## Sonicate Fluid Culture in Revision THA: Improved Microorganism Detection in PJI

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INTRODUCTION: Culture of synovial fluid and periprosthetic tissue are standard for diagnosis of periprosthetic joint infection (PJI). However, they may lack sensitivity and specificity. Sonicate fluid culture of explanted prostheses aims to identify bacteria adherent to implants and has been shown to improve sensitivity of PJI diagnosis. The purpose of this study was to assess the impact of sonicate fluid culture in revision total hip arthroplasties (THAs). METHODS:

We identified 224 revision THAs which utilized sonicate fluid cultures from 2018-2021 at a single institution. The mean age was 66 years, 48% were female, and mean BMI was 32 kg/m<sup>2</sup>. Indications for revision THA were PJI (49%), reimplantation after PJI (11%), and aseptic failure (40%). Infectious Diseases Society of America (IDSA) PJI diagnostic criteria (omitting culture criteria) were utilized. Sensitivity and specificity of sonicate fluid cultures were compared to synovial fluid and tissue culture. Mean follow-up was 3 years.

RESULTS: Sonicate fluid culture was more sensitive than tissue culture (62% v. 48%, p=0.03). However, the specificities of sonicate fluid and tissue culture were similar (92% v. 88%, p=0.3). The sensitivity and specificity of synovial fluid culture (56% and 82%, respectively) were not significantly different than sonicate fluid culture (p=0.3 for both). Of 135 THAs with both synovial fluid and a minimum of two tissue cultures, 61 were diagnosed with PJI by IDSA criteria. Of these, 3 THAs (5%) had microorganisms identified by sonicate fluid culture alone. Survivorship free of reinfection was 89% at 2 years, with no difference in survivorship between THAs with concordant and discordant tissue and sonicate fluid culture (90% vs 88%; p=0.3).

DISCUSSION AND CONCLUSION: In revision THAs, prosthesis sonicate fluid cultures were more sensitive than tissue cultures for the diagnosis of PJI. Sonicate fluid culture improved microorganism detection and identification, providing information to inform antimicrobial treatment.