BMAC Augmentation of Allograft Anterior Cruciate Ligament Reconstruction Improves Patient Reported Outcomes in the Presence of Intra-articular Pathology

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INTRODUCTION: Concurrent intra-articular pathology, such as meniscal or cartilage lesions, often impairs outcomes following anterior cruciate ligament reconstruction (ACLR). Bone marrow aspirate concentrate (BMAC) may enhance healing and improve clinical outcomes through regenerative and anti-inflammatory effects. To evaluate the impact of BMAC augmentation on patient-reported outcomes and graft healing in ACLR using bone-tendon-bone (BTB) allografts, particularly in the presence of intra-articular pathology.

METHODS: One hundred thirteen patients undergoing ACLR with BTB allografts were randomized to receive intra-graft BMAC augmentation (n = 59) or standard ACLR (n = 54). Patients were stratified by the presence of concurrent intra-articular pathology. The primary outcome was the International Knee Documentation Committee (IKDC) score at 9 months. Secondary outcomes included Tegner activity levels and MRI-based signal intensity ratios (SIR) and graft volume at 3 and 9 months. Statistical comparisons were performed between groups.

RESULTS: At 9 months, IKDC scores in patients with concurrent intra-articular pathology were significantly higher in the BMAC group (81.69 ± 10.17) compared to the control group (74.28 ± 14.59; P = 0.039). No significant differences in IKDC scores were observed in patients without pathology. MRI outcomes revealed higher inferior third SIR at 3 months in the BMAC group with concurrent pathology (3.00 ± 1.97) versus controls (1.83 ± 0.97; P = 0.041), with no differences in graft volume at any time point. Tegner activity levels were similar across groups.

DISCUSSION AND CONCLUSION: BMAC augmentation significantly improves patient-reported outcomes in ACLR patients with concurrent intra-articular pathology, demonstrating its potential role in optimizing healing in complex knee injuries. No additional benefit was observed in patients without pathology.