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Original Article

Efficacy of Corticosteroid versus Platelet-Rich Plasma in Patients presenting with Lateral Epicondylitis at A Tertiary Care Hospital

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ABSTRACT

Objective: To compare the efficacy of Platelet rich plasma (PRP) and corticosteroid injection in patient with Lateral Epicondylitis.

Study Design: Quasi-experimental study.

Place and Duration of Study: Department of Physical Medicine and Rehabilitation, Armed Force Institute of Rehabilitation Medicine Rawalpindi, Pakistan from Sep 2020 to Feb 2021.

Methodology: A total of 144 patients were included in the study. Patients chose between either Platelet Rich Plasma (PRP) treatment or corticosteroid intra-lesional injection. The latter were included in group-A, while the former was allocated to Group-B. Baseline and follow-up evaluations at one, two, and three months, numerical rating scale (NRS), patients rated tennis elbow evaluation (PRTEE), and grip strength using JAMAR® Dynamometer) were documented. Chi-square test was used to analyze data.

Results: This study enrolled 144 participants. Baseline PRTEE, NRS, and grip strength were comparable for both groups. At one and two months, Group-A showed better short-term improvement. At three months, however, Group-B demonstrated better PRTEE findings (p=0.009) and reduced NRS pain levels (p<0.001). Both groups saw a progressive increase in grip strength with no discernible differences. The study showed that PRP is better in terms of improvement in different parameters like PRTEE, NRS and grip strength in the longer-term.

Conclusion: This study showed there is no statistical significant difference in efficacy of platelet rich plasma and corticosteroids, with 100% efficacy seen in both groups with relatively better scores in PRP group as the follow-up duration increased.

Keywords: Corticosteroid Injection, Dynamometer, Grip Strength, Lateral Epicondylitis, Platelet Rich Plasma, Tennis Elbow.

How to Cite This Article: *Shafiq O, Akhtar N, Iram S, Younas U, Hassan TU, Irshad I. Efficacy of Corticosteroid versus Platelet-Rich Plasma in Patients presenting with Lateral Epicondylitis at A Tertiary Care Hospital. Pak Armed Forces Med J 2026; 76(6): 831-835.*
DOI: https://doi.org/10.51253/pafmj.v76i6.13083

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INTRODUCTION

Lateral epicondylitis (LE), known as lateral elbow tendinopathy or tennis elbow, is a common source of pain in the lateral side of the elbow and is caused by overuse of the short extensor of the wrist (extensor carpi radialis brevis).[1-3] Soreness is usually restricted to the epicondyle but can occasionally migrate to the shoulder and wrist in severe cases due to epicondylar strain, pressure, or resistance to wrist or finger extension.[4] The most common cause of lateral elbow pain is lateral epicondylitis, which affects 0.4–10% of people. It is more common in some populations, such as tennis players and toll laborers.[5] In general practice, lateral elbow pain affects 4–7 out of 1000 persons annually, is more prevalent in the fourth and fifth decades of life, and equally affects men and women.[6] A Pakistani revealed that 46% of housewives had lateral epicondylitis (LE), one of the repetitive stress injuries that frequently affect them.[7]

The first line of treatment for lateral epicondylitis is conservative and includes bracing, NSAIDs, rest, physiotherapy, activity modification, and watchful waiting.[8] More recent alternatives include PRP, autologous blood, prolotherapy, and shockwave therapy, local steroid injections continue to provide reliable short-term pain relief.[9] Although corticosteroids (CS) effectively reduce inflammation, their effectiveness after eight weeks is debatable. Tendon ruptures, joint pain, skin abnormalities, subdermal atrophy, face flushing, and hyperglycemia are among the hazards associated with them. By giving three to four times the bioactive components of whole blood in smaller injections of two to three

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Received: 28 Jan 2025; revision received: 22 Jun 2025; accepted: 24 Jun 2025

milliliters, PRP provides a more effective substitute that speeds up the healing process.[10]

This study aimed to compare the efficacy of platelet-rich plasma (PRP) and corticosteroid injection in line with the evidence-based advancements in injectable treatment options worldwide for treatment of lateral epicondylitis.

METHODOLOGY

This quasi-experimental study was conducted at Department of Physical Medicine and Rehabilitation, Armed Force Institute of Rehabilitation Medicine Rawalpindi, Pakistan, from September 2020 to February 2021, following approval by the Institutional Ethical Review Committee (Case No. 04/2020 dated 26th August 2020).

Inclusion Criteria: Patients of either gender aged between 20 and 70 years presenting with lateral epicondylitis, who were either receiving conservative treatment with analgesics and anti-inflammatory medications or not receiving any treatment at all, were included.

Exclusion Criteria: Patients who had a history of arthritis and nerve entrapment around elbow, already treated with intra-lesional injections, history of elbow surgery, elbow trauma or fracture, other inflammatory joint conditions like rheumatoid arthritis or gout, and conditions that preclude intra-articular injection, like thrombocytopenia or coagulopathy, with pregnancy, history of congestive cardiac failure, asthma, chronic liver disease, psychiatric disorders, COPD and stroke were excluded.

A sample size of 144 (each group 72) was calculated using the WHO calculator, keeping the prevalence of lateral epicondylitis at 10%.[10] Non-probability consecutive sampling was used to recruit participants.

Patients were labeled as having lateral epicondylitis (LE) by the presence of any one or more of the following: Clinically Cozen test positive, tenderness present at and/or around lateral epicondyle, joint pain NRS ≥ 5 for more than one month, less than age specified grip strength (as measured by Dynamometer and compared to internationally accepted standards.[11]

Patients were briefed about injection procedure, and after informed consent was obtained, allocated to receive either corticosteroid injections (Group-A) or PRP injections (Group-B) randomly (Figure-1). Personal details including hospital registration number, age, gender, duration of lateral elbow pain and clinical signs including tenderness at lateral epicondyle were noted. Clinical provocative test 'Cozen' (resistance on extension of wrist) were performed at time of enrollment. All of the patients were examined and baseline numerical rating scale (NRS), patients rated tennis elbow evaluation (PRTEE) and Grip strength by using a Dynamometer were calculated and recorded. For 48 hours prior to the study, both non-drug treatments (elbow physiotherapy using modalities like transcutaneous electrical nerve stimulation and laser) and drug treatments (e.g., non-steroidal anti-inflammatory drugs, corticosteroids, and other anti-inflammatory drugs) were discontinued in order to prevent blocking the outcome of PRP treatment.

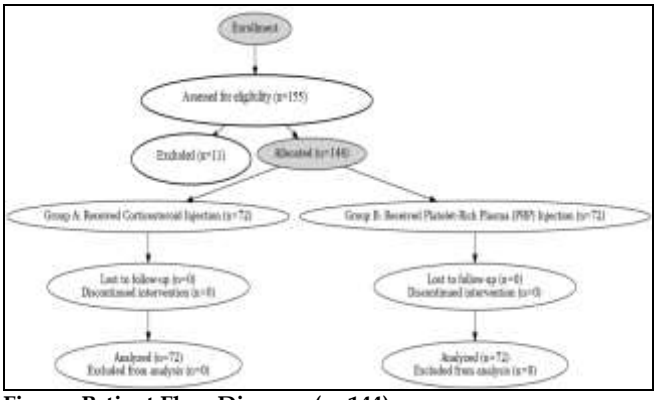

Figure: Patient Flow Diagram (n=144)

For PRP, blood was drawn from a vein (15ml) in the patient's arm with a syringe (20cc, 21-gauge needle) and processed using a centrifuge machine at 2800 rpm, followed by preparing the centrifuged platelet-rich plasma for injection. For corticosteroid 20mg of Triamcinolone Acetonide was used. Under aseptic conditions, the skin injection site was prepared and covered in both groups, and local anesthetic spray was used to numb the injection site and patient was asked to relax. Corticosteroid/PRP was injected as a single injection using a 23-gauge needle using anterior or lateral approaches. The injection area was cleansed and bandaged. Patient was advised to use cold compresses to reduce pain and inflammation for five minutes, twice a day, for three days due to injection. They were followed up at 1, 2 and 3 months and NRS, PRTEE and Dynamometer scores were again calculated. Efficacy was noted in all patients (improvement/decrease of NRS scale ≥ 2 points and PRTEE ≥ 20 Points).

Statistical Package for Social Sciences (SPSS) version 23 was used to analyze data. For quantitative variables, such as age, mean and standard deviation were calculated; for qualitative variables, such as gender and efficacy, frequency and percentage were calculated. For efficacy, Chi-square test was used to compare two groups. a *p*-value ≤0.05 was considered significant. The data was stratified by age, gender, and duration of disease to control for confounding.

RESULTS

A total of 144 patients (72 in each group) were included in this study. Out of the total, 67(46.6%) were male with the mean age of 50.7±6.5 years and 77(53.5%) were female, with an average age of 41.7±4.5 years. The baseline characteristics of study population are shown in Table-I.

Table-I: Baseline Characteristics of Study Population (n=144)

Variables		n (%)
Gender	Male	67(46.6%)
	Female	77(53.5%)
Age Range	21-45 years	77(53.5%)
	46-70 years	67(46.6%)
Duration of Disease	≤6 months	60(41.7%)
	>6 months	84(58.3%)
Treatment Group	Group-A (Corticosteroid)	72(50.0%)
	Group-B (PRP)	72(50.0%)

Table-II presents a comparative analysis of clinical outcomes between Group-A (Corticosteroid, n=72) and Group-B (PRP, n=72) at various time points using PRTEE scores, NRS scores, and grip strength measurements. Both groups started with similar pre-injection PRTEE scores. At 1 month, Group-A showed a greater reduction in PRTEE scores compared to Group-B, with a statistically significant difference ($p < 0.001$). This trend continued at 2 months. By 3 months, Group-B demonstrated greater improvement compared to Group-A (p=0.009), indicating better long-term efficacy for PRP. The NRS scores revealed that pain was significantly lower in Group-B at 3 months (Median: 3.0, IQR: 4.0–2.0) compared to Group-A (Median: 4.0, IQR: 5.0–4.0, p<0.001). There were no discernible variations in grip strength between the two groups at any point in time. Both groups experienced gradual improvements over time, with median grip strength increasing similarly from pre-injection levels to 3 months post-treatment.

DISCUSSION

In this study, clinical outcomes such as PRTEE scores, NRS pain ratings, and grip strength are compared between corticosteroid and platelet-rich plasma (PRP) therapies in patients with mean ages of 50.7±6.5 years for males and 41.7±4.5 years for females. The findings shed light on significant variations in treatment effectiveness over time and provide explanations for their underlying mechanisms. Both groups displayed similar features at baseline, guaranteeing that the interventions were predominantly responsible for the outcomes. Pre-injection PRTEE scores for Group-A (Corticosteroid) and Group-B (PRP) were similar (76.7±7.8 vs. 77.1±8.0, p=0.785), indicating similar levels of functional impairment. PRTEE scores decreased considerably more in Group-A one month after therapy (61.5±9.2 vs. 68.5±9.2, p<0.001). The short-term effectiveness of corticosteroids is suggested by this data, which is probably because of their quick suppression of inflammation, lowering pain and enhancing function. Wong *et al*. showed that whereas steroid injections offer more rapid pain relief and improved function after one week, both treatments produce comparable results at two months. PRP, however, performs better than steroids at the 6-month follow-up, because there are fewer recurrences, whereas the steroid group had more.[13] This demonstrates the long-term advantages of PRP over steroids for long-lasting treatment. Jacobson et al. stated that short-term results indicated PRP was either first or second in pain-related indices.[14] PRP was at the top of most measures for long-term outcomes. Findings thus demonstrated the effectiveness of PRP and its relationship to the follow-up period. Apart from LE, prior research has shown that PRP is effective in reducing pain associated with other tendinopathies, including rotator cuff injuries, patellar tendinopathy, and gluteal tendinosis.[14] A study conducted by Lin *et al.* states that clinical proof of PRP's effectiveness in improving function beyond pain relief was discovered when treating rotator cuff and recalcitrant Achilles tendinopathies, with follow-up periods of six months and over four years, respectively.[15]

By three months, their PRP group had significantly lower NRS pain scores (p<0.001) and larger improvements in PRTEE scores (p=0.009) than the corticosteroid group. This implies that PRP's long-term regenerative and anti-inflammatory properties support long-term pain alleviation and functional rehabilitation. Li *et a*l., conducted seven randomized controlled trials (RCTs) with 515 patients, demonstrating that PRP injection produced statistically significant improvements in elbow joint function and pain levels during a 6-month follow-up

when compared to local corticosteroid injection.[16] Regarding the adverse events that occurred after injection, no discernible difference was seen between the two groups. At one year following intervention, Polish randomized research showed that PRP provided longer-lasting pain relief and improved function for LE compared to steroids.[17] Additionally, Gossen *et al*. noted long-lasting improvements two years following PRP injections.[18] Due to the wide range of commercially available PRP preparations, the concentration of leukocytes in PRP is currently a topic of discussion.[19]

Table-II: Comparison of PRTEE Scores, NRS Scores, and Grip Strength between Groups over Time (n=144)

	Group-A (n=72)	Group-B (n=72)	*p*-value
PRTEE Score	Mean ± SD	Mean ± SD	
Pre-Injection	76.7 ± 7.8	77.1 ± 8.0	0.785
1 month	61.5 ± 9.2	68.5 ± 9.2	<0.001
2 month	54.3 ± 9.6	57.7 ± 10.9	0.048
3 month	48.3 ± 9.2	43.5 ± 12.0	0.009
NRS	Median (IQR)	Median (IQR)	
Pre-Injection	8.0 (8.0-7.0)	7.0 (8.0-6.0)	0.001
1 month	6.0 (6.0-5.0)	6.0 (7.0-5.0)	0.048
2 month	5.0 (6.0-4.0)	5.0 (6.0-4.0)	0.886
3 month	4.0 (5.0-4.0)	3.0 (4.0-2.0)	<0.001
Grip strength (kg)	Median (IQR)	Median (IQR)	
Pre-Injection	21.0 (30.0-18.1)	21.00 (29.8-18.0)	0.881
1 month	23.0 (32.0-20.6)	23.00 (31.8-19.6)	0.603
2 month	25.0 (34.7-22.0)	24.75 (34.0-21.6)	0.848
3 month	26.0 (36.0-23.0)	27.0 (35.8-24.0)	0.507

**NRS: Numerical Rating Scale, PRTEE: Patient-Rated Tennis Elbow Evaluation*

According to treatment schedules, this study shows that PRP and corticosteroids have different benefits. Corticosteroids were useful for short-term therapy because they quickly reduced symptoms and significantly improved pain and functionality during the first month. In contrast, PRP offered improved long-term effects, with higher decreases in pain (NRS) and functional impairment (PRTEE) by three months, likely due to its regenerative qualities. Similar gains in grip strength were seen with both therapies, suggesting that their main advantages lie in pain management and functional recovery rather than muscle growth. These results highlight a customized approach to treatment, matching therapy to the objectives and requirements of each patient by using PRP for long-term healing and recovery and corticosteroids for instant relief.

LIMITATIONS OF STUDY

A small sample size, and absence of long-term follow-up to evaluate the durability of therapy effects are the study's limitations. Furthermore, the generalizability of results may be impacted by individual differences in response to injections of corticosteroids and platelet-rich plasma.

CONCLUSION

We concluded that there is no statistically significant difference in the effectiveness of intra-lesional platelet-rich plasma and corticosteroids. However, intra-lesional PRP has better efficacy in terms of improvement in different parameters like PRTEE (Patient Related Tennis Elbow Evaluation), NRS (Numerical Rating Scale) and grip strength. Therefore, in order to lower the morbidity of these patients, we advise that intra-lesional platelet-rich plasma be used as the first line of treatment for tennis elbow.

ACKNOWLEDGEMENT

We would like to acknowledge all those who participated directly or indirectly in the study.

Conflict of Interest: None.

Funding Source: None.

Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

OS & NA: Conception, study design, drafting the manuscript, approval of the final version to be published.

SI & UY: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

TUH & II: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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