

Synovial fluid absolute neutrophil count a promising marker for diagnosing periprosthetic joint infection

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INTRODUCTION:

With no gold standard for diagnosing periprosthetic joint infection (PJI) clinicians who encounter a suspected PJI case have to use a combination of tests. Several studies have indicated the importance of absolute neutrophil count (ANC) in systemic infections. However, this test has not yet been investigated in synovial fluid (SF). In this study the performance of SFANC was assessed and compared to SFPMN% and SFWBC.

METHODS:

We conducted a retrospective multicenter study reviewing the clinical records of patients undergoing revision surgery from 2017 to 2020. Patients who had full set of SFWBC, SFPMN%, and SFANC were included in the study. Our cohort consists of 231 patients that were divided into two groups: aseptic revisions (N=136) and septic revisions (N=95). Sensitivity, specificity, positive and negative likelihood ratio (LR), and diagnostic odds ratio (DOR) were calculated for each test. The cutoff for SFANC was calculated using the Youden's Index (>1950 cells/ μ L).

RESULTS:

SFANC had a sensitivity of 88.4%, specificity of 85.2%, positive and negative likelihood ratio of 6.0 and 0.1, and a DOR of 44.2 (95% confidence interval [CI]: 20.1-97.3). SF WBC showed 84.2% sensitivity, 83.8 specificity, 5.2 +LR, 0.1 -LR, and 27.6 (95%CI: 13.5-56.5) DOR. Synovial PMN% had a sensitivity of 80.0%, a specificity of 80.8%, + and - LR of 4.1 and 0.2 respectively, and a DOR of 16.9 (95%CI: 8.7-32.7). SFANC with an area under the curve (AUC) of 0.93 was a significantly better predictor of PJI than both SF WBC (AUC=0.91, $p=0.007$) and SF PMN% (AUC=0.88, $p=0.016$). The AUC was comparable for SFWBC and SFPMN, $p=0.16$.

DISCUSSION AND CONCLUSION:

Based on the findings of the current study, it appears that SFANC has a better performance for diagnosing PJI than SFWBC and SFPMN%. Considering that this test is reported as part of the routine synovial fluid analysis at no added cost, we recommend that the orthopaedic community to consider this test in diagnostic work up for PJI.

Figure 1. Laboratory values in the study cohort. The dashed lines indicate the thresholds for the tests.

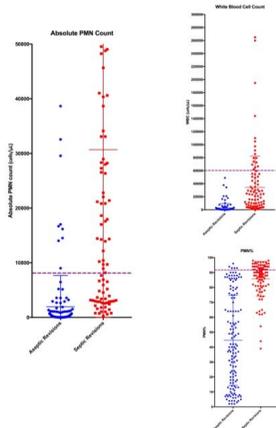


Figure 2. Receiver operating characteristic curves for synovial fluid WBC, PMN%, and absolute PMN count.

