Cefazolin Alone versus Cefazolin with Tobramycin or Gentamicin as Intraoperative Antibiotic Prophylaxis for Total Joint Arthroplasty

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Introduction: Prosthetic joint infection (PJI) / surgical site infection (SSI) are serious complications of total hip arthroplasty (THA) and total knee arthroplasty (TKA). Determining optimal antibiotic prophylaxis regimen to minimize the incidence of PJI/SSI is of importance. While cefazolin is the most commonly used prophylactic antibiotic used in such cases, some centers have considered adding tobramycin or gentamycin to their prophylactic regimens.

Methods: Adult primary THA and TKA patients were identified from 2010-2021 April PearlDiver M151 database. Exclusion criteria were: infectious, neoplastic, or traumatic diagnoses within 90 days preoperative or not being activity in the database ≥90 days postoperative. Intraoperative antibiotic prophylaxis regimens were determined utilizing CPT codes for intravenous cefazolin, gentamicin, or tobramycin administration.

For both THA and TKA, two sub-cohorts were created: 1) Patients who received coding for cefazolin alone, 2) Patients who received coding for cefazolin and tobramycin/gentamicin. Differences in age, sex and Elixhauser Comorbidity Index (ECI), 90-day postoperative adverse outcomes (specifically PJI/SSI), sepsis, wound dehiscence, pneumonia, urinary tract infection, acute kidney injury, and emergency department visits) were assessed with multivariable logistic regression controlling for patient age, sex and ECI (a Bonferroni correction was applied for multivariable analyses). Five-year implant survival was assessed utilizing Kaplan-Meier analysis and compared with log-rank tests.

Results Section: For THA, 32,882 patients were identified, of which prophylactic cefazolin alone was given to 30,527 (92.8%) and cefazolin+gentamicin/tobramycin was given to 2,355 (7.2%). For TKA, 119,611 patients were identified, of which prophylactic cefazolin alone was given to 110,469 (92.4%) and cefazolin+gentamicin/tobramycin was given to 9,142 (9.6%). Overall SSI rate was 1.1% for THA and 0.8% for TKA.

For analyses of both THA and TKA, antibiotic subgroups were clinically similar with regard to age, sex, and ECI. On univariable and multivariable analysis, none of the examined 90-day outcomes varied significantly (Tables 1 and 2). Five-year implant survivals were not significantly different.

Discussion: For THA and TKA, cefazolin alone versus cefazolin+gentamicin/tobramycin were not found to have differences in rates of perioperative adverse outcomes (including SSI/PJI) or five-year revision rates.

Significance/Clinical Relevance: The presented data cast doubt about the utility of adding gentamycin/tobramycin to cefazolin alone for prophylaxis with primary THA and TKA.

Table 1. Multivariable analysis of 90-day outcomes of adult patients who underwent primary total hip arthroplasty for osteoarthritis indications between 2010-2021 Q1 who received cefazolin +/- gentamicin/tobramycin compared to cefazolin alone

	Cefazolin + Tobramycin/Gentamicin [OR (95% CI)]	P-value
All adverse events	1.02 (0.87,1.19)	P=0.7908
Prosthetic Joint Infection (PJI)	2.54 (0.59,7.70)	P=0.1417
Surgical site infection	1.06 (0.71,1.54)	P=0.7574
Sepsis	0.49 (0.21,0.97)	P=0.0679
Wound dehiscence	0.82 (0.50,1.26)	P=0.3897
Pneumonia	0.86 (0.50,1.38)	P=0.5540
Urinary tract infection	1.08 (0.81,1.40)	P=0.5920
Acute kidney injury	0.79 (0.53,1.14)	P=0.2312
ED visits	0.92 (0.83,1.03)	p=0.1720

Controlled for age, sex, Elixhauser comorbidity index (ECI)
Bonferroni correction applied, p<0.0056 considered significant

Table 2. Multivariable analysis of 90-day outcomes of adult patients who underwent primary total knee arthroplasty between 2010-2021 Q1 who received cefazolin +/- gentamicin/tobramycin compared to cefazolin alone

	Cefazolin + Tobramycin/Gentamicin [OR (95% CI)]	P-value
All adverse events	1.04 (0.96,1.12)	P=0.3270
Prosthetic Joint Infection (PJI)	1.68 (0.58,3.90)	P=0.2757
Surgical site infection	1.17 (0.93,1.46)	P=0.1740
Sepsis	0.88 (0.68,1.13)	P=0.3083
Wound dehiscence	0.77 (0.61,0.99)	P=0.0381
Pneumonia	1.07 (0.85,1.32)	P=0.5660
Urinary tract infection	1.09 (0.96,1.24)	P=0.1710
Acute kidney injury	1.04 (0.88,1.22)	P=0.6620
ED visits	1.06 (1.01,1.11)	P=0.0237

Controlled for age, sex, Elixhauser comorbidity index (ECI)
Bonferroni correction applied, p<0.0056 considered significant