

## **Exploring the Diagnostic Utility of Leukocyte Esterase for Exclusion of Periprosthetic Joint Infections in Patients Presenting with Culture-Negative Results**

Alisina Shahi<sup>1</sup>, David Rodriguez-Quintana<sup>2</sup>, Adam Michael Freedhand<sup>3</sup>, Ali R Oliashirazi<sup>4</sup>, Kenneth B Mathis

<sup>1</sup>University Of Texas Health Science Center At Houst, <sup>2</sup>University Of Texas - Houston, <sup>3</sup>UT Ortho, <sup>4</sup>Joan C Edwards School of Medicine

### **INTRODUCTION:**

Diagnosis of periprosthetic joint infection (PJI) is very challenging especially when the cultures are negative. The Leukocyte Esterase (LE) test strip has emerged as a cost-effective modality for diagnosing PJI and is one of the minor Musculoskeletal Infection Society (MSIS) criteria for the diagnosis of PJI. The purpose of this study was to assess the performance of the LE strip test in identifying culture negative PJIs.

### **METHODS:**

We conducted a retrospective study and identified 294 revision arthroplasties that were performed in our institution between 2014-2022. The included patients had negative cultures and available results of LE strip test. Of these patients 43 were infected. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), positive likelihood ratio (+LR), and negative likelihood ratio (-LR) were calculated using both the ++ and ++/+ cutoff for the LE strip test.

### **RESULTS:**

Using the ++ threshold, LE test had a sensitivity of 30.0%, specificity of 97.1%, PPV of 42.1%, NPV of 95.0%, +LR of 10.3, and -LR of 0.7. When the ++/+ threshold was used the LE test had 95.0% sensitivity, 85.8% specificity, 32.8% PPV, and 99.58% NPV. The +LR and -LR were 6.67 and 0.05 respectively.

### **DISCUSSION AND CONCLUSION:**

It appears that the LE test could effectively rule out PJI in culture negative patients given its high NPV and sensitivity and very low -LR when the ++/+ threshold was used. Currently available LE strip tests are designed based on the quantitative values of the LE activity in the urine. This arises the point that a synovial fluid specific LE strip test needs to be developed with an optimized sensitivity and specificity. Nevertheless, the current strip can be confidently used to rule out PJI in suspected patients with negative cultures.