Cytokine Profil e Expression Differs In Degenerative Rotator Cuff Tears According To Chronicity

Michell Ruiz-Suarez, MD, PhD¹, Felipe Vadillo-Ortega, MD, PhD², Melchor I. Encalada-Díaz, MD³, Fernando S. Valero-González, MD⁴.

¹Instituto Nacional de Rehabilitacion, Mexico City, Mexico, ²Universidad Nacional Autonoma de Mexico, Mexico City, Mexico, ³Instituto Nacional de Rehabilitación, Mexico City, Mexico, ⁴Hospital Ángeles del Pedregal, Mexico City, Mexico.

Disclosures:

Introduction: Prior investigations have published findings with regard to cytokine expression in degenerative rotator cuff tears (RCT). Nevertheless, RCT may change their cytokine expression through time, due to intrinsic changes in cell composition, extracellular matrix modifications, and/or modifications in cell biology. The biochemical tenocyte expression may be responsible of the treatment outcome, and may have definitive implications in the pharmacologic and/or biologic adjuvant treatment to the patient in order to improve clinical, imaging, and biological results. Fatty infiltration of rotator cuff muscles is useful as a proxy staging classification for rotator cuff tear chronicity. We hypothesized that cytokine expression differs according to the chronicity of the injury.

Methods: We used fatty infiltration staging of the supraspinatus muscle as a proxy to injury chronicity. For this purpose, we used T1 sagittal oblique magnetic resonance images at the level of the body of the scapula. Due to inconsistencies in previous studies assessing the reliability in percentage of fatty infiltration using Goutallier or Thomazeau classifications, we decided to use the Zanetti tangent sign to divide our population into two groups. Group 1 had a negative tangent sign (&lt50% fatty infiltration) and Group 2 had a positive sign (&gt50% fatty infiltration). We included patients with degenerative RCT, with any time of evolution, both genders. We excluded patients with prior surgery, history or active infection, local infiltration with NSAIDs or steroids, or history of inflammatory arthritis. All tendon samples were taken at the time of surgery. A sample of the most lateral edge of the supraspinatus was biopsied (2x5 mm tissue sample). This tendon sample was digested and tenocytes were recovered. Free cells were left as an explant for fifteen days. This method assured that biochemical expression was isolated from cells and not from any other cell line or anatomic structure. We measured Th1 and Th2 cytokines, chemotactic molecules and local and systemic growth factors with a multiplex molecular flow cytometry analyzer. Demographic and clinical variables were analyzed with averages and standard deviation for quantitative variables and percentages for qualitative variables. Clinical variables and cytokine levels were analyzed with U-Mann Whitney test due to sample size, and non-parametric correlation test (Pearson correlation method) was performed to analyze strength of association between biochemical markers. SPSS v20.0 for Macintosh was used for statistical analysis.

Results: We included thirteen patients (seven patients in Group 1 and six patients in Group 2). There was no significant difference with regard to age or gender composition between groups. There was no significant difference with regard to preoperative Constant-Murley or DASH scores in the preoperative setting. We only found differences with regard to Simple Shoulder Test scores (Group 1 had a higher score) in the preoperative setting. With regard to cytokine expression, Group 1 had a significant higher expression of IL-4 and IL-12p70 (p&lt0.05) while Group 2 expressed higher levels of IL-10, VEGF and MIP-1 (p&gt0.05). Patients in Group 1 expressed a biochemical profile showing a transition from a Th1 to a Th2 response. Patients in Group 2 expressed a biochemical profile resembling a TH2 response.

Discussion: None of the patients with a degenerative RCT showed signs of an inflammatory response (Th1 response). Patients with less fatty infiltration have a cytokine profile expression that showed a Th1 (inflammatory) response in transition to a Th2 response. Patients with higher percentage of fatty infiltration resembled a Th2 (non-inflammatory) response.

Significance: These findings have a significant impact in implementing treatment strategies; regardless a conservative or surgical treatment is preferred based on the fatty infiltration status.

Acknowledgments: Alejandra Migoya, MS


ORS 2014 Annual Meeting
Poster No: 0483