

Paper #26

The Effect of Blood Pressure on Cement Depth Penetration in Tourniquet-less Total Knee Arthroplasty

Luke G. Menken, DO, MS, Jean Q. Fleuriscar, BS, Travis M. Weiner, Jose A. Rodriguez, MD

Introduction: Cement penetration into trabecular bone appears to be an important factor in determining the longevity of an implant in total knee arthroplasty (TKA). Maintenance of hypotensive anesthesia is preferred by many orthopaedic surgeons when performing tourniquet-less TKA in an effort to reduce bleeding and improve cement depth penetration (CDP), but the effectiveness of this practice is not well-established. Our study explored the effect of systolic blood pressure (SBP) at the time of cementation on cumulative tibial metaphyseal CDP. We hypothesized that increased SBP would decrease CDP.

Methods: In this retrospective consecutive cohort study, we evaluated tibial metaphyseal CDP, according to the Modern Knee Society Radiographic Evaluation System (MKSRES), on the first postoperative radiograph available for tourniquet-less TKAs performed by the senior author (n = 203; mean age = 68.1; 58.6% female; mean BMI = 30.4 kg/m²). Two independent reviewers measured each zone at the location of least CDP and the average of both readings was taken. Averages for all zones were summed to determine cumulative CDP in each patient. Using operative records, we extracted SBP at the estimated time of cementation—3/4 of the way through the surgery. Linear regression was utilized to investigate the relationship between these two variables.

Results: Among patients, mean cumulative metaphyseal CDP was 31.76mm and median SBP at cementation was 104mmHg. There was no statistically significant association between SBP at the time of cementation and CDP ($\beta = -0.0012$, $p = 0.968$, 95% CI [-0.063-0.060]). Notably, 99% of knees had measured SBP <150mmHg.

Conclusions: Cement fixation is technique dependent. In patients undergoing tourniquet-less TKA, and with a systolic blood pressure maintained below 150 mmHg, no benefit in cement penetration was evident with additional hypotension.

Notes
