Introduction: Approximately 16% of the general population is believed to have rotator cuff disease (RCD) at a given time. The hallmarks of RCD are inflammation, abnormal immune response, angiogenesis and variables of vascularity. Avascular zones of tendons are predisposed for degenerative changes and spontaneous rupture in RCD. Decreased and increased vascularity might be involved in the pathogenesis of degenerative tendon disease. In healthy individuals, the cytokines synthesis of tendon increases in response to physical activity, which results in stronger skeletal muscle and more resistant connective tissue. Abnormalities in angiogenesis-related cytokines (ARC) network of importance for the clinical signs and symptoms will be focused on.

Objectives: To evaluate the diagnostic performance of serological tests for early degenerative changes in RCD patients: the alterations in endogenous ARC expression (IL-1beta, IL-6, IL-8, IL-10, VEGF, bFGF, ANG) in the peripheral blood sera.

Methods: It is a prospective study of 200 patients with RCD (mean age 66.5). Patients were followed with clinical measures (UCLA, Constant, WORC). MRI studies were performed on each shoulder. The control group consisted of 200 age-, sex- matched healthy controls. Angiogenesis imaging assays was performed using PDUS for evaluation the variables of vascularity of the rotator cuff tendons. ARC profiles was performed using Immunoassay kits (Bio-Plex Human Cytokine Assay; Bio-Rad Inc., Hercules, CA, USA) per the manufacturer’s instructions, NIBSC’s International Standards and ECBS’s recommendations of the World Health Organization for of cytokine measurements.

Results: At time of inclusion the concentration of IL-1beta, IL-8, VEGF was significantly higher in RCD patients than in control. Serum VEGF levels significantly higher was found in 85% RCD patients studied. The overexpression of VEGF correlated with advanced stage (r=0.75; p<0.0005), aMVD (r=0.68, p<0.005) and VAS (r=0.75, p<0.0002) in RCD patients. Serum ANG and IL-10 levels significantly lower in RCD patients versus control.

Levels IL-1beta and ANG significantly correlate with degenerative tendon grade in RCD patients. No difference in IL-6 and bFGF levels between RCD patients and control. Patients with degenerative changes had very lower serum ANG levels compared with controls. Combination of high VEGF and low ANG concentrations in the sera have been considered as a predisposing factor for patients with ruptures of rotator cuff tendons. PDUS examination revealed a high blood vessel density in patients with tendon ruptures.

Conclusions: This investigation provides the first standardized analytic approach for assessing differences in ARC levels in the sera of RCD patients. Our data demonstrated that uncontrolled pathogenesis of RCD is associated with an imbalance between inflammatory, antiinflammatory and vascular ARC. The future of ARC in clinical RCD application requires close interactions between the public and private sectors: the government, the pharmaceutical and biotechnology industries, and academia.

References: