Which DAIRs Are Doomed? Predicting Failure in Acute PJI

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Background

- Debridement, antibiotics, and implant retention (DAIR) is an attractive, bone- and implant-preserving strategy for acute periprosthetic joint infection (PJI). However, reported success rates vary widely (20–80%), leaving surgeons uncertain about which patients are truly salvageable.
- "Success rates vary wildly (20–80%). Surgeons often ask: 'Is this patient salvageable?'"

Objectives

- Identify independent predictors of DAIR failure in acute PJI and develop a validated risk model to guide clinical decision-making.

Methods

- Retrospective cohort (2012–2024)
- 1,090 consecutive DAIRs for acute PJI
- Inclusion: acute infection ≤4 weeks (index surgery or symptom onset)
- Exclusion: chronic infections, incomplete records, non-arthroplasty reconstructions

- Cohort Demographics:
- N = 1,090 acute PJI DAIRs
- 57% knees, 43% hips
- Mean age: 72.8 ± 9.6 years
- 62% female
- Median follow-up: 24 months

Results: Failure Rate

- 516/1,090 (47.3%) failed within 1 year
  - 74% required staged revision
  - 12% underwent repeat DAIR
  - Remaining: resection arthroplasty or alternative salvage procedures
- Multivariate analysis demonstrates several predictors of DAIR failure

Results: Antibiotic Findings (Route & Duration)

- Median duration ≈ 12 weeks (IQR 10–16)
- Duration not predictive (p=0.78)
- IV vs oral: no difference in failure (46.9% vs 48.2%; p=0.64)
- Tailored antibiotic regimen significantly reduced failure (39.5% vs 55.7% (p=0.002)

Predictor	Odds Ratio (95% CI)	p-value
Time to DAIR > 10 days	2.9 (1.7–4.8)	<0.001
Enterococcus species	2.8 (1.3–6.0)	0.007
Concurrent positive blood culture	2.6 (1.3–5.1)	0.006
Polymicrobial infection	2.5 (1.4–4.3)	0.003
Coag-negative *Staph*	1.9 (1.1–3.4)	0.03
CRP > 100 mg/L	1.8 (1.1–3.0)	0.02

Limitations

- Retrospective design
- Microbiology evolved over time (culture → NGS)
- Non-standardized antibiotic regimens
- Potential confounding from surgeon-specific DAIR protocols

Conclusion

- Predict failure before you cut
- DAIR can reduce surgical morbidity, preserve well fixed implants, and maintain bone stock – but only when timing and biology align
- Act swiftly, select carefully, and treat precisely

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