Debridement, Antibiotics, and Implant Retention (DAIR) within 48 Hours for Acute Knee Periprosthetic Joint Infection Does Not Improve Success Rate

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INTRODUCTION: Periprosthetic joint infection (PJI) is the most frequent cause of failure after total knee arthroplasty (TKA), resulting in significant morbidity. Although debridement, antibiotics, and implant retention (DAIR) is common management for acute PJI, failure remains high. Time to debridement is an important consideration, as delayed intervention may impair chance of success. However, evidence to inform guidelines is limited. This study evaluated the impact of time to DAIR from 1) first contact with the healthcare system and 2) diagnosis with acute PJI on patient outcomes.

METHODS: A retrospective study was performed using electronic medical records (EMR) from a regional health system. Patients who underwent DAIR for acute TKA PJI between 2016 and 2022 were identified via searches of the EMR. Time of first contact with the healthcare system and time of diagnosis with PJI using 2018 International Consensus Meeting (ICM) criteria were obtained from EMR and used to compute time to DAIR for each timepoint. For each timepoint, all patients were stratified between 3 groups: <24, 24-48, and >48 hours. The primary outcome was treatment failure, defined by 2019 MSIS ORT criteria. Secondary outcomes included readmissions, 90-day mortality, and need for chronic suppressive antibiotics (>1 year).

RESULTS: Overall, 166 patients were included. No demographic differences were noted between the groups (all $p>0.05$). No significant differences were seen in overall failure ($p=0.97$) or 1-year failure ($p=0.92$) between groups for time from first contact. No differences were noted in overall failure ($p=0.84$) or 1-year failure ($p=0.88$) between groups for time from diagnosis. Logistic regression demonstrated similar odds of failure regardless of timing. Greater 90-day mortality was observed in patients who underwent debridement <24 hours from diagnosis ($p<0.001$). Otherwise, time to debridement from diagnosis or first contact did not significantly affect secondary outcomes.

DISCUSSION AND CONCLUSION: Our data suggests that DAIRs in the initial 24 hours have comparable failure rates at a minimum of one year follow-up to those performed beyond 48 hours. Greater mortality in the <24-hour group likely reflects selection bias. It is likely reasonable to allow one to two days for medical optimization before performing DAIR, especially for patients at highest risk for postoperative complications.

Outcomes for Time from First Contact with the Healthcare System				
	< 24h (n = 21)	**24-48h (n = 36)**	**> 48h (n = 109)**	***P*-value**
Overall failure, n (%)	8 (38.10)	15 (41.67)	44 (40.37)	0.97
One-year failure, n (%)	6 (28.57)	9 (25.00)	31 (28.44)	0.92
90-day readmit, n (%)	6 (28.57)	11 (30.56)	41 (37.61)	0.60
90-day mortality, n (%)	2 (9.52)	2 (5.56)	4 (3.67)	0.34
Chronic suppression, n (%)	5 (23.81)	18 (50.00)	41 (37.96)	0.14
Outcomes for Time from Diagnosis with Acute Periprosthetic Joint Infection				
	< 24h (n =66)	**24-48h (n =39)**	**> 48h (n =61)**	***P*-value**
Overall failure, n (%)	27 (40.91)	17 (43.59)	23 (37.70)	0.84
One-year, n (%)	18 (27.27)	12 (30.77)	16 (26.23)	0.88
90-day readmit, n (%)	21 (31.82)	17 (43.59)	20 (32.79)	0.43
90-day mortality, n (%)	8 (12.12)	0 (0.00)	0 (0.00)	**0.001***
Chronic suppression, n (%)	22 (33.33)	20 (51.28)	22 (36.67)	0.17
*<24h significantly greater than 24-48h (p=0.024) and >48h (p=0.006)				

Table 1: Outcomes by Time from First Contact with the Healthcare System or Time from Diagnosis with Acute Periprosthetic Joint infection.