INTRODUCTION:

Loss of the meniscus generates increased forces on the knee cartilage and other joint structures and increases the risk of articular cartilage degeneration and development of arthritis. The appropriate treatment for loss of the meniscus with uncompartimental knee arthritis remains controversial: with common treatment being osteotomy, uncompartimental (UNI) or total knee arthroplasty (TKA). Biologic treatment options, including meniscus allograft transplantation and articular cartilage repair, can potentially slow the progression of arthritis without limiting a patient’s option for joint arthroplasty in the future.

METHODS:

One hundred nineteen meniscus allograft transplantations were performed in 115 patients with severe articular cartilage damage. All patients underwent an informed consent process as approved by an independent Institutional Review Board. Study inclusion criteria consisted of irreparable injury of the meniscus or loss of the meniscus with pain and Outerbridge (OB) Grade III or IV changes in the respective compartment and knee range-of-motion of at least 90°. Microfracture was used to treat articular cartilage damage if the defect area was small (<25 mm²), if it was located far posterior, or if it was directly under the meniscus allograft transplant on the tibial side.

Articular cartilage paste grafting was used to treat accessible defects > 25 mm². Patients consented to clinical examinations with subjective patient evaluations pre-operatively and at 2, 3, 5, 7, and 10-year post-operative intervals. IKDC, WOMAC, and Tegner Index scoring methods were used to follow pain, activity, and function. Tegner Index represents the ratio of current Tegner score as compared with highest pre-injury Tegner score. Procedure failure was defined as removal of allograft without revision, or progression to knee arthroplasty (TKA or UNI). Analysis of overall patient survival was achieved by the Kaplan-Meier (KM) survival analysis method. Multivariate analysis using the Cox proportional hazards model was carried out to assess the effect of confounding variables on allograft survival. Secondary analysis of patient reported subjective outcomes data was accomplished using the Wilcoxon rank-sum test for 2 independent non-parametric samples. Significance level was set at p < 0.05. Results are presented as mean ± standard deviation. Ninety-five percent confidence intervals, where given, are presented in brackets. Subjective patient outcomes were evaluated in cases with a minimum 2-year follow-up (N = 101).

RESULTS:

Eighty-three (69.7%) patients were male and 32 (30.3%) female. Eighty-five (71.4%) cases were medial and 34 (28.6%) cases were lateral. Mean age at time of surgery was 46.9 years (range, 14.1-73.2 years). Twenty-two cases were classified intraoperatively as OB grade III (18.5%) and 97 cases were classified as OB grade IV (81.5%). Patients underwent an average of 5 concomitant procedures (range, 1-9 procedures). Average follow-up was 5.8 years (range, 2.1 months – 12.3 years). Forty-seven percent of cases required at least one subsequent non-failure related surgery. Kaplan-Meier estimated mean survival time was 9.93 ± 0.40 years (Figure 1). Twenty-five of the original 119 procedures failed (20.1%) with a mean failure time of 4.7 years (range, 2.1 months to 10.4 years); 18 of these cases progressed to knee arthroplasty. There was no significant difference in the number of concomitant procedures between those cases that failed (5.32 ± 1.55 procedures) and those that did not (4.95 ± 1.74 procedures), (p = 0.333). Patients experienced significant improvements from baseline in subjective outcome measures of pain, activity, and function over the course of follow-up (p < 0.05), with exception the 7-year Tegner Index score (Figure 2). Procedure survival was not affected by sex, severity of cartilage damage, axial alignment, degree of joint space narrowing, or medial vs lateral allograft.

REFERENCES: