A Comparison Study Between One-Stage and Two-Stage Debridement, Antibiotics, and Implant Retention (DAIR) in Treating Acute Prosthetic Joint Infection in Total Hip Arthroplasty

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INTRODUCTION: Prosthetic joint infection (PJI) is a rare but devastating complication following total hip arthroplasty (THA). Revision surgery is effective for chronic PJI, however, it carries high morbidity and mortality. Debridement, antibiotics, and implant retention (DAIR) offers a less morbid option for acute PJI (aPJI), though infection control rates vary significantly from 50-90%. Emerging studies suggest repeat (two-stage) DAIR may improve infection control and over the long term can be more cost-effective than single DAIR. This study aims to demonstrate that two-stage DAIR results in higher success rates in treating aPJI compared to one-stage DAIR in THA.

METHODS: A retrospective cohort of 32 patients from a single academic institution who underwent one-stage or two-stage DAIR for aPJI between January 2013 and December 2024 was performed. The primary outcome assessed was the success rate of infection control at one year. Failure was defined as the recurrence of infection requiring additional surgery. Additional outcomes measured included microorganism, peri- and post-operative complications, and patient comorbidities.

RESULTS: Of the 32 hips treated for aPJI, 18 were treated with one-stage DAIR and 14 treated with two-stage DAIR. The overall success rate for the entire cohort was 78.1% (25/32). Although not statistically significant, two-stage DAIR produced a potential improvement in success rate of 92.9% (13/14), compared to one-stage DAIR 66.7% (12/18) (OR = 6.5, p = 0.075). There were no significant differences found regarding infecting microorganism cultures, days between index procedure and onset of PJI symptoms, or laboratory values (ESR, CRP).

DISCUSSION AND CONCLUSION: This retrospective review demonstrates observed trend towards increased effectiveness of two-stage DAIR compared to one-stage DAIR for aPJI in THA. Surgeons should consider two-stage DAIR for the treatment of aPJI in THA.

Acute PJI Hip	Single DAIR n=18	Double DAIR n=14	P-value
Days between index surgery and PJI symptom	45.9	31.8	0.067
ESR (mm/hr)	57.8	49.1	0.613
CRP (mg/dL)	11.1	7.7	0.283
Presence of gross purulence	10	8	
Cultured microorganism			
Aerobic Gram+	7	5	
Aerobic Gram -	1	1	
Anaerobic	1	1	
Polymicrobial	3	2	
No growth	6	5	
Failed DAIR	6	1	0.075, Odds Ratio: 6.5