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Letter to Editor

Effect of combination of bone marrow aspiration concentrate (BMAC) and platelet-rich plasma (PRP) in anterior cruciate ligament reconstruction

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To the Editor,

We read a recently published article by Lin et al.[1] titled, "Effect of bone marrow aspiration concentrate and platelet-rich plasma combination in anterior cruciate ligament reconstruction: a randomized, prospective, double-blinded study". In this study, the authors investigated the effect of combination of bone marrow aspiration concentrate (BMAC) and platelet-rich plasma (PRP) compared to the PRP alone and the control group (no orthobiologic augmentation) in enhancing graft maturation and tendon-bone tunnel interfacial healing post anterior cruciate ligament (ACL) reconstruction (ACLR). The results demonstrated inadequate improvements in clinical function, graft maturation and tendon-bone tunnel interfacial healing in both BMAC+PRP and PRP alone groups compared to the control group. Although it was an interesting study, we have two concerns that we would like to communicate.

First, the authors did not include BMAC alone group as an active comparator. There are insufficient studies assessing the role of BMAC in graft maturation and/or enhancing ligamentization during ACL reconstruction. In a recent study, Forsythe et al.[2] demonstrated that BMAC augmentation has the potential to accelerate the ligamentization of allografts utilized during ACLR, however no significant differences were observed between the BMAC and the control groups in terms of attaining minimally clinically important difference. We believe inclusion of BMAC alone group would have added valuable insights into the limited currently available literature on this topic.

Second, it is imperative that orthobiologics used, i.e., BMAC and PRP, must be characterized. For PRP, it is important to report the platelet count, leukocyte concentration, content of red blood cells (RBCs) and use of exogenous activator(s).[3] Several studies have reported that a platelet concentration of 5-7 times compared to the baseline whole blood is essential to promote cell proliferation, mesenchymal stem/stromal cells recruitment and tissue healing.[3,4] A recent editorial summarized the harmful effects of RBCs and recommended it to be avoided in PRP formulations.[5] Interestingly, a recent pre-clinical study also demonstrated superiority of RBCs depleted BMAC over regular BMAC.[6] In addition, for BMAC, it is important to report the content of total nucleated cells, expression of hematopoietic and mesenchymal stem cells markers, colony forming units, and platelet counts.[7] The lack of standardized formulation protocols and patient variables, including age,

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comorbidities, concomitant medications taken, etc., have been attributed to subpar outcomes associated with studies utilizing orthobiologics, and all of this information is critical to ensure repeatability and reproducibility of studies outcomes. [8–10]

List of Abbreviations

BMAC-Bone Marrow Aspiration Concentrate, PRP-Platelet-rich Plasma, ACL-Anterior Cruciate Ligament, ACLR-Anterior Cruciate Ligament Reconstruction, RBCs-Red Blood Cells.

Conflict of Interest

The authors declare that they have no competing interests.

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Authors' Contributions

AG conceptualized the study and wrote the initial manuscript draft. AG and SPS reviewed and edited the manuscript draft and have read and agreed to the published version of the manuscript.

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