

Polymerase Chain Reaction Multiplex Provides Minimal Utility in Periprosthetic Joint Infection Diagnosis

Beau J. Kildow, MD, Sean P. Ryan, MD, Richard Danilkowicz, MD, Alexander L. Lazarides, MD, Michael P. Bolognesi, MD, Thorsten M. Seyler, MD, PhD, William A. Jiranek, MD

Introduction: Utilization of molecular sequencing modalities in periprosthetic joint infection (PJI) diagnosis and organism identification have gained popularity. Polymerase chain reaction (PCR) multiplex offers timely results of common organisms within 24 hours. The purpose of this study was to compare the diagnostic accuracy of PCR multiplex, culture, the Musculoskeletal Infection Society (MSIS) criteria, and the recently proposed criteria by Parvizi et al. in the diagnosis of PJI.

Methods: In this retrospective study, aspirate or tissue samples were collected in 93 revision and 77 primary arthroplasties for routine diagnostic workup for PJI and sent to the laboratory for PCR multiplex. Concordance along with statistical differences between diagnostic studies were calculated using Chi-squared test for categorical data.

Results: When comparing to the MSIS criteria, concordance was significantly lower for PCR at 65.9% compared to 87.6% for culture ($p < 0.001$). There was no significant difference based on prior infection ($p = 0.706$) or sample collection method (tissue swab or synovial fluid) ($p = 0.316$). Of the 78 patients that met MSIS criteria, only 20 (25.6%) samples identified an organism.

Conclusions: In our series, PCR has little utility as a stand-alone test for PJI diagnosis with a sensitivity of only 25.6% when using MSIS criteria as the gold standard. PCR also appears to be significantly less accurate than culture in the diagnosis of PJI. Currently, laboratory tests used for either criteria for PJI diagnosis should be obtained along with the overall clinical picture to help guide decision making for PJI treatment.