Use of Platelet-Rich Plasma for the Improvement of Pain and Function in Rotator Cuff Tears: A Systematic Review and Meta-analysis With Bias Assessment

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Abstract

Background:

Many clinical trials have investigated the use of platelet-rich plasma (PRP) to treat rotator cuff–related abnormalities. Several meta-analyses have been published, but none have focused exclusively on level 1 randomized controlled trials.

Purpose:

To assess the efficacy of PRP for rotator cuff–related abnormalities and evaluate how specific tendon involvement, the inclusion of leukocytes, and the use of gel/nongel formulations affect pain and functional outcomes.

Study Design:

Systematic review and meta-analysis.

Methods:

The literature was screened following PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. Baseline, short-term, and long-term data were extracted for the Constant score, University of California, Los Angeles (UCLA) score, visual analog scale (VAS) for pain, retear rate, Simple Shoulder Test (SST), and American Shoulder and Elbow Surgeons (ASES) score. The 100-point modified Coleman Methodology Score (CMS) was used to assess methodological quality. Funnel plots and the Egger test were used to screen for publication bias, and sensitivity analysis was performed to evaluate the effect of potential outliers.

Results:

A total of 18 level 1 studies were included in this review, 17 (1116 patients) of which could be included in quantitative analysis. The mean modified CMS was 79.4 ± 10.39. The Constant scores of patients who received PRP were significantly better short term (weighted mean difference [WMD], 2.89 [95% CI, 0.89-4.90]; $P < .01$) and long term (WMD, 2.66 [95% CI, 1.13-4.19]; $P < .01$). The VAS scores were significantly improved short term (WMD, –0.45 [95% CI, –0.75 to −0.15]; $P < .01$). Sugaya grade IV and V retears in PRP-treated patients were significantly reduced long term (odds ratio [OR], 0.34 [95% CI, 0.20-0.57]; $P < .01$). In PRP-treated patients with multiple tendons torn, there were reduced odds of retears (OR, 0.28 [95% CI, 0.13-0.60]; $P < .01$). Patients who received leukocyte-rich PRP had significantly better Constant scores compared with the leukocyte-poor PRP group, but there was no difference in VAS scores. Patients receiving PRP gel reported higher Constant scores compared with the controls, whereas those receiving nongel PRP treatments did not, although there was no difference in VAS scores. Long-term odds of retears were decreased, regardless of leukocyte content (leukocyte-poor PRP: OR, 0.36 [95% CI, 0.16-0.82]; leukocyte-rich PRP: OR, 0.32 [95% CI, 0.16-0.65]; all $P < .05$) or usage of gel (nongel: OR, 0.42 [95% CI, 0.23-0.76]; gel: OR, 0.17 [95% CI, 0.05-0.51]; all $P < .01$).

Conclusion:
Long-term retear rates were significantly decreased in patients with rotator cuff–related abnormalities who received PRP. Significant improvements in PRP-treated patients were noted for multiple functional outcomes, but none reached their respective minimal clinically important differences. Overall, our results suggest that PRP may positively affect clinical outcomes, but limited data, study heterogeneity, and poor methodological quality hinder firm conclusions.