Seronegative Periprosthetic Joint Infections Occur in 7%, But Most Identified with Arthrocentesis

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INTRODUCTION: Serum erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) are commonly utilized to screen for periprosthetic joint infection (PJI). The purpose of this study was to report incidence of seronegative PJIs in total joint arthroplasty (TJA), and the utility of arthrocentesis to supplement the workup.

METHODS: We identified 858 TJAs (290 total hips and 568 total knees) that had surgical management of a chronic PJI from 2013 – 2023 at a single institution. All cases met 2011 MSIS criteria. Seronegative PJI was defined as a preoperative ESR of less than 30 mm/hr and CRP of less than 10 mg/L. All patients were aspirated preoperatively and had intraoperative tissue cultures taken.

RESULTS: Out of 858 PJIs identified, 7% (n=58) were seronegative. Of the 56 seronegative PJIs, 97% met \geq 1 major MSIS criterion, with 93% (n=54) having at least 2 positive cultures with the same organism and 7 cases having a sinus tract. Only 3% of seronegative PJIs (n=2) met MSIS criteria by having 4 minor criteria, all of which had 1 positive culture. Of the preoperative aspirations, 80% had a total nucleated cell (TNC) count >3000 and 77% had a TNC >3000 with >80% neutrophils. A positive culture was obtained from 83% of seronegative PJIs. The most common infecting organism for seronegative PJI was *Staphylococcus epidermidis* (n=19), followed by polymicrobial (n=8) and *Staphylococcus aureus* (n=7).

DISCUSSION AND CONCLUSION: Seronegative PJIs occurred in 7% of our cohort. An arthrocentesis prior to revision TJA was able to identify a large percentage (80%) of seronegative PJIs, highlighting the essential nature of arthrocentesis is both seropositive and seronegative cases.