Impact of Intraosseous Morphine on Pain Control in Primary Total Knee Arthroplasty: A Double-Blind, Randomized Controlled Study

Devon Robert Pekas, Murillo Adrados, MAXINE LEE, Youngjae Lee, John Martino, Benjamin Ray Coobs, Joseph T Moskal

INTRODUCTION: Effective pain management following total knee arthroplasty (TKA) is crucial to optimizing patient outcomes and experience. Multimodal pain management regimens vary between institutions, with some recently implementing an intraoperative, intraosseous (IO) combined injection of morphine and vancomycin. The purpose of this study was to investigate if the use of an intraoperative, IO injection of morphine and vancomycin during primary TKA leads to improved short-term pain control in a prospective, double-blinded, randomized controlled trial.

METHODS: In this double-blind, randomized controlled trial, 100 patients undergoing elective primary TKA were prospectively enrolled. All patients received spinal anesthesia and sedation or general anesthesia combined with an intraoperative, surgeon-administered adductor canal block. Experimental patients received an intraoperative, IO injection containing 10 mg of morphine and 500 mg of vancomycin in 110 mL of normal saline. Control patients received the same injection but without morphine. All patients received 6 daily text message surveys (3 in the morning and 3 in the evening) for 14 days postoperatively to collect pain scores, morphine milliequivalent (MME) consumption, and nausea/vomiting events. Data on demographics, operative factors, post anesthesia care unit (PACU) pain scores, PACU MME consumption, and patient-reported outcomes were also collected. Linear mixed-effects (LME) and linear regression models were utilized where appropriate.

RESULTS: Following the exclusion of 11 patients (failed spinal, withdrawal, emergency surgery, medical complication, or lost to follow-up), there were 89 patients who completed the study. LME demonstrated no differences between experimental and control cohorts regarding mean daily pain scores at any time point within 14 days postoperatively ($p = 0.660$) (Figure 1). There were also no differences between cohorts regarding daily MME consumption at any time point within 14 days postoperatively ($p = 0.056$) (Figure 2). There were no differences between cohorts regarding total MME consumption or weekly MME consumption ($p \geq 0.090$).

DISCUSSION AND CONCLUSION: An intraoperative injection of morphine and vancomycin during primary TKA does not improve short-term pain scores or decrease postoperative MME consumption.

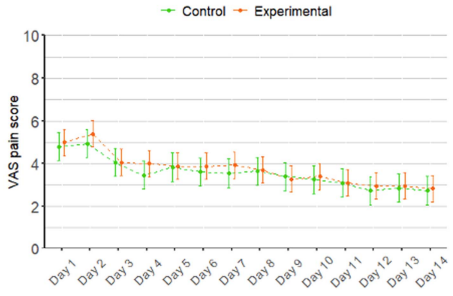

Figure 1. Visual analog scale (VAS) pain scores following elective primary total knee arthroplasty with intraoperative, intraosseous injection of morphine and vancomycin (Orange) or only vancomycin (Green)

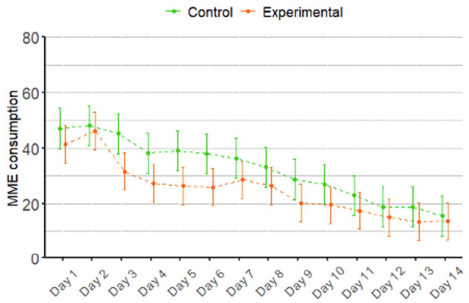

Figure 2. Morphine milliequivalent (MME) consumption following elective primary total knee arthroplasty with an intraoperative, intraosseous injection of morphine and vancomycin (Orange) or only vancomycin (Green)