

**ORIGINAL RESEARCH****Assessment of management outcome of rotator cuff injuries using allogenic platelet-rich plasma**

**<sup>1</sup>Dr. Ayush Chauhan, <sup>2</sup>Dr. Nitesh Ayalani, <sup>3</sup>Dr. Sharad Kumar Sahu, <sup>4</sup>Dr. Smriti Chaturvedi, <sup>5</sup>Dr. Aditya Jadhav**

<sup>1</sup>Consultant Orthopaedic Surgeon, Chatrapati Shivaji Hospital, Sagar, Madhya Pradesh, India

<sup>2</sup>Senior Resident, Department of Emergency Medicine, BMC, Sagar, Madhya Pradesh, India

<sup>3</sup>Assistant Professor, Department of Surgery, Bundelkhand Medical College, Sagar, Madhya Pradesh, India

<sup>4</sup>Assistant Professor, Department of Pathology, Bundelkhand Medical College, Sagar, Madhya Pradesh, India

<sup>5</sup>Orthopedic Specialist, District Hospital Khandwa, Madhya Pradesh, India

**Corresponding author**

Dr. Aditya Jadhav

Orthopedic Specialist, District Hospital Khandwa, Madhya Pradesh, India

**Email:** [Adityajadhav1008@gmail.com](mailto:Adityajadhav1008@gmail.com)

Received: 07 January, 2024

Accepted: 12 February, 2024

**Abstract**

**Background:** Rotator cuff injuries are among the most common causes of shoulder pain and dysfunction. The present study was conducted to assess management outcome of rotator cuff injuries using allogenic platelet-rich plasma.

**Materials & Methods:** 60 cases of rotator cuff injuries of both genders were selected. Patients were given dual PRP injection into the rotator cuff. Patients were divided into 4 groups. Group I were cases of Tendinitis, group II were partial tear < 50 %, group III were partial tear >50 % and group IV were full thickness tear. Parameters such as Global improvement score, Quick DASH scores were collected at pre- treatment, 6months and 1 year after treatment.

**Results:** Out of 58 patients, males were 38 and females were 20. Global improvement score at pre- treatment, 6 months and 1 year was 58.2, 60.7 and 57.4 in group I respectively. It was 65.3, 68.4, and 62.1 in group II respectively. It was 64.9, 70.3, and 74.6 in group III respectively. It was 61.2, 60.8, and 62.4 in group IV respectively. The difference was significant ( $P < 0.05$ ). Q-DASH score in group I was 38.4, 20.3 and 18.5 at pre- treatment, at 6 months and at 1 year. In group II was 37.4, 24.2 and 30.4 at pre- treatment, at 6 months and at 1 year. In group III, it was 38.6, 18.4 and 10.2 at pre- treatment, at 6 months and at 1 year. In group IV, it was 18.4, 24.2. and 22.7 at pre- treatment, at 6 months and at 1 year respectively. The difference was significant ( $P < 0.05$ ).

**Conclusion:** For patients with RC cuff injuries who have not improved with conservative treatment such as physical therapy and activity modification, platelet-rich plasma injection is a safe and efficient alternative.

**Keywords:** PRP, Rotator cuff injuries, Rotator Cuff Tendinitis

**Introduction**

Rotator cuff injuries are among the most common causes of shoulder pain and dysfunction. The rotator cuff is a group of muscles and tendons that surround the shoulder joint, providing

stability and facilitating shoulder movement.<sup>1</sup> Injuries to the rotator cuff can occur due to various reasons, including acute trauma, chronic overuse, or degenerative changes over time.<sup>2</sup> Rotator Cuff Tendinitis characterized by inflammation of the rotator cuff tendons, which is frequently brought on by abrupt increases in activity or repetitive overhead motions.<sup>3</sup> Shoulder soreness and tenderness are common symptoms of tendinitis, especially when moving. Rotator cuff tear may result from acute trauma, prolonged overuse, or degenerative changes can all result in a tear in one or more of the rotator cuff tendons.<sup>4</sup> Partial or full-thickness rotator cuff injuries can cause shoulder pain, weakness, and restricted range of motion. Impingement syndrome is the result of pinched or compressed rotator cuff tendons between the acromion and humerus, the bones that make up the shoulder joint. Impingement can cause the rotator cuff tendons to become inflamed, painful, and irritated.<sup>5</sup> Applications of biologics, such as platelet-rich plasma (PRP), in musculoskeletal regenerative medicine have attracted a lot of interest.<sup>6</sup> The present study was conducted to assess management outcome of rotator cuff injuries using allogenic platelet-rich plasma.

### Materials & Methods

The present study consisted of 60 cases of rotator cuff injuries of both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. All underwent clinical examinations and rotator cuff pathology was diagnosed based on anterolateral shoulder pain, a positive NEER and Hawkins sign, and increased pain with elevation of the arm. All underwent MRI examination. Patients were given dual PRP injection into the rotator cuff. Patients were divided into 4 groups. Group I were cases of Tendinitis, group II were partial tear < 50 %, group III were partial tear >50 % and group IV were full thickness tear. Parameters such as Global improvement score, Quick DASH scores were collected at pre- treatment, 6 months and 1 year after treatment. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

### Results

**Table I Distribution of patients**

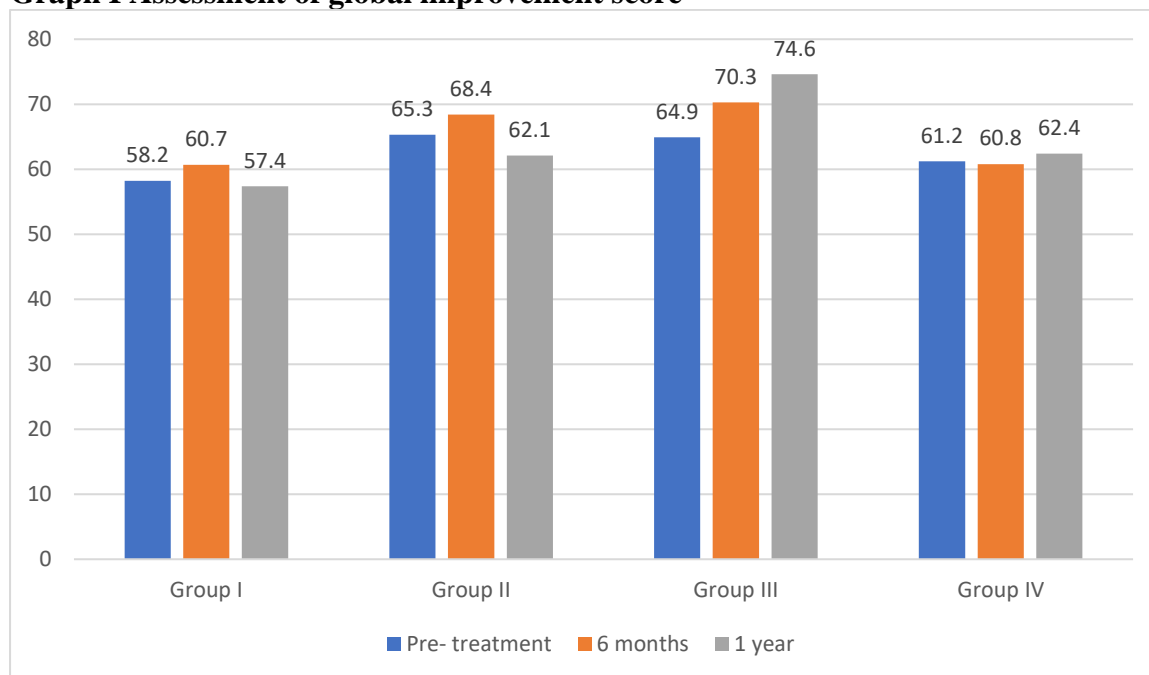
Total- 58		
Gender	Male	Female
Number	38	20

Table I shows that out of 58 patients, males were 38 and females were 20.

**Table II Assessment of global improvement score**

Groups	Pre- treatment	6 months	1 year	P value
Group I	58.2	60.7	57.4	0.05
Group II	65.3	68.4	62.1	
Group III	64.9	70.3	74.6	
Group IV	61.2	60.8	62.4	

Table II, graph I shows that global improvement score at pre- treatment, 6 months and 1 year was 58.2, 60.7 and 57.4 in group I respectively. It was 65.3, 68.4, and 62.1 in group II respectively. It was 64.9, 70.3, and 74.6 in group III respectively. It was 61.2, 60.8, and 62.4 in group IV respectively. The difference was significant (P < 0.05).

**Graph I Assessment of global improvement score****Table III Assessment of Q-DASH score**

Groups	Pre- treatment	6 months	1 year	P value
Group I	38.4	20.3	18.5	0.05
Group II	37.4	24.2	30.4	
Group III	38.6	18.4	10.2	
Group IV	18.4	24.2	22.7	

Table III show that Q-DASHscore in group I was 38.4, 20.3 and 18.5 at pre- treatment, at 6 months and at 1 year. In group II was 37.4, 24.2 and 30.4 at pre- treatment, at 6 months and at 1 year. In group III, it was 38.6, 18.4 and 10.2 at pre- treatment, at 6 months and at 1 year. In group IV, it was 18.4, 24.2. and 22.7 at pre- treatment, at 6 months and at 1 year respectively. The difference was significant ( $P < 0.05$ ).

## Discussion

In rotator cuff calcific tendinitis, calcium deposits accumulate within the rotator cuff tendons, leading to pain and inflammation.<sup>7</sup> Calcific tendinitis can cause symptoms similar to other types of rotator cuff injuries and may require treatment to alleviate pain and resolve the calcium deposits. Symptoms of rotator cuff injuries include shoulder pain, especially with overhead movements or reaching behind the back.<sup>8,9</sup>

Platelet-rich plasma (PRP) therapy is a regenerative medicine approach that has gained attention for its potential benefits in treating various musculoskeletal conditions, including rotator cuff injuries.<sup>10,11</sup> PRP contains a concentrated form of platelets and growth factors derived from the patient's own blood, which are believed to stimulate tissue repair and regeneration. PRP therapy is thought to promote healing by stimulating tissue repair. Platelets release growth factors such as platelet-derived growth factor (PDGF), transforming growth factor-beta (TGF-beta), and vascular endothelial growth factor (VEGF), which can enhance the body's natural healing process.<sup>12,13</sup> These growth factors promote the proliferation of cells involved in tissue repair and angiogenesis (formation of new blood vessels), potentially accelerating the healing of damaged rotator cuff tendons. PRP has anti-inflammatory properties that may help alleviate pain and inflammation associated with rotator cuff injuries. By modulating the inflammatory response, PRP therapy may contribute to symptom relief

and improve overall shoulder function.<sup>14,15,16</sup>The present study was conducted to assess management outcome of rotator cuff injuries using allogenic platelet-rich plasma.

We found that out of 58 patients, males were 38 and females were 20. Global improvement score at pre- treatment, 6 months and 1 year was 58.2, 60.7 and 57.4 in group I respectively. It was 65.3, 68.4, and 62.1 in group II respectively. It was 64.9, 70.3, and 74.6 in group III respectively. It was 61.2, 60.8, and 62.4 in group IV respectively. Prodromos CC et al<sup>17</sup>found that after failing conservative treatment, 71 shoulders with MRI-confirmed rotator cuff disease had dual PRP injections into the rotator cuff. At six, twelve, and twenty-four months following therapy, scores for global improvement, Quick DASH, and VAS were gathered. Changes were examined by means of comparison of means. No patient experienced any negative outcomes. Positive outcomes were observed in 77.9% of patients at six months, 71.6% at one year, and 68.8% at two years, according to global rating scores. Before the injection, the mean VAS scores were 50.2; after six months, 22.4; and after two years, 18.2, all of which showed improvement. Before treatment, the mean Q-DASH scores (0-100, 100 worse) for all patients were 39.2. After six months, 18.0 after a year, and 13.8 after two years, these scores improved. Clinical evidence of a progression to a full thickness tear was absent in all patients with partial tears. Upon dividing into smaller groups according to the condition of the rotator cuff, every subgroup exhibited progress. Based on Global Rating scores, patients in the >50% partial tear group showed the greatest overall recovery, while those in the tendinitis group had the worst results.

We found that Q-DASH score in group I was 38.4, 20.3 and 18.5 at pre- treatment, at 6 months and at 1 year. In group II was 37.4, 24.2 and 30.4 at pre- treatment, at 6 months and at 1 year. In group III, it was 38.6, 18.4 and 10.2 at pre- treatment, at 6 months and at 1 year. In group IV, it was 18.4, 24.2. and 22.7 at pre- treatment, at 6 months and at 1 year respectively. Jo et al<sup>18</sup>investigated the safety and efficacy of allogenic platelet-rich plasma (PRP) in rotator cuff repair. Seventeen patients with a full-thickness rotator cuff tear were included. Ten patients underwent arthroscopic rotator cuff repair with allogenic, and seven patients with autologous PRP. Three PRP gels in a volume 3 ml each were applied between the torn end and the greater tuberosity. Clinical outcomes were assessed preoperatively and at a minimum of 2 years after surgery. Structural outcomes were evaluated with the presence of retear and the change of the cross-sectional area (ACT) of the supraspinatus. Allogenic PRP did not cause any adverse events during the follow-up period. There was no significant difference in the clinical outcome measures between the two groups. The retear rate was 33.3% and 25.0% in the allogenic group and autologous group, respectively. The change between the one-year postoperative and immediately postoperative ACT was not also significantly different between the two groups ( $p = 0.373$ ).

The limitation of the study is the small sample size.

## Conclusion

Authors found that for patients with RC cuff injuries who have not improved with conservative treatment such as physical therapy and activity modification, platelet-rich plasma injection is a safe and efficient alternative.

## References

1. Ide J, Maeda S, Takagi K. Arthroscopic transtendon repair of partial-thickness articular-side tears of the rotator cuff: anatomical and clinical study. *Am J Sports Med.* 2005;33(11):1672–9.
2. Jordan RW, Bentick K, Saithna A. Transtendinous Repair of Partial Articular Sided Supraspinatus Tears Is Associated With Higher Rates of Stiffness and Significantly

- Inferior Early Functional Scores Than Tear Completion and Repair: A Systematic Review *OrthopTraumatolSurg Res.* 2018;104(6):829–37.
3. Shin S. A comparison of 2 repair techniques for partial-thickness articular-sided rotator cuff tears. *Arthroscopy: the journal of arthroscopic & related surgery: official publication of the Arthroscopy Association of North America and the International Arthroscopy Association.* 2012;28:25–33.
  4. Unverferth LJ, Olix ML. The effect of local steroid injections on tendon. *The Journal of sports medicine.* 1973;1(4):31–7.
  5. Chechick A, Amit Y, Israeli A, Horoszowski H. Recurrent rupture of the achilles tendon induced by corticosteroid injection. *Br J Sports Med.* 1982; 16(2):89.
  6. Ramírez J, Pomés I, Cabrera S, Pomés J, Sanmartí R, Cañete JD. Incidence of Full-Thickness Rotator Cuff Tear After Subacromial Corticosteroid Injection: A 12-week Prospective Study. *Mod Rheumatol.* 2014;24(4):667–70.
  7. Andriolo L, Altamura SA, Reale D, Candrian C, Zaffagnini S, Filardo G. Nonsurgical Treatments of Patellar Tendinopathy: Multiple Injections of Platelet-Rich Plasma Are a Suitable Option: A Systematic Review and Meta-analysis. *Am J Sports Med.* 2019;47(4):1001–18.
  8. Cai YU, Sun Z, Liao B, Song Z, Xiao T, Zhu P. Sodium Hyaluronate and Platelet-Rich Plasma for Partial-Thickness Rotator Cuff Tears. *Med Sci Sports Exerc.* 2019;51(2):227–33.
  9. Ilhanli I, Guder N, Gul M. Platelet-Rich Plasma Treatment With Physical Therapy in Chronic Partial Supraspinatus Tears. *Iran Red Crescent Med J.* 2015;17(9):23732.
  10. Jo CH, Lee SY, Yoon KS, Oh S, Shin S. Allogenic Pure Platelet-Rich Plasma Therapy for Rotator Cuff Disease: A Bench and Bed Study. *Am J Sports Med.* 2018;46(13):3142–54.
  11. Kesikburun S, Tan AK, Yilmaz B, Yaşar E, Yazicioğlu K. Platelet-rich plasma injections in the treatment of chronic rotator cuff tendinopathy: a randomized controlled trial with 1-year follow-up. *Am J Sports Med.* 2013; 41(11):2609–16.
  12. Mautner K, Colberg RE, Malanga G, Borg-Stein JP, Harmon KG, Dharamsi AS, et al. Outcomes after ultrasound-guided platelet-rich plasma injections for chronic tendinopathy: a multi-center, retrospective review. *Pm r.* 2013;5(3): 169–75.
  13. Rha DW, Park GY, Kim YK, Kim MT, Lee SC. Comparison of the therapeutic effects of ultrasound-guided platelet-rich plasma injection and dry needling in rotator cuff disease: a randomized controlled trial. *Clin Rehabil.* 2013;27(2): 113–22.
  14. Sari A, Eroglu A. Comparison of ultrasound-guided platelet-rich plasma, prolotherapy, and corticosteroid injections in rotator cuff lesions. *J Back MusculoskeletRehabil.* 2020;33(3):387–96.
  15. Say F, Gurler D, Bulbul M. Platelet-rich Plasma Versus Steroid Injection for Subacromial Impingement Syndrome. *J OrthopSurg (Hong Kong).* 2016; 24(1):62–6.
  16. Gupta A, Migliorini F, Maffulli N. Management of rotator cuff injuries using allogenic platelet-rich plasma. *Journal of Orthopaedic Surgery and Research.* 2024 Dec;19(1):1-7.
  17. Prodromos CC, Finkle S, Prodromos A, Chen JL, Schwartz A, Wathen L. Treatment of Rotator Cuff Tears with platelet rich plasma: A prospective study with 2 years follow-up. *BMC musculoskeletal disorders.* 2021 May 29;22(1):499.
  18. Jo CH, Shin JS, Lee SY, Shin S. Allogeneic platelet-rich plasma for rotator cuff repair. *Acta Ortopédica Brasileira.* 2017 Jan;25:38-43.