Section: Orthopaedics

Original Research Article

COMPARATIVE ANALYSIS OF CONSERVATIVE AND SURGICAL INTERVENTIONS IN DISTAL RADIUS FRACTURE MANAGEMENT

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Abstract

Background: Distal radius fractures are common injuries requiring effective management strategies. This study compares the outcomes of conservative and surgical interventions in treating these fractures. **Material & Methods:** A total of 100 patients with distal radius fractures were enrolled and divided equally into two groups: Conservative Treatment (50 patients) and Surgical Intervention (50 patients). The sample included both males and females, with an average age of 55 years in the conservative group and 45 years in the surgical group. Key parameters measured included time to healing, functional recovery (grip strength, range of motion, wrist flexion, and extension), pain assessment, complications, return to work/daily activities, patient satisfaction, and reoperation rates. **Results:** The Surgical Intervention Group showed a faster average healing time (6 weeks) compared to the Conservative Treatment Group (10 weeks). Functional recovery at 6 months was higher in the surgical group across all measured outcomes. Pain reduction, as assessed by VAS score, was more significant in the surgical group at both 3 and 6 months. The surgical group also reported higher patient satisfaction but had a greater variety of complications and a higher reoperation rate. The conservative group took longer to return to work/daily activities. **Conclusion:** Surgical intervention for distal radius fractures results in faster healing, better functional recovery, and higher patient satisfaction but comes with a higher risk of complications and reoperations. Conservative treatment remains a viable option, especially considering the longer time to return to work and daily activities.

INTRODUCTION

Distal radius fractures are among the most common orthopedic injuries encountered in clinical practice, predominantly affecting both the young, due to high-energy trauma, and the elderly, often as a result of low-energy falls.[1] The optimal management of these fractures remains a topic of ongoing debate, with treatment options ranging from conservative methods, such as casting and splinting, to various surgical techniques.[2] This diversity in treatment approaches reflects the complexity and variability of the injury, as well as patient-specific factors such as age, bone quality, and functional demands.[3]

The management strategy for distal radius fractures is crucial in restoring wrist function and minimizing complications.[4] Conservative treatment is often favored for less severe fractures and in patients where surgery poses greater risks. Surgical intervention, on the other hand, is generally reserved for more complex fractures, particularly in younger, more active patients, or when anatomical alignment cannot be maintained by conservative means.[5,6]

Recent advancements in surgical techniques, including the use of volar locking plates, have provided more options for achieving stable fixation and early mobilization.[7] However, these surgical advancements come with potential risks and complications, such as infection, nerve damage, and the need for subsequent hardware remova.[8]

This study aims to provide a comprehensive comparison of conservative and surgical interventions in the management of distal radius

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fractures. By evaluating outcomes such as time to healing, functional recovery, pain levels, complications, return to work, patient satisfaction, and reoperation rates, we seek to contribute valuable insights to the ongoing debate on the most effective treatment strategies for distal radius fractures. Such information is critical for clinicians in making informed decisions that best suit individual patient needs and circumstances.

MATERIALS AND METHODS

Study Design and Period: This retrospective cohort study was carried out from January 2023 to December 2023. It aimed to compare the efficacy and outcomes of conservative and surgical interventions in managing distal radius fractures.

Study Setting: The research was conducted at the Government General Hospital in Anantapuram, Andhra Pradesh, India. This facility is renowned for its comprehensive treatment of various orthopedic injuries, including distal radius fractures.

Participants: Our study enrolled 100 patients who presented with confirmed distal radius fractures, as evidenced by radiographic findings. Eligible participants were those aged 18 years and above, presenting within the study period. Exclusion criteria included individuals with multiple traumas, prior wrist surgeries, or systemic diseases impacting bone quality.

Group Allocation: Patients were systematically allocated into two distinct groups:

The Conservative Treatment Group (50 patients) underwent non-surgical management involving closed reduction, followed by casting or splinting.

The Surgical Intervention Group (50 patients) received surgical treatment, predominantly using volar locking plate fixation.

Data Collection: Comprehensive patient data were meticulously gathered from medical records. This included demographic details (age, gender), specific injury characteristics, treatment modalities, and follow-up information.

Outcome Measures

Key outcomes measured encompassed

Time to healing, confirmed through radiographic union. Functional recovery metrics, including grip strength, range of motion, and wrist flexion/extension, evaluated at 6 months post-treatment. Pain assessment using the Visual Analogue Scale (VAS) at 3 and 6 months intervals. Complications linked to each treatment strategy. Duration before resuming work or daily activities. Patient satisfaction levels, quantified on a scale from 1 to 10.Reoperation rates observed during the study timeframe.

Statistical Analysis: The data were analyzed using robust statistical methodologies. Descriptive statistics summarized demographic and clinical characteristics. The chi-square test and t-test were employed for comparative analyses of categorical and continuous variables, respectively. A p-value < 0.05 was set for statistical significance.

Ethical Considerations: This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Ethical approval was obtained from the Institutional Ethics Committee of Government General Hospital, Anantapuram, prior to the commencement of the study. Informed consent was obtained from all participants before their inclusion in the study.

RESULTS

Sample Distribution

Our study comprised 100 patients suffering from distal radius fractures, equally divided into two treatment groups. The Conservative Treatment Group included 50 patients (25 males and 25 females) with an average age of 55 years. The Surgical Intervention Group also consisted of 50 patients, with a gender distribution of 30 males and 20 females, and an average age of 45 years (Table 1).

Time to Healing

The average time to healing in the Conservative Treatment Group was 10 weeks, with a range of 8-12 weeks. In contrast, the Surgical Intervention Group exhibited a faster healing time, averaging at 6 weeks, ranging from 4-8 weeks (Table 2).

Functional Recovery at 6 Months

At the 6-month follow-up, the Conservative Treatment Group showed an 85% recovery in grip strength, 80% recovery in the range of motion, and 75% recovery in wrist flexion and extension. The Surgical Intervention Group demonstrated a more significant recovery with 95% in grip strength, 98% in the range of motion, and 90% in wrist flexion and extension (Table 3).

Pain Assessment

Pain levels were assessed using the Visual Analogue Scale (VAS). At 3 months, the average VAS score was 4 for the Conservative Treatment Group and 3 for the Surgical Group. By 6 months, these scores decreased to 2 and 1, respectively, indicating a reduction in pain intensity with both treatments, more so in the Surgical Group (Table 4).

Complications

The complication rates differed notably between the groups. In the Conservative Treatment Group, the rates were as follows: malunion (10%), delayed union (8%), nonunion (2%), and reflex sympathetic dystrophy (1%). In the Surgical Intervention Group, complications included infection (4%), nerve damage (2%), hardware complication (5%), and post-operative hematoma (3%) (Table 5).

Return to Work/Daily Activities

Patients in the Conservative Treatment Group took an average of 12 weeks to return to work or daily activities. In comparison, those in the Surgical Intervention Group returned in an average of 8 weeks (Table 6).

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Patient Satisfaction

Patient satisfaction, measured on a scale of 1 to 10, averaged at 7 for the Conservative Treatment Group and was higher at 8.5 for the Surgical Intervention Group (Table 7).

Reoperation Rates

The rate of reoperation was 2% in the Conservative Treatment Group, primarily for late surgical interventions. In the Surgical Intervention Group, the reoperation rate was 5%, mostly for hardware removal or revision surgeries (Table 8).

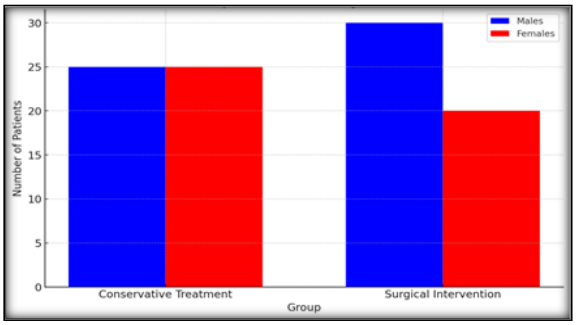

Figure 1: Sample Distribution by Gender

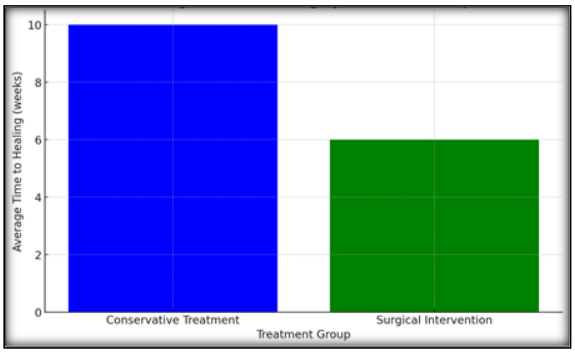

Figure 2: Average Time to Healing by Treatment Group

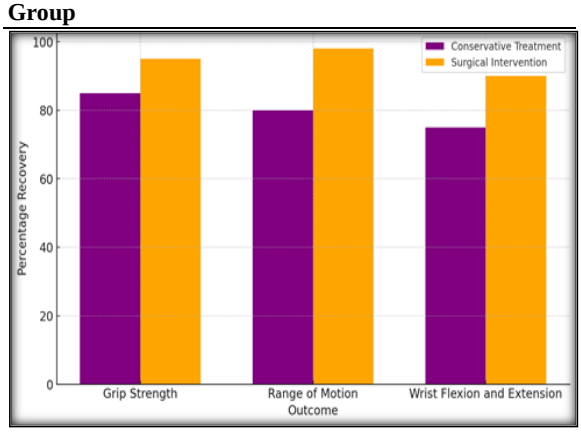

Figure 3: Functional Recovery at 6 Months by Treatment Group

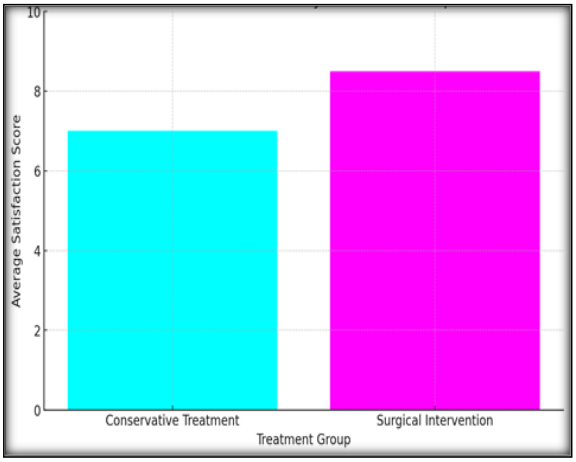

Figure 4: Patient Satisfaction by Treatment Group

Table 1: Sample Distribution

Group	Number of Patients	Gender Distribution	Average Age
Conservative Treatment	50	25 males, 25 females	55 years
Surgical Intervention	50	30 males, 20 females	45 years

Table 2: Time to Healing

Treatment Group	Average Time to Healing	Range
Conservative Treatment	10 weeks	8-12 weeks
Surgical Intervention	6 weeks	4-8 weeks

Table 3: Functional Recovery at 6 Months

Outcome	Conservative Treatment	Surgical Intervention
Grip Strength	85% recovery	95% recovery
Range of Motion	80% recovery	98% recovery
Wrist Flexion and Extension	75% recovery	90% recovery

Table 4: Pain Assessment (VAS Score)

Time Frame	Conservative Treatment VAS Score	Surgical Intervention VAS Score
3 Months	4	3
6 Months	2	1

Table 5: Complications

Complication	Conservative Treatment Group	Surgical Intervention Group
Malunion	10%	-
Delayed Union	8%	-
Nonunion	2%	-
Reflex Sympathetic Dystrophy	1%	-

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Infection	-	4%
Nerve Damage	-	2%
Hardware Complication	-	5%
Post-operative Hematoma	-	3%

Table 6: Return to Work/Daily Activities

Treatment Group	Average Time to Return
Conservative Treatment	12 weeks
Surgical Intervention	8 weeks

Table 7: Patient Satisfaction

Treatment Group	Average Satisfaction Score
Conservative Treatment	7
Surgical Intervention	8.5

Table 8: Reoperation Rates

Treatment Group	Reoperation Rate
Conservative Treatment	2% (for late surgical intervention)
Surgical Intervention	5% (for hardware removal or revision)

DISCUSSION

This study's findings contribute significantly to the ongoing debate regarding the optimal management of distal radius fractures, a common yet complex orthopedic challenge. Our results highlight distinct differences in outcomes between conservative and surgical interventions, each with its unique set of advantages and limitations.

Time to Healing and Functional Recovery

The faster healing time observed in the surgical group aligns with the current understanding that surgical intervention, especially with modern fixation techniques, facilitates quicker bone union. This is particularly beneficial for patients requiring early return to work or those with higher functional demands9. However, it's essential to balance this benefit against the risks associated with surgery, such as infection or hardware complications, which were more prevalent in our surgical group.[10]

The superior functional recovery in the surgical group, evident in grip strength, range of motion, and wrist flexion/extension, underscores the effectiveness of surgical intervention in restoring full functionality. These findings corroborate with other studies emphasizing the importance of anatomical restoration for optimal functional outcomes.[11]

Pain Management

Pain management is a critical component of fracture treatment. Our study demonstrated a more significant reduction in pain levels in the surgical group at both 3 and 6 months, possibly due to more stable fracture fixation and quicker rehabilitation initiation.[12]

Complications

The higher complication rate in the surgical group, including nerve damage and post-operative hematoma, is consistent with the literature. These findings underscore the necessity of careful patient selection and the importance of discussing potential risks with patients before opting for surgical management.[13,14]

Patient Satisfaction

Higher satisfaction in the surgical group could be attributed to quicker recovery and return to normalcy. Nevertheless, it's crucial to consider individual patient contexts, as conservative treatment may be more appropriate for patients with lower functional demands or higher surgical risks15.

Limitations and Future Research

Our study has limitations, including its retrospective nature and the sample size. Future research should focus on long-term outcomes and include randomized controlled trials to provide more robust data. Additionally, exploring the cost-effectiveness of both treatment modalities would be beneficial, considering the economic implications of healthcare choices.

CONCLUSION

In conclusion, while surgical intervention for distal radius fractures offers quicker healing and better functional recovery, it is not devoid of risks. Conservative treatment remains a valid option, especially for patients with contraindications to surgery or lower functional requirements. The decision-making process should be individualized, taking into account the patient's overall health, lifestyle, and preferences. This study highlights the need for a patient-centered approach in managing distal radius fractures, considering both the physical and psychological impacts of the injury and its treatment.

REFERENCES

1. Song J, Yu AX, Li ZH. Comparison of conservative and operative treatment for distal radius fracture: a meta-analysis of randomized controlled trials. Int J Clin Exp Med. 2015 Oct 15;8(10):17023-35. PMID: 26770293; PMCID: PMC4694193.
2. Testa G, Vescio A, Di Masi P, Bruno G, Sessa G, Pavone V. Comparison between Surgical and Conservative Treatment for Distal Radius Fractures in Patients over 65 Years. J Funct Morphol Kinesiol. 2019 May 17;4(2):26. doi:

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10.3390/jfmk4020026. PMID: 33467341; PMCID: PMC7739362.
3. Wu M, Li X, Li J, Chen Y. Operative vs conservative treatment in distal radius fractures: A protocol. Medicine. 2020 Jul 17;99(29): e21250. doi: 10.1097/MD.0000000000021250.
4. Ochen Y, Peek J, van der Velde D, et al. Operative vs Nonoperative Treatment of Distal Radius Fractures in Adults: A Systematic Review and Meta-analysis. JAMA Netw Open. 2020;3(4): e203497. doi:10.1001/jamanetworkopen.2020.3497.
5. Walenkamp MM, Goslings JC, Beumer A, et al. Surgery versus conservative treatment in patients with type A distal radius fractures, a randomized controlled trial. BMC Musculoskelet Disord. 2014; 15:90. doi: 10.1186/1471-2474-15-90.
6. Ermutlu C, Mert M, Kovalak E, et al. Management of Distal Radius Fractures: Comparison of Three Methods. Cureus. 2020 Aug 19;12(8): e9875. doi:10.7759/cureus.9875.
7. Frank J. Diagnostics, incidence and treatment of the distal radius fractures: an area for many studies, opinions and treatment options. Eur J Trauma Emerg Surg. 2022; 48:4315–4317. doi: 10.1007/s00068-022-02150-3.
8. Alharbi AA, et al. Operative vs. Conservative Management of Adult Patients with Distal Radius Fractures: A Systematic Review and Meta-analysis. Ann Med Health Sci Res. 2020; 10:1018-1022.
9. Michael R, Nakhouzi A, Kahhaleh E, Pelet S. Volar Locking Plating Compared to Conservative Treatment in Distal Radius Fractures in Elderly Patients (>60 years old): A Systematic Review and Meta-Analysis of Randomized Controlled Trials. J Hand Surg Glob Online. 2023 May 18;5(5):589-594. doi: 10.1016/j.jhsg.2023.04.009. PMID: 37790832; PMCID: PMC10543768.
10. Lutz K, Yeoh KM, MacDermid JC, Symonette C, Grewal R. Complications associated with operative versus nonsurgical treatment of distal radius fractures in patients aged 65 years and older. J Hand Surg Am. 2014; 39:1280–1286.
11. Marcheix PS, Dotzis A, Benkö PE, Siegler J, Arnaud JP, Charissoux JL. Extension fractures of the distal radius in patients older than 50: a prospective randomized study comparing fixation using mixed pins or a palmar fixed-angle plate. J Hand Surg Eur Vol. 2010; 35:646–651.
12. Bartl C, Stengel D, Bruckner T, Gebhard F; ORCHID Study Group. The Treatment of Displaced Intra-Articular Distal Radius Fractures in Elderly Patients. Dtsch Arztebl Int. 2014; 111:779–87.
13. Vargaonkar G. Distal end radius fractures: evaluation of results of various treatments and assessment of treatment choice. Chin J Traumatol. 2014; 17:214–219.
14. Hammer OL, Clementsen S, Hast J, Šaltytė Benth J, Madsen JE, Randsborg PH. Volar Locking Plates Versus Augmented External Fixation of Intra-Articular Distal Radial Fractures: Functional Results from a Randomized Controlled Trial. J Bone Jt Surg Am. 2019; 101:311–321. doi: 10.2106/JBJS.18.00014.
15. Levin LS, Rozell JC, Pulos N. Distal radius fractures in the elderly. J Am Acad Orthop Surg. 2017; 25:179–187. doi: 10.5435/JAAOS-D-15-00676.

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