Intraoperative Liposomal Bupivacaine Is Associated with Reduced Opioid Use and Enhanced Recovery After Total Knee Arthroplasty: A Multi-Center Registry Study

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INTRODUCTION: With the annual volume of total knee arthroplasties (TKA) in the United States projected to exceed 1.5 million by 2050, optimizing perioperative pain control and facilitating early discharge remain clinical priorities. Liposomal bupivacaine (LB) is a long-acting local anesthetic designed to extend postoperative analgesia when administered intraoperatively. This study evaluated the effectiveness of liposomal bupivacaine versus conventional bupivacaine or ropivacaine in opioid-naïve patients undergoing primary TKA, focusing on 1) pain score improvements, 2) opioid usages, 3) functional recoveries, and 4) hospital lengths of stay.

METHODS: This prospective observational study used data from the Innovations in Genicular Outcomes Research (iGOR) registry, including patients who underwent unilateral primary TKA between September 22, 2021 and December 15, 2024. Among 225 patients analyzed, 42 received LB and 183 received conventional local anesthetics. Patients were stratified based on intraoperative analgesia (LB versus conventional bupivacaine/ropivacaine). Pain was assessed using the Brief Pain Inventory–Short Form (BPI-SF); opioid use was captured by self-report; function was measured with the Knee Injury and Osteoarthritis Outcome Score for Joint Replacement (KOOS, JR); and lengths of stay were recorded in hours. Comparative analyses were performed using generalized linear mixed-effects regressions, with significance set at $P < 0.05$.

RESULTS: The LB group showed lower average BPI-SF scores in the early postoperative period (2.6 versus 2.9, $P = 0.03$), reduced opioid use at three months (24 versus 41%, $P < 0.001$), and improved KOOS, JR scores (65.2 versus 63.9, $P = 0.004$). Patients receiving LB were discharged 5.6 hours earlier than controls (15.0 versus 20.6 hours, $P = 0.007$).

DISCUSSION AND CONCLUSION: The use of LB is associated with improved pain control, reduced opioid use, and shorter lengths of stay following TKA. These findings support its inclusion in multimodal, opioid-sparing perioperative protocols. By demonstrating meaningful benefits across several areas, this study highlights the potential of LB to advance perioperative care, facilitate early mobilization, and contribute to broader efforts to decrease opioid use after TKA.