

Alpha-Defensin Has Poor Utility in the Diagnosis of Acute Postoperative Periprosthetic Joint Infection: A Multicenter Study

Saad Tarabichi, Alex Miguel Holle, Jens Taylor Verhey, Collin Braithwaite, SUJEESH SEBASTIAN, Jochen G Hofstaetter, Mustafa Citak, Mark J Spangehl, Joshua Bingham

INTRODUCTION: The alpha-defensin test has witnessed a surge in popularity following reports of its superior diagnostic capabilities, when compared to more conventional synovial markers. Despite this, no study to date has evaluated the utility of alpha-defensin for the diagnosis of acute periprosthetic joint infection (PJI). The purpose of this multicenter study was to determine whether the alpha-defensin test provided additional clinical benefit, when compared to synovial white blood cell (WBC) count and polymorphonuclear leukocyte percentage (PMN%), in the diagnosis of acute postoperative PJI.

METHODS: This retrospective study identified all patients who underwent arthrocentesis within 90 days of their primary total joint arthroplasty (TJA) at three institutions. PJI was defined as revision TJA for infection within 2-weeks of joint aspiration with ≥ 1 positive intraoperative culture. Patients were considered aseptic if they had no reoperation for ≥ 1 -year after arthrocentesis. Receiver operator characteristic (ROC) curves were used to assess the utility of alpha-defensin, WBC count, and PMN% in the diagnosis of acute PJI. Pairwise comparison was performed to compare whether the area under the curve (AUC) was significantly different between the three markers.

RESULTS: A total of 143 patients were included. Of these, 85 (59.4%) were infected and 58 (40.6%) were aseptic. After plotting ROC curves, WBC count was found to have the highest diagnostic utility (AUC 0.912, sensitivity 79.5%, specificity 91.2%), followed by PMN% (AUC 0.869, sensitivity 70.5%, specificity 93.0%), and alpha-defensin (AUC 0.812, sensitivity 62.4%, specificity 100%). Using pairwise comparison, the AUC for WBC count was found to be significantly higher than that of alpha-defensin ($p=0.005$). However, there was no difference in the AUC between alpha defensin and PMN% ($p=0.457$).

DISCUSSION AND CONCLUSION: Based on our findings, it appears that alpha-defensin provides little to no additional clinical benefit in the diagnosis of acute PJI, when compared to synovial WBC count and PMN%.