

## Which DAIRs Are Doomed? Predicting Failure in Acute PJI

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### INTRODUCTION:

Debridement, antibiotics, and implant retention (DAIR) remains an appealing strategy for acute periprosthetic joint infection (PJI), but outcomes are heterogeneous and patient selection remains controversial. This study aims to identify independent predictors of DAIR failure following total hip and knee arthroplasty and to develop a validated multivariable risk model to guide clinical decision-making.

### METHODS:

We retrospectively reviewed 1,090 patients who underwent DAIR for acute PJI (<4 weeks from index arthroplasty or symptom onset) between 2012–2024 at a single tertiary care center. DAIR failure was defined as the need for subsequent surgical intervention, chronic suppressive antibiotics, or persistent drainage within 1 year. Multivariate logistic regression was performed to identify independent predictors of failure. Model performance was assessed using the area under the receiver operating characteristic curve (AUC) and Hosmer-Lemeshow goodness-of-fit.

### RESULTS:

The overall DAIR failure rate was 47.3%. The following factors were independently associated with failure:

Time to DAIR >10 days (OR: 2.9, 95% CI: 1.7–4.8,  $p < 0.001$ )

Polymicrobial infection (OR: 2.5, 95% CI: 1.4–4.3,  $p = 0.003$ )

CRP >100 mg/L at time of DAIR (OR: 1.8, 95% CI: 1.1–3.0,  $p = 0.02$ )

Positive concurrent blood culture (OR: 2.6, 95% CI: 1.3–5.1,  $p = 0.006$ )

Coagulase-negative Staphylococcus as index organism (OR: 1.9, 95% CI: 1.1–3.4,  $p = 0.03$ )

Enterococcus species as index organism (OR: 2.8, 95% CI: 1.3–6.0,  $p = 0.007$ )

The predictive model demonstrated strong discrimination (AUC: 0.82) and acceptable calibration (Hosmer-Lemeshow  $p = 0.67$ ).

### DISCUSSION AND CONCLUSION:

Based on the findings of this study, DAIR failure in acute PJI is independently associated with delayed intervention, systemic bacteremia, elevated inflammatory markers, and low-virulence organisms including *Enterococcus* and coagulase-negative staphylococci. These data support a more selective approach to DAIR, prioritizing early intervention and heightened caution in the presence of high-risk microbial and systemic profiles.