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Diagnostic Accuracy of the Alpha-Defensin Test for Periprosthetic Joint Infection in Patients with Inflammatory Diseases

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Introduction: Alpha-defensin has high accuracy to diagnose prosthetic joint infection (PJI). However, the reliability of the test in patients with systemic inflammatory diseases (e.g., rheumatoid arthritis [RA] and psoriatic arthritis [PsA]) is unclear. Several recent studies reported high accuracy of alpha-defensin in diagnosing PJI in a heterogenous population inclusive of primarily patients suffering from osteoarthritis, but also containing small numbers of patients with systemic inflammatory diseases. The purpose of this study was to determine the accuracy of alpha-defensin in diagnosing PJI in a homogenous cohort of patients afflicted by systemic inflammatory disease and underwent revision surgery.

Methods: A retrospective review was conducted of all 1374 cases who underwent revision total hip/knee arthroplasty at a single healthcare system from 2014 to 2017. Forty-three cases with inflammatory disease who received a one stage revision arthroplasty or the first stage of 2-stage revision arthroplasty with available preoperative alpha-defensin results were included. Two cases who received a spacer exchange were excluded from this study. Cases were classified as infected or not according to Musculoskeletal Infection Society (MSIS) criteria. The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and accuracy of alpha-defensin to diagnose PJI were calculated. Receiver operating characteristic (ROC) analysis was performed.

Results: A total of 41 cases met the inclusion criteria, including 17 with RA, 13 seronegative arthropathy (e.g., PsA), and 11 systemic inflammatory diseases (e.g., sarcoidosis). Fifteen cases were diagnosed as MSIS positive. The alpha-defensin test demonstrated a sensitivity of 93%, a specificity of 100%, a PPV of 100%, a NPV of 96%, and accuracy of 97% for the diagnosis of PJI. There was one patient with polymyositis who had a false-negative alpha-defensin result.

Conclusions: The alpha-defensin test provides useful information with high accuracy in diagnosing PJI in patients with inflammatory diseases.