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"The Effect of the Hyaluronic Acid Enhanced Calcium Phosphate Subchondroplasty on Bone Marrow Lesion Outcomes"

Introduction: Subchondral calcium phosphate injections are rising in popularity as a method to address bone marrow lesions (BMLs) due to minimal invasiveness and promising improvements in knee pain and function. While several studies have investigated the short-term outcomes of these injections, little research has explored the results of a newer hyaluronic acid-enhanced, calcium phosphate (HACP) bone graft substitute material. The goal of this study is to investigate the short-term outcomes of these HACP injections, and to confirm that they reflect the results seen with similar injections in other studies.

Methods: This retrospective observational cohort study includes 39 patients who received HACP injections between August 2022 and January 2024 for treatment of BML by a single orthopedic surgeon. All patient data, including demographics, BML characteristics, follow-up appointment dates, and subsequent interventions were acquired through the Ochsner Epic electronic medical records. All patients have a documented diagnosis of bone marrow lesions in the knee joint, confirmed through magnetic resonance imaging (MRI) or X-ray. The primary outcome of the study is the time between when patients receive their HACP bone graft substitute material injection until their first follow-up date. The secondary outcome of the study will consist of the time from initial injection to any subsequent interventions.

Results: Of the 39 patients included in this study, majority were female (82%), black (46%), with varus deformity (97%), and contained a single BML (87%). No patients experienced complications from the HACP injection. The average number of intraarticular injections before attempting HACP injection per patient was 3.03 (SD= 1.96), and the average time to intervention after HACP injection per patient was 3.33 (SD= 2.39). The mean and median preoperative pain scores for this patient set were 6.59 and 7, respectively. The median pain score change at 2 weeks post-HACP injection and at 3 months post-HACP injection were -2 ($p<0.001$) and -3 ($p=0.0255$) respectively, indicating a decrease in pain at both points in the postoperative course.

Conclusion: HACP injections are a minimally invasive option to address BMLs. Complication rate is minimal, and these injections can reliably decrease knee pain within the 3-month postoperative period.