

Reduced Reinfection Rate with Intraosseous Vancomycin Administration for Reimplantation in Two Stage Revision Total Knee Arthroplasty

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INTRODUCTION: Recurrent prosthetic joint infection (PJI) following a two-stage exchange total knee arthroplasty (TKA) is a devastating outcome that often necessitates additional surgeries and is associated with increased patient morbidity and mortality. Recent publications have shown that intraosseous vancomycin (IOV) administration reduces PJI rates after primary and aseptic revision TKA. However, little is known about the efficacy of IOV in the setting of prosthetic joint infection. The purpose of this study was to investigate if IOV administration during the reimplantation stage of a two-stage exchange TKA reduces the rate of recurrent infection compared to intravenous (IV) antibiotics.

METHODS: This was a retrospective cohort study of patients who underwent two-stage revision TKA for PJI at a single-institution, performed by 20 orthopedic surgeons from July 2016 to March 2025. One-stage exchanges and fungal PJIs were excluded. We included both first-time infections as well as recurrent PJI. Demographic data including age, sex, BMI, medical comorbidities, and surgical history was recorded for all patients. IOV patients received IV cefazolin and 500mg intraosseous vancomycin through a standardized protocol. IV patients received either IV vancomycin plus IV cefazolin or just IV cefazolin pre-operatively. Infection type, systemic host grade, and local extremity grade was also recorded according to the McPherson classification of PJI. Reinfection rates of patients who received IOV during reimplantation were compared to those that received IV antibiotic prophylaxis at 30-days, 90-days, 1-year, 2-year, and 3-year follow-up. Two-tailed independent sample t-tests were used to compare continuous variables, chi-squared analysis was used to compare categorical variables, significance set at $\alpha = 0.05$.

RESULTS: There were 254 patients with 102 patients in the IOV group and 152 patients in the IV group. There was no significant difference in average age, BMI, sex, or ASA score between two groups. Most cases were chronic infections (91.7%), with no significant differences in infection type between groups. The most common infecting microorganisms were coagulase negative staphylococci (23.2%), methicillin-sensitive staphylococcus aureus (17.3%), streptococcus species (9.1%), and culture negative (23.2%) with no significant differences between groups. The IOV group had a significantly higher rate of systemic host grade C patients (37.3% versus 21.7%, $P = 0.007$). There were no significant differences in local extremity grade between groups. There was no significant difference in rate of recurrent PJI between the two groups at 30-day (0% versus 3.3%, $P = 0.085$) and 90-day follow-up (3.2% versus 8.1%, $P = 0.172$). There was a significant reduction in the rate of recurrent PJI between IOV and IV groups at 1-year (6.1% versus 14.9%, $P = 0.049$), 2-year (9.9% versus 23.0%, $P = 0.023$), and 3-year (17.5% versus 32.7%, $P = 0.039$) follow-up timepoints.

DISCUSSION AND CONCLUSION: Intraosseous vancomycin administration during reimplantation for two-stage revision TKA led to a reduced rate of recurrent PJI at 1-year, 2-year, and 3-year follow-up compared to IV antibiotic prophylaxis alone.

Table. Outcomes

	IO Vancomycin (N = 102)	IV Antibiotic (N = 152)	Overall (N = 254)	P-Value
Reinfection After Reimplantation				
30-day	0	5 (3.3%)	5 (2.0%)	0.085
90-day	3 (3.2%)	12 (8.1%)	15 (6.2%)	0.172
1-year	5 (6.1%)	20 (14.9%)	25 (11.6%)	0.049
2-year	7 (9.9%)	28 (23.0%)	35 (18.1%)	0.023
3-year	10 (17.5%)	34 (32.7%)	44 (27.3%)	0.039
Unfortunate Outcomes				
Death Within 90 Days of Reimplantation	2 (2.0%)	0	2 (0.8%)	0.160
Amputation After Reimplantation	3 (2.9%)	11 (7.2%)	14 (5.5%)	0.170