Optimizing The Use of Liposomal Bupivacaine in Shoulder Arthroplasty

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INTRODUCTION: Shoulder arthroplasty (SA) is the fastest growing joint replacement surgery in the United States, and it has been estimated that postoperative pain management is not adequately controlled in up to 80% of patients. Liposomal bupivacaine (LB) has been an addition to this multimodal pain management that has shown promise in reducing pain, narcotic consumption, and hospital length of stay in SA but there has been some controversy regarding its efficacy in the literature. This may be due to lack of standardization across studies in the utilization of LB. The purpose of this study was to identify whether there is an optimal dilution of LB required for maximal analgesia after shoulder arthroplasty in order to direct future literature and increase the strength of evidence for recommendations in clinical practice.

METHODS: A retrospective review of prospectively collected data was conducted with patients undergoing primary shoulder arthroplasty categorized into 40 mL, 60 mL or 80 mL dilutions of 20mg of LB with 0.9% normal saline. Patient reported pain scores and opioid consumption were collected at days 1, 3, 7 and 30 postoperatively. Dependence rates were reported and defined as three months of continuous opioid use. Opioid consumption was calculated using total morphine equivalents (TME) and an ANOVA was performed to compare outcomes between groups.

RESULTS: Seventy-four patients were identified and divided into one of three groups based on the dilution of LB received intraoperatively. There were significant differences in pain scores between the groups on day 7 postoperatively with the 80 mL group having significantly lowest pain scores ($p = 0.012$). No significant difference in opioid consumption was found between groups during any time point. There was a trend toward fewer opioids over the study period in the 80 mL group relative to other groups. Overall, all dilution groups resulted in low TME and postoperative pain after the 30-day study period.

DISCUSSION AND CONCLUSION: All three dilution groups achieved excellent pain control and minimal opioid usage following shoulder arthroplasty. The 80 mL dilution group showed lower pain scores at day 7 postoperatively and trended toward less opioid consumption in the first 30 days. Given our results, orthopedic surgeons can consider using any of the three LB dilutions as an effective and safe option for pain management after shoulder arthroplasty. Our study also demonstrates that the use of an 80mL dilution may help reduce opioid demand while providing exceptional postoperative pain control.