Editorial Commentary: Platelet-Rich Plasma Has Advantages Over Corticosteroid for Nonoperative Treatment of Rotator Cuff Pathology: Another Step in the Right Direction

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Abstract: Lack of high-quality evidence has limited the widespread acceptance of platelet-rich plasma, bone marrow aspirate, and other therapeutics, collectively referred to as "orthobiologics," for partial-thickness rotator cuff tears and associated tendinopathies. The existing literature is limited, among other things, by underpowered studies and imprecise descriptions of the administration and/or formulation of the platelet-rich plasma being investigated. However, recent research favors platelet-rich plasma over corticosteroid injections in the nonoperative treatment of rotator cuff pathology. In light of evidence showing a deleterious effect of corticosteroids on subsequent surgical interventions, surgeons should continue to be wary of subacromial corticosteroid injections if alternatives such as platelet-rich plasma exist. A corticosteroid injection may have been the "go-to" nonoperative intervention in the past, but platelet-rich plasma may be a more effective arrow in our quiver. Of course, the conspicuous cost differential between these 2 different injections remains a very real consideration. However, this should be weighed against the increased risk (and cost) of a revision repair in the event that a surgical repair is performed subsequent to a corticosteroid injection.

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As arthroscopic surgeons and readers of *Arthroscopy*, we share a special appreciation for the place of innovation in advancing the state of the art in treatment of musculoskeletal conditions. We value the role of technology in helping us to tackle vexing clinical problems, and we are generally eager to "think outside the box" when it comes to addressing shortcomings in our techniques. Together, these qualities have spurred us along in a direction toward the delivery of cutting-edge operative (and nonoperative) treatments to our patients. However, as the great thought leaders in our field have discussed, the challenge lies in balancing enthusiasm for the perceived benefits of a new technology with an obligation to vet the safety and true efficacy of the innovation in question.[1] The successful reconciliation of these competing interests—speed of action and deliberate circumspection—ensures that we move forward in the right direction.

Regrettably, the collective enthusiasm for "orthobiologic" therapies as the next great frontier in treatment of musculoskeletal conditions has largely outpaced the science. Historically, there has been a paucity of high-quality clinical trials that has consistently substantiated the benefits of these treatments, leaving a void that has been filled with oftentimes-dubious claims made by a motley crew of practitioners. Unfortunately, this group has sometimes included orthopaedic surgeons.[2] This is particularly worrisome, given the fluid (and somewhat nebulous) regulatory climate governing many of these therapies *and* the costs associated with their administration. In light of these facts, surgeons and scientists are obligated to pursue innovation in the field of orthobiologics in a manner that reflects a commitment to transparency and the execution of sound scientific investigation.

In completing their randomized, controlled trial, "Platelet-Rich Plasma in Patients With Partial-Thickness Rotator Cuff Tears or Tendinopathy Leads

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to Significantly Improved Short-Term Pain Relief and Function Compared to Corticosteroid Injection: A Double-blind Randomized Controlled Trial,"[3] which was recognized with the 2019 Arthroscopy Association of North America Stephen S. Burkhart, M.D. Shoulder Innovation Research Paper Award, Kwong, Woodmass, Gusnowski, Bois, Leblanc, More, and Lo go a long way toward enriching our understanding of the utility of a particular orthobiologic therapy by comparing the efficacy of ultrasound-guided platelet-rich plasma (PRP) and corticosteroid (CS) injections for the treatment of either partial-thickness rotator cuff (RC) tears or RC tendinopathy.[3] The study was powered to detect a minimally clinically important difference in pain as represented on a visual analog scale. Ninety-nine patients were randomized (47 patients in the PRP group and 52 patients in the CS group) to undergo an ultrasound-guided, intratendinous injection and followed regularly with the collection of patient-reported outcome measures such as the American Shoulder and Elbow Surgeons Shoulder Score, Western Ontario Rotator Cuff Index, and visual analog scale pain, in addition to repeat diagnostic ultrasound examinations at 3 months and 12 months. Interestingly, those patients randomized to the PRP group were more symptomatic before the study intervention, as manifested in greater pain scores and lower American Shoulder and Elbow Surgeons and Western Ontario Rotator Cuff Index compared with patients in the CS group. There were no significant differences between groups in the proportion of patients with tendinopathy or partial RC tear of any type (articular vs bursal-sided tears). At 3 months, an ultrasound-guided PRP injection resulted in superior symptom relief and shoulder function compared with CS injection. However, at 12 months postinjection, there were no significant differences in PRO between groups. In addition, the rates of treatment "failure," as defined as either undergoing subsequent surgical intervention or repeat injection, were not significantly different between the PRP and CS groups (23.4% and 32.6%, respectively, $P = .31$).

The strength of this study's conclusions are limited somewhat by the heterogeneous collection of RC pathology included for treatment. The authors do not specify between high- and low-grade partial RC tears, and it is possible that depending on the severity of the RC tears, the results may not be generalizable to one tear type over another. In addition, the authors specify the preparation and use of a leukocyte-poor PRP with 1.6× platelet concentration. Given the variability in platelet concentrations produced by other commonly used systems, some caution should be exercised in presuming an identical treatment effect under similar, but not identical, circumstances. Finally, it should be noted that both the PRP and CS injections were performed directly into the tendon under ultrasound guidance as well as into the subacromial space. The importance of such a targeted delivery technique is unclear, but this fact may limit the generalizability of the results considering that, at least in the case of CS, these injections are commonly performed in the office without the use of ultrasound guidance.

These limitations notwithstanding, the positive implications of this study are manifold. When we see patients in clinic with shoulder pain attributable to RC pathology, it is common to hear "Doc, I need something to get me through the holidays," or "I've got a vacation coming up—is there anything you can do for me that doesn't involve surgery?" Whereas a CS injection may have been the "go-to" nonoperative intervention in the past, the data from this study would suggest that we may have a more effective arrow in our quiver. This finding, coupled with the noninferiority of PRP compared with CS injections at 12 months, is noteworthy, given the growing body of literature that has convincingly demonstrated the deleterious effects of CS injections on subsequent surgical repairs.[4,5] Of course, the conspicuous cost differential between these 2 different injections remains a very real consideration. However, this fact should be weighed against the increased risk (and cost) of a revision repair in the event that a surgical repair is performed subsequent to a CS injection.

As clinicians and scientists, we are obligated to approach innovation responsibly, progressing in a way that is based on incremental scientific progress and a candid discussion of our results. Ongoing research focused on the clinical efficacy of orthobiologics must continue to be based upon well-designed, prospective study designs: that is the direction that will build consensus among the innovators. This study represents a step in the right direction toward a more complete understanding of the appropriate use of PRP for the treatment of RC pathology.

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