Liposomal Bupivacaine and Peri-articular Injection are Not Superior to Single Shot Intra-articular Injection for Pain Control in Total Knee Arthroplasty

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Introduction: Liposomal bupivacaine has been shown to be effective in managing post-operative pain in hallux valgus and hemorrhoid surgery. However, non-industry-supported and well-powered randomized studies evaluating its efficacy in Total Knee Arthroplasty (TKA) are lacking. Our hypothesis was that liposomal bupivacaine would not decrease post- operative visual analog pain scores (VAS) or narcotic consumption in the acute post-operative period.

Methods: Two hundred seven consecutive patients were enrolled into a single-blinded prospective randomized study. We included patients undergoing unilateral TKA by five fellowship-trained surgeons with a diagnosis of osteoarthritis, rheumatoid arthritis, or post-traumatic arthritis. Patients were excluded for any other diagnosis necessitating TKA, allergy to the medications, or pre-operative opiate use. Participants received standardized pain management, anesthesia, and physical therapy. Patients were randomized intra-operatively to one of three groups: an intra-articular (IA) injection of bupivacaine and morphine at the conclusion of the procedure, a peri-articular (PA) injection of a bupivacaine and morphine, or a PA injection of liposomal bupivacaine. Post-operative pain VAS and mean morphine equivalents (MME) consumed were recorded and compared utilizing analysis of variance (ANOVA). A power analysis demonstrated that 159 patients were needed for 80% power to detect a 25% difference in VAS or MME.

Results: Patients in each study group had a mean VAS score of 3.95 (SD 2.1), 3.97 (SD 1.9). and 3.86 (SD 1.8) (p=0.94), respectively. MME consumed per day in each group was 100.7 (SD 48.4), 100.1 (SD 42.2), and 98.9 (SD 41.6) (p=0.97).

Conclusions: Liposomal bupivacaine does not alter mean pain scores or post-operative narcotic consumption in patients undergoing unilateral TKA. Further, no difference was noted in comparing patients who received a single IA injection vs. a PA injection. To our knowledge, this is the first reported study to evaluate post-operative pain control between identical IA and PA injections in patients undergoing unilateral TKA.