# Evaluation of liposomal bupivacaine in postoperative pain management of patients undergoing breast reconstruction surgery

Basem Elashal, PharmD; Ashmi A. Philips, PharmD, AAHIVP; Andrew Giaquinto, PharmD;
Navin Philips, PharmD, BS, DPLA
Hunterdon Medical Center, Flemington, New Jersey
Department of Pharmaceutical Services

## INTRODUCTION

- Liposomal bupivacaine has demonstrated evidence of long-acting postoperative analgesic control in patients that have undergone regional/localized surgical procedures
- It has also been shown to improve postoperative patient outcomes and contribute to significant cost savings
  - However, the evidence of such benefit is conflicting in breast reconstructive surgeries as no statistically significant improvement in pain outcomes has been reported
- The objective of the study is to evaluate the efficacy of liposomal bupivacaine for this indication at our institution

## METHODS

**STUDY DESIGN**

- Retrospective chart review of patients who received standard of care in 2018 versus liposomal bupivacaine in 2020 for breast reconstructive surgery

**PRIMARY OUTCOME**

- Change in the average Morphine Milligram Equivalents (MME) used by the patients receiving standard of care versus liposomal bupivacaine

**SECONDARY OUTCOMES**

- Change in average length of stay (hours)
- Average pain scores (numeric pain rating scale–NPRS) from days 1 to 4
- Change in average daily pain scores post-surgery from day 1 to day 2

| INCLUSION CRITERIA | EXCLUSION CRITERIA |
|---|---|
| ➢ 18 years of age or older<br>➢ Breast reconstruction surgery:<br>• Institution-specific standard of care in 2018<br>• Liposomal bupivacaine in 2020 | ➢ Patients who received breast reconstruction surgery outside of these timeframes |

**DATA COLLECTION PROCESS & STATISTICAL ANALYSIS**

- Electronic health record was used to identify and collect pertinent data
- Data collected included; patient demographics, comorbidities, medications prior to admission, type of surgery, opioid use, hospital length of stay, daily pain scores, and renal function
- Student's t-test was used to detect statistically significant differences in the average MME requirements, pain scores between days 1 and 2 post-surgery, and the hospital length of stay in each group

## RESULTS

**TABLE #1: BASELINE DEMOGRAPHICS (n = 78)**

| Characteristics | Results (average ± SD) | |
|---|---|---|
| | Active (n = 37) | Control (n = 41) |
| Age (years) | 55.47 ± 11.08 | 55.15 ± 12.95 |
| Female (%) | 100 | 100 |
| BMI (kg/m²) | 26.39 ± 5.74 | 27.63 ± 6.31 |
| Baseline creatinine clearance (mL/min) | 90.18 ± 33.27 | 98.19 ± 36.00 |
| Home use of pain medications (%) | 18.92 | 14.63 |
| Home use of opioid medications (%) | 5.41 | 4.88 |
| Confirmed chronic pain conditions (%) | 10.81 | 12.20 |
| Patients that received non-opioid management in the hospital (%) | 35.14 | 39.02 |

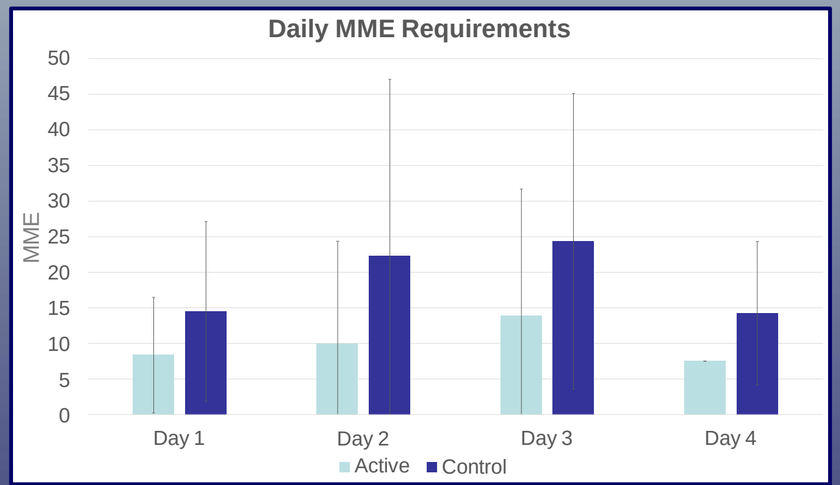


**TABLE #2: SECONDARY OUTCOME MEASURES**

| SECONDARY OUTCOMES | RESULTS (average ± SD) | |
|---|---|---|
| | Active | Control |
| Average hospital length of stay (hours) | 30.59 ± 12.25 | 41.59 ± 16.66 |
| Day 1 pain score (NPRS) | 4.90 ± 2.14 | 5.53 ± 1.99 |
| Day 2 pain score (NPRS) | 4.36 ± 2.80 | 4.95 ± 2.54 |
| Day 3 pain score (NPRS) | 6.17 ± 1.26 | 6.08 ± 1.57 |
| Day 4 pain score (NPRS) | 5 | 6.07 ± 1.68 |

## RESULTS (cont.)

**TABLE #3: PRIMARY AND SECONDARY OUTCOMES**

| Cumulative Results | Results (average ± SD) | |
|---|---|---|
| | Active (n = 37) | Control (n = 41) |
| Total Average MME requirements | 9.39 ± 11.65 | 17.86 ± 18.38 |
| Average MME difference between groups | -8.47 [95% CI: -13.42 – -3.52] | |
| | p = 0.011 | |
| Change in average length of stay (hours) | -11.386 [95% CI: -19.14 – -3.63] | |
| | p = 0.0052 | |
| Change in pain scores (NPRS) between day 1 and day 2 post-surgery | 1.21 [95% CI: 0.30 – 2.12] | 0.58 [95% CI: -0.14 – 1.30] |
| | p = 0.011 | p = 0.11 |

## DISCUSSION

- The use of liposomal bupivacaine in breast reconstruction surgery led to statistically significant decreases in the total average MME requirements, average hospital length of stay, and average pain scores between day 1 and day 2 post-surgery.
- Limitations of the study include an inability to determine pre-surgical pain scores, the large standard deviation between recorded measurements and outcomes, small sample size, lack of pain assessment scoring on the day of discharge in some cases, differences in the standard of care in 2018 compared to 2020, and the lack of documentation regarding the patient's chronic pain conditions and home medications.
- This study will be presented at our institution's next Pharmacy & Therapeutics Committee for formulary review.

## CONCLUSION

- The results seem to validate liposomal bupivacaine in breast reconstruction with the purpose of improving patient pain management and ensuring cost-savings from decreased length of stay

**DISCLOSURE**
Authors of this presentation have the following to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation: Basem Elashal, PharmD; Ashmi A. Philips, PharmD, AAHIVP; Andrew Giaquinto, PharmD; Navin Philips, PharmD, BS, DPLA