Infection after Total Knee Arthroplasty: Does Timing of Preoperative Antibiotics Matter?

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INTRODUCTION:

Since the 2003 NIH consensus statement, the use of prophylactic preoperative antibiotics in total knee arthroplasty (TKA) has been the standard of care. Studies have shown that the administration of antibiotics needs to be within one hour before skin incision; however, no specific time frame has been delineated. The objective of this study was to determine if the timing of preoperative antibiotics is associated with postoperative infection after TKA.

METHODS:

A prospectively collected institutional database from a multicenter healthcare system was queried with ICD-10 codes and manually reviewed for all patients undergoing primary TKA between March 2020 and December 2020. Patient demographics, comorbidities, and infection data were collected. Univariate and multivariate analyses were performed to compare patients who received antibiotics within 60 minutes before skin incision to those who received antibiotics more than 60 minutes before skin incision. Periprosthetic joint infections (PJIs) were defined based on MSIS criteria, and superficial surgical site infections (SSIs) were defined as any infection that did not meet MSIS criteria.

RESULTS:

Of the 2,511 patients who underwent primary TKA, 19 were found to have had a postoperative infection (0.8%), 7 SSIs and 12 PJIs. Timing of antibiotic administration ranged from 5 to 125 minutes before skin incision. Our analyses demonstrated no significant difference in SSI or PJIs between those who received antibiotics within an hour of skin incision and those who received antibiotics greater than an hour before skin incision (p=0.49).

DISCUSSION AND CONCLUSION:

This study shows that timing of preoperative antibiotics is not associated with postoperative infection after TKA. Although the literature reports the necessity of preoperative antibiotics within 60 minutes of incision, our study shows that this threshold can be expanded to 2 hours. Future studies are required to determine the ideal timing for preoperative antibiotics, which may not be as important as previously understood to be.

Table 1. Univariate analysis of demographics and comorbidities

	Infection (n = 19)	No Infection (n = 2,492)	p-value
Age (years)	63.0 ± 7.2	66.8 ± 9.0	0.07
BMI (kg/m²)	31.8 ± 6.3	32.2 ± 6.4	0.78
Sex Male Female	11 (58%) 8 (42%)	924 (37.1%) 1,568 (62.9%)	0.06
Obesity	6 (31.5%)	808 (32.4%)	0.94
Anemia	6 (31.5%)	332 (13.2%)	**0.02**
Renal Failure	1 (5.3%)	183 (7.3%)	0.59
Malnutrition	1 (5.3%)	6 (0.2%)	**0.05**
Diabetes	2 (10.6%)	462 (18.5%)	0.29
MI	0 (0.0%)	23 (0.9%)	0.67
PVD	0 (0.0%)	28 (1.1%)	0.64
CVA	0 (0.0%)	32 (1.3%)	0.62
CKD	0 (0.0%)	20 (0.8%)	0.70
COPD	0 (0.0%)	57 (2.3%)	0.51
Peptic Ulcer Disease	0 (0.0%)	18 (0.7%)	0.71
Rheumatoid Arthritis	0 (0.0%)	56 (2.2%)	0.51
Smoking	8 (42.1)	787 (31.6%)	0.33
Anxiety	6 (31.6%)	293 (11.8%)	**0.01**
Depression	5 (26.3%)	252 (10.1%)	**0.02**
ESRD	0 (0.0%)	3 (0.1%)	0.88
Hypertension	12 (63.2%)	1,104 (44.3%)	0.10
Hyperlipidemia	10 (52.6%)	796 (31.9%)	**0.05**
Preoperative COVID	0 (0.0%)	29 (0.9%)	0.64
Postoperative COVID	0 (0.0%)	10 (0.3%)	0.78

Table 2. Infection frequency.

Type of infection	Frequency (%)
Superficial surgical site infection	7 (0.2%)
Periprosthetic joint infection	12 (0.4%)
Total	**19 (0.8%)**

Table 3. Univariate analysis of preoperative antibiotic administration timing.

Time between antibiotic start and surgical incision (Abx Time)	Infection (n = 19)	No Infection (n = 2,492)	p-value
≤ 60 min	19 (100.0%)	2,401 (96.3%)	0.49
> 60 min	0 (0.0%)	91 (3.7%)	

Table 4. Multivariate analysis.

Variable	OR	95% CI	p-value
Abx Time	0.99	[0.86-1.15]	0.93