Intraosseous Vancomycin Reduces the Rate of Periprosthetic Joint Infection Following Aseptic Revision Total Knee Arthroplasty

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INTRODUCTION: Periprosthetic joint infection (PJI) is a devastating complication following total knee arthroplasty (TKA). Prior literature supports the intraosseous (IO) delivery of vancomycin as a safe and effective technique for primary TKA. The purpose of this study was to evaluate its efficacy for aseptic revision TKA.

METHODS: A single-institution retrospective review was performed on patients who underwent aseptic revision TKA from May 2016 to October 2023. Vancomycin was administered through an intravenous (IV) route in 386 cases and via an IO infusion in 333 cases. The IV cohort received a 15mg/kg dose of vancomycin prior to skin incision. The IO cohort received a 500mg dose of vancomycin infused into the tibia after tourniquet inflation. All patients also received a weight-based dose of IV cefazolin perioperatively. Patient characteristics, surgical details, and infection-related data were extracted during chart review. PJI diagnosis was based on the 2018 Musculoskeletal Infection Society criteria. Fisher's exact tests and chi-square analyses were used to compare categorical outcomes.

RESULTS: The incidence of PJI was significantly lower in the IO cohort compared to the IV cohort at 30-day (0.3% vs 2.1%, $P = 0.03$), 90-day (0.9% vs 3.1%, $P = 0.04$), and 1-year follow-up (1.6% vs 4.9%, $P = 0.04$). There were no reported adverse reactions to vancomycin. There were no differences in the incidence of acute kidney injury (2.7% vs 2.9%, $P = 0.90$), deep venous thrombosis (1.2% vs 1.8%, $P = 0.56$), or pulmonary embolism (0% vs 0.3%, $P = 1.0$) between groups.

DISCUSSION AND CONCLUSION: Intraosseous vancomycin infusion is a safe and effective alternative to IV administration for patients undergoing aseptic revision TKA. Furthermore, IO vancomycin optimized the efficiency of vancomycin administration in this high-risk surgical cohort and resulted in a significant reduction in the rate of PJI through 1-year follow-up.

Organism	IV	IO
Methicillin-sensitive *Staphylococcus aureus*	4	2
Coagulase-negative *Staphylococcus aureus*	2	1
Methicillin-resistant *Staphylococcus aureus*	1	1
Enterobacter cloacae	2	0
Group B *Streptococcus*	2	0
Pseudomonas aeruginosa	2	0
Citrobacter koseri	1	0
Proteus mirabilis	1	0

Outcome	Post-Operative Time Frame	IV, N (%)	IO, N (%)	P-value
Periprosthetic Joint Infection	30 Day	8 (2.1%)	1 (0.3%)	**0.0331**
	90 Day	12 (3.1%)	3 (0.9%)	**0.0389**
	1 Year	15 (4.9%)	4 (1.6%)	**0.0374**
Wound Complications Not Requiring Reoperation	30 Day	7 (1.8%)	2 (0.6%)	0.1877
	90 Day	9 (2.3%)	2 (0.6%)	0.0713
	1 Year	9 (2.9%)	2 (0.8%)	0.1229
Wound Complications Requiring Reoperation	30 Day	6 (1.6%)	3 (0.9%)	0.5158
	90 Day	9 (2.3%)	5 (1.5%)	0.4218
	1 Year	9 (2.9%)	5 (2.0%)	0.5093
Cumulative Infections	30 Day	21 (5.4%)	6 (1.8%)	**0.0105**
	90 Day	30 (7.8%)	10 (3.0%)	**0.0054**
	1 Year	33 (10.8%)	11 (4.5%)	**0.0070**