Editorial Commentary: Mesenchymal Stem Cells in the Shoulder Subacromial Bursa: Do Cells Understand Statistical Significance?

William M. Weiss, M.D., Editorial Board

Abstract: Local, arthroscopic harvest of mesenchymal stem cells is of interest due to their potential to augment healing. The high rates of retear after rotator cuff repair are a significant concern, and solutions, such as augmentation with mesenchymal stem cells, are being sought. The subacromial bursa of the shoulder is a potential source of cells to augment healing.

Accessing mesenchymal stem cells (MSCs) within anatomic reach of arthroscopic sites is of great interest for their potential to augment healing. The high rates of retear after rotator cuff repair are a significant concern, for which better solutions, such as augmentation with MSC, are being sought. For their report in this issue, “Intraoperative and In Vitro Classification of Subacromial Bursal Tissue,” Baldino, Muench, Kia, Johnson, Morikawa, Tamburini, Landry, Gordon-Hackshaw, Bellas, McCarthy, Cote, and Mazzocca are to be commended for an interesting and inspired investigation on the characterization of MSCs from the subacromial bursa of the shoulder as a potential source to augment healing and solution to this problem.

Although hypovascularity of the rotator cuff is thought to be largely to blame for poor healing after repair, the authors further propose that the subacromial bursa may demonstrate differences in both vascularity and stem cell proliferation based on anatomic location relative to the musculotendinous junction. While they acknowledge the subjective nature of the methods used to estimate fatty and vascular infiltration of bursal tissue, and the lack of identifiable differences between potential stem cells harvested from both anatomic locations, they present a statistically significant difference in stem cell proliferation based on the anatomic region of harvest.

The MSC content of bursal tissue and its role in healing of the rotator cuff remain unclear, as do any differences in this tissue relative to its immediate anatomic vicinity. The authors sought to classify subacromial bursal tissue relative to the musculotendinous junction using intraoperative anatomy and previously published in vitro isolation techniques. While they were able to demonstrate the presence of MSC in bursal tissue, their methodology may retract from widespread application of their conclusions.

There is considerable and significant heterogeneity in the patient population, with inclusion of those having habits or conditions known to impact vascularity, inflammation, and cellular activation. Almost one third of included patients are smokers, nearly one quarter had superior capsular reconstruction for presumably longstanding and retracted tears likely resulting in arthropathy, and there is a significant subgroup with adhesive capsulitis, which remains a poorly understood entity on a cellular level. The musculotendinous junction serves as an arthroscopically identifiable anatomic landmark but does not necessarily correlate with an obvious or consistent “partition” in the overlying bursa. The inclusion of patients with rotator cuff tears, and especially those requiring superior capsular reconstruction, raises the question of retraction and impact on bursal tissue in relation to the musculotendinous junction. Is this anatomic division still valid in these patients? This is not clear or discussed. The subjective sampling and characterization of bursal tissue

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demonstrates no correlation between intraoperative and histologic assessment for vascularity (although fat was moderately correlated), and authors acknowledge results contradicted intuitive increased cellular activity of more vascular tissues. Most importantly, the statistically significant difference observed in MSC proliferation between bursal tissue over the muscle and tendon each came with a considerably large range that was essentially equal to the difference between the respective averages... which begs the question of whether this “difference” benefits from statistics... and is at all clinically relevant? MSCs have demonstrated the ability to do many things... but can they understand when they are statistically or clinically significant?

References