Timing from Admission to Debridement, Antibiotic and Implant Retention (DAIR) Affects Treatment Success in Total Knee and Hip Arthroplasty Prosthetic Joint Infection

Samuel Benjamin Morgan, Hesham Abdelbary[1], George A Grammatopoulos[1], Simon Garceau
[1]The Ottawa Hospital

INTRODUCTION:
Debridement, Antibiotics, and Implant Retention (DAIR) in prosthetic joint infection (PJI) is commonly performed. Little is known on the influence that timing from admission to DAIR has on treatment success. We developed a study to assess the association of factors associated with failure of DAIR in total knee and hip arthroplasty (TKA, THA).
METHODS:
This is a retrospective, consecutive series from a single academic, tertiary referral centre specializing in the treatment of PJI. A search of our institutional PJI registry was conducted between 2008 and 2021 for patients having undergone DAIR following TKA or THA at a minimum 2-year follow-up. Baseline patient and surgical characteristics were collected. The primary outcome assessed was reoperation for recalcitrant PJI. Secondary outcomes assessed were: 90-day readmission, 90- day and 1- year mortality, post-operative complications, and use of chronic suppressive antibiotic therapy. Multivariate regression analysis was performed.
RESULTS:
A total of 211 patients were included (121 TKAs and 90 THAs). Mean age was 68.5 $\pm$ 11 years. Multivariate regression analysis in TKAs demonstrated that time from admission to DAIR > 48 hours was associated with a substantial increase in risk for reoperation for PJI (OR: 8.7, CI95% 1.5-51.1, p = 0.017). Post-operative complications were positively associated with DAIR >48 hours from admission (OR: 47.7, CI95% 2.7 – 827.1, p = 0.008). 90-day readmission was associated with lower preoperative Hb (OR: 1.04, CI95% 1.01 – 1.07, p = 0.014). Similarly, 1-year all-cause mortality was associated with lower preoperative Hb (OR: 1.06, CI95% 0.99 – 1.14, p = 0.082). Similar findings were noted for THAs.
DISCUSSION AND CONCLUSION:
Timing of hospital admission to DAIR impacts rate of reoperation for recalcitrant PJI and post-operative complications. Akin to the treatment of hip fractures, care should be provided within 48 hours of admission to reduce treatment failure. Surgeons should advocate for rapid OR access.

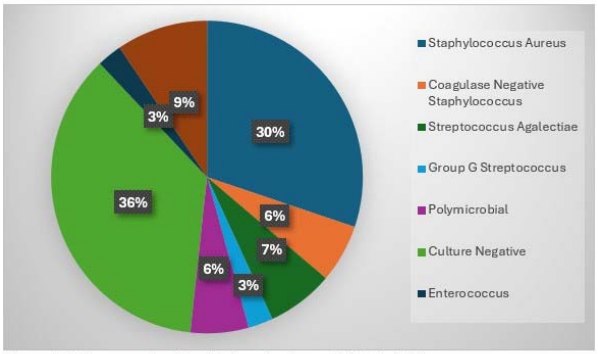

Figure 1. Microorganism identified at the time of DAIR in TKA.

Table 1. Multivariate analysis analysing timing from admission to DAIR and other variables with outcomes of interest in TKA.

Multivariate Analysis		
Outcome	**Variable**	**Significance**
Re-operation	Time from admission to DAIR (<48 vs. >48 hours)	OR: 8.69 (CI 95% 1.48-51.14), p = 0.01
	Age	OR: 0.92 (CI 95% 0.89-1.01), p = 0.12
	Pre-operative CRP	OR: 1.01 (CI 95% 100-1.02), p = 0.11
Post-operative complication	Time from admission to DAIR (<48 vs. >48 hours)	OR: 47.67 (CI 95% 2.75-827.12), p = 0.01
	Age	OR: 0.95 (CI 95% 0.89-1.03), p = 0.21
	Pre-operative CRP	OR: 1.01 (CI 95% 1.00-1.02), p = 0.20
	DAIR (primary vs. revision)	OR: 0.11 (CI 95% 0.01-1.44), p = 0.09
	Time from symptom onset	OR: 0.99 (CI 95% 0.98-1.00), p = 0.03
90-day Readmission	Lower pre-Hgb	OR: 1.04 (CI 95% 1.01-1.07), p = 0.01
	DAIR (primary vs. revision)	OR: 0.30 (CI 95% 0.05-1.93), p = 0.21
90-day Mortality	Time from admission to DAIR (<48 vs >48 hours)	OR: 7.85 (CI 95% 0.36-173.39), p = 0.19
	DAIR (primary vs. revision)	OR: 9.08 (CI 95% 0.41-200.85), p = 0.16
1-year Mortality	Lower pre-Hgb	OR: 1.06 (CI 95% 0.99-1.14), p = 0.08
	Pre-operative CRP	OR: 0.99 (CI 95% 0.97-1.01), p = 0.19