

Correlation Between Preoperative Microbiological Isolation And Intraoperative Cultures In The Surgical Treatment of Periprosthetic Joint Infection: Clinical Implications

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INTRODUCTION

Periprosthetic joint infection (PJI) represents a devastating complication of hip, knee, and shoulder arthroplasty, where preoperative pathogen identification is critical for guiding targeted antimicrobial therapy and surgical strategy. Despite its key role, the concordance between preoperative and intraoperative cultures in PJI management is often variable, leading to potential discrepancies in pathogen identification and subsequent treatment strategies¹. This study evaluated microbiological concordance between preoperative synovial fluid aspiration and intraoperative cultures in PJI revision cases.

METHOD

Retrospective analysis of 33 patients with primary prosthetic joint PJI treated between October 2024 and December 2025, preoperative arthrocentesis was performed after ≥ 15 days of antibiotic washout. Patients underwent one- or two-stage revision or DAIR, with intraoperative sampling of 5–7 periprosthetic tissues plus synovial fluid. Concordance required identical bacterial species and resistance profiles across pre- and intraoperative cultures.

Inclusion Criteria

- Primary prosthetic implants
- Preoperative joint aspiration with microbiological culturing for suspected PJI
- Antibiotic discontinuation ≥ 15 days prior to arthrocentesis

Exclusion Criteria

- Arthrocentesis or cultures obtained during ongoing ABX therapy
- Infection of revision prostheses
- Prior failure of DAIR, ABX-spacers, or one-stage revisions
- Non-diagnostic aspirations - inadequate synovial fluid volumes

RESULTS

Concordance in 67.7% (22/33) of cases (Fig 1.)

Population: 33 patients - 18 males, 15 females
Mean age: 71 years
Joints involved: 24 knees, 7 hips, 2 shoulders
Procedures: 23 one-stage, 9 two-stage, 1 DAIR
Mean follow-up: 133 days

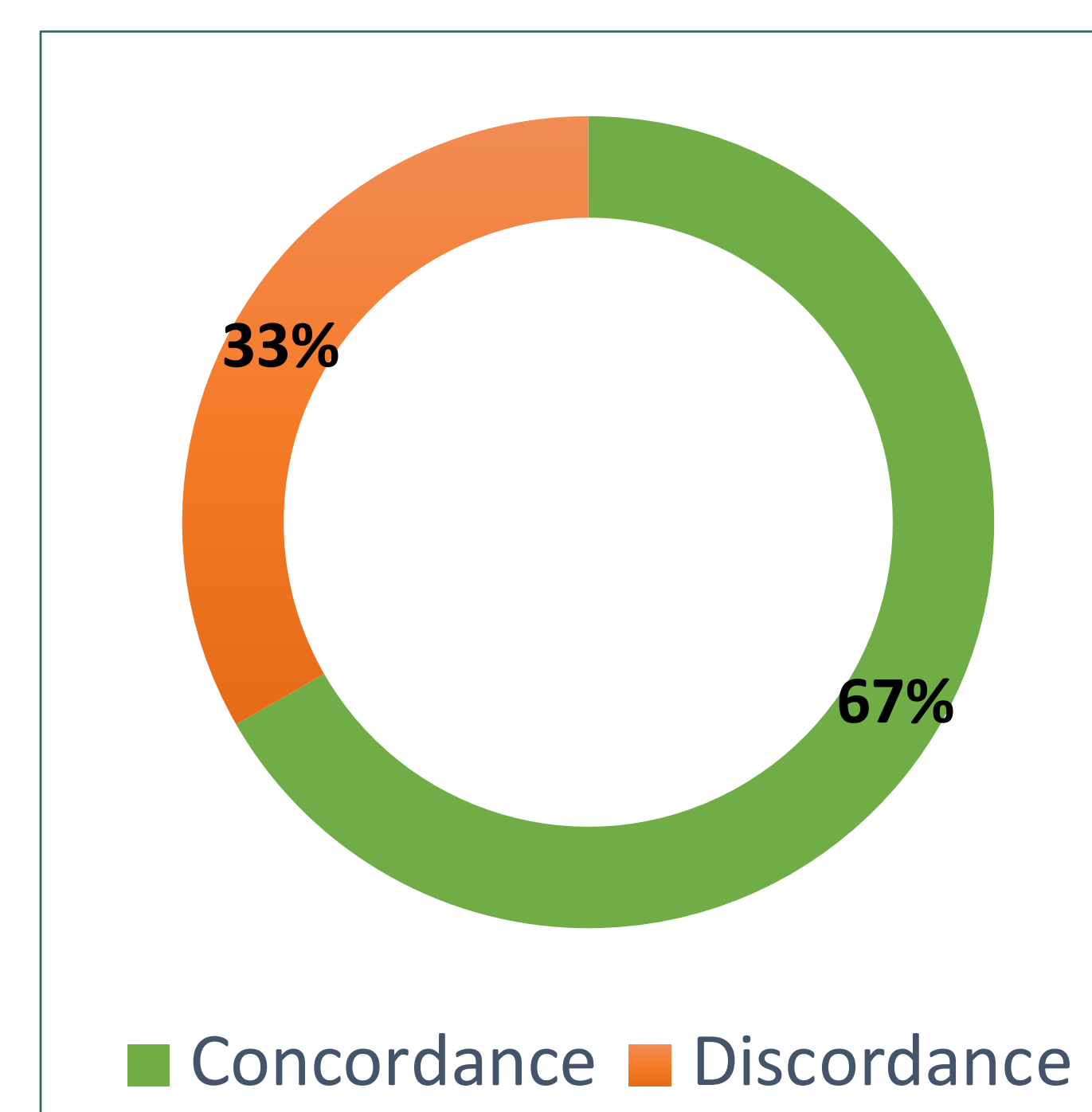


Fig 1. Concordance between preoperative and postoperative cultures

Pre-operative Cultures: Most Frequent Microorganisms

Rank	Most Frequent Microorganism	Frequency (n, %)
1°	Staphylococcus epidermidis	9 (27.3%)
2°	MSSA	6 (18.2%)

Intra-operative Cultures: Most Frequent Microorganisms

Rank	Most Frequent Microorganism	Frequency (n, %)
1°	Staphylococcus epidermidis	7 (21.2%)
2°	MSSA	6 (18.2%)
2°	NEG (negative)	6 (18.2%)

CONCLUSION

- Preoperative arthrocentesis support initial empirical ABX therapy but cannot replace intraoperative cultures for definitive treatment planning.
- Targeted ABX therapy should be postponed until intraoperative culture results confirm or refine the causative pathogen.
- Further large-scale, long-term studies are needed to evaluate the impact of pathogen virulence, Gram status, joint type, and biofilm-related factors on diagnostic concordance.

1. Schulz P, Dlaska CE, Perka C, Trampuž A, Renz N. Preoperative synovial fluid culture poorly predicts the pathogen causing periprosthetic joint infection. Infection. 2021;49(3):427–437.