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Original Article

Role of Intra-Lesional Corticosteroid and Platelet-Rich-Plasma Injections in the Non-Surgical Management of De Quervain's Tenosynovitis: A Quasi Experimental Study

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ABSTRACT

Objective: To compare the improvement in functional outcomes and pain reduction between patients receiving steroid injections and those receiving platelet-rich plasma (PRP) injections for the treatment of De Quervain's tenosynovitis.
Study Design: Quasi Experimental Study.
Place and Duration of Study: PNS Shifa Hospital, Karachi Pakistan, from Dec 2024 to Nov 2025.
Methodology: A total of 94 patients were enrolled, with 42 patients assigned to each of the two treatment groups. Group-A (PRP-Group): This group received a single injection of autologous platelet-rich plasma (PRP). Group-B (CS-Group): Patients in this group received a single injection of Methylprednisolone acetate. All patients were measured through Finkelstein's test, the Visual Analogue Scale (VAS) for pain, and functional improvement, assessed using the Disabilities of the Arm, Shoulder, and Hand (DASH) score at 2 weeks, 1 month, 3 months and 6 months post infection.
Results: For all 42 patients in both the groups, the VAS score, DASH score and MMWS showed improvement with no significant difference. In terms of complications, the PRP-Group reported lower complications, while the CS-Group had 5 cases of local depigmentation (p=0.02) and 3 cases of subcutaneous fat atrophy (p=0.04). Temporary increase in pain was observed in 2 patients in the PRP-Group and 1 in the CS-Group (p=0.56).
Conclusion: PRP is a safer option compared to CS for treating DQT, yet it is just as effective, based on our data and the problems associated with CS usage.
Keywords: Corticosteroid, De Quervain's Tenosynovitis, DASH.

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INTRODUCTION

A painful inflammatory wrist condition known as De Quervain's tenosynovitis (DQT) mostly affects the abductor Pollicis Longus (APL) and Extensor Pollicis Brevis (EPB) tendons as they pass through the wrist's first dorsal compartment.[1] It is generally more prevalent in women than in males, and it peaks in people between the ages of 30 and 50 years. The estimated prevalence worldwide is 1.3% for women and 0.5% for males.[2] An incidence rate of approximately 1.6% was found in recent Pakistani research involving patients who presented with wrist pain.[3] Consistent with worldwide trends, research undertaken in India indicates a greater frequency among women aged 30 to 50 years.[4]

Overuse or repetitive strain on the wrist and thumb is the main cause of DQT. Its development is aided by tasks like typing, gardening, playing an instrument, and picking up babies. Rheumatoid arthritis and other inflammatory diseases may also raise the chance.[5] Physical examination and history are used to make the diagnosis. Finkelstein's test,[1,6] which involves deviating the wrist to the ulnar side while holding the thumb and producing pain, usually yields a positive result. Both nonsurgical and surgical methods are used to manage DQT; the choice of treatment is based on the severity of the symptoms and how well the patient responds to the first treatments. NSAIDs, splinting, physical therapy, activity modification, and rest are common nonsurgical options.[6]

Researchers have investigated the relative efficacy of PRP and Corticosteroid injections in the treatment of DQT. For example, a study comparing PRP and Corticosteroid injections was carried out by Kumar *et al.*, indicating the need for more investigation into the effectiveness of PRP.[7]

PRP injections provide a viable substitute with potential regenerative benefits for DQT, despite the fact that Corticosteroid injections are a well-

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established treatment. Still, more research is necessary to determine whether PRP is effective in treating DQT.[8] To add to the growing body of research on PRP's efficacy in treating DQT, this Quasi Experimental study compares the clinical and functional results of steroid and PRP injections in patients with the condition.

METHODOLOGY

This Quasi Experimental study was carried out to assess the efficacy of two distinct DQT treatment modalities. Sample size was calculated using WHO sample size calculator and by Fleiss' kappa keeping proportion of success at 60%, margin of error at 10%, confidence level at 95%, assuming anticipated frequency at 93% and 85% for Group-A and Group-B respectively.[8-12] In all 94 patients were enrolled, 47 of whom were divided in each of the treatment groups. The study was carried out at our tertiary care facility over a one-year period after receiving ethical approval from our institution (ERC approval letter id ERC/2023/Rehab Med/58-A dated 27-11-2023).

Inclusion Criteria: Patients of either gender with age ranging from 20 to 65 years, presenting in Outpatient Department with Finkelstein's test-diagnosed DQT were included in the study.

Exclusion Criteria: All patients with prior wrist trauma, Dupuytren's disease, first carpometacarpal joint arthritis, prior corticosteroid injections, uncontrolled diabetes mellitus, pregnancy, myxedema, rheumatoid arthritis, or gout were all excluded from the study.

The PRP-Group, (Group-A) was administered a single autologous Platelet-Rich Plasma (PRP) injection. To prepare PRP,[10] milliliters of the patient's blood were drawn using an 18-gauge sterile syringe and then transferred to BD Vacutainers that contained buffered Sodium Citrate, an anticoagulant. To separate the components, the blood was centrifuged at 800 Hz for 8 minutes. The interface between the layers of platelet-rich and platelet-poor plasma was used to extract PRP. A 22–24 gauge needle was used to sterilize the affected area and inject a 3 ml dose of PRP. To specifically target the tendons, the injection was given at a 45-degree angle. A compression bandage was then applied. Patients were instructed to apply, elevate, and rest the affected limb.

In CS-Group (Group-B), A single injection of 1 ml (40 mg) of Methylprednisolone Acetate was given to the patients in this group. The injection was given with the same procedural safeguards as the PRP-Group, utilizing a fine gauge needle (24 gauge). The post-injection guidelines were the same as those provided to the PRP-Group.

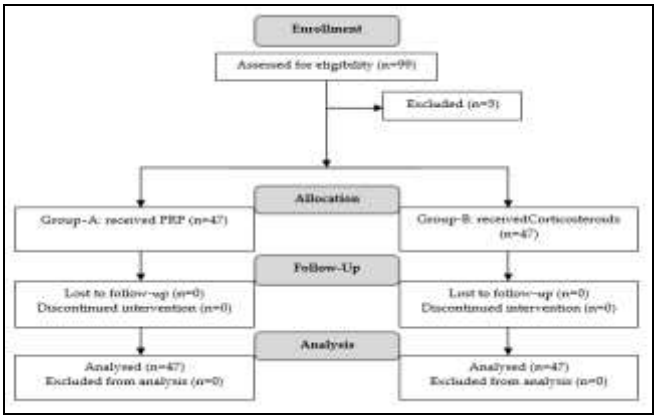


Figure: Patient Flow Diagram (n=94)

Finkelstein's test, the Visual Analogue Scale (VAS) for pain, and the Disabilities of the Arm, Shoulder, and Hand (DASH) score—a score that ranges from 0 (no disability) to 100 (most severe disability)—were among the metrics used to evaluate the patients,[9] and the Modified Mayo Wrist Score (MMWS). Higher scores denote better performance; the total score extends from 0 to 100 points. 90 to 100 points is considered an excellent result; 80 to 89 is good; 65 to 79 is fair; and less than 65 is poor.[10]

Statistical Package for Social Sciences Version 21.0 for data management and analysis. Whereas categorical variables were shown as frequency and percentages. Age was normally distributed and represented by mean ± standard deviation (SD) and compare by independent samples t test.While others continuous variables were non normally distributed and summarized as median (IQR). Mann-Whitney U/ Wilcoxon rank-sum test was used to compare non-normally distributed continuous variables between groups, and to compare within-group variables before and after the intervention. When appropriate, Fisher's exact test or Chi-square tests were used to analyze nominal categorical data. A and $p \leq 0.05$ were used to determine statistical significance.

RESULTS

All 94 patients completed the study with no drop out. Basic characteristics of the patients are given in Table-I. Comparisons of outcome variables is as shown in Table-II. The median VAS score in Group-A (PRP-Group) and Group-B (CS-Group) at day 0 was

7.0(5.9-8.1) and 6.9(5.8-8.0), respectively (p=0.75). At 6 months, the VAS scores reduced to 0.6(0.5-0.7) in the PRP-Group and 1.3(1.0-1.6) in the CS-Group (p=0.18), indicating that both treatments were effective in reducing pain, with no significant difference between the groups. The median DASH score at day 0 was 30.5(27.0-34.0) for the PRP-Group and 29.4(26.0-32.6) for the CS-Group (p=0.75). At 6 months, the DASH scores were 3.0(2.0-4.0) for the PRP-Group and 5.4(4.0-6.8) for the CS-Group (p=0.12), showing significant improvement in both groups with no significant difference. The median MMWS at day 0 was 58.7(54.0-63.4) for the PRP-Group and 57.6(52.0-63.2) for the CS-Group (p=0.62). At 6 months, the MMWS improved to 90.1(88.0-92.2) in the PRP-Group and 81.1(75.0-87.3) in the CS-Group (p=0.05), indicating significant improvement in both groups, with a slight edge for the PRP-Group. In terms of complications, the PRP-Group had no instances of local depigmentation or subcutaneous fat atrophy, while the CS-Group had 5 cases of local depigmentation (p=0.02) and 3 cases of subcutaneous fat atrophy (p=0.04). Temporary increase in pain was observed in 2 patients in the PRP-Group and 1 in the CS-Group (p = 0.56) as shown in Table-III.

Table-I: Comparison of Patients Characteristics (n=94)

Variable(s)	Group-A (PRP-Group) (n=47)	Group-B (CS-Group) (n=47)	*p*-value
Mean Age (years)	38.43±7.57	39.67±6.82	0.004
Female	25(53.1%)	21(44.6%)	0.003
Male	22(46.8%)	26(55.3%)	
Left side	23(48.9%)	19(40.4%)	0.002
Right side	24(51.0%)	28(59.5%)	

Table-II: Comparison of Outcomes between Group-A (PRP-Group) and Group-B (CS-Group) (n=94)

Time Point	Outcome Measure	Group-A (PRP-Group) (n=47) Median(IQR)	Group-B (CS-Group) (n=47) Median(IQR)	*p*-value
Pre-intervention (Day 0)	VAS Score	7.0(5.9-8.1)	6.9(5.8-8.0)	0.75
1 month	VAS Score	3.7(2.8-4.6)	2.9(2.3-3.5)	0.21
3 months	VAS Score	1.7(1.3-2.1)	2.3(1.7-2.9)	0.42
6 months	VAS Score	0.6(0.5-0.7)	1.3(1.0-1.6)	0.18
Pre-intervention (Day 0)	DASH Score	30.5(27.0-34.0)	29.4(26.0-32.6)	0.75
1 month	DASH Score	12.9(10.0-15.8)	11.7(9.0-14.4)	0.53
3 months	DASH Score	5.7(4.0-7.4)	5.9(4.0-7.8)	0.92
6 months	DASH Score	3.0(2.0-4.0)	5.4(4.0-6.8)	0.12
Pre-intervention (Day 0)	MMWS	58.7(54.0-63.4)	57.6(52.0-63.2)	0.62
1 month	MMWS	74.3(68.0-80.6)	83.8(78.0-89.60	0.04
3 months	MMWS	87.1(84.0-90.2)	80.4(76.0-84.8)	0.02
6 months	MMWS	90.1(88.0-92.2)	81.1(75.0-87.3)	0.05

Table-III: Association of Complications between Group-A (PRP-Group) and Group-B (CS-Group) (n=94)

Complication(s)	Group-A (PRP-Group) (n=47) Frequency (%)	Group-B (CS-Group) (n=47) Frequency (%)	*p*-value*
Local Depigmentation	0(0.0%)	5(10.6%)	0.02
Subcutaneous Fat Atrophy	0(0.0%)	3(6.3%)	0.04
Temporary Increase in Pain	2(4.2%)	1(2.1%)	0.56

DISCUSSION

The findings of our study show that PRP is a safer option compared to CS for treating DQT, yet the effectiveness is the same in both. DQT symptoms include wrist pain and tenderness, which can spread to the thumb and forearm. Patients may also have swelling over the radial side of the wrist, a catching or snapping sensation when moving the thumb, difficulty gripping objects or clenching a fist, and pain that worsens with movement of the thumb and wrist.[11]

Surgical release of the extensor retinaculum is performed as a treatment for de DQT when conservative treatment fails. The bulk of DQT therapy is local CS injection since surgery-related consequences include painful neuromas, superficial radial nerve neuropathies and entrapment, scar adhesion to underlying tendons, persistent discomfort, and wound infections. While Methylprednisolone acetate and other CS show promise in treating DQT, their usage is limited by certain adverse effects.[12,13]

Numerous studies have shown that PRP injections are a feasible and low-risk treatment option for a range of tendinopathies. While multiple studies have shown that CS is beneficial for treating DQT, there is comparatively less evidence to support the use of PRP in DQT and their comparison in treating this ailment. Given the foregoing, the aim of this investigation was to evaluate and compare the efficacy of autologous PRP injection and CS injection in the treatment of DQT.[14-17]

In our study mean VAS show significant improvement after 1 year. In our study VAS decreased 7.0(5.9-8.1) to 0.6(0.5-0.7) in the PRP-Group and 6.9(5.8-8.0) to 1.3(1.0-1.6) in CS-Group. After six months, the VAS decreased by 63% in the Peck and Ely research.[15] Separate research reported that following a single PRP injection, there was a statistically significant increase in pain alleviation. The baseline VAS score was 9.42, and the post-procedural 6-month VAS score was 3.92.[16] The median DASH score in our study was improved from 30.5(27.0-34.0) to 3.0(2.0-4.0) in PRP-Group and 29.4(26.0-32.6) to 5.4(4.0-6.8) in CS-Group. Median MMWS was also improved from 58.7(54.0-63.4) to 90.1(88.0-92.2) in PRP-Group and 57.6(52.0-63.2) to 81.1(75.0-87.3) in CS-Group.

Similar to our findings, a study by Shivanna *et al.*,[17] found that only two out of 60 patients had positive tests at the end of their care. The mean VAS score in our study improved statistically significantly

after a year, going from 6.53±1.48 to 0.47±0.78. The McDermott *et al.,* study's[18] VAS was 2.2 following the conclusion of therapy. After a year of the intervention, the mean DASH score in our research improved from 26.98±7.02 to 1.21±2.83, which was shown to be statistically significant.

When comparing the two groups, none of the modalities showed itself to be better in terms of pain alleviation and functional improvement, and the differences in all of the scores were statistically not significant. The CS-Group had better pain relief, hand function tests, and ultrasonographic findings at one month, but at the six-month follow-up, the PRP-Group had statistically significant better pain relief, hand function tests, and ultrasonographic findings than the CS-Group. El Sheikh *et al.*,[19] also demonstrated significant improvements in VAS and quick DASH scores after six months of treatment.

No studies have reported any complication of PRP except very small risk of infection.[20,21] We also noticed this procedure to be well tolerated by the patients with no or a minimal risk of complication. On the other hand, in CS-Group, five cases of local depigmentation, three cases of subcutaneous fat atrophy, and one case of temporary increase in pain in CS-Group and two cases of significant increase in pain in PRP-Group were reported which was statistically significant. Infection, tendon rupture, or nerve damage were not common.

After considering the low cost and convenience of preparation and administration, we have reached to the conclusion that autologous PRP and CS can potentially develop into very helpful treatments that can reduce the need for more invasive surgery in DQT.

CONCLUSION

PRP is a safer option compared to CS for treating DQT, yet it is just as effective, based on our data and the problems associated with CS usage.

LIMITATION OF STUDY

In addition to being a Quasi Experimental Study with limited sample size, done at single center study, over a limited time period, the main limitation of this study was a lack of long-term following follow-up of patients which can be helpful to determine long term effects.

Conflict of Interest: None.

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Authors' Contribution

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

AAK & TA: Data acquisition, data analysis, critical review, approval of the final version to be published.

MHA & AA: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

AA & AR: 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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