Intraosseous Vancomycin Is Safe and Effective in Primary Total Hip Arthroplasty

Kwan Park[1], Charles Michael Granade, Thomas Castlen Sullivan[2], Bradley Lambert, Timothy Scott Brown, Stephen J Incavo[1], Terry A Clyburn
[1]Houston Methodist Hospital, [2]Orthopedic Surgery, Houston Methodist Hospital

INTRODUCTION:

Postoperative infection continues to be a major cause for revision in total hip arthroplasty (THA). To combat the increased incidence in methicillin-resistant *Staphylococcus aureus* (MRSA) infections, vancomycin has been added as an additional antibiotic in total hip and knee arthroplasty. Recent studies support intraosseous (IO) administration of vancomycin in total knee arthroplasty for infection prophylaxis. One study in primary THA patients has shown equal or higher tissue concentrations of vancomycin with lower systemic exposure in with IO vancomycin compared to intravenous (IV). Vancomycin prophylaxis is dependent upon adequate administration pre-operatively which can be challenging due to prolonged infusion times and busy hospital environments. Intraosseous administration eliminates the logistical difficulties with IV administration of vancomycin. This study seeks to determine if IO administration of vancomycin is a safe alternative to IV administration in primary THA.

METHODS:

A single-institution retrospective chart review from 12/2020 to 2/2024 was performed to identify patients who underwent primary THA with administration of 500 mg IO vancomycin mixed in 150 ml of normal saline injected into the greater trochanter. A total of 326 IO patients were identified which were matched to 326 patients who were administered a weight-based dose of IV vancomycin based on demographic data and baseline comorbidities. All patients received a first-generation weight-based cephalosporin (cefazolin, 1-2g IV) perioperatively. Patient charts were reviewed for wound complications, prosthetic joint infection (PJI), anesthesia complications, postoperative fractures, acute kidney injury (AKI), and rates of deep vein thrombosis (DVT) or pulmonary embolism (PE). Categorical outcomes were compared with either a Fisher's exact test or chi-square analysis and quantitative outcomes were assessed with two-tailed independent-samples t-test.

RESULTS:

At 30-day follow-up, there was 1 (0.3%) PJI in the IO group vs 2 (0.6%) in the IV group ($P = 1.0$). At 90 days, there was 1 PJI (0.4%) in the IO group compared to 3 (0.9%) in the IV group ($P = 0.63$). The incidence of DVT was 1.5% in the IO group vs 1.2% in the IV group ($P = 1.0$). The IO group had a total of 3 (0.9%) PE compared to 1 (0.3%) in the IV group ($P = 0.64$). There were no differences in wound or anesthesia complications between either group. There were no differences in AKI rates between groups (1.2% IO, 0.6% IO, $P = 0.69$).

DISCUSSION AND CONCLUSION:

This study demonstrated no difference between patients who received IO or IV vancomycin regarding rates of infection and perioperative complications. IO administration of vancomycin is effective for infection prevention without increasing complication risk in primary THA.

Outcome	Post-Operative Time Frame	IV, N (%)	IO, N (%)	P-value
Periprosthetic Joint Infection	30 Day	2 (0.6%)	1 (0.3%)	1.000
	90 Day	3 (0.9%)	1 (0.4%)	0.630
Wound Complications Not Requiring Reoperation	30 Day	0 (0.0%)	0 (0.0%)	1.000
	90 Day	0 (0.0%)	0 (0.0%)	1.000
Wound Complications Requiring Reoperation	30 Day	0 (0.0%)	0 (0.0%)	1.000
	90 Day	1 (0.3%)	0 (0.0%)	1.000

Outcome	IV, N (%)	IO, N (%)	P-value
DVT	4 (1.2%)	5 (1.5%)	1.000
PE	1 (0.3%)	3 (0.9%)	0.624
Anesthesia Complications	0 (0.0%)	2 (0.6%)	0.499