Paper #31

Diagnosing Infection in the Setting of Periprosthetic Fractures

Roshan P. Shah, MD, Darren R. Plummer, MBA, BBA, Mario Moric,
Scott M. Sporer, MD, MS, Brett R. Levine, MD, Craig J. Della Valle, MD

Introduction: Currently, no guidelines exist to diagnose periprosthetic joint infection (PJI) in patients who have periprosthetic fractures, and there is a concern that the commonly used tests may be unreliable. The purpose of this study is to investigate the utility of commonly used diagnostic tests for PJI in patients with periprosthetic fractures.

Methods: We reviewed 121 patients (97 hips, 24 knees) with periprosthetic fractures treated operatively (mean interval before fracture, 4.8 years; range, 7 days to 30.2 years). The cohort's mean age was 72.9 years-old and included 93 females (77%). ESR, CRP, synovial WBC, and differential were compared between patients who did and did not meet MSIS criteria for PJI. Student's t-test was used to compare means, and ROC curves were generated to determine optimal cut-off values and evaluate testing performance.

Results: 14 (11.2%) patients met MSIS criteria for PJI. Mean ESR, CRP, cell count, and differential were significantly higher among infections (each $p < 0.05$). Synovial WBC and differential were the best diagnostic tests, each with an AUC of 84% (good test performance). A synovial WBC cut-off of 2,707 resulted in sensitivity of 100% and specificity of 65%. A differential polymorphonuclear cell cut-off of 77% resulted in sensitivity of 100% and specificity of 63%. The AUC values for CRP and ESR were 63% (poor test performance) and 76% (fair test performance), respectively. ESR of 30 mm/hr resulted in an 85% sensitivity and 40% specificity; CRP of 8 mg/L resulted in an 86% sensitivity and 36% specificity.

Conclusion: The diagnosis of PJI in the setting of a periprosthetic fracture can be challenging. Specifically the ESR and CRP have overall lower test performance but still remain relatively sensitive. The synovial fluid WBC count and differential are the best tests with optimal cut-off values (3,000 WBC/µL and 80%) that are similar to those used for patients without fracture.