

What is the Safest and Most Effective Dose of IV Dexamethasone in TKA? A Multicenter Randomized Controlled Trial

Charles Patrick Hannon¹, Anne Debenedetti², Robert L Barrack³, Young-Min Kwon⁴, Jess H Lonner⁵, Rafael Jose Sierra¹, James Irvin Huddleston⁶, Charles L Nelson⁷, Ran Schwarzkopf⁸, Gwo-Chin Lee⁹, Thomas Parker Vail¹⁰, Erik Nathan Hansen¹¹, Jeffrey A Geller¹², Craig J Della Valle¹³

¹Mayo Clinic, ²Rush University Medical Center, ³Washington University, ⁴Massachusetts General Hospital/Harvard Medical Sch, ⁵Rothman Orthopaedic Institute, ⁶Stanford Medicine, ⁷University of Pennsylvania, ⁸NYU Langone Orthopedic Hospital, Hospital For Joints, ⁹Hospital For Special Surgery, ¹⁰University of California, San Francisco, ¹¹UCSF, ¹²New York Presbyterian- Columbia University, ¹³Rush University Med Ctr

INTRODUCTION:

The purpose of this multicenter, double-blinded prospective randomized controlled trial was to determine the safest and most effective dose of intravenous (IV) dexamethasone administered during primary total knee arthroplasty (TKA).

METHODS:

Four hundred and four patients undergoing inpatient primary TKA were randomized across 11 centers to receive 4mg (n=138), 8mg (n=137), or 16mg (n=129) of IV dexamethasone intraoperatively. All sites utilized the same perioperative multimodal protocol. Opioid consumption measured in morphine milligram equivalents (MME), pain scores, nausea scores, vomiting episodes, and sleep duration were collected for 7 days postoperatively. Glucose levels were measured on postoperative day (POD) 1. The mean age was 68 years, mean body mass index was 33 kg/m², and 62% were female. Independent sample t-tests were used for continuous data and Chi-squared and Fisher's exact tests were used for discrete data. An a priori power analysis determined that 114 patients were needed per group to detect a 25% difference in cumulative 48-hour opioid consumption. Demographic characteristics were comparable between groups, suggesting successful randomization.

RESULTS:

Patients who received 16mg IV dexamethasone consumed less MME on POD1 (38 v. 37 v. 27 MME; p=0.047) and had fewer vomiting episodes (p=0.02). There were no differences in cumulative opioid consumption within the first 48 hours (p=0.24) or pain with activity on POD1 (p=0.49). The 8mg group demonstrated the lowest glucose levels at 48 hours (p<0.001). There were no differences in nausea or sleep within the first 24 hours, length of stay, cumulative opioid consumption or pain scores with activity over 7 days, or 90-day complication rates between groups.

DISCUSSION AND CONCLUSION:

High dose (16mg) IV dexamethasone in TKA leads to reduced opioid consumption and vomiting in the first 24 hours after surgery. However, outcomes including total opioid consumption, sleep, and nausea are comparable beyond 24 hours for all doses.