Bacterial Prevalence of Sonication Cultures in Revision Total Joint Arthroplasty

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INTRODUCTION

- Periprosthetic joint infection (PJI) is a devastating complication of total joint arthroplasty (TJA)
  - → Therefore, accurate diagnosis of PJI is critical
    - → Diagnosis is largely guided by MSIS[1]
- However, evidence of bacterial infection can occur without meeting MSIS criteria[2]
  - → Positive bacterial growth on sonication of explanted prostheses has been reported in MSIS negative revisions
- Clinical significance and bacterial prevalence of positive sonication cultures in patients not meeting MSIS criteria remains unclear

OBJECTIVE

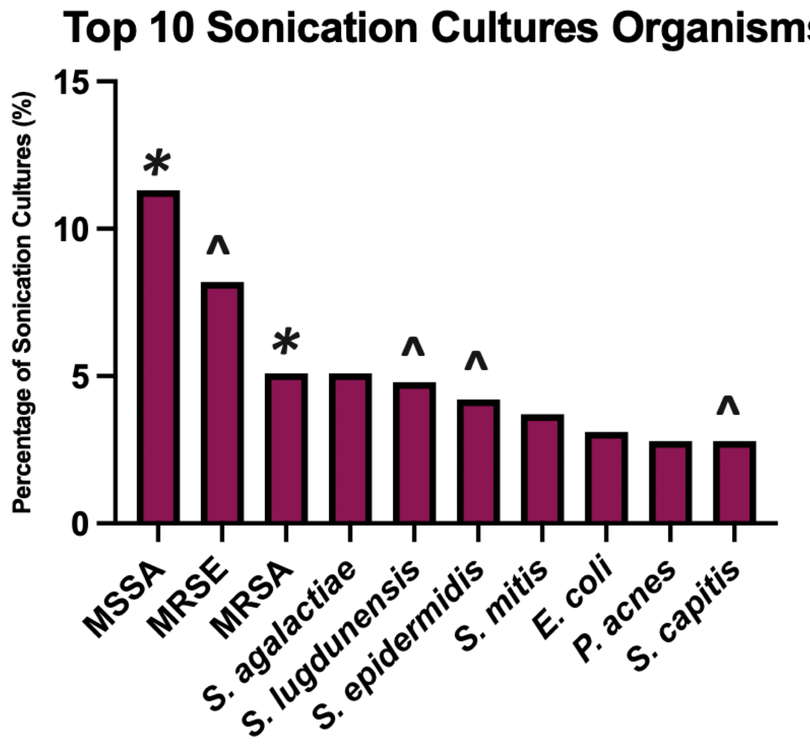
- Investigate bacterial prevalence in MSIS negative, sonication positive vs. MSIS negative, sonication negative (aseptic) revisions
  - → Difference in CFU and/or bacterial prevalence between groups?
  - → Difference in bacterial prevalence over time?

METHODS

- Retrospective case-control study
  - Revision TJA performed at multicenter single institution between 2016-2025
  - Required sonication of explanted prosthesis
- <u>Exclusion Criteria</u>:
  - Inadequate workup to determine MSIS criteria
  - Absent CFU values within electronic medical records (EMR)
  - Sonication of antibiotic spacers
- Compared sonication cultures of PJI vs. aseptic revisions
  - PJI diagnosis according to MSIS criteria[1]
- Primary outcome = bacterial prevalence
- Secondary outcome = temporal shift of PJI bacterial prevalence
- <u>Stats</u>:
  - Bacterial prevalence: categorical comparisons with Fisher exact tests
  - CFU: means compared with T-tests

RESULTS

- Total of **1168** patients (318 PJI; 850 aseptic)
- Total of **354** positive sonication cultures (233 PJI; 121 aseptic)
  - Positive sonication cultures in 14.2% of revisions classified as aseptic by MSIS criteria
- Organism-specific findings:
  - MSSA, MRSA & GBS **exclusive to PJI** (p≤0.001)
  - *S. hominis* **exclusive to aseptic** (p=0.01)
  - *P. acnes*: only organism with statistically significant difference in mean CFU
    - **80.25 PJI vs 7.17** aseptic (p=0.002)



CONCLUSIONS

- Most frequent sonication culture organisms in prior literature (2013-2018): coagulase-negative staphylococci > MSSA/MRSA > Streptococcus spp.[3]
- Most frequent sonication culture organisms in current cohort (2016-2025): *S. aureus** > coagulase-negative staphylococci **^**
- Proportional increase in antibiotic resistant bacteria compared to prior studies[3]
- Temporal increase in *S. aureus* prevalence from sonication cultures suggests a shift in the microbiological cause of PJI

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