

Editorial Commentary: Platelet-Rich Plasma Reduces Retear Rates Following Rotator Cuff Repair but Does Not Improve Clinical Outcomes



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Abstract: Platelet-rich plasma (PRP) is a novel biologic treatment in orthopaedic sports medicine that may enhance surgical repairs and improve clinical and functional outcomes. Studies investigating the effect of PRP on shoulder rotator cuff healing, clinical outcomes, and retear rates suggest that PRP has no effect on outcome and healing but potentially reduces retear rates. However, study quality is compromised by low samples sizes, inadequate randomization protocols, and heterogeneity. In addition, other factors influence outcomes and could cause bias when collecting data. PRP preparation varies among studies, and a variety of patient factors such as smoking; comorbidity; rotator cuff tear size, configuration, and grade; and functional demands are difficult to control even if a randomized study protocol is undertaken. Until there are reliable and valid data available, the use of PRP in rotator cuff repair is not strongly supported and is at the discretion of the treating surgeon. The current evidence shows the superiority of PRP over hyaluronic acid and corticosteroids, and there is promise that PRP could be a useful adjunct promoting rotator cuff healing following surgical repair.

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Randomized controlled trials (RCTs) are considered the gold standard for evidence-based medicine and are only surpassed by meta-analyses and systematic reviews.¹ Despite their prominent position in the pyramid of evidence, RCTs have several flaws that need to be considered when appraising the conclusions of a study. For example, randomization only equalizes the treatment in the treatment group and control group. It does not automatically deliver a precise estimate of the treatment effect; it does not balance the confounders and observed or unobserved covariates; and it is often no more than a convenience sample.² Deaton and Cartwright² even argued that RCTs can serve science but are weak for inferring “what works.”

Regardless of these arguments, RCTs are a very important part of our armamentarium in research and orthopaedic surgery. However, only a minority of published studies in orthopedics are actually level I or II

studies. Souza et al.³ reported that only 8% of studies were level I, 8% level II, 52% level III, and 31% level IV, with the highest percentage ($\geq 20\%$) observed in shoulder and elbow, adult knee reconstruction, and hand and wrist. Moreover, for trials comparing different surgical techniques, only 16% of studies reported significant differences.⁴ Could this be due to a type I or type II error? Quite possible. Certainly, these points should be considered when evaluating studies comparing novel or new treatment options.

Platelet-rich plasma (PRP), one of these novel treatments, is widely studied.⁵ Current evidence clearly demonstrates the superiority of PRP over hyaluronic acid and corticosteroids, and there is promise that PRP could be a useful adjunct promoting rotator cuff healing following surgical repair.⁵ Rotator cuff healing was also the subject of the study by Zhang, Cai, and Wang investigating the application of leukocyte-poor platelet-rich plasma following double-row rotator-cuff tears.⁶ In their study, entitled “Injection of Leukocyte-Poor Platelet-Rich Plasma for Moderate-to-Large Rotator Cuff Tears Does Not Improve Clinical Outcomes but Reduces Retear Rates and Fatty Infiltration: A Prospective, Single-Blinded Randomized Study,” the authors randomized 89 consecutive patients and, in 43

The author reports the following potential conflicts of interest or sources of funding: E.H. reports personal fees, Arthroscopy Association of North America. Full ICMJE author disclosure forms are available for this article online, as supplementary material.

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0749-8063/22372/\$36.00

<https://doi.org/10.1016/j.arthro.2022.03.019>

patients, injected PRP during surgery and 7 and 14 days after surgery.⁶ They concluded that both groups achieved significant improvements in clinical outcomes exceeding the minimal clinically important difference, with reduced retear rates of 18% in the study group compared with 38% in the control group.⁶ However, the authors also issued a caveat: the sample size may have been too low, as they lost nearly 27% of patients during follow-up, to reliably allow analysis for clinical differences.⁶ The quality of the study is further compromised by the randomization protocol, which assigned patients according to odd or even numbers of their medical records.

The results of Zhang et al.⁶ seem to confirm the findings of previous studies. Villarreal-Villarreal⁷ pooled 9 RCTs using meta-analysis and reported that PRP reduces retear rates but did not result in any significant differences for clinical and functional outcomes. Malavolta et al.⁸ investigated the effect of PRP on clinical and structural outcomes 5 years after rotator cuff repair. The authors also demonstrated a reduction in retear rates in the PRP group but failed to observe any better clinical or structural results at 5 years.⁸ Randelli et al.⁹ reported 10-year results comparing arthroscopic rotator cuff repair with and without PRP and could not demonstrate any differences between the two groups. In addition to the 9 studies that were included by Villarreal-Villarreal et al.⁷ for meta-analysis, the two studies by Malavolta et al.⁸ and Randelli et al.,⁹ and now the study by Zhang et al.,⁶ we have a total of 12 studies that have reported on the effects of PRP on rotator cuff healing, retear rates, and clinical outcomes.

Coming back to Deaton and Cartwright²: Even though the science is weak, the data suggest that PRP works. It seems that we can now safely conclude that PRP has no effect on clinical outcomes but definitely reduces retear rates. This by itself could be a strong argument to support PRP. However, despite the seemingly strong evidence, other factors deserve consideration. Heterogeneity with regard to PRP preparation techniques, PRP "quality," and patient factors such as smoking, comorbidities, medication, tear size, and grade may influence outcomes. We also need to remember that PRP is not without complications. Infection, sterile and severe inflammatory responses, or a combination of both are a reality, and the use of PRP must be carefully considered.^{10,11} The study by Zhang et al.⁶ has certainly helped to strengthen the current

evidence and confirmed that PRP is not improving clinical outcomes but possibly reduces retear rates. Is this enough to recommend the use of PRP routinely? Possibly not.

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