

Gene Expression Analysis Reveals Differences in the Capsular Tissue of Patients with Anterior and Posterior Shoulder Instability

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INTRODUCTION: Little is known about the pathobiology of unidirectional anterior and posterior shoulder instability. The purpose of this study was to compare gene expression differences in the peripheral blood and capsular tissue of young patients with recurrent anterior shoulder instability and those patients with unidirectional posterior shoulder instability.

METHODS: All consecutive patients with symptomatic unidirectional anterior shoulder instability and unidirectional posterior shoulder instability undergoing arthroscopic and open shoulder stabilization at a single institution were prospectively enrolled. Blood specimens and shoulder capsular specimens obtained at the time of surgery were compared between those with anterior and posterior shoulder instability. RNA was extracted and a customized 277-gene expression panel was utilized. Gene expression levels were quantified. Differential expression analysis was performed to identify genes expressed at different levels between patients with anterior and posterior shoulder instability.

RESULTS:

Twenty-four patients underwent arthroscopic and open shoulder stabilization. Seventeen patients had unidirectional recurrent anterior shoulder instability with a mean age of 27 years (range, 20-41). Seven patients had posterior shoulder instability with mean age 30 years (range, 21-39). Eighteen genes were identified as significantly differentially expressed in the shoulder capsule of patients with anterior and posterior shoulder instability. No genes in the blood specimens were differentially expressed. The 3 most significantly differentially expressed genes included COMP, FGF2, CXCL1. Cartilage Oligomeric Matrix Protein (COMP) had a q-value (p-value adjusted for multiple comparisons) of 9×10^{-5} with a logFC of 3.7 (12.9 times higher expression) in posterior shoulder instability.

DISCUSSION AND CONCLUSION:

There are significant gene expression differences in the shoulder capsule of anterior and posterior shoulder instability patients. This transcriptomic data may provide an improved understanding of the pathobiology of various forms of shoulder instability which could lead to future precision medicine approaches.