

Periprosthetic Joint Infections Over a Decade: Are Organism Profiles Changing at US Referral Centers?

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INTRODUCTION:

Understanding the microbiological profile is important for successful treatment of periprosthetic joint infection (PJI). This study aimed to report on the distribution of infecting organisms in total hip (THA) and knee (TKA) arthroplasties as well as the types of procedures performed for PJI at a high-volume center in the U.S.

METHODS:

We conducted a retrospective analysis of 962 patients (223 hips and 739 knees) who underwent revision procedures for PJI between 2011 and 2023. PJI was defined as per the 2018 International Consensus Meeting (ICM) criteria. Procedures performed included debridement-antibiotics-and implant retention (DAIR), two-stage revision arthroplasty, and resection arthroplasty. Preoperative aspirate and intraoperative tissue cultures were analyzed and compared for microorganism distribution over the study period.

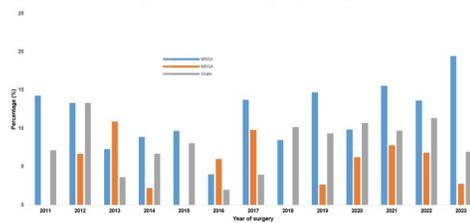
RESULTS:

A majority of the patients in the hip cohort underwent two-stage exchange procedure (62.8%), followed by DAIR (29.1%) and resection arthroplasty (8.1%). Similarly, in the knee cohort the majority of the patients underwent two-stage exchange revision (73.6%), followed by a DAIR (23.9%), and resection arthroplasty (2.5%). *Staphylococcus aureus* was the most commonly identified organism isolated in both hip (21%) and knee (16%) cohort, followed by coagulase-negative *Staphylococcus* (8% in hips, 12% in knees). The percentage of methicillin-resistant *Staphylococcus aureus* (MRSA) declined from 17% in 2012 and 2013 to 10% in 2022 and 2023. Negative culture results were observed in 43% of hips and 49% of knees overall. Concordance between preoperative synovial aspiration and intraoperative tissue cultures was observed in 76% of hips and 72% of the knees.

DISCUSSION AND CONCLUSION:

The most commonly identified causative organism species in PJI was *Staphylococcus* (29%), and there was significant concordance between preoperative and intraoperative culture results in our study cohort. Although the incidence of methicillin resistance seems to be decreasing in PJI over the study period, a substantial proportion of samples remained culture-negative (43-49%), emphasizing the need to improve diagnostic methods for organism identification and treatment.

Figure 1: Common causative organisms in PJI cases following TKA (2011–2023).



MSSA, Methicillin-resistant *Staphylococcus aureus*; MRSA, Methicillin-sensitive *Staphylococcus aureus*; Gram-] Gram-negative bacteria.

Table 1. Hip and Knee Microorganism Distribution for United States Center.

Microorganism	Hips (n = 201)	Knees (n = 615)
Methicillin-resistant <i>Staphylococcus aureus</i>	8.5% (17)	4.1% (25)
Methicillin-sensitive <i>Staphylococcus aureus</i>	12.4% (25)	11.8% (73)
<i>Streptococcus</i> and <i>Enterococcus</i>	6% (12)	5.5% (34)
Coagulase-negative <i>Staphylococcus</i>	7.9% (16)	12.2% (75)
Gram-negative bacteria	11.4% (23)	7.4% (45)
Polymicrobial	6% (12)	8.5% (52)
Fungal	2.5% (5)	0.7% (4)
Mycobacterial	0	0
Other	2% (4)	1.1% (7)
Culture negative	43.3% (87)	48.7% (300)