

# Synovial CRP is a Useful Adjunct for Diagnosis of Periprosthetic Joint Infection

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**INTRODUCTION:** There has been a plethora of studies demonstrating the value of serum markers such as C-reactive protein (CRP) to aid in the diagnosis of periprosthetic joint infection (PJI). However, there is still conflicting evidence on the utility of synovial CRP. Existing studies were limited by small sample sizes and used outdated PJI criteria. Furthermore, the relationship between synovial and serum CRP in the setting of PJI has rarely been investigated. The purpose of this study was to evaluate the diagnostic utility of synovial CRP using the most updated criteria for PJI, and assess the relationship between synovial CRP and other commonly studied biomarkers.

**METHODS:** Between 2014 and 2021, 621 patients who underwent evaluation for PJI prior to revision arthroplasty were reviewed. Biomarkers including serum CRP and erythrocyte sedimentation rate (ESR), synovial CRP, polymorphonuclear leukocyte percentage (PMN%), white blood cell count (WBC) and alpha-defensin were evaluated using the 2018 International Consensus Meeting (ICM) criteria.

**RESULTS:** In total, 194 patients had PJI, 394 were considered aseptic failures and 33 were inconclusive. Synovial CRP showed an area under the curve (AUC) of 0.951 (95% CI, 0.932–0.970) with 74.2% sensitivity and 98.0% specificity, whereas serum CRP had an AUC of 0.926 (95% CI, 0.903–0.949) with 83.5% sensitivity and 88.3% specificity. There was good correlation between synovial and serum CRP ( $R=0.703$ ; 95% CI, 0.604–0.785). The combination of serum and synovial CRP yielded a significantly higher AUC than that obtained when using serum CRP alone (AUC 0.964 vs. 0.926,  $p=0.016$ ).

**DISCUSSION AND CONCLUSION:** Synovial CRP demonstrated excellent accuracy when used to determine the presence of PJI. Furthermore, the combination of serum and synovial CRP demonstrated the highest accuracy. There was still good correlation between serum and synovial CRP levels in revision arthroplasty patients. These findings support the routine use of synovial CRP in the evaluation of PJI.

Figure 1. Receiver operating characteristic curves of serum and synovial CRP

