Paper #55

Trends of Synovial Fluid Cytokines in Non-arthritic, Arthritic and Painful Hip and Knee Arthroplasty

Salvatore J. Frangiamore, MD, MS, Nicholas Gajewski, Anas Saleh, MD, Mario Farias-Kovac , MD, Colin O'Rourke, Alison K. Klika, MS, Thomas Daly, Wael K. Barsoum, MD, **Carlos A. Higuera, MD**

Introduction: Synovial fluid pro-inflammatory cytokines have shown potential for increased sensitivity in diagnosis of periprosthetic joint infection (PJI). However, it is unclear if some specific cytokines are markers for inflammation related with infection or other conditions such as osteoarthritis (OA). The purpose of this study was to evaluate the efficacy of broader synovial fluid cytokine panel in differentiating inflammation in the setting of OA and infection.

Methods: 151 consecutive patients that underwent either arthroscopic surgery for a non-arthritic condition (n=17), primary knee or hip arthroplasty for OA (n=34), and non-infected (n=70) or infected (n=30) revision of a primary knee or hip arthroplasty were prospectively included. Aseptic and septic samples were categorized using MSIS criteria for PJI. Synovial fluid levels of nine pro-inflammatory cytokines (IL-6, GM-CSF, IL-1□, IL-12, IL-2, IL-8, IFN-□, IL-10, TNF-□), were measured using a cytokine immunoassay. Elevations in each cytokine were evaluated across diagnostic categories, and associations between individual cytokines were determined.

Results: There was wide variation on all cytokines among compared groups. IL-6 was the most significantly elevated in the infection group (24766.1 pg/mL, 95% CI [11853.05, 33657.2 pg/mL]) compared to the non-infected group (204.35 pg/mL, 95% CI [67.38, 754.97 pg/mL], p< 0.001). Similarly, IL-1□ had significant elevation in the infection group (120.65 pg/mL, 95% CI [47.1, 276.6 pg/mL]) compared to the non-infected group (2.5 pg/mL, 95%CI [0.96, 6.98], p< 0.001). Other cytokines are nonspecific for inflammation related with either OA or other conditions. Also, they are not specific with inflammation related with infection of non-infection.

Conclusion: Cytokine profiles between non-osteoarthritis, OA and aseptic and septic joints vary considerably in the nine pro-inflammatory cytokines measured. IL-6 and IL-1□ are specific markers for infection. This study characterizes different inflammatory conditions within the joint and provides useful cytokine profiles that can be used to improve the diagnosis of infection after arthroplasty.