Pseudomonas Prosthetic Joint Infections: Is there a role for monotherapy?

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Introduction

- **Introduction:** *Pseudomonas spp.* (<5% of prosthetic joint infections) have developed a notorious reputation as one of the most recalcitrant PJI pathogens
  - Multi-drug resistance
  - Biofilm Formation
- Due to the small number of *Pseudomonas* PJIs, often grouped together with other gram-negative organisms or are reported in heterogenous cohorts (i.e. any implant-associated bone and joint infections)
- **Purpose:** Describe patient and treatment information as they relate to outcomes after *Pseudomonas* PJI
- **Hypothesis:** Anticipate poor outcomes for *Pseudomonas* PJI compared to other organism PJIs, with treatment success varying by surgical and antibiotic treatment methods

Methods

- Retrospective review from 2005 to 2020 for patients with *Pseudomonas* positive PJI after primary or revision TKA and THA presenting at a tertiary referral center
- Divided patients into mono (n=19) and polymicrobial (n=23) *Pseudomonas* PJI cohorts
- Data on patient demographics, comorbidities, prior surgical history, PJI characteristics, culture data, surgical and antibiotic treatment, and antibiotic resistance in recurrent infections were collected
- Primary Outcomes was 1-year infection clearance (without ongoing antibiotic treatment)
- Secondary Outcomes included final joint outcomes and patient mortality
- **Statistical Analysis:**
  - Categorical data reported as counts (proportions)
  - Continuous data reported as means (standard deviations) or medians (interquartile range)
  - Kaplan Meier Survival analysis

Results

	Monomicrobial (n=19)	Polymicrobial* (n=23)
1-year clearance	11 (57.9%)	8 (34.8%)
Treatment success at Last F/u	10 (52.6%)	8 (34.8%)
Death at Last F/u	0 (0.0%)	10 (43.5%)
Final Joint Outcomes		
2-stage reimplantation	6 (31.6%)	5 (21.7%)
Retained TKA after DAIR	6 (31.6%)	8 (34.8%)
Destination Spacer	5 (26.3%)	5 (21.7%)
Resection/Amputation	2 (10.5%)	5 (21.7%)

***GP (n=18/23)**
GNR (n=10/23)
MRSA (n=4/23)

Table 1. Outcomes after Monomicrobial and Polymicrobial PJI

	Clearance at 1 year		
	Overall	Re-infection in 1 year	Clear of Infection at 1 year
	19	8	11
Antibiotic Regimen, N (%)			
combo-concomittant*	4 (21.1)	1 (12.5)	3 (27.3)
IV-to-PO tail**	4 (21.1)	1 (12.5)	3 (27.3)
mono-IV***	5 (26.3)	3 (37.5)	2 (18.2)
mono-PO******	6 (31.6)	3 (37.5)	3 (27.3)
Total Antibiotic Duration in Weeks, median [IQR]	6.00 [6.00, 12.00]	6.00 [6.00, 15.00]	8.00 [6.00, 11.00]

*combo-concomitant = IV cefepime + PO ciprofloxacin, dual IV cefepime + aminoglycoside;
**IV-to-PO tail = IV cefepime transition to post-IV tail with PO ciprofloxacin
***mono-IV = IV cefepime, IV meropenem
****mono-PO = PO ciprofloxacin

Table 2. Antibiotic Treatment for Monomicrobial PJI (minimum 6 weeks IV or PO)

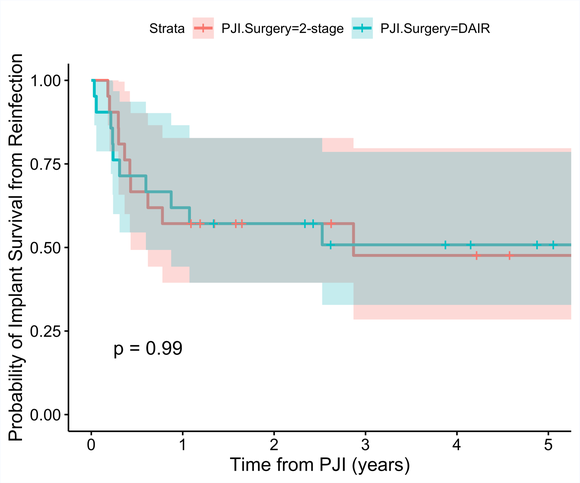

Figure 1. Survivorship Free of Reinfection for 2-stage and DAIR Treatment

Conclusion

- Treatment success rates are low (60% for DAIR, 54.5% for 2-stage) and consistent with prior single-center studies
- For monomicrobial *Pseudomonas* PJI, treatment success rates may vary based on antibiotic regimen (lower rates of infection clearance with PO or IV monotherapy)
- Polymicrobial PJIs have a lower clearance rate (34.8% overall) and a high mortality (43.5%) rate at a median follow-up of 3.6 years
  - All deaths a result of preexisting medical comorbidities: arrhythmia, CHF, PNA, and oncologic conditions