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Research Article

Clinical and Functional outcome after local injection of autologous platelet rich plasma in symptomatic Rotator cuff tendinopathy

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ABSTRACT

Introduction: Rotator cuff tendinopathy (RCT) is a leading cause of shoulder pain, significantly impairing daily function. Platelet-rich plasma (PRP), rich in growth factors, has emerged as a potential regenerative therapy. This study evaluates the efficacy of autologous PRP in symptomatic RCT unresponsive to conservative treatment.

Methods: A prospective cohort study of 30 patients with MRI-confirmed RCT was conducted. Patients received a single intra-articular PRP injection under aseptic conditions. Functional and pain outcomes were assessed using DASH, SPADI, and VAS scores at baseline, 4, 12, and 24 weeks.

Results: Significant improvement was observed in all outcome measures over 6 months. Mean DASH decreased from 63.1 to 36.4, SPADI from 67.2 to 34.6, and VAS from 5.4 to 1.5 ($p < 0.001$). No serious adverse events were reported.

Conclusion: Autologous PRP is a safe and effective treatment for RCT, offering meaningful pain relief and functional recovery. Further randomized studies with standardized protocols are warranted.

Keywords: *RCT (Rotator cuff tendinopathy), PRP (Platelet rich plasma), DASH (Disability of Arm, Shoulder & Hand) score, SPADI score (Shoulder pain & Disability index), VAS (Visual Analog scale) score.*

INTRODUCTION

Shoulder pain ranks as the third most common musculoskeletal condition globally, with rotator cuff tendinopathy (RCT) accounting for over half of cases in orthopaedic practice. It significantly affects quality of life by limiting function and overhead motion. The rotator cuff, made up of the supraspinatus, infraspinatus, teres minor, and subscapularis muscles, stabilizes the humeral head within the glenoid cavity during shoulder movements. RCT may present acutely due to trauma or chronically due to extrinsic impingement from the acromion. Diagnosis relies on clinical tests such as the empty can test, drop arm sign, lag sign, and lift-off test to identify partial or complete tears and isolate affected muscles[1]. Treatment options range from conservative methods, including physiotherapy and steroid injections, to surgical repair. Platelet-rich plasma (PRP), a blood derivative concentrated with growth factors like PDGF and TGF-β, has been explored for its regenerative properties in various musculoskeletal conditions. Despite widespread interest, PRP's efficacy in treating RCT remains uncertain[2-4]. This study aims to evaluate the therapeutic potential of PRP in the management of RCT.

MATERIAL & METHODS

A prospective single-cohort study was conducted over a period of 1.5 yr from April,2023 to September,2024 in the Orthopaedics Department at Maharaja Agrasen Medical College, Agroha, Hisar. A total of 30 patients aged 18 years and above, clinically and radiologically (MRI) diagnosed with rotator cuff tendinopathy resistant to conservative treatment for over 3 months, were recruited from outpatient department. Patients with recent steroid injections, full-thickness tears,

previous shoulder surgeries, systemic illnesses, or those unwilling to participate were excluded. Follow up assessments were done at 4 weeks, 12 weeks and 24 weeks using DASH[5], SPADI[6] and VAS[7] scoring systems.

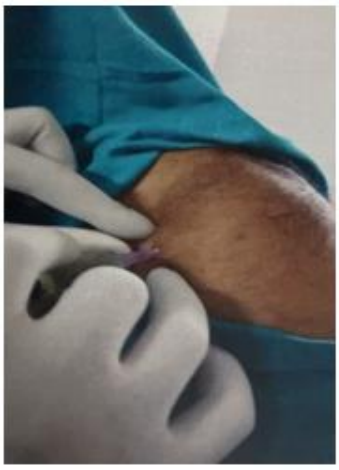
Procedural Technique

Platelet-rich plasma (PRP) was prepared by drawing 20 ml of the patient's blood into acid citrate dextrose tubes under aseptic conditions. The blood was centrifuged in two steps—first at 2000 rpm (soft spin) to separate components, then at 3000 rpm (hard spin) to concentrate platelets. The final PRP (5–7 ml) was extracted from the lower third of the sample.[8] Each patient received a single intra-articular PRP injection using either an anterior or posterior approach under sterile conditions and local anaesthesia. The injection targeted the glenohumeral joint, and patients were encouraged to begin early mobilization post-procedure.[9]

CENTRIFUGE (Rotanta 460 R, Germany)

Patient Prepration

Posterior Approach



Anterior Approach

RESULTS

This study assessed the effectiveness of autologous PRP injections in 30 adults with rotator cuff tendinopathy. The average participant age was 46.5 years, with a slight female predominance (53.3%). Most were right-hand dominant (90%) and homemakers (43.4%). The right shoulder was more commonly affected (56.7%), and the average pain duration was 7.3 months. The most common MRI finding was a partial supraspinatus tear (40%).

PRP was administered via the posterior approach in 73.3% of patients. Post-injection pain was noted in the same percentage, though no serious complications occurred. Significant improvements were observed across all outcome measures at 6 months:

- **DASH SCORE**

The DASH score, reflecting disability and arm function, improved significantly over time. The mean score decreased from 63.1 at presentation to 36.4 at six months post-injection ($p < 0.001$), indicating a statistically significant improvement in functional outcomes.

Table 1. Distribution of study participants according to their DASH score over time (n=30)

DASH score	Mean
At presentation	63.1
At 4 weeks	52.1
At 12 weeks	43.1
At 6 months	36.4

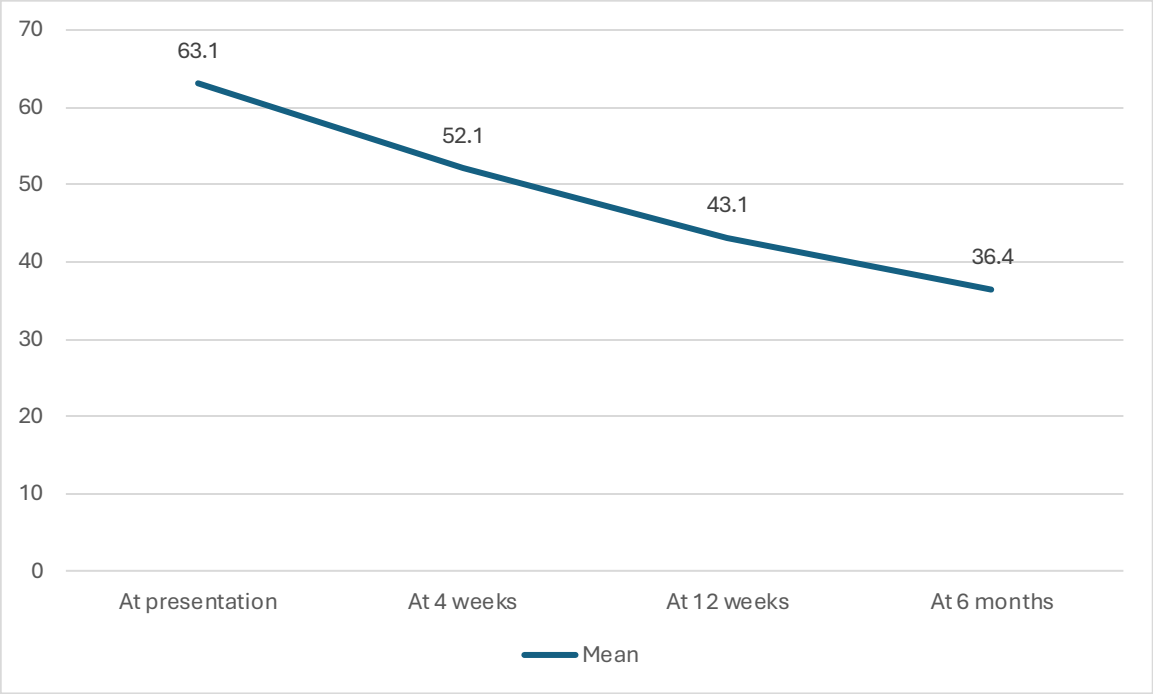


Figure 1. Distribution of study participants according to their DASH score over time (n=30)

- **SPADI SCORE**

The SPADI score, assessing shoulder pain and disability, also showed significant improvement. The mean score decreased from 67.2 at presentation to 34.6 at six months ($p < 0.001$). These findings demonstrate the efficacy of PRP in reducing pain and enhancing shoulder functionality.

Table 2. Distribution of study participants according to their SPADI score over time (n=30)

SPADI score	Mean
At presentation	67.2
At 4 weeks	52.9
At 12 weeks	42.9
At 6 months	34.6

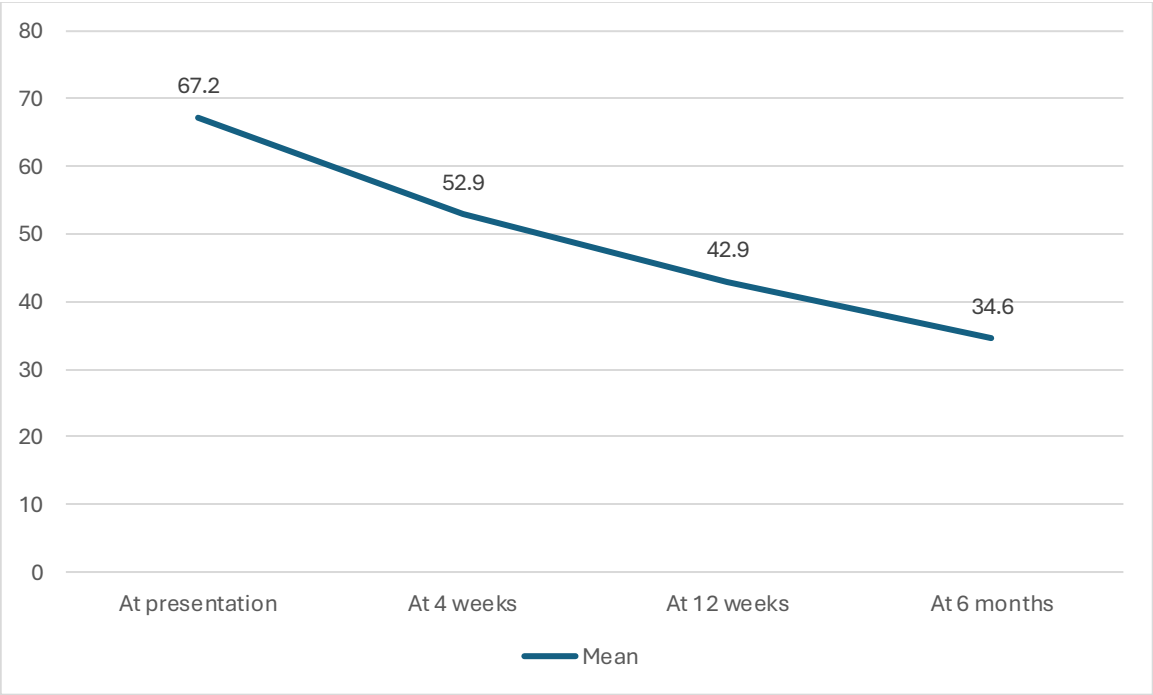


Figure 2. Distribution of study participants according to their SPADI score over time (n=30)

- **VAS SCORE**

VAS scores, measuring pain intensity, declined significantly from 5.4 at baseline to 1.5 at six months ($p < 0.001$).

Table 3. Distribution of study participants according to their VAS score over time (n=30)

VAS score	Mean
At presentation	5.4
At 4 weeks	2.9
At 12 weeks	2.2
At 6 months	1.5

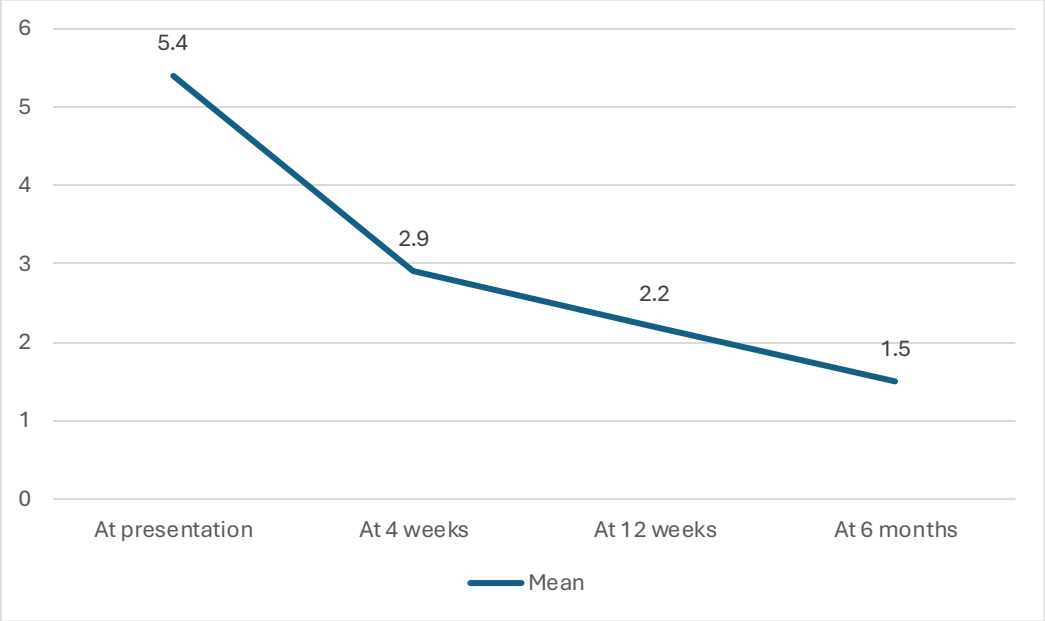
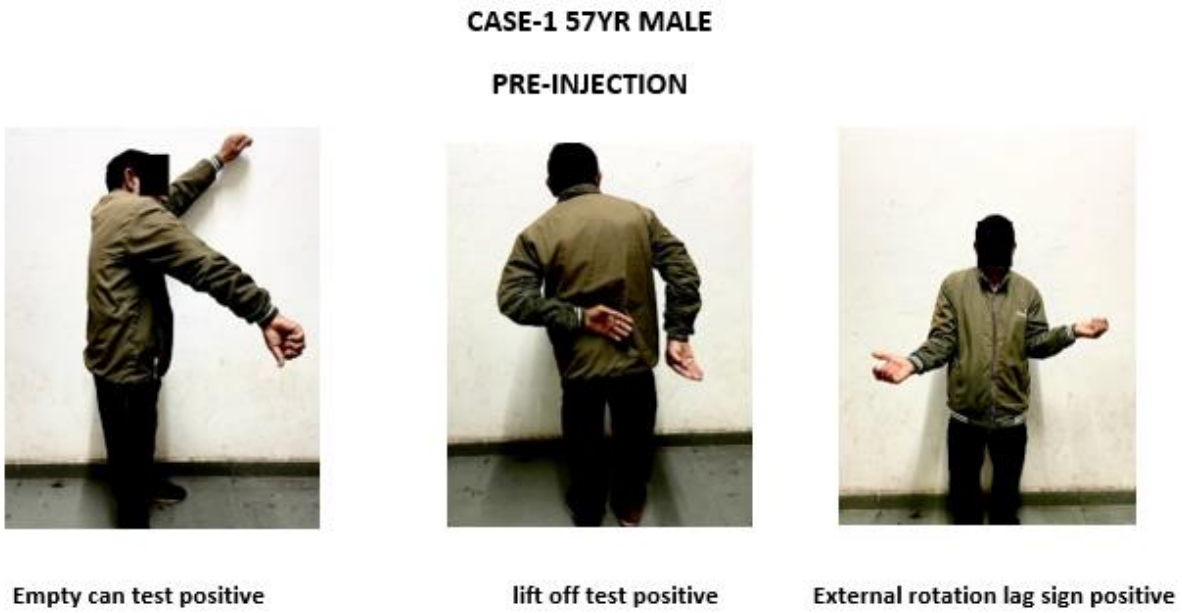


Figure 3. Distribution of study participants according to their VAS score over time (n=30)

These findings indicate that PRP therapy led to substantial pain relief and functional improvement over six months.



CASE-2 POST-INJECTION FINAL FOLLOW UP AT 6 MONTHS

Empty can test negative

lift off test negative

External rotation lag sign negative

DISCUSSIONS

This study evaluated the clinical efficacy of autologous PRP injections in managing rotator cuff tendinopathy, showing significant improvements in pain, function, and disability over a six-month period. Reductions in DASH (from 63.1 to 36.4), SPADI (67.2 to 34.6), and VAS (5.4 to 1.5) scores were statistically significant, indicating meaningful functional recovery and pain relief.

Demographic findings—such as a mean age of 46.5 years, right-side dominance, and a nearly equal sex distribution—mirror trends observed in prior studies, including those by Rha et al.[10] and Scarpone et al.[11], emphasizing the influence of age, overuse, and occupation in disease pathogenesis. The study found that 90% of participants were right-hand dominant, with the right shoulder being affected in 56.7% of cases. This correlation between hand dominance and the side of injury supports findings by Kim et al.[12], who also reported a strong link between dominant hand use and rotator cuff injuries. All patients in this study reported a gradual onset of symptoms with a mean duration of pain of 7.3 months. Homemakers and farmers, who often perform repetitive upper-limb tasks, comprised the most affected groups, aligning with Tahririan et al.[13] and Rossi et al.[14] findings on occupational strain and tendon degeneration.

MRI patterns most commonly revealed partial supraspinatus tears and tendinosis, consistent with chronic degenerative etiology. The posterior approach was the preferred injection route, supported by literature for optimal tendon access. Mild post-injection pain occurred in 73.3% of cases, with no serious adverse events—findings similar to those reported by Dadgostar et al.[15] and Rha et al.[10], supporting the safety profile of PRP.

Comparatively, the improvement in DASH and SPADI scores aligns with previous studies (e.g., Aslani et al.[16], Scarpone et al.[11]), though some trials like Kesikburun et al.[17] reported less favorable results, possibly due to differences in PRP preparation, study design, or patient selection. The use of leukocyte-rich PRP in this study may have enhanced outcomes by promoting a stronger regenerative and anti-inflammatory response.

Overall, these findings reinforce PRP as a promising non-surgical treatment for rotator cuff tendinopathy, providing both symptomatic relief and functional recovery with minimal complications.

Study	DASH Score (Pre/Post)	SPADI Score (Pre/Post)
Aslani et al. (2020)[16]	65.9 / 31.9	Not specified
Yadav et al. (2017)[9]	60.64 / 32.4	50.53 / 76.76
Present study (2025)	63.1 / 36.4	67.2 / 34.6

CONCLUSION

Autologous PRP injections show promising potential in treating symptomatic rotator cuff tendinopathy, with notable improvements in pain and function (VAS, DASH, SPADI) and a favorable safety profile. While findings support PRP's regenerative and anti-inflammatory role, further large-scale, standardized trials are needed to validate its efficacy and optimize treatment protocols.

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