Efficacy of Particulated Juvenile Cartilage Allograft Transplantation for Osteochondral Lesions of the Talus

Travis Dekker, MD, Kamran Hamid, MD,MPH, Mark Easley, MD, John Steele, MD, Samuel Adams, MD

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Introduction/Purpose: Symptomatic osteochondral lesions of the talus (OLTs) are difficult to treat. As such, a broad array of cartilage treatment options exist. Despite the various techniques, many patients require multiple procedures due to persistent pain, failure of cartilage adherence, or persistent mechanical symptoms. The cartilage replacement technique, particulated juvenile cartilage allograft transplantation (PJCAT), is a novel treatment option supported by the benefits of ease of application, no need for perpendicular access to the OLT, and the delivery of viable hyaline cartilage. However, there is minimal clinical data to support this treatment option. The purpose of this study was to determine the efficacy of PJCAT.

Methods: After obtaining IRB approval, we conducted a retrospective review of patients that underwent PJCAT for the treatment of OLTs at a single academic institution. From 2012 to 2015, 18 patients were identified. However, one patient died of an unrelated cause and two patients were lost to follow-up leaving 15 patients (7 males and 8 females) whom had a minimum of 12 months of follow up (mean 34.6, range, 12-51 months). The mean age of this cohort was 32.7 years (15-48) at time of surgery with BMI average 29.9 (18.8-40.2). The primary outcome was failure of the procedure defined as: recurrent or worsening symptoms with corresponding imaging demonstrating delamination, and/or the need for a secondary cartilage restoration procedure. Variables studied included: size of lesion denoted by MRI, intraoperative size, etiology (traumatic versus atraumatic), location of lesion, sex, age, and history of prior surgery.

Results: Failure of primary procedure as defined by continued pain with corresponding imaging and/or necessity of secondary cartilage procedure after use of PJCAT was 40% (6/15). Preoperative MRI size (188.7 +/- 81.7mm² vs. 113.5 +/- 50.5mm², p<0.05) was significant predictors of PJCAT failure. Furthermore, male sex was predictive of failure(p<0.05). Age, BMI, etiology, technique (open versus arthroscopic), history of prior surgery nor location were predictors of failure. Lastly, patients with lesions greater than 125mm² area were at a statistically significant increased risk of clinical failure. Functional outcome scores were significantly better at final follow-up in the patients who had undergone successful treatment versus those who did not: AOFAS score (89.4 +/- 8.4 vs. 65.8 +/- 26.7) and FAOS total (77.9 +/- 13.2 vs. 47.9 +/- 24.8).

Conclusion: These findings demonstrate the association of preoperative MRI lesion size, intraoperative lesion size and male sex as risk factors for failure of PJCAT setting of an already difficult to treat pathology.

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