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Alpha-defensin Accuracy to Diagnose Periprosthetic Joint Infection – Best Available Test?

Mario Farias-Kovac, MD, Jessica L. Masch, MA, Anas Saleh, MD, **Salvatore J. Frangiamore, MD**, Robert M. Molloy, MD, Wael K. Barsoum, MD, Carlos A. Higuera, MD, Alison K. Klika, MS

Introduction: Despite efforts of the Musculoskeletal Infection Society (MSIS) to define criteria to improve accuracy and standardize PJI definition, current tests are deficient in making a reliable diagnosis. There is a clear need for a test capable of improving diagnostic accuracy. The purpose of this study was to measure the accuracy of a single synovial fluid biomarker, alpha-defensin, to diagnose PJI in revision total hip (rTHA) and knee arthroplasty (rTKA).

Methods: A prospective consecutive series of 102 patients comprising 111 rTHA and rTKA procedures performed for any indication between May 2013 and March 2014 was identified. Demographics, cause of revision, laboratory tests including inflammatory markers and synovial fluid information were collected. Patients were excluded if viable index joint synovial fluid or preoperative laboratory data were not obtained. MSIS criteria were used to categorize cases as non-infected and infected. Synovial fluid was obtained preoperatively or intraoperatively and tested for alpha-defensin using a commercially available kit. The assay defines 5.2 ug/ml as a positive result. The test was evaluated using sensitivities, specificities, and likelihood ratios, and values reported with 95% confidence intervals (CI)

Results: Alpha-defensin test had a sensitivity of 96.4% (CI 81.6%-99.4%) and a specificity of 98.8% (CI 93.4%-99.8%). Likelihood ratio for a positive test result was estimated at 80.04 (CI 11.4-562.2) and likelihood ratio for a negative test result at 0.04 (CI 0.01-0.25). The positive predictive value was 96% (CI 81.6-99.4) and negative predictive value 99% (CI 93.4-99.8).

Conclusion: A positive alpha-defensin test result significantly increased the estimation of the odds of infection and a negative test result significantly decreased the estimate of the odds of infection with accuracy (sensitivity and specificity) higher than what is reported for current available PJI diagnostic tests. Synovial fluid alpha-defensin is a valid and very accurate option to diagnose infection.