULT ACCORDING TO FRACTURE TYPE

The assessment of result was done according to patient rated hand wrist evaluation score and then we categorized the data according to the fracture pattern seen. AO classification was used and the fractures Type 23-C were included. Further the results of the cases according to different sub classification as C1, C2 & C3 were done and were tabulated in the following table.

	JESS with K Wire					Volar LCP				
	Excellent	**Good**	**Fair**	**Poor**	**Total**	**Excellent**	**Good**	**Fair**	**Poor**	**Total**
C1	0	4 (16%)	2 (8%)	0	6 (24%)	1 (4%)	7 (28%)	0	0	8 (32%)
C2	0	5 (20%)	4 (16%)	2 (8%)	11 (44%)	0	4 (16%)	5 (20%)	3 (12%)	12 (48%)
C3	2 (8%)	2 (8%)	4 (16%)	0	8 (32%)	0	4 (16%)	0	1 (4%)	5 (20%)
Total	**2**	**11**	**10**	**2**	**25 (100%)**	**1 (4%)**	**20 (80%)**	**2 (8%)**	**2 (8%)**	**25 (100%)**

The assessment of the result according the fracture type showed that patients treated with external fixation by JESS and having C1 type of fractures had 4 cases (16%) good results & 2 cases (8%) had fair results. While patients with volar LCP and type C1 fracture had 1 case (4%) excellent result, 7 cases (28%) with good result and no fair or poor result. In JESS with K wire group. The fracture type C2 had 5 cases (20%) with good result, 4 cases (16%) with fair result and 2 cases (4%) with poor result compared to treatment by volar LCP which had 4 cases (16%) good result, 5 cases (20%) with fair and 3 case (12%) with poor result. The fracture type C3 had 2 cases (8 %) excellent result, 2 case (8%) good result and 4 case (16%) fair result and no poor result in JESS group and patients treated by volar LCP showed 4 cases (16%) with good result, 1 case (4%) showed poor result with no excellent, fair results.

Complications

Complications	JESS with K Wire	Volar LCP
	No of cases (%)	No of Cases (%)
Pin Tract Infection	2 (8)	0

Finger and Wrist Stiffness	4 (16)	1 (4)
Superficial Radial Nerve Injury	1 (4)	0
Malunion	2 (8)	1 (4)

Chi-square = 3.691 with 3 degrees of freedom; P = 0.400 NS

The range of movements at 6 weeks follow-up in JESS group with respect to WR EXT,PF, DF, SUP, Pro, RD, UD, Grip strength were 64.56 ± 9.179, 52.20 ± 8.466, 44.08 ± 6.970, 5.92 ± 1.412, 71.04 ± 9.16, 60.24 ± 9.917 & 78.88 ± 24.552 respectively. While the LCP group the PF, DF, SUP, PRO, RD, UD, Grip strength were 74.76 ± 5.925, 53.76 ± 3.940, 44.16 ± 4.079, 6.64 ± 1.221, 19.64 ± 3.252, 70.76 ± 8.19, 81.68 ± 16.662. By comparing the two groups, the range of movement at 6 weeks follow-up did not show any statistical significance as shown in the above table, which indicates that both the modalities of treatment brought similar result in short term.

PRWHE Score (3 months)

RESULTS	JESS with K Wire	Volar LCP	Total
	No (%)	No (%)	No (%)
Excellent	2 (8)	2 (8)	4 (8)
Fair	10 (40)	2 (8)	12 (24)
Good	10 (40)	19 (76)	29 (58)
Poor	3 (12)	2 (8)	5 (10)
Total	**25 (100)**	**25 (100)**	**50 (100)**

DISCUSSION

During the recent years, volar approach has become more popular. The present study was undertaken to compare the functional & radiological outcome of operative management of distal radial fractures using external fixation by B.B. Joshi's External Stabilization system (JESS) & volar locked compression plate (LCP). Our data showed,

open reduction and plate fixation is the widely recognized surgical methods. Locked plates are in the progress of replacing conventional support plates. While facilitating the positioning, those anatomical plates with screw-plate interlocking feature have more biomechanical strength against forces applied on the fracture surfaces and works as internal fixator. Because of their biomechanical strength, locked plates are preferred in osteoporotic and/or multiple fractures. But for highly comminuted intra-articular fractures most authors combine fixation with K wires, bone graft and external fixation after closed or open reduction and report good to excellent results (Axelrod et al 1988, Bradway et al 1989, Edwards 1991, Fernandez & Geiseler 1991; Jupiter and Lipton 1993; Trumble et al 1994). The long period of immobilization and prolonged rehabilitation, however, can be a major problem in this type of management.

CONCLUSION

External fixation of the distal end radius fracture by B.B.Joshi's External Stabilization system (JESS) is a promising method which provides a biological environment for early healing of the fracture with pin site complications. After removal of fixator and regular physiotherapy the range of movements achieved are comparable to that of the internal fixation by LCP. Open reduction and internal fixation is more useful in patients requiring faster return to normal activities like young adults, high performance athletes, sportsmen and who are not tolerant of external hardware. This study shows that JESS fixator gives better functional results as compared to plating for comminuted unstable fracture (AO 23C2 and C3) distal end radius and allows for early mobilization of patients. But in minimally unstable fracture (AO23C1) plating has better functional outcome compare to JESS fixator.

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