Three-Month Wound Complication and Infection Rates After Vancomycin Powder and Dilute Povidone Iodine Lavage for Infection Prophylaxis in High-Risk Total Knee Arthroplasty: A Multicenter Randomized Control Trial

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Periprosthetic joint infection (PJI) remains a devastating complication following total knee arthroplasty (TKA), placing significant burden upon patients and providers. Specific risk factors predispose certain patients to the development of PJI, and these patients may benefit from additional protocols to mitigate infection risk. This study aimed to investigate the effects of four different combinations of wound irrigation protocols for TKA patients at high-risk for infection. METHODS:

A multicenter, randomized controlled trial was performed, including only high-risk patients as defined by: over 75 years old, body mass index greater than 35 kg/m², active smoker, American Society of Anesthesiologists score greater than 2, immunosuppression, diabetes mellitus, or colonization with *Staphylococcus aureus*. A total of 1,080 patients were randomized into one of four treatment cohorts: povidone iodine and topical vancomycin powder (254 patients), povidone iodine alone (273 patients), topical vancomycin powder alone (256 patients), or saline alone (297 patients). We collected demographic and surgical data, as well as data on three-month wound complications, infections, and surgical outcomes (Tables 1 & 2).

RESULTS:

There were no differences in rates of persistent wound drainage or dehiscence across the four groups (P=0.95). There were no differences in rates of cellulitis or abscess (P=0.51, Table 2). There were no differences in 3-month infection rates across the four groups (P=0.13, Table 2), nor were there differences in the type of septic revisions performed (P=0.80, Table 2). There were no differences in aseptic revision rates across the four groups (P=0.90, Table 2). There were no differences in emergency department visits or readmissions across the four groups (P=0.46 and P=0.87, respectively, Table 2).

DISCUSSION AND CONCLUSION:

There were no statistically significant differences in PJI or other surgical outcomes following TKA among the study cohorts. Therefore, the use of such prophylactic measures including povidone-iodine and vancomycin powder can be left up to surgeon discretion.

Table 1. Baseline characteristics stratified by prophylactic treatment cohort

	Vancomycin (n = 256)	Iodine (n = 273)	Vancomycin & Iodine (n = 254)	Saline (n = 297)	P-value
Mean Age (SD)	67.71 (10.82)	66.66 (10.36)	68.15 (9.99)	67.34 (10.76)	0.413
Sex, n (%)					0.796
Female	178 (69.5)	180 (65.9)	176 (69.3)	201 (67.7)	
Male	78 (30.5)	93 (34.1)	78 (30.7)	96 (32.3)	
Race, n (%)					0.312
White	134 (52.3)	149 (54.6)	146 (57.5)	178 (59.9)	
Black	65 (25.4)	63 (23.1)	52 (20.5)	68 (22.9)	
Asian	9 (3.5)	13 (4.8)	10 (3.9)	3 (1.0)	
Other	48 (18.8)	48 (17.6)	46 (18.1)	48 (16.2)	
Diabetes, n (%)	79 (31.0)	100 (36.6)	82 (32.4)	91 (30.6)	0.417
Smoking Status, n (%)					0.988
Current	19 (7.4)	20 (7.4)	16 (6.3)	24 (8.1)	
Former	82 (32.0)	87 (32.3)	80 (31.6)	98 (33.1)	
Never	155 (60.5)	162 (60.2)	157 (62.1)	174 (58.8)	
ASA Score, n (%)					0.974
1	2 (0.8)	1 (0.4)	1 (0.4)	1 (0.3)	
2	111 (43.5)	118 (43.4)	118 (46.5)	130 (44.4)	
3	138 (54.1)	148 (54.4)	128 (50.4)	157 (53.6)	
4	4 (1.6)	5 (1.8)	7 (2.8)	5 (1.7)	
Mean BMI (SD)	34.27 (7.62)	34.70 (7.62)	34.79 (7.04)	34.44 (6.90)	0.839
	2 50 (2 20)	2 52 (2 40)	2 64 (2 27)	2 40 (2 22)	0.000

Table 2. Clinical outcomes stratified by prophylactic treatment cohort

	(n = 256)	lodine (n = 273)	Vancomycin & Iodine (n = 254)	Saline (n = 297)	<i>P</i> -value
Persistent Wound					
Drainage or	6 (2.3)	7 (2.6)	7 (2.8)	6 (2.0)	0.950
Dehiscence, n (%)					
Cellulitis or	0 (0)	2 (0.7)	2 (0.8)	1 (0.3)	0.512
Abscess, n (%)					
Infection					
Requiring Septic	3 (1.2)	0 (0)	4 (1.6)	1 (0.3)	0.125
Revision, n (%)					
Septic Revision					0.801
Type, n (%)					0.001
DAIR	2 (66.7)	0 (0)	3 (75.0)	1 (100.0)	
Two-Stage	1 (33.3)	0 (0)	1 (25.0)	0 (0)	
Aseptic Revision, n (%)	2 (0.8)	1 (0.4)	1 (0.4)	2 (0.7)	0.895
ED Visit, n (%)	8 (3.1)	11 (4.0)	13 (5.1)	8 (2.7)	0.458
Readmission, n (%)	7 (2.7)	7 (2.6)	8 (3.1)	6 (2.0)	0.869

DAIR, debridement, antibiotics, and implant retention; ED, Emergency department