Commercial Synovial Antigen Testing is Not Superior to Traditional Culture for the Diagnosis of Periprosthetic Joint Infection

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INTRODUCTION: Despite its limitations, culture remains the “gold standard” for pathogen identification in patients with periprosthetic joint infection (PJI). Recently, a synovial fluid antigen test has been introduced by a commercial entity. The purpose of this multicenter study was to determine the accuracy of said antigen test in the diagnosis of PJI.

METHODS: This retrospective study identified 613 patients undergoing revision total knee arthroplasty that had undergone preoperative synovial fluid analysis. PJI was defined using the 2018 International Consensus Meeting (ICM) criteria. Patients with an extended time (>180 days) from aspiration to revision procedure (n=62), those presenting within 90 days of their index arthroplasty procedure (n=17), and patients with an inconclusive ICM score (n=8) were excluded. Using receiver operator characteristic curves analyses, we examined the utility of the microbial identification (MID) antigen test and any positive culture (either preoperative or intraoperative) in the diagnosis of PJI.

RESULTS:

A total of 526 patients were included. Of these, 125 (23.8%) were ICM positive and 401 (76.2%) were ICM negative. Culture demonstrated an AUC of 0.864, sensitivity of 75.2%, and specificity of 97.5%. On the other hand, the MID test exhibited an AUC of 0.802, sensitivity of 61.6%, and specificity of 98.8%. The AUC of culture was significantly higher than that of the MID test (p=0.037). MID test was positive in 41.9% of culture negative PJI cases. We also observed a high rate of discordance (29.7%) when both culture and the MID test were positive in the ICM positive group.

DISCUSSION AND CONCLUSION: Synovial fluid antigen testing does not provide additional clinical benefit when compared to traditional cultures for the diagnosis of PJI. The antigen test had low sensitivity in the diagnosis of PJI and a relatively high rate of discordance with culture.