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Original Research

Functional outcome of distal end radius fracture managed with Joshi's external stabilization system- An observational study

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ABSTRACT:

Background: Distal end radius fractures are the commonest fractures. The present study assessed functional outcome of distal end radius fracture managed with Joshi's external stabilization system. **Materials & Methods:** The present study was conducted on 83 subjects of distal end radius fractures both genders. In all patients, mean operative time, duration of JESS application and radiological union time was recorded. **Results:** Out of 83 patients, males were 48 and females were 35. The mean operative time was 32.4 minutes, duration of JESS application was 8.2 minutes and mean radiological union was 8.4 minutes. The mean VAS after 6 months was 9.2 and 1 years was 1.5, range of mothion was 16.2 and 21.4 after 6 months and 1 year respectively, grip strength was 16.8 and 19.5 respectively, activity was 21.1 and 23.5 respectively and final score was 63.4 and 67.9 respectively. **Conclusion:** Authors found that Joshi's external stabilization system is capable of providing better treatment outcome in patients with distal end radius fracture.

Key words: Radius, fracture, JESS

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INTRODUCTION

Distal end radius fractures are the commonest fractures. Increasing incidence of these injuries may be attributed to an ageing population (osteoporotic fractures) and the growing participation in outdoor pursuits (higher energy fractures).Whereas a large number of these fractures are managed non-operatively, the number of patients who undergo surgical management is considerable. Displaced fractures are treated surgically by various methods like percutaneous pin or screw fixation, open reduction, and internal fixation with plate and screw, locking plate and screw fixation, and intramedullary nailing and external fixation.[1]

Various factors can cause secondary displacement of the fracture fragments, including shortening, angle of reduction (dorsal angulation), and articular congruence. These factors determine the treatment outcomes of DRFs.[2] In young adults, the fractures are typically the result of high-energy injuries such as motor accidents or fall from height. In contrast, most of the DRFs in the elderly occur from low-energy injuries such as fall from a standing height or on an outstretched hand. Management of DRFs is still controversial and may be influenced by the initial fracture classification. Even though numerous classification systems have been proposed e.g., Frykman, Mayo, Melone, and AO, the evaluation and management of these fracture is yet controversial.[3]

Joshi et al devised a simple external fixator (Joshi's external stabilization system [JESS]), in the early 1990s which is cost effective, easily applicable, light weight, and needs minimum number of instruments for

application. Since then it has been used for treatment of post-burn contractures of the hand and wrist, inter-phalangeal joint contractures in leprosy, intra-articular distal radial fractures.[4] The present study assessed functional outcome of distal end radius fracture managed with Joshi's external stabilization system.

MATERIALS & METHODS

The present study was conducted in the department of Orthopaedics. It comprised of 83 subjects of distal end radius fractures both genders. All were informed regarding the study and written consent was obtained. Ethical clearance was obtained before the start of study.

General information such as name, age, gender etc. was recorded. A thorough clinical examination was done in all patients.

JESS consists of application of total of 4 pins in radius and 2nd metacarpal connected by serrated connecting rod with provision for distraction. 1st two 3.5 mm Schanz pins were applied in radius 2-3 cm proximal to fracture. Then two 2.5mm Schanz pins are applied in 2nd metacarpal through JESS distractor holes. Distraction and acceptable reduction was achieved and confirmed in image intensifier. In all patients, mean operative time, duration of JESS application and radiological union time was recorded. Results were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 83		
Gender	**Males**	**Females**
Number	48	35

Table I shows that out of 83 patients, males were 48 and females were 35.

Table II Assessment of parameters

Parameters	Mean
Operative time (mins)	32.4
Duration of JESS application (Weeks)	8.2
Radiological union (weeks)	8.4

Table II, graph I shows that mean operative time was 32.4 minutes, duration of JESS application was 8.2 weeks and mean radiological union was 8.4 weeks.

Graph I Assessment of parameters

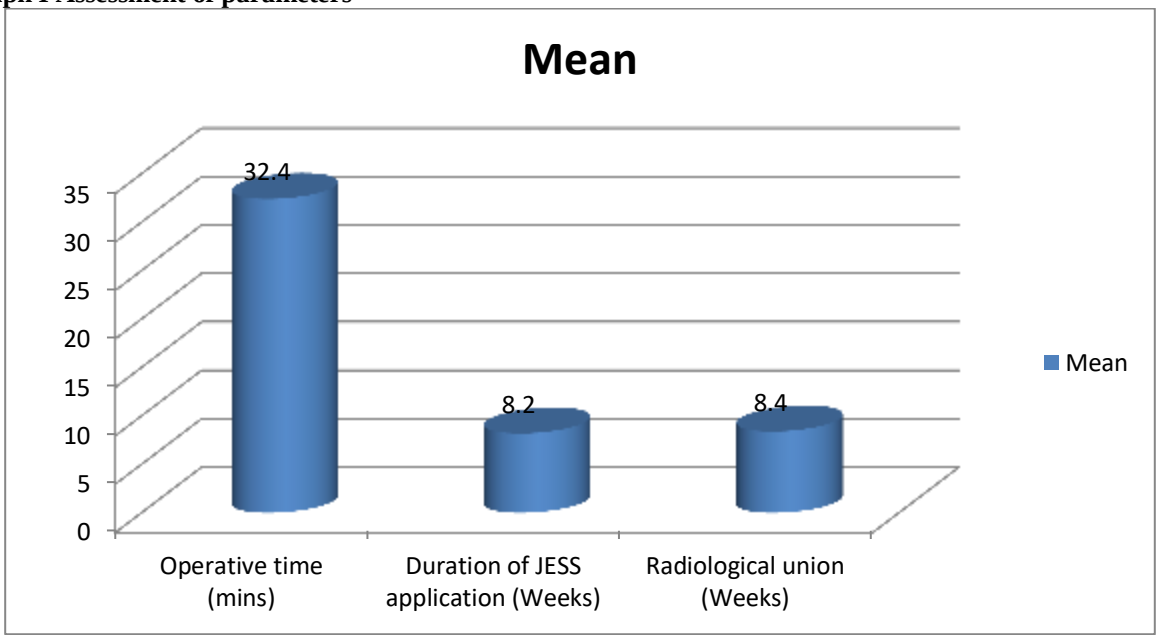
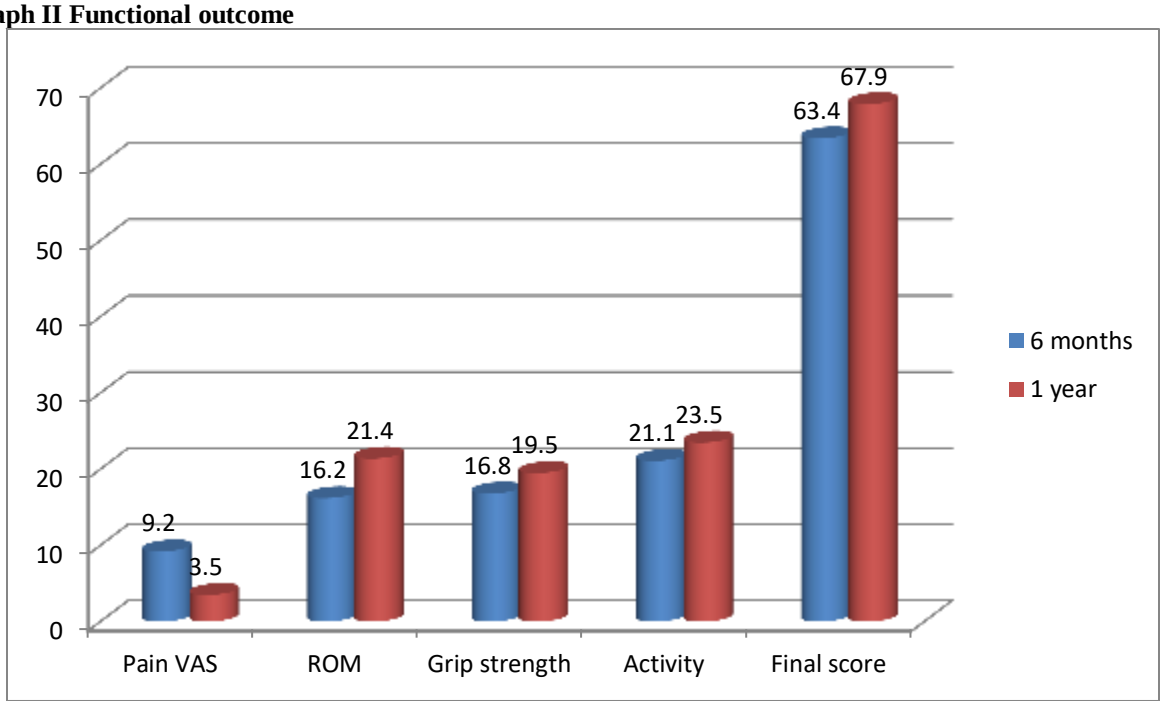


Table III Functional outcome

Outcome	6 months	1 year	P value
Pain VAS	9.2	3.5	0.01
ROM	16.2	21.4	0.04
Grip strength	16.8	19.5	0.02
Activity	21.1	23.5	0.05
Final score	63.4	67.9	0.01

Table III, graph II shows that mean VAS after 6 months was 9.2 and 1 years was 1.5, range of mothion was 16.2 and 21.4 after 6 months and 1 year respectively, grip strength was 16.8 and 19.5 respectively, activity was 21.1 and 23.5 respectively and final score was 63.4 and 67.9 respectively.

Graph II Functional outcome



DISCUSSION

Different types of fractures may occur due to the anatomy of the distal radius and the effects of for cesin different directions. It is not feasible to have a successful outcome using the same approach and materials for different types of fractures.[5] Many external fixation devices are described to achieve reduction and fixation of the fragments without loss of position and acceptable functional results. The ligamentotaxis is the basic principle used by external fixation. Prolonged rigid immobilization of the wrist in an external fixator leads to decreased blood supply to bone and soft tissues and causes periarticular fibrosis.[6]

Management of DRF has been the most debatable topic among the orthopedic fraternity. Perhaps no other fracture has got so many eponyms over time. The resultant conflicting understanding of each eponym creates difficulty in assessing outcomes following treatment.[7] To remedy this, several classification systems have been proposed. Some classifications seem to be more of an attempt to stress the significance of some features of the fracture rather than to provide a global approach.[8] The present study assessed functional outcome of distal end radius fracture managed with Joshi's external stabilization system.

In present study, out of 83 patients, males were 48 and females were 35. The mean operative time was 32.4 minutes, duration of JESS application was 8.2 weeks and mean radiological union was 8.4 weeks.

Singh et al[9] included a total of 72 patients with intra-articulate distal end radius fracture which were treated with Joshi's External Stabilization System. The patients were followed up at 2 weeks, 8 weeks, 6 months and 1 year after the surgery. The assessment of pain, range of motion, grip strength and activity were assessed at 6th month and 1year follow up and scored according to Green and O'Brien scoring system. The good and/or excellent results were found in 77.8% of cases. We observed that patients with age less than 50 years had greater prognosis as compared to patient with more than

50 years of age. Final outcome was also found better in males as compared to females at 6 month and 1 year post operatively.

We found that mean VAS after 6 months was 9.2 and 1 years was 1.5, range of mothion was 16.2 and 21.4 after 6 months and 1 year respectively, grip strength was 16.8 and 19.5 respectively, activity was 21.1 and 23.5 respectively and final score was 63.4 and 67.9 respectively.

Graham et al[10] classified 310 DRFs cases as per the new classification system into four types; metaphyseal stable, metaphyseal unstable, radiocarpal stable, and radiocarpal unstable fractures. They were managed and followed over a mean period of 15.10 ± 5.4 months, and the results were recorded at the final follow-up. The mean age of the patients was 51.22 ± 20.58 years. Most of the patients were females (n=189, 64.19%). The minimal follow up was 6 months with a mean of 15.10 ± 5.4 months. Mean mayo wrist scores were 95 ± 4, 80 ± 7.4, 75 ± 7.4, and 70 ± 6.9, for stable metaphyseal fractures, unstable metaphyseal radial, stable radiocarpal fractures and unstable radiocarpal fractures, respectively. The overall mean mayo wrist functional score was 80.58 ± 12.3 (good results) at final follow up.

CONCLUSION

Authors found that Joshi's external stabilization system is capable of providing better treatment outcome in patients with distal end radius fracture.

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