https://doi.org/10.37939/jrmc.v27i3.2302

Comparison Of Prophylactic Injection Of Corticosteroid With Placebo, In Management Of Wrist Pain On Ulnar Aspect In Patients Of Fractures Of Distal Radius

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Abstract

Objective: To compare the mean pain score with prophylactic corticosteroid injection versus placebo in the management of wrist pain on the ulnar aspect in patients presenting with fracture of distal radius.

Material and methods:

Study Design: Randomized controlled trial

Setting: Orthopedic Surgery Department, Benazir Bhutto Hospital, Rawalpindi

Duration: Six months (March 5, 2018 to Sept 5, 2018)

Data Collection Procedure: 80 patients were included by using non-probability consecutive sampling after fulfilling the selection criteria. A demographic profile (patient name, age, gender, anatomical side and contact details) was obtained. Patients were split into two random groups by a simple lottery method. Patients of group A were given one shot of 80mg corticosteroid in the area of the ulnar styloid process near TFCC and group B patients were given a shot of distilled water (2 cc). Both groups of patients were followed in OPD for 3 months in their postoperative visits. A visual analogue scale (VAS) score was recorded. Data was analyzed using SPSS version 21.

Results: The mean age of the patients was 41.05 ± 11.05 years an age range of 40 years. The mean age in the corticosteroid and placebo groups was 39.68±10.67 years and 42.42 ± 11.39 years respectively. There were 42 (52.50%) male and 38 (47.50%) female patients with a higher male ratio i.e., 1.10:1. In corticosteroid and placebo groups there were 21 (52.50%) male and 19 (47.50%) female cases. The mean pain at baseline was 7.72 ± 1.66 while in the corticosteroid and placebo group, the mean pain was 7.60 ± 1.67 and 7.85 ± 1.65 respectively with statistically equal mean pain p-value = 0.504. After 3 months of treatment, mean pain in the corticosteroid group was 1.30 ± 0.66 and was 2.60 ± 1.58 in the placebo group, p-value < 0.001.

Conclusion: Our findings suggested that prophylactic corticosteroid injection is more effective in reducing pain in patients with distal radial fracture than placebo. By using prophylactic corticosteroid injections in the future, we can reduce pain to achieve more satisfaction for patients.

Keywords: Fractures of distal radius, conservative treatment, Prophylactic corticosteroid injection, saline, side effects, complication, pain reduction

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Cite this Article: Akhtar, R. R., Warraich, U. Z., Ahmed, R., Haider , M., Qammar, M. U., & Khan , A. Q. (2023). Comparison Of Prophylactic Injection Of Corticosteroid With Placebo, In Management Of Wrist Pain On Ulnar Aspect In Patients Of Fractures Of Distal Radius. *Journal of Rawalpindi Medical College*, *27*(3). https://doi.org/10.37939/jrmc.v27i3.2302.

Received August 03, 2023; accepted September 04, 2023; published online September 26, 2023

1. Introduction

Distal radius fractures are one of the most common fractures experienced by Orthopaedic surgeons. In the year 2001, 440,000 such cases occurred in America alone.[1] The manner of injury is exceptional, with high-impact injuries occurring in children and low-impact injuries occurring the adults.[2]

Distal radius fractures not only cause instability of the inferior radioulnar joint but also damage the triangular fibrocartilage complex (TFCC). Corticosteroid injection is a modest initial step in decreasing ulnar wrist pain in TFCC and ligament injury.[3] Conventionally, surgical treatment was advised for displaced and irreducible distal radius fractures or reducible and unstable distal radius fractures. Another method gaining acceptance is to offer surgical management to those patients who do

not want to bear the limitations of plaster treatment, exertion, or frivolous fears.[4]

Corticosteroid injection is commonly used to handle TFCC injuries, inferior radio-ulnar joint instability and injuries of the lunotriquetral ligament.[5] In randomized trials, it was observed that the mean pain score after corticosteroid injection was 1.41±1.09 which was meaningfully less as compared to saline water 2.39±1.89 injection for management of wrist pain on the ulnar aspect in distal radius fracture patients after 3 months of administration.[6] The rationale of my study is to compare the average pain score with a prophylactic injection of corticosteroid and placebo for ulnar wrist pain management in patients presenting with distal radius fracture. Studies show that corticosteroids may help in the significant reduction of ulnar pain than conservative management. Few studies are currently available in this regard. Therefore, we wish to conduct this study in our community, as no local evidence is accessible. The use of corticosteroids for the management of ulnar pain in distal radius fracture through this study can be implemented.

2. Materials & Methods

Study Design: Randomized Controlled Trial
Setting: Orthopedic Surgery department, Benazir Bhutto hospital, Rawalpindi.
Duration: Six months (March 5, 2018 to Sept 5, 2018)
Sample Size: A total of 80 cases; 40 cases in each group were calculated using the WHO calculator, the confidence level was 95%, power of test 80% and magnitude of mean pain score i.e. 1.41±1.09 with corticosteroid and 2.39±1.89 with saline water for management of wrist pain on the ulnar side in patients presenting with distal radius fracture.
Technique of Sampling:
consecutive sampling
Sample Selection:
Inclusion Criteria:

- 20-60 years of patients of either gender.
- Extra-articular fracture of distal radius presenting with baseline VAS>4

Exclusion Criteria:

1. Open fracture with debris or infection (presence of pus and positive culture report).
2. Comminuted fractures, multiple fractures or open fractures with infection and debris (clinical examination).
3. Patients with osteoarthritis (chronic pain of joints) or positive RA factor (medical record).

Data Collection Procedure:
80 patients were included in my study coming in the Accident & Emergency Department of Orthopedic Surgery, Benazir Bhutto Hospital, Rawalpindi, after hospital ethical committee approval. An informed consent was taken. Demographic profile (name, age, gender, anatomical side and contact) was noted. Patients were arbitrarily segregated into two groups via a lottery method. Group A, patients were given one shot of 80mg corticosteroid in the area of the ulnar styloid process near TFCC while group B, patients were given a shot of (2 cc) distilled water in the same area. The management of the fracture of the distal radius was done under general anaesthesia by a single Orthopedic team by closed reduction under fluoroscopic guidance and percutaneous k-wire fixation. After 24 hours of i/v antibiotics and the subsiding of swelling, patients were discharged. Later, these patients were followed up in OPD for 3 months postoperative visits. A visual analogue scale (VAS) was recorded. The patients were given diclofenac for resolution of pain for the initial two weeks. Then it was used as required in both groups. Data was gathered on a specific proforma.

3. Results

The average patient's age was 41.05 ± 11.05 years with an age range of 40 years. The mean age in the corticosteroid and placebo group was 39.68±10.67 years and 42.42 ± 11.39 years.

Table 1 Age comparison in both study groups.

		Mean	S.D	Minimum	Maximum
Age (years)	Corticosteroid group	39.68	10.67	23.00	60.00
	Placebo	42.42	11.39	20.00	60.00
	Total	41.05	11.05	20.00	60.00

There were 42(52.50%) male and 38(47.50%) female patients with higher male ratio i.e., 1.10:1. In

corticosteroid and placebo groups there were 21(52.50%) male and 19(47.50%) female cases.

Data Analysis: Data entry and analysis was done via SPSS 21. The quantitative variables including the age of the patient and pain score were presented as mean & standard deviation. The qualitative variable including gender and anatomical side was presented as frequency and percentage. Student T-test was used to compare the mean pain score in both groups. P-value≤0.05 was considered as significant. Data was stratified for age, gender, baseline pain score and anatomical side. Stratified groups were compared by using a student t-test taking p-value≤0.05 as significant.

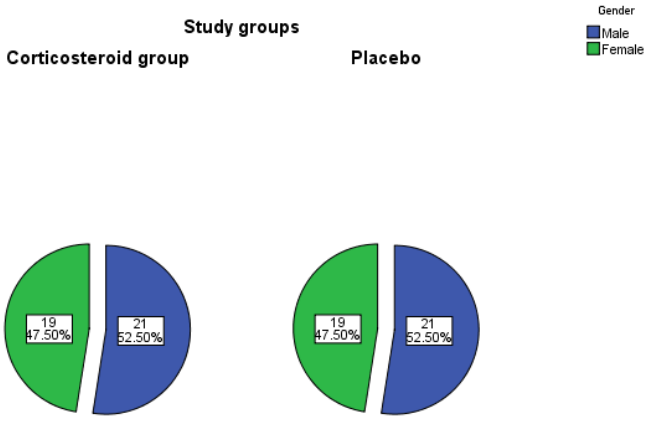

Fig-1 Gender distribution in both groups

43(53.75%) cases had left anatomical side and 37(46.25%) had right anatomical side affected. In group-A 24(60%) had left and 16(40%) had right side while in group-B 19(47.50%) had left and 21(52.50%) had right side involvement.

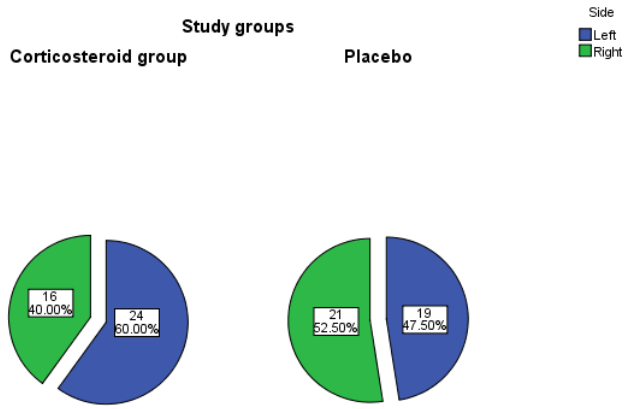

Fig-2 Anatomical side distribution in both groups

The mean pain at baseline was 7.72 ± 1.66 while in the corticosteroid and placebo group, the mean pain was 7.60 ± 1.67 and 7.85 ± 1.65 respectively with statistically equal mean pain p-value = 0.504. (Table-2)

Table-2 Comparison of baseline pain

		Mean	S.D	Minimum	Maximum
Pain (baseline)	Corticosteroid	7.60	1.67	5.0	10.0
	Placebo	7.85	1.65	5.0	10.0
	Total	7.72	1.66	5.0	10.0

After 3 months of treatment, the mean pain value in the corticosteroid group was 1.30 ± 0.66 and 2.60 ± 1.58 in the placebo group. The mean pain was significantly low in corticosteroid groups when equated with the placebo group, with a p-value < 0.001. (Table-3)

Table-3 Comparison of pain after 3 months

		Mean	S.D	Minimum	Maximum
Pain (after 3 months)	Corticosteroid group	1.30	0.66	.00	3
	Placebo	2.60	1.58	1.00	6.00
	Total	1.97	1.35	.00	6.00

Table-4 Comparison of both study groups when stratified for age groups.

Age groups	Study groups	No. of cases	Mean	S.D	p-value
20-40	Corticosteroid group	26	1.42	0.64	0.010
	Placebo	17	2.82	1.77	
41-60	Corticosteroid group	14	1.21	0.69	0.006
	Placebo	23	2.43	1.44	

Table 5 Comparison of both study groups when stratified for gender.

Gender	Study groups	No. of cases	Mean	S.D	p-value
Male	Corticosteroid group	21	1.38	0.66	0.008
	Placebo	21	2.42	1.59	
Female	Corticosteroid group	19	1.31	0.67	0.001
	Placebo	19	2.78	1.58	

Table 6 Comparison of both study groups when stratified for side involvement.

Side	Study groups	No. of cases	Mean	S.D	p-value
Left	Corticosteroid group	24	1.42	0.72	0.003
	Placebo	19	2.63	1.70	
Right	Corticosteroid group	16	1.25	0.58	0.002
	Placebo	21	2.57	1.50	

When data was stratified for age, gender, side involvement and pain at baseline, we found lower mean pain in corticosteroid groups in each stratum when compared with the placebo group, p-value < 0.05.

5. Discussion

Distal radius fractures are one of the most common fractures experienced by Orthopedic surgeons. In the year 2001, 440,000 such cases had occurred in America alone. Such patients usually complain of continuous pain on the ulnar aspect of the wrist. A study showed that 71% of such patients complained of this pain. The cause of pain on the ulnar aspect of the wrist in such patients is due to the unstable nature of the inferior radioulnar joint, arthritis or harm to the triangular fibrocartilage complex (TFCC). Distal radius fracture is the usual cause of instability of the inferior radioulnar joint and an important cause of injury to the triangular fibrocartilage complex (TFCC). Corticosteroid injection is an initial step in reducing the wrist pain on the ulnar aspect in TFCC ligament injury or instability of the joint.

Fractures of the distal radius are reported more in boys as compared to girls. This is supported by Ryan et al. that nearly 64% of such fractures occurred in boys. In this study, we took adult cases so the mean age of patients was 41.05 ± 11.05 years with 42(52.50%) male and 38(47.50%) female patients with a higher male ratio i.e., 1.10:1.

One more study reported that the mean patient age was 39±13.62 in the control and 42±13.23 in the steroid group. In our study, the mean age in the corticosteroid and placebo group was 39.68±10.67 years and 42.42 ± 11.39 years. A recent study reported that both groups did not reveal significant differences regarding age and sex. We also found similar age and gender distribution among both groups with no difference in both groups.

However, studies also show that females are 4.88 times more prone to get such fractures as compared to males. A study by Brogren et al. demonstrated that fractures were 5 times more common in elderly females than elderly males. We in this study could not see such gender difference.

Injuries of TFCC, lunotriquetral ligament and distal radio-ulnar joint instabilities are treated by corticosteroid injections. This injection of corticosteroid temporarily decreases the intensity of pain.

A study conducted in the year 2015, evaluated the consequence of corticosteroid injection in reducing the pain on the ulnar aspect of the wrist. It was reported that after 3 months of the administration, the mean pain score was 1.41±1.09 with corticosteroid, being meaningfully less as compared with saline water, which was 2.39±1.89 for ulnar wrist pain management in patients presenting with distal radius fracture. Moreover, after a follow-up of 3 months, the difference between both the study groups was significant statistically (P = 0.038) for patients with absent ulnar side pain. Statistically significant mean grip power, visual analogue pain score

and the disabilities of the arm, shoulder and hand (DASH) score were seen between both groups. The group of patients that were given corticosteroids showed better grip power and decreased pain score and DASH ($P < 0.05$). In our current study, we only assessed patients for pain after 3 months and found similar facts regarding lesser mean pain with corticosteroid injection i.e. the mean pain in the corticosteroid group was 1.30 ± 0.66 and was 2.60 ± 1.58 in the placebo group.

Table 7 Comparison in both study groups when stratified for side involvement

Pain baseline	Study groups	No. of cases	Mean	S.D	p-value
5-7	Corticosteroid group	23	1.39	0.58	<0.001
	Placebo	22	2.90	1.57	
8-10	Corticosteroid group	17	1.29	0.77	0.034
	Placebo	18	2.22	1.55	

Similarly, a study conducted in 2014 evaluated the effectiveness of corticosteroid injection in reducing pain on the ulnar aspect of the wrist. In this study, 82 such patients presenting with distal radius fracture were arbitrarily segregated into corticosteroid and control groups. At the end of the follow-up of 3 months, the difference between both the groups was statistically significant (12 patients in the control and 23 in corticosteroid groups, p=0.038) regarding the number of patients without wrist pain on the ulnar aspect. Hence, the study concluded that prophylactic injection of corticosteroids helps in reducing the intensity of wrist pain in patients with distal radius fractures. 12. Therefore, statistical trials like ours confirm the role of corticosteroids in reducing mean pain.

5. Conclusion

Findings in our study suggest that Prophylactic corticosteroid injection is useful in reducing pain as compared to placebo in patients presenting with pain on the ulnar aspect of the wrist with distal radius fractures. Use of prophylactic corticosteroid injection in future can help in better pain management and gaining more patient satisfaction

CONFLICTS OF INTEREST- None

Financial support: None to report.
Potential competing interests: None to report
Contributions:
R.R.A, U.Z.W, R.A - Conception of study
R.R.A, U.Z.W, R.A - Experimentation/Study Conduction
R.R.A, U.Z.W, M.H - Analysis/Interpretation/Discussion
R.R.A, M.H, M.U.Q, A.Q.K - Manuscript Writing
R.A, M.H - Critical Review
U.Z.W, R.A, M.U.Q, A.Q.K - Facilitation and Material analysis

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