

Clinical Research

Intraosseous Regional Prophylactic Antibiotics Decrease the Risk of Prosthetic Joint Infection in Primary TKA: A Multicenter Study

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Abstract

Background Recent studies have demonstrated that the administration of regional prophylactic antibiotics by intraosseous (IO) injection achieves tissue concentrations around the knee that are 10- to 15-fold higher than intravenous (IV) delivery of prophylactic antibiotics. It is currently unknown whether the use of regional

prophylactic antibiotics for primary TKA would result in a lower risk of prosthetic joint infection (PJI).

Questions/purposes (1) Is IO injection of prophylactic antibiotics associated with a decreased risk of early (< 12 months) deep PJI compared with traditional IV prophylactic antibiotics? (2) What other patient factors are associated with an increased risk of early PJI after TKA, and do regional prophylactic antibiotics influence these risk factors? (3) Can IO antibiotics be administered to all patients, and what complications occurred from the delivery of IO prophylactic antibiotics?

Methods A retrospective comparative study of all primary TKAs (1909 TKAs) over a 5-year period (January 2013 to December 2017) was performed to determine the risk of early PJI. Three primary TKAs did not meet the study inclusion criteria and were excluded from the study, leaving a total of 1906 TKAs (725 IO, 1181 IV) for analysis at a minimum of 12 months after index procedure. Both cohorts exhibited similar ages, BMI, and American Society of Anesthesiologists (ASA) grades; however, a greater proportion of patients in the IO cohort were smokers ($p = 0.01$), while a greater proportion of patients were diabetic in the IV cohort ($p = 0.006$). The PJI risk between IO and IV delivery techniques was compared while adjusting for patient demographics and medical comorbidities. Complications related to IO delivery—inability to administer via IO technique, compartment syndrome, fat embolism, and red man syndrome with vancomycin use—were recorded.

Results The delivery of regional prophylactic antibiotics by the IO technique resulted in a lower PJI risk than IV prophylactic antibiotics (0.1% [1 of 725] compared with 1.4% [16 of 1181]; relative risk 0.10 [95% CI 0.01 to 0.77];

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All ICMJE Conflict of Interest Forms for authors and *Clinical Orthopaedics and Related Research*® editors and board members are on file with the publication and can be viewed on request. Ethical approval for this study was obtained from Townsville Hospital and Health Service Human Research Ethics Committee (number HREC/17/QTHS/223).

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