Arthroscopic Inlay Suprapectoral versus Mini-Open Onlay Subpectoral Biceps Tenodesis: A Prospective, Randomized Analysis of Clinical Outcomes and Ultrasound-Assessed Structural Integrity

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INTRODUCTION: Biceps tenodesis is an extremely common procedure, and multiple techniques are currently utilized clinically. At our institution, we employ both arthroscopic suprapectoral (ASBT) and mini-open subpectoral (MOBT) tenodesis and have observed comparable clinical outcomes in a prior retrospective study. The purpose of this study was to prospectively evaluate similarly sized, randomized cohorts of patients undergoing ASBT using an inlay technique with interference screw fixation and MOBT using an onlay technique with a unicortical button implant using clinical outcomes measures and structural healing as evaluated by ultrasound.

METHODS: Patients with biceps tendinopathy undergoing a biceps tenodesis procedure were preoperatively randomized to one of two surgical techniques: a mini-open onlay subpectoral biceps tenodesis or an arthroscopic inlay suprapectoral biceps tenodesis. In addition to a clinical examination of the shoulder, patients' preoperative SANE and VAS scores were recorded at baseline and subsequently at both 3 months and 2 years postoperatively. Additionally, the integrity of the biceps tendon at the tenodesis site was objectively examined via ultrasound by a musculoskeletal radiologist at 3 months and 2 years postoperatively. T-tests were performed for continuous variables while Chi squared tests were performed for categorical variables.

RESULTS:

A total of 53 patients (25 ASBT, 28 MOBT) were randomized and completed a 3-month follow-up shoulder exam and ultrasound. Mean baseline SANE scores between groups were similar (50.4 ± 20.1 ASBT and 49.8 ± 19.8 MOBT; p = 0.914) as were the mean baseline VAS scores (43.9 ± 23.6 ASBT and 39.5 ± 20.7 MOBT; p = 0.473). At 3-month follow up, mean SANE scores were statistically significantly better in the MOBT group (73.8 ± 18.4) compared to the ASBT group at (63.3 ± 19.0; **p= 0.049**). Three-month mean VAS scores were 15.5 ± 20.2 (MOBT) and 23.3 ± 19.7 (ASBT); this trended better in favor of the MOBT group but did not reach significance (p = 0.167). At the three-month postoperative ultrasound, 26/28 (93%) of the MOBT patients and 24/25 (96%) of the ASBT patients (p = 0.621) were noted to have an intact biceps tenodesis. Of this cohort, 27 patients (13 ASBT; 14 MOBT) have completed 2-year postoperative follow up. The mean outcome scores at 24 months were similar between groups. Mean SANE was 93.8 ± 6.2 (ASBT) vs. 92.1 ± 10.1 (MOBT; p = 0.606) and mean VAS was 5.5 ± 11.3 (ASBT) vs. 13.1 ± 19.0 (MOBT; p=0.223). On ultrasound analysis at 2 years, every biceps tenodesis was noted to be intact and healed, including one patient in the ASBT group whose ultrasound noted a possible detachment without significant retraction of the tendon at the prior 3-month ultrasound evaluation.

DISCUSSION AND CONCLUSION: This study demonstrated similar long-term outcomes between groups although superior early clinical outcomes in patients undergoing mini-open subpectoral biceps tenodesis with onlay fixation. Ultrasound appears to be a useful modality to evaluate structural integrity after biceps tenodesis in the postoperative setting. Neither the location (suprapectoral, subpectoral) or the type (inlay, onlay) of tenodesis appears to have a significant impact on definitive patient outcome or structural integrity in the early postoperative period and at two years. Biceps tenodesis is a predictable procedure with a high rate of structural healing and excellent overall patient outcomes. Based on these findings, the choice of surgical technique for biceps tenodesis should be based upon the location of pathology and surgeon preference.