# Liposomal Bupivacaine Does Not Decrease Postoperative Pain in Patients with Intracapsular Femoral Neck Fracture Treated with Hemiarthroplasty: A Double-Blinded Randomized, Controlled Trial

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INTRODUCTION: Liposomal bupivacaine is a long lasting local anesthetic agent developed for use in the surgical setting to help manage pain postoperatively. Recent studies have supported its efficacy following primary total joint arthroplasty, but little is known about its effectiveness in hip fracture patients. The objective of this study was to evaluate the effect of liposomal bupivacaine for patients with intracapsular hip fractures treated with hip hemiarthroplasty on: 1) postoperative pain, 2) function, and 3) overall hospital course.

METHODS:

This was a single center, randomized prospective double-blinded study of 50 patients with isolated intracapsular femoral neck fractures from 2018 to 2022. Inclusion criteria were patients 65 years or older without dementia, treated with hip hemiarthroplasty through posterior approach. The study group consisted of 25 patients treated with intraoperative Exparel injections, while the control group consisted of 25 patients treated with standard multimodal IV/oral analgesia, and an intraoperative injection of saline. Primary outcomes were visual analogue scale (VAS) pain scores taken 4, 8, 12, 24, and 48 hours postoperatively, total morphine milligram equivalents (MME) at 12, 24, and 48 hours postoperatively, delirium at 24 and 48 hours postoperatively, and time to ambulate with physical therapy. Secondary outcomes included: length of stay, discharge disposition (home vs. skilled nursing facility vs. inpatient rehab), and any adverse event or complication. Two-sample T-tests were conducted to identify differences, using a two-sided P-value level of 0.05 as statistically significant.

RESULTS: There was no significant difference found in any of the outcomes measured between liposomal bupivacaine relative to the control cohort. Most notably, there were no differences in patients' average pain scores at 4,8,12,24, or 48 hours (2.26 vs. 2.7 NRS; p=0.34), total morphine equivalents used postoperatively (11.73 vs. 9.98 MME; p=0.71), time to ambulation with physical therapy (1.08 vs. 1.44 days, p=0.07), and postoperative day of discharge (4.00 vs. 3.88 days; p=0.82).

DISCUSSION AND CONCLUSION: The results of our study suggest use of liposomal bupivacaine is not associated with significantly improved postoperative pain, function, or shorter hospital course relative to saline following hip hemiarthroplasty for femoral neck fractures. Given the cost of liposomal bupivacaine over standard postoperative pain modalities, it is worth examining its use in the setting of geriatric hip fractures.

**Table 1.** Analysis patient-reported pain score outcomes following hip hemiarthroplasty following intracapsular femoral neck fracture in Liposomal bupivacaine versus control cohorts

| | Control | Liposomal bupivacaine | p-value |
|---|---|---|---|
| Number of patients | 25 | 24 | |
| Age (in years) | 84.28 | 81.54 | 0.27 |
| Pain at 4 hours | 3.16 | 2.75 | 0.57 |
| Pain at 8 hours | 2.80 | 2.13 | 0.20 |
| Pain at 12 hours | 2.32 | 2.17 | 0.83 |
| Pain at 24 hours | 2.48 | 2.08 | 0.61 |
| Pain at 48 hours | 2.60 | 1.96 | 0.44 |
| Average Pain | 2.70 | 2.26 | 0.34 |
| Morphine Eq at 12 hours | 3.20 | 4.65 | 0.36 |
| Morphine Eq at 24 hours | 3.58 | 3.59 | 1.00 |
| Morphine Eq at 48 hours | 3.20 | 3.65 | 0.83 |
| Total Morphine Equivalent | 9.98 | 11.73 | 0.71 |
| POD first ambulated with PT | 1.44 | 1.08 | 0.07 |
| POD of discharge | 3.88 | 4.00 | 0.82 |

**Table 2.** Analysis of morphine equivalent usage, time to ambulate with physical therapy and discharge following hip hemiarthroplasty following intracapsular femoral neck fracture in Liposomal bupivacaine versus control cohorts

| | Control | Exparel | p-value |
|---|---|---|---|
| Number of patients | 25 | 24 | |
| Morphine Eq at 12 hours | 3.20 | 4.65 | 0.36 |
| Morphine Eq at 24 hours | 3.58 | 3.59 | 1.00 |
| Morphine Eq at 48 hours | 3.20 | 3.65 | 0.83 |
| Total Morphine Equivalent | 9.98 | 11.73 | 0.71 |
| POD first ambulated with PT | 1.44 | 1.08 | 0.07 |
| POD of discharge | 3.88 | 4.00 | 0.82 |

POD: post-operative day; PT: physical therapy