Proximal Biceps Tendinopathy is Associated with Rotator Cuff Degeneration on MRI

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INTRODUCTION:

Shoulder pain is the most common reason for people to seek upper extremity musculoskeletal specialty care. Rotator cuff tendinopathy–-present in two-thirds of people after age 80–is the most common cause of symptoms. Neer suggested that tendinopathy of the long head of the biceps tendon (LHB) and the rotator cuff are associated anatomically and symptomatically, but these are still treated as separate disease processes. Clinical presentation of biceps tendinopathy is often described in literature as anterior shoulder pain worse with shoulder flexion and overhead activities, which is similar to how rotator cuff tendinopathy presents. A previously published systematic review of 5 studies and nearly 600 patients demonstrated associated lesions of the long head of biceps tendon and supraspinatus tendon between 22% and 78.5%. Additional information about the relative prevalence of LHB and RTC tendinopathy with age and their association would help determine if these might be best considered as a single disease process.

METHODS:

A consecutive set of 500 MRIs of the shoulder obtained for various indications were analyzed for the presence and severity of both long head of the biceps tendinopathy and rotator cuff tendinopathy. We analyzed rotator cuff tendinopathy using 4 different classifications including: 1) normal tendon, 2) abnormal signal in the tendon, 3) partial thickness defect, and 4) full thickness defect. Long head of the bicep was evaluated similarly: 1) normal tendon, 2) abnormal signal in the tendon, 3) partial thickness defect, and 4) rupture. Patients with fractures, dislocations, previous surgery, and soft tissue masses seen on MRI were excluded. Descriptive statistics were performed for all patients. Continuous variables were reported as the mean with standard deviation when normally distributed, and the categorical variables were reported as the percentage with frequency. We used Fisher's exact test and Chi-Squared tests to assess the correlation of age, gender, the grade of pathophysiology of the supraspinatus, infraspinatus, and subscapularis (normal, tendinopathy with no thinning or rupture, thinning, and defect throughout), any pathophysiology of the supraspinatus, infraspinatus and subscapularis, and any pathophysiology of the rotator cuff, with the presence of any biceps tendon pathophysiology (normal versus tendinopathy/thinning/rupture) and the specific grades of biceps tendon pathophysiology separately. All variables with a P value of below 0.05 in bivariate analysis were moved to a logistical regression seeking factors associated with each LHB pathophysiology specifically and any LHB pathophysiology, accounting for potential confounders. There was local dependency present in the logistic regression model that sought factors associated with rupture of the biceps tendon, presumably due to the absence of any patients with normal supraspinatus with rupture of the biceps tendon. There were convergence issues with the model, and therefore we decided to omit supraspinatus from this model. Our decision was further justified by a better model fit, as assessed with Akaike Information Criterion, in the model without supraspinatus included. The estimates are displayed as an odds ratio with a 95% confidence interval. All variables with a P value below 0.05 were considered statistically significant.

RESULTS:

A total of 406 patients were included in this study. Mean age of patients in our study was 55 with standard deviation of 14. There were 197 males (49%) and 209 females (51%). Age was significantly associated with long head of the biceps pathology with an odds ratio of 1.04 ($P<.001$). Any rotator cuff pathology was also significantly associated with any LHB pathology with an odds ratio of 6.9 ($P<0.001$).

DISCUSSION AND CONCLUSION:

Diseases that are expected with age are generally well accommodated. Patients with misconceptions to the contrary might be at risk of making decisions about tests and treatments that are discordant to their values.

Importantly our study found that no shoulder with a long head of the biceps rupture had a normal supraspinatus and very few people with a suprapinatus defect has a normal LHB tendon. This suggests that these are likely part of the same disease process.

The finding that long head of the biceps tendinopathy and rotator cuff tendinopathy are notably associated and highly prevalent with age suggests that the vast majority of shoulder pain in adult patients is associated shoulder tendon senescence. Future studies can examine potential benefits and potential harms of diagnosing long head of the biceps tendinopathy separate from rotator cuff tendinopathy.