

# **Success of Debridement, Antibiotics, and Implant Retention vs. Revision in Early and Late Prosthetic Joint Infections following Primary Total Knee Arthroplasty: A Prospective, Multicenter Study of 251 Cases**

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## **INTRODUCTION:**

For surgeons treating prosthetic joint infection (PJI) in total knee arthroplasty (TKA), the indications for debridement, antibiotics, and implant retention (DAIR) are unclear. The Auckland classification divides PJIs into “early” infections occurring within one year of primary, and “late” infections occurring after one year. Previous studies have demonstrated higher success rate of DAIR within one year of the primary arthroplasty. This study aimed to compare the success rate of DAIR vs revision in “early” and “late” infections to provide guidance for choosing the preferred treatment strategy.

## **METHODS:**

The Prosthetic Joint Infection in Australia and New Zealand Observational (PIANO) is a prospective cohort study of PJIs between July 2014 and December 2017 in 27 hospitals across Australia and New Zealand. This study included PIANO patients with first time PJIs occurring after primary TKA. Baseline patient and surgical data were collected on patient enrolment and follow up completed at 1- and 2-years. Treatment success was defined as the patient being alive, free from further revision, and without clinical or microbiological evidence of reinfection at two years follow up.

Patients were classified into the DAIR and Revision groups based on the treatment strategy selected. Patients with a sinus tract or treated with non-curative intent were excluded. “Early” and “late” infections were analyzed separately. Univariate analysis was performed to compare demographic and disease specific factors compared between the DAIR and Revision groups. Multivariate binary logistic regression was performed to identify whether treatment strategy and other risk factors were associated with treatment success in “early” and “late” infections.

## **RESULTS:**

Of the 117 ‘early’ (<1 year) infections, 93 were initially managed with DAIR and 24 with revision. There were no differences in patient demographics (Age, gender, BMI, comorbidities) or disease factors (CRP on admission, organism type) between those treated with DAIR or revision. The DAIR group had a significantly greater proportion of patients with duration of symptoms less than 21 days (88.2% vs. 45.8%,  $p<0.001$ ). The treatment success rate was 56% in the DAIR group and 54% in the revision group for “early” infections ( $p=0.88$ ). No independent risk factors were associated with treatment outcome on multivariate analysis.

Of 134 ‘late’ (>1 year) infections, 96 were initially managed with DAIR and 38 with revision. Patients in the DAIR group were more likely to have CRP>65 on presentation (89.6% vs. 63.2%,  $p<0.001$ ) and duration of symptoms <21days (91.7% vs. 42.1%,  $p<0.001$ ). The treatment success rate in “late” infections was 34.4% in the DAIR group and 60.5% in the Revision group (OR 3.07  $p=0.006$ ). On multivariate analysis, Revision was associated with 2.47x higher odds of treatment success ( $p=0.04$ ) when compared to DAIR. Patients with at least one significant comorbidity (OR 2.27,  $p=0.045$ ) or with Staphylococcus aureus PJIs (OR 2.5,  $p=0.042$ ) had higher odds of treatment failure.

## **DISCUSSION AND CONCLUSION:**

In “late” PJIs occurring greater than one year following primary TKA, a treatment strategy with revision rather than DAIR was associated with greater treatment success. Patients with significant comorbidities and Staphylococcus aureus PJIs were at higher risk of failure, regardless of treatment strategy.