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EVALUATION OF FUNCTIONAL OUTCOMES OF DISTAL END RADIUS FRACTURES MANAGED WITH EXTERNAL FIXATION: A CROSS-SECTIONAL STUDY

Orthopaedics

Dr. Patel Nipun Mahendrabhai* Junior Resident, Department Of Orthopaedics, Rohilkhand Medical College And Hospital, Barielly, U.P, India *Corresponding Author

Dr. Irfan Hussain Siddiqui Associate Professor, Department Of Orthopaedics, Rohilkhand Medical College And Hospital, Barielly, U.P, India

Dr. Mohik Makkar Junior Resident, Department Of Orthopaedics, Rohilkhand Medical College And Hospital, Barielly, U.P, India

ABSTRACT

Background: Distal radius fractures are among the most frequently encountered skeletal injuries. External fixation is a well-established technique using the principle of ligamentotaxis for fracture reduction and stabilization. This study evaluates the functional and radiological outcomes of patients treated with this method. **Materials And Methods:** A prospective observational study was conducted on 32 patients with AO type A, B, and C distal end radius fractures. External fixation was applied under standardized protocols. Outcomes were assessed using the Mayo Wrist Score (MWS) and Sarmiento's modification of Lindstrom's radiological criteria. **Results:** The study population had a mean age of 35.47 years; 84.38% were males. Road traffic accidents were the predominant injury mechanism. The average Mayo Wrist Score improved significantly from 37.03 to 78.91 postoperatively ($p < 0.0001$). 53.13% of patients had excellent to good radiological outcomes. **Conclusion:** External fixation is a reliable treatment for distal end radius fractures, offering satisfactory functional recovery and acceptable alignment restoration, especially beneficial in comminuted fractures.

KEYWORDS

External Fixation, Functional Outcome, Mayo Wrist Score, Ligamentotaxis, Comminuted Fractures, Radiological Evaluation, AO Classification, Sarmiento Criteria, Orthopaedic Trauma

INTRODUCTION

Distal radius fractures are the most common upper limb fractures, often affecting elderly women due to osteoporosis and falls. These injuries can lead to malunion if inadequately treated, resulting in pain, deformity, reduced grip strength, and limited wrist and forearm motion. While closed reduction with casting is suitable for simple fractures, complex or displaced fractures often require surgical intervention[1]. External fixation, sometimes with percutaneous K-wires, provides stable alignment and preserves wrist function in comminuted cases. This study evaluates radiological outcomes of distal radius fractures treated with external fixation, focusing on anatomical parameters and functional recovery through postoperative imaging[2].

MATERIALS AND METHODS

Study Design:
Prospective cross-sectional study

Location:
Department of Orthopaedics, Rohilkhand Medical College & Hospital

Duration:
August 2023 – July 2024

Sample Size:
32 patients, calculated via:
$n = 4\sigma^2 / L^2$, where $\sigma = 9.1$, $L = 3$

Inclusion Criteria[3]:
- Adults (>18 years)
- AO/OTA classified distal radius fractures (Types A, B, C)
- Closed and open fractures

Exclusion Criteria[4]:
- Pathological fractures
- Malunited or recurrent injuries

Procedure:
All patients underwent external fixation with Schanz pins, rods, and optional K-wires. Reduction was confirmed radiologically. Follow-up was conducted at 2, 4, 12, 24, and 52 weeks [5].

Assessment Tools[6]:
- **Functional:** Mayo Wrist Score
- **Radiological:** Sarmiento's modification of Lindstrom's criteria
- **Software:** SPSS v23.0 for data analysis

RESULTS

Demographics:
- **Mean Age:** 35.47 ± 9.88 years; 27 males, 5 females.
- **Mechanism Of Injury:** 81.25% RTA, 9.38% FOOSH, 9.38% FFH

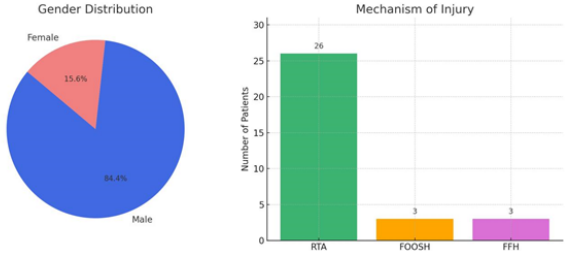

Fig:1

Radiological Results:
Based On Palmar Tilt, Radial Height, And Inclination:
- **Excellent:** 12 patients (37.5%)
- **Good:** 10 patients (31.25%)
- **Fair:** 6 patients (18.75%)
- **Poor:** 4 patients (12.5%)

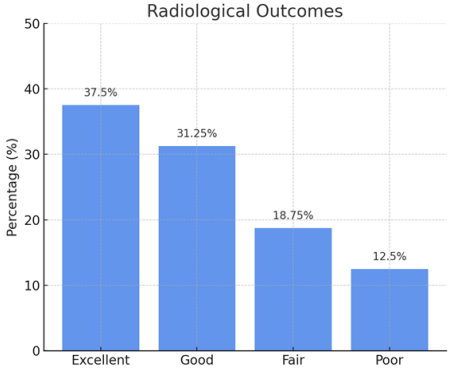

Fig:2

Functional Outcomes:
Significant improvements in all MWS parameters:
- **Pain score:** 7.97 → 20.16
- **Work status:** 9.53 → 18.28

- **ROM:** 9.38 → 18.75
- **Grip strength:** 10.16 → 21.72
- **Total score:** 37.03 → 78.91 ($p < 0.0001$)

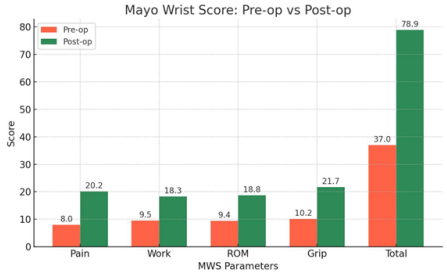

Fig:3

DISCUSSION

External fixation provides a viable treatment for distal end radius fractures, especially in cases of severe comminution where open reduction might be challenging or risky. Salve et al. and Rao et al. reported similar outcomes, with over 80% of patients achieving good to excellent results using augmented fixators [3,7].

Mahadevaiah et al. (2023) emphasized the role of ligamentotaxis in restoring anatomical alignment without extensive soft tissue disruption . While volar plating offers more immediate stabilization, it may not be suitable in grossly comminuted fractures or settings with limited resources[1,8].

CONCLUSION

External fixation is an effective and minimally invasive method for managing distal radius fractures, especially intra-articular and comminuted types. It ensures satisfactory restoration of function and anatomy when applied with proper technique.

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