CYTOKINE AND NITRIC OXIDE SYNTHASE PROFILE IN HUMAN ROTATOR CUFF BURSAE

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Introduction: Subacromial bursitis is a significant source of shoulder dysfunction. However, the intensity of the inflammatory processes in the bursal tissue in patients with rotator cuff dysfunction is controversial. Cytokines are considered to be the major mediators of inflammation. Nitric oxide (NO), a free radical produced by nitric oxide synthases (NOSs) is a potent stimulator and modulator of biological processes, including regulation of immune and inflammatory responses. The aim of our study was to determine which cytokines and which isoforms of nitric oxide synthase are expressed in the subacromial bursa of patients with a rotator cuff tear.

Methods: Subacromial bursal samples were collected at open surgery for rotator cuff tears (n=17). Total RNA was extracted from the tissue samples and using reverse transcription/polymerase chain reaction (RT-PCR) the mRNA expression of interleukin-1 (IL-1β), IL-6, IL-8, tumor necrosis factor (TNF-α), and granulocyte macrophage colony stimulating factor (GMCSF), as well as inducible, endothelial and neuronal isoforms of nitric oxide synthase (iNOS, eNOS, nNOS) were examined. The PCR products were fractionated on agarose gel. The PCR reaction for the cytokines was run with a standard positive control (peripheral blood mononuclear cells stimulated with concanavalin A), which allowed a semiquantitative assessment of the PCR products.

Results: The samples showed high mRNA expression of IL-6 in 12/17 samples, GMCSF in 10/17 samples, and low levels of IL-8 in 7/17 samples. No or minimal expression of IL-1β and TNF-α were detectable. iNOS and eNOS mRNA were detected in all specimens, but no nNOS mRNA was found in the subacromial bursae of patients with a rotator cuff tear (Figure 1.).

Conclusion: The profile of the cytokine expression in subacromial bursae of patients with rotator cuff tears is consistent with a dominance of cytokines of fibroblast origin rather than immune system cells, a dominance of proliferative or degenerative changes rather than inflammatory processes. The expression of eNOS and iNOS mRNA in human bursa is a novel finding and suggests a possible involvement of NO in the pathological processes in the subacromial bursa of rotator cuff tears.

Acknowledgments: This study was supported in part by St George Private Hospital / Health Care of Australia

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