Microbiologic Composition and Failure Rates of Prosthetic Hip and Knee Infections Managed With Debridement, Antibiotics, and Implant Retention

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Background

- Prosthetic joint infection (PJI) rates range from 0.5-2%.
- Debridement, antibiotics, and implant retention (DAIR) remains a viable option in management.
- Factors that may impact DAIR success rates include viability of local tissue, persistence of sinus tract, duration of symptoms, microbiologic pathogen, and other common surgical risk factors.
- This study evaluates the success rate for hip and knee PJIs following DAIR in relation to microbiological composition, antimicrobial treatment, and antimicrobial duration.

Methods

- Single-center, retrospective, cross-sectional study to evaluate knee and hip PJI outcomes of DAIR with respect to the microbiological composition and antimicrobial therapy.
- Patients admitted January 2017 to May 2020 meeting the following criteria:

Inclusion Criteria	Exclusion Criteria
• Ages 18-99 years • First occurrence of prosthetic hip or knee infection • Undergone DAIR followed by at least 3 weeks parenteral antimicrobial therapy • Consolidative & chronic/indefinite oral antimicrobial therapy allowed	• Prisoners • PJI of any joint other than hip or knee • Previous history of surgical intervention &/or antimicrobials for PJI in the joint in question • Surgical interventions other than DAIR (e.g., one-stage or two-stage revision) • Fungal PJI

- Baseline demographics, clinical characteristics, and patient outcomes were collected for comparison.
- Data were summarized using descriptive statistics.

Primary Outcome	Evaluation of failure at 2 years after DAIR defined as: -Any subsequent need for surgical intervention -Infection related mortality -Persistent infection, new infection, or probable treatment failure of prosthetic hip or knee
Secondary Outcome	-Time to failure -Infection related mortality -Duration of antimicrobial therapy -Chronic (indefinite) suppressive antimicrobial therapy -Adverse advents from antimicrobial therapy

Results

Table 1: Patient Characteristics

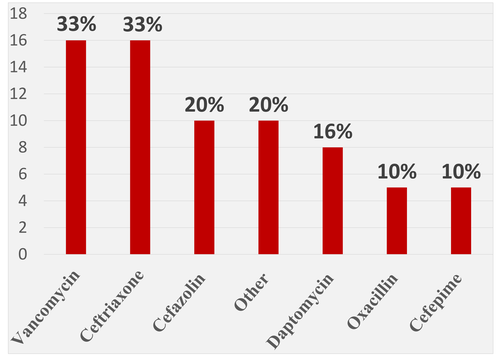
	N=49
Median Age (Minimum, Maximum) years	61 (24, 83)
Female	32 (65%)
Smoking Status	
Current	5 (10%)
Former	20 (41%)
Never	24 (49%)
Body Mass Index	
18.5-24.9	5 (10%)
25.0-29.9	12 (24%)
>30.0	32 (65%)
Comorbidities	
Diabetes Mellitus	16 (33%)
Chronic Kidney Disease	5 (10%)
Immunocompromised	9 (18%)
Rheumatoid arthritis	3 (6%)
Symptoms	
Joint pain	47 (96%)
Joint Swelling	37 (76%)
Drainage / Sinus Tract	22 (45%)
Fever	17 (35%)
Leukocytosis	15 (31%)
Limited Ambulation	9 (18%)

Table 2: Outcomes

	Failure (N=21)	**Remission** (N=28)	**Total** (N=49)
Location of PJI			
Hip	6 (40%)	9 (60%)	15
Knee	15 (44%)	19 (56%)	34
Time to PJI			
Early (<3 months)	7 (41%)	10 (59%)	17
Delayed (3-12 months)	0 (0%)	2 (100%)	2
Late (>12 Months)	14 (47%)	16 (53%)	30
Bacteremia Present	3 (43%)	4 (57%)	7
Time to DAIR			
< 3 weeks	20 (46%)	23 (54%)	43
> 3 weeks	1 (17%)	5 (83%)	6
Chronic / Indefinite Antibiotic Use	2 (13%)	13 (87%)	15
Organism			
Staphylococcus aureus	9 (64%)	5 (36%)	14
Methicillin sensitive	8 (62%)	5 (38%)	13
Culture negative	3 (27%)	8 (73%)	11
Streptococcus species	2 (33%)	4 (67%)	6
Gram-negative	2 (40%)	3 (60%)	5
Coagulase-negative staphylococci	1 (25%)	3 (75%)	4
Polymicrobial	2 (50%)	2 (50%)	4
Cutibacterium	1 (33%)	2 (67%)	3
Enterococcus species	1 (50%)	1 (50%)	2

Results, Continued

Figure 1: Parenteral Antimicrobials



Parenteral Antibiotics	• Median 42 days • Range 7-72 days
Consolidative Oral Antibiotics	• 32 (67%) received • Median 180 days • Range 9-689 days
Rifampin	• 10 (20%) received • Median 18.5 days • Range 2-245 days

Figure 2: Oral Antimicrobials

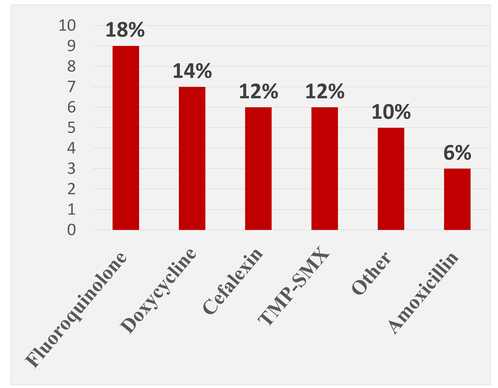
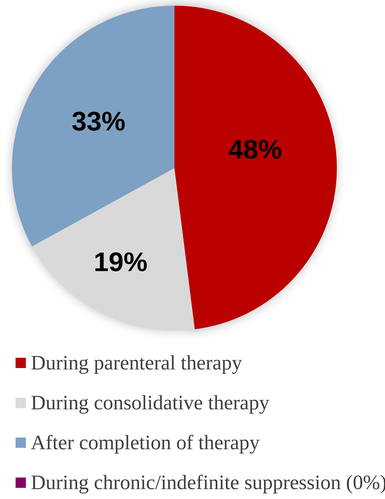


Figure 3: Failure Outcomes, N=21



Discussion

- We observed a failure rate similar to published literature despite a majority of cases in our study undergoing intervention within 3 weeks of symptom onset.
  - Need for further surgical intervention was the leading cause of failure.
  - Nearly half of failures occurred while still on parenteral therapy.
  - No failures occurred on chronic/indefinite suppressive oral antimicrobial therapy.
- *S. aureus* was the most common pathogen identified among patients with failure, suggesting this virulent pathogen may warrant careful consideration prior to DAIR.
- Further studies are needed to characterize risk factors for failure among patients undergoing DAIR.

References

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DISCLOSURE: The authors of this presentation have nothing to disclose concerning possible financial or commercial entities that may have a direct or indirect interest in the subject of this presentation.