Draining Sinus Tracts and Periprosthetic Joint Infections: Traditional Synovial Fluid Counts May Be Misleading

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INTRODUCTION: Serologic and synovial values guiding the diagnosis of periprosthetic joint infection (PJI) are well-established. However, we hypothesized that these values would be lower in patients with a draining sinus tract. The purpose of this study was to determine if patients with sinus tracts have lower values for serum erythrocyte sedimentation rate (ESR), serum C-reactive protein (CRP), synovial white blood cell (WBC) count, and synovial percent neutrophils.

METHODS: We reviewed 665 infected primary total joint arthroplasties performed between 2000 and 2020 at a high-volume academic center. There were 191 patients (94 hips, 97 knees) that met the 2011 MSIS major criteria for infection and did not receive antibiotics within two weeks of laboratory evaluation. Patients were divided into those with sinus tracts (n=58) and those without (n=133). Early (<90 days) and late (≥90 days) postoperative PJI cases were analyzed separately. False negative rates for detecting PJI were compared based on 2018 ICM early/late PJI cutoffs.

RESULTS: Median synovial WBC count was significantly lower in early (9,978 vs. 76,068 cells/μL; p=0.01) and late (20,365 vs. 63,356 cells/μL;p=0.03) PJI in those with a sinus tract. False negative rates for detecting PJI were significantly higher in patients with a sinus tract compared to those without a sinus tract for synovial WBC (38% vs. 5%; p=0.002), synovial percent neutrophils (38% vs. 12%; p=0.04), and serum CRP (49% vs. 16%;p<0.001).

DISCUSSION AND CONCLUSION: Those with a sinus tract had approximately 3 and 8 times higher false negative rates for detecting PJI by synovial percent neutrophils and WBC, respectively. The false negative rate for detecting PJI by serum CRP was about 3 times higher in those with a sinus tract. The presence of a sinus tract is diagnostic of PJI and relatively lower synovial WBC and percent neutrophil values should not lead providers to question this diagnosis.