

Extended Antibiotic Prophylaxis Reduces Infection Risk for Most Primary and Aseptic Revision Total Joint Arthroplasty: A Meta-Analysis

Suhas P. Dasari¹, Sanjana Kanumuri¹, JaeWon Yang¹, Paul A. Manner¹, Navin D. Fernando¹, Nicholas M. Hernandez¹
¹University of Washington, Seattle, WA.
 spdasari@uw.edu

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INTRODUCTION: There is growing interest in extended antibiotic prophylaxis (EAP) following total joint arthroplasty (TJA); however, the benefit of EAP remains controversial as there is a lack of high-quality randomized data published within the last decade examining the true potential benefit in EAP for TJA. As a result, the purpose of this investigation was to determine if there was a difference in the incidence of PJI between TJA patients who were treated with either ≤24 hours of postoperative antibiotic prophylaxis (standard of care or SoC) or EAP (>24 hours) by pooling the relevant clinical literature that directly compared the two cohorts.

METHODS: The Cochrane Database of Systematic Reviews, Cochrane Register of Controlled Trials, PubMed, MEDLINE, Web of Science, Ovid EMBASE, EBSCO, and CINAHL were queried for literature comparing outcomes of primary and aseptic revision total hip arthroplasty (THA) and total knee arthroplasty (TKA) patients who were treated with either ≤24 hours of postoperative antibiotic prophylaxis (standard of care, SoC) or >24 hours of EAP. The primary outcome was prosthetic joint infection (PJI). A pooled relative-risk random-effects Mantel-Haenszel model was implemented to compare cohorts.

RESULTS SECTION: Eighteen studies with a total 19,153 patients were included. Among all TJA cases, patients treated with EAP were 35% less likely to develop PJI relative to the SoC ($p=0.0004$). When examining primary TJA, patients treated with EAP were 39% and 40% less likely to develop a PJI for TJA ($p=0.0008$) and THA ($p=0.02$), respectively. There was no significant difference for primary TKA ($p=0.17$). When examining aseptic revision TJA, EAP led to a 36% and 47% reduction in the probability of a PJI for aseptic revision TJA ($p=0.007$) and aseptic revision TKA ($p=0.008$), respectively; there was no observed benefit for aseptic revision THA ($p=0.36$).

DISCUSSION: This meta-analysis demonstrated that patients treated with EAP were less likely to develop a PJI relative to those treated with the SoC for all TJA, primary TJA, primary THA, aseptic revision TJA, and aseptic revision TKA. There was no significant difference observed between EAP and SoC for primary TKA or aseptic revision THA.

SIGNIFICANCE/CLINICAL RELEVANCE: (1-2 sentences): Periprosthetic joint infection (PJI) remains one of the most devastating complications in total joint arthroplasty, and many have recently investigated the role of extended antibiotic prophylaxis (EAP) as a method to decrease risk. This study is the first meta-analysis to evaluate literature published after 2007 and found that EAP reduces the risk of PJI in nearly all primary and aseptic revision TJA—potentially substantiating their use in these settings.

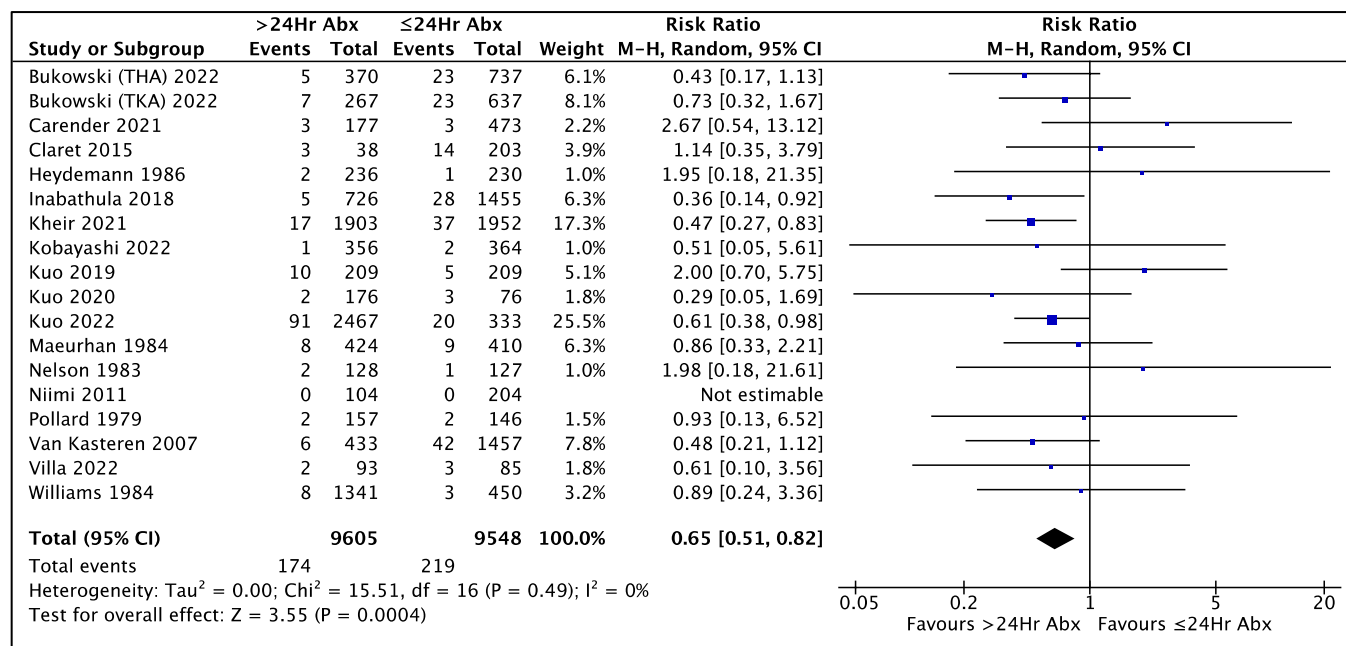


Figure 1: Forest plot demonstrating the relative risk (RR) for developing a PJI in total joint arthroplasty patients (primary and aseptic revision) treated with either extended antibiotic prophylaxis (EAP; >24 hours) or the current standard of care (SoC; ≤24 hours). This includes a summary estimate (center of the diamond) and a 95% confidence interval (width of the diamond) for the true difference. The size of each square represents the relative weight given to each respective study. For this outcome, a random effects Mantel-Haenszel (M-H) model was implemented. This plot suggests that patients treated with EAP were 35% less likely to develop a PJI relative to the SoC. For this data set, variance/heterogeneity were minimal ($\tau^2=0$, $I^2=0\%$).