

Antibiotic-Loaded Bone Cement in Primary Total Knee Arthroplasty: Utilization Patterns and Impact on Complications Using a National Database

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Introduction: Routine prophylactic use of antibiotic-loaded cement in primary total knee arthroplasty (TKA) remains controversial and is currently not FDA-approved in the U.S. Its effectiveness in mitigating infection remains unclear while the high antibiotic elution may lead to other medical complications. The purpose of this population-based study was to evaluate utilization patterns of antibiotic-loaded bone cement in primary TKA, and its impact on outcomes and economic burden.

Methods: This retrospective cohort study utilized data from the nationwide Premier Healthcare claims database (2006-2016, N=1,184,270 TKA procedures). Multivariable models estimated associations between (prophylactic) antibiotic-loaded bone cement use (defined by inpatient billing) and postoperative infection, acute kidney injury (AKI), acute need for inpatient dialysis (from inpatient billing), allergic complications and those related to disturbances in the microbiome, 30-day and 90-day readmission, cost of hospitalization and length of stay (LOS). We report odds ratios (OR; or % change for continuous variables) and 95% confidence intervals (CI).

Results: Overall, antibiotic cement was utilized in 27.2% (N=322,476) of all primary TKA procedures. This increased from 17.3% in 2006 to 30.2% in 2010 and plateaued till 2016. Utilization of antibiotic cement was lower in rural hospitals (21.4%) and higher in large (>500 beds; 29.4%) hospitals. After adjusting for relevant covariates, antibiotic-loaded cement use was associated with significantly decreased odds for postoperative infection (OR=0.89; CI 0.83-0.96) and increased odds for AKI (OR = 1.06; CI 1.02-1.11). Associations with other outcomes were either statistically or clinically non-significant.

Conclusions: This is the first national study on the prophylactic use of antibiotic-loaded bone cement in primary TKA patients. With utilization rates of around 30% we found reduced odds for infection while there may be a potential increase AKI. These data highlight the need for cost-effective analyses with infection reduction weighed against serious adverse events.