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Original article

Efficacy of liposomal bupivacaine versus bupivacaine in port site injections on postoperative pain within enhanced recovery after bariatric surgery program: a randomized clinical trial

Pearl Ma, M.D.[a,*], Aaron Lloyd, M.P.H.[b], Morgan McGrath, M.A.S.[b], Ariel Shuchleib Cung, M.D.[a], Ikemefuna Akusoba, M.D.[a], Alice Jackson, R.N.[b], Daniel Swartz, M.D.[a], Keith Boone, M.D.[a], Kelvin Higa, M.D.[a]

[a]*Advanced Laparoscopic Surgery Associates, Department of Surgery, University of California San Francisco, Fresno, California*
[b]*Fresno Heart and Surgical Hospital, Fresno, California*

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Abstract

Background: Use of liposomal bupivacaine (LB) in surgery is reported with decreased postoperative opioid requirements. The efficacy of LB versus standard bupivacaine injections at laparoscopic port sites during bariatric surgery is unknown.

Objectives: To determine whether there was a difference in postoperative hospital opioid requirements after port site injections of LB versus standard bupivacaine during laparoscopic bariatric surgeries. Primary endpoint was total in hospital opioid use expressed as morphine-equivalent use. Secondary endpoints included home opioid use, pain scores, hospital length of stay, and adverse events.

Setting: Academic-affiliated private practice.

Methods: A 2-group randomized, double-blinded trial from November 2017 to August 2018 with patients randomly assigned to receive either LB or bupivacaine alone at trocar site injections during laparoscopic Roux-en-Y gastric bypass (LRYGB) or vertical sleeve gastrectomy (VSG). All patients underwent enhanced recovery after bariatric surgery protocols.

Results: All patients undergoing LRYGB or VSG assessed for eligibility. Of 682 patients undergoing LRYGB or VSG, 231 met inclusion criteria, 52 patients excluded intraoperatively. Among 231 patients (mean age, 39.2 years; 79% women; mean body mass index 45.0), 179 patients (77%) completed the trial. Patients randomly assigned to receive either LB (n = 89) or bupivacaine alone (n = 90) at trocar site injection during LRYGB or VSG. Postoperative morphine-equivalent use were similar (LB 8.3 [standard deviation 4.0–13.9] versus bupivacaine group 7.5 [standard deviation 3.6–13.1] $P = .94$) with highest requirement in first 4 hours after surgery. There was no significant difference in length of stay, pain scores, or complications. There were more patients in the bupivacaine group that did not take pain medications on postoperative days 2 to 4 ($P = .032$, $P = .23$, $P = .005$, respectively). There were more patients in the bupivacaine group 48.1% (n = 39) compared with the LB group 34.2% (n = 27) that did not consume any narcotic tablets at home but this not found to be statistically significant (P value = .07).

Conclusions: Among patients undergoing primary bariatric surgery under enhanced recovery after bariatric surgery protocol, there was no significant difference in postoperative hospital opioid use in

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*Correspondence: Pearl Ma, M.D., University of California-San Francisco Department of Surgery, Advanced Laparoscopic Surgical Associates (ALSA), 205 E. River Park Circle #460, Fresno, CA 93720.
E-mail address: pma@fresno.ucsf.edu (P. Ma).

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those receiving LB compared with standard bupivacaine. A greater percentage of patients in the standard bupivacaine group did not require any narcotics at home, which was significant on postoperative days 2 to 4. To become completely opioid free after bariatric surgery, resources should be focused on multimodal approaches instead of reliance on type of anesthetic medication used. (Surg Obes Relat Dis 2019;■:1–9.)

Key words: Liposomal bupivacaine; Bariatric surgery; Randomized control trial; Opioids; Pain; ERAS

Bariatric surgeries are safe, effective procedures in treating morbid obesity and obesity-related co-morbidities [1,2]. As bariatric surgeries are now routinely performed laparoscopically, recovery is much faster compared with open surgery with less postoperative pain and early mobilization. However, most practices still use opioids for postoperative pain management [3,4]. Opioid use is not without potential complications; side effects of increased risk of respiratory depression, sedation, airway obstruction, altered gastrointestinal motility, and nausea can prolong postoperative recovery course, length of stay, and patient safety [4–6]. Long term, the initial exposure to opioids in an opioid naïve patient may even lead to addiction. In 1 study, the use of opioids after major or minor surgeries led to a 6% rate of chronic opioid use in those patients that were previously never exposed to opioids [7]. In bariatric patients, this risk may be even higher. Pain thresholds may be higher in patients with obesity than patients without obesity [8].

Multimodal analgesic approaches to minimize opioid use are currently underway; however, the ideal pain regimen has yet to be found [9]. Enhanced recovery after surgery (ERAS) protocols show promise in reducing length of stay and improving pain control and have been recently introduced in bariatrics [10–13]. These protocols emphasize a multimodal approach to early mobilization, nonopioid pain management, and early intake. Recently, the additional use of liposomal bupivacaine (LB) in ERAS protocols have been described with good outcomes in colorectal, urologic, gynecologic, and orthopedic surgeries [14–17].

Exparel (Pacira Pharmaceuticals, Parsippany, NJ, USA) is a Food and Drug Administration–approved LB. After injection, bupivacaine is slowly released from tissues for 72 to 96 hours, whereas conventional bupivacaine has duration of $<$10 hours [18]. In bariatric patients, there are few studies examining the use of LB. This is the first randomized, double-blind controlled study comparing the use of LB with bupivacaine alone in surgical-site infiltration in bariatric surgeries.

Our hypothesis was that surgical port site injection of LB compared with standard bupivacaine during laparoscopic bariatric surgery will reduce total hospital opioid use. Secondary outcomes will examine length of stay, pain scores, antiemetic use, perioperative complications, and postoperative home opioid use.

Methods

The study was conducted after hospital institutional review board approval and registration at National Institutes of Health clinical trials registry (clinicaltrials.gov: NCT03196505). This study was conducted without outside funding.

Design

The study was a 2-group, randomized, double-blinded trial conducted from November 2017 until August 2018.

Participants

All patients undergoing primary bariatric surgery of either laparoscopic Roux-en-Y gastric bypass (LRYGB) or vertical sleeve gastrectomy (VSG) were assessed for eligibility at time of preoperative visit. All surgeries were performed at single-center, bariatric-accredited, tertiary referral center.

Exclusion criteria included those with body mass index of $<$35 kg/m^2 or $>$60 kg/m^2, age $<$18 or $>$65 years, patients with history of substance abuse, chronic pain, opiate use within 30 days or use of narcotics $>$2 weeks in the preceding year, preoperative inability to ambulate, previous bariatric or gastric surgeries, American Society of Anesthesiologist score $>$3, inability to understand informed consent or read English, pregnant or lactating patients, prisoners, or patients with renal or hepatic failure, bupivacaine use within 96 hours before operation, or patients intolerant of opiates, nonsteroidal anti-inflammatory drugs, acetaminophen, or local anesthetics. Patients were excluded if the operation took $>$3 hours, required $>$5 surgical incisions or converted to open operation, required transfascial port site closure, placement of feeding or drainage tube, or underwent concurrent ventral hernia repair, hiatal hernia repair, extensive lysis of adhesions, cholecystectomy, subtotal gastrectomy, or fundoplication.

Interventions

LRYGB and VSG were performed in similar techniques among all 4 bariatric surgeons. A total of 100-mL mixture of either LB (Exparel) mixed with bupivacaine and saline or bupivacaine mixed with saline was injected into the 5

Table 1
Enhanced recovery after surgery (ERAS)

		ERAS
Preoperative		
	Diet	Full liquid diet day before surgery, clear liquids until 2 hr before surgery
	Pain control	Gabapentin and acetaminophen night of surgery and day of surgery
		Postoperative pain expectation handouts and counseling
Perioperative		
	Nausea and pain control	Scopolamine patch, IV dexamethasone, oral melatonin
Intraoperative	Pain control	Port site analgesic injection
		Anesthesia limits fentanyl administration to <150 μg
	Fluid management	Goal directed fluid therapy, <2 L IVF
		No urinary catheters
Postoperative	Diet	Clears immediately postoperative
	Ambulation	Ambulate within 3 hr of surgery
	Pain management	Nonopioid management first line, discontinue patient controlled analgesia
		Scheduled oral acetaminophen and IV ketorolac
	Anxiety	As needed IV lorazepam
Discharge	Pain management	Scheduled acetaminophen, limited oxycodone prescription

IV = intravenous; IVF = intravenous fluids.

laparoscopic port sites at the beginning of operation (4 working 12-mm trocars, 1 5-mm liver retractor). Each port site received 20 mL of the medication mixture. If in the treatment arm, mixture of 20 mL of LB diluted with 60 mL of .25% bupivacaine and 20 mL of saline was combined for a total of 100 mL. If in the bupivacaine group, a mixture was performed of 60 mL of .25% bupivacaine diluted with 40 mL of saline was combined for a total of 100 mL. Medication was injected circumferentially around each trocar site with 5 mL injected after needle placed preperitoneal and withdrawn to inject just below transversus abdominus plane without violation of peritoneum. The remaining 5 mL at the site was injected with needle slowly withdrawn to skin.

All patients underwent ERAS protocol already established at our hospital. Description of ERAS protocol is found in Table 1.

Randomization and Blinding

The randomization was performed by operating room nurse choosing an envelope in a stack that was previously randomized in a 1:1 ratio by computer program generator. Patient, surgeon, and all hospital staff caring for patient were blinded to study arm. Only the operating room surgical technician and nurse who prepared the medications were knowledgeable to patient study assignment. The operating room surgical technician and nurse covered the syringes containing the medications with colored sterile tape before operating surgeon entered the operating room. This impeded the surgeon performing the operation from guessing medication type as LB is slightly opaque. The surgical technician and nurse announced the medications as "study medications" when delivered to the surgeon and during "Time-Out" procedures. All other hospital staff were blinded to patient study arm as electronic medical record documentation of medication was limited to "investigational study medication." Management of additional breakthrough pain and nausea medications required outside of standard ERAS protocol were assessed and ordered by the nonoperating surgeon blinded to patient participation in the study.

Outcomes

The primary endpoint was to evaluate the total hospital opioid use after injection of LB or bupivacaine alone at laparoscopic port sites in bariatric patients undergoing VSG or LRYGB. All opioids administered were converted to morphine-equivalents units (MEU) to standardize reporting.

Secondary endpoints included home opioid use, pain scores using analogue scale, and presence of nausea requiring antiemetic, hospital course, and postoperative 30-day complications. Analogue pain rating scale ranged from 0 to 10 with 0 being no pain and 10 being the worst possible pain. Assessment of pain and nausea were performed every 4 hours after operation until discharge. Pain medication was administered by nursing and standardized for moderate to severe pain according to patient's pain scale score. Additional breakthrough pain medication was

requested per nursing discretion. Amount of antiemetics were measured as number of doses administered to the patient.

On discharge, patients received a questionnaire to rate daily pain score, daily nausea score, and number of narcotics taken each day. Patients were instructed to fill out questionnaire at the same time daily until seen at postoperative visit. Assessment of incisional/abdominal pain included a range from 0 to 10, with 0 representing no pain and 10 presenting maximum imaginable pain. Assessment of nausea and vomiting included a distress range from 0 to 4, with 0 representing no distress and 4 representing a lot of distress. Daily, the patients quantified the amount of prescription pain medication tablets were taken for incisional/abdominal pain. The total number of narcotic pills taken up until the postoperative day 7 visit was assessed. Patients also received a questionnaire rating their satisfaction with overall pain control with a range of 1 to 4, with 1 being very dissatisfied and 4 being very satisfied. Thirty-day outcomes were examined for each patient for readmission, reoperation, length of stay, and complications.

Statistical analysis

A sample size of 200 was estimated to be sufficient to provide 90% power to detect a response rate ratio for the mean postoperative MEU per day of at least .875 to 1.14; thus, providing a minimal detectable difference of 12.5%. A baseline rate of 12.14 postoperative MEU per day was based on a 6-month period (July to December 2017). Unadjusted means and standard deviations (SD) or means and interquartile ranges (IQRs) were calculated and presented for the descriptive statistics of each of the treatment arms and the combined sample, as well as for the perioperative and postoperative metrics and follow-up survey responses. For continuous variables, normality of the distribution of data was assessed and either *t* tests or Wilcoxon rank sum/Mann-Whitney *U* tests were performed, as was appropriate. Differences between group categoric variables were assessed using Fisher's Exact Test or Conditional Fisher's Exact Test. The originally planned Poisson regression model analysis was complicated by the introduction of fractional units due to the MEU conversion. Analysis of variance models were fit for the postoperative MEU and pain scores. For each model, Tukey method HSD tests were used to identify Tukey groupings. All statistical tests performed were 2-sided and a P value $< .05$ was considered statistically significant. Bootstrap resampling with N = 3000 samples was used to compute 95% confidence intervals (CI). Statistical analysis was conducted in R Statistical Software version 3.5.1 (The R Foundation for Statistical Computing, Vienna, Austria), NCSS 9/PASS 13 (NCSS, LLC, Kaysville, UT), and Excel (Microsoft Inc., Redmond, WA, USA).

Results

Two hundred thirty-one patients were randomized to receive either LB or bupivacaine at port site injections during bariatric surgery from November 2017 until August 2018. Of the 52 patients excluded from the study during their operation, the most common intraoperative exclusion was due to concurrent hiatal hernia repair (n = 21) (Fig. 1). No patients reported drug side effects requiring exclusion from study. Patient demographic characteristics are presented in Table 2.

Operative time with LB was 94.8 (SD 33.0) minutes versus bupivacaine group 95.6 (SD 36.4) minutes (P = 0.87). Type of procedure was also not statistically significant with 43.8% (n = 39) cases of LRYGB in LB versus 46.7% (n = 42) cases in bupivacaine group. Length of stay was also similar with LB 1.3 days (IQR 1.2–1.3) versus bupivacaine group 1.2 days (IQR 1.2–1.3) (absolute difference, .1; 95% CI, .0–.2; P = .32). Time to ambulation after surgery was similar at 4.7 hours (IQR 3.2–6.4) in the LB group versus 4.2 hours (IQR 3.3–5.4) in the bupivacaine group (absolute difference, .7; 95% CI, –.4 to 1.6; P = 0.29).

There was no statistically significant difference in operative time, surgeon performing case, procedure type, or length of stay. Of the 30-day readmissions, 3 patients required intravenous hydration for poor oral intake and 2 patients with abdominal pain requiring observation. One patient had portal vein thrombosis requiring anticoagulation and 1 patient with postoperative esophagogastroduodenoscopy intervention for stricture. Two patients required surgical exploration for control of bleeding. There was no statistical significance of readmissions, reoperations, complications, or interventions between the 2 groups (Table 3).

Primary outcome

Total hospital MEU requirements in both LB and bupivacaine group were equivalent. In the first 24 hours after surgery, both groups had comparable MEU requirements (Table 3). This was then examined in 4-hour blocks for the first 24 hours of postoperative hospital stay as average hospital stay was approximately 24 hours (Fig. 2). MEU requirements were similar between the 2 groups, with the greatest MEU requirements in the first 4 hours after the operation (LB 6.4 MEU versus bupivacaine group 7.4 MEU; absolute difference, −1.0; 95% CI, −2.3 to .3; P = .23) and averaging <1 MEU in both groups for remaining hospitalization.

Pain scores also followed this similar trend where greatest pain scores were in the first 4 hours (LB 4.3 score versus bupivacaine group 4.9 score; absolute difference; −.6, 95% CI, −1.1 to −.1; P = .08) after the operation and was equivalent between the 2 groups during the hospital stay. Antiemetic requirements after surgery was also similar between the 2 groups (LB 2.3 doses versus bupivacaine group 2.1 doses, absolute difference, .2; 95% CI −.3 to .7; P = .45).

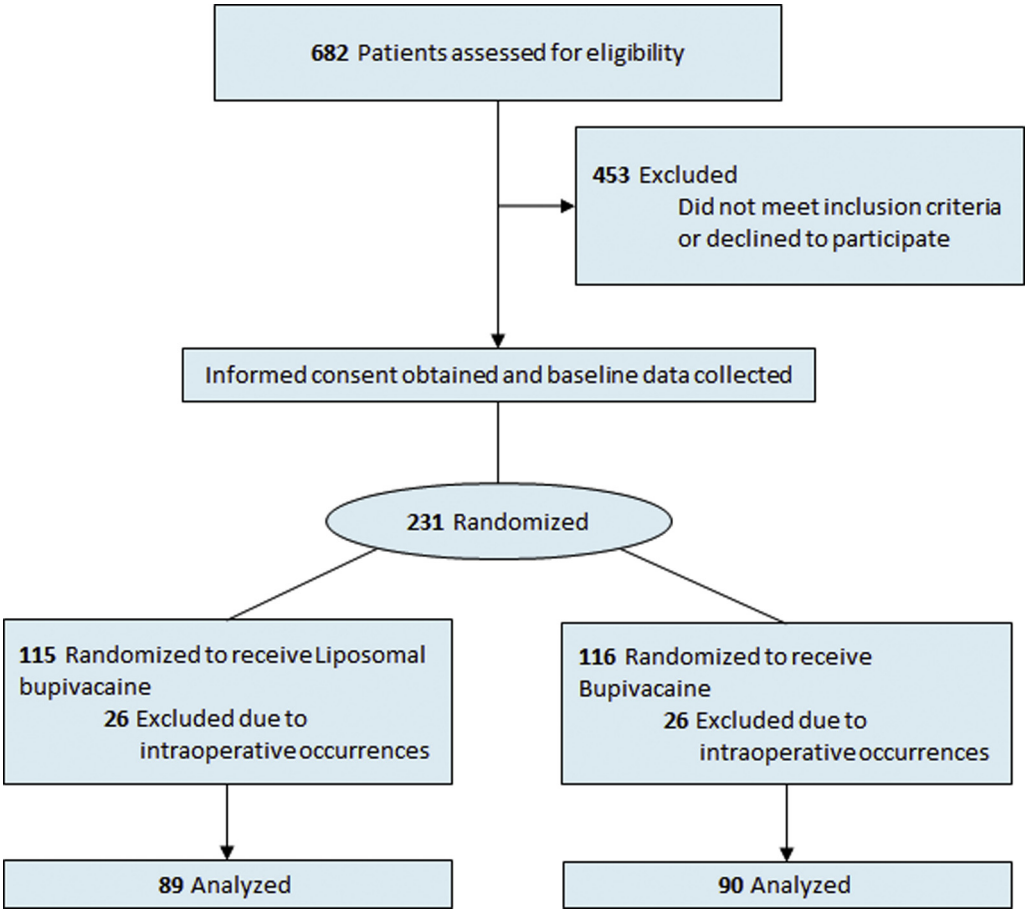

Fig. 1. CONSORT flow diagram.

As LB effects can last 96 hours after injection, analysis of number of narcotic pills taken at home was then performed based on patient surveys and 1-week postoperative survey.

Of surveys, 61% were returned (n = 109) and 89% (n = 160) 1-week postoperative surveys were completed. Overall, there were more patients in the LB group (3.7 tablets) that consumed more narcotics tablets than in the bupivacaine group (2.9 tablets); however, this was not statistically significant (absolute difference, .8; 95% CI, −.4 to 2.1; $P = .07$). In analysis of daily log of tablet use,

Table 2
Baseline demographic characteristics

Characteristics	Liposomal bupivacaine (n = 89)	Bupivacaine (n = 90)	All patients (n = 179)
Age, mean (SD), y	39.2 (9.8)	39.2 (10.1)	39.2 (9.9)
Weight, mean (SD), kg	127.9 (22.6)	122.6 (19.1)	125.2 (21.0)
Body mass index, mean (SD)*	45.4 (5.9)	44.5 (5.5)	45.0 (5.7)
Female	68 (76.4)	74 (82.2)	142 (79.3)
Diabetes	13 (14.6)	13 (14.4)	26 (14.5)
Insulin	2 (2.2)	7 (7.8)	9 (5.0)
Noninsulin	11 (12.4)	6 (6.7)	17 (9.5)
Gastroesophageal reflux	20 (22.5)	30 (33.3)	50 (27.9)
Hypertension	35 (39.3)	29 (32.2)	64 (35.8)
Obstructive sleep apnea	33 (37.1)	29 (32.2)	62 (34.6)
Hyperlipidemia	21 (23.6)	12 (13.3)	33 (18.4)
Back or joint pain	37 (41.6)	41 (45.6)	78 (43.6)

SD = standard deviation.
Data are expressed as n (%) of participants unless otherwise indicated.
* Calculated as weight in kilograms divided by height in meters squared.

Table 3
Perioperative and postoperative metrics

Metrics	Mean (SD)			*P* value among groups
	Liposomal bupivacaine (n = 89)	Bupivacaine (n = 90)	Absolute difference (95% CI)	
Procedure time, min	94.8 (32.3)	95.6 (36.4)	−.8 (−11.0 to 9.3)	.87
Time to ambulation, hr	4.7 (3.2–6.4)*	4.2 (3.3–5.4)*	.7 (−.4 to 1.6)	.29†
Length of stay, d	1.3 (1.2–1.3)*	1.2 (1.2–1.3)*	.1 (.0–.2)	.32†
Procedure, n (%)				
Roux-en-Y gastric bypass	39 (43.8)	42 (46.7)		
Vertical sleeve gastrectomy	50 (56.2)	48 (53.3)		
Morphine equivalent units, median (IQR)				
First 24 hr	8.0 (4.0–13.3)	7.5 (3.6–13.1)	−.3 (−2.6 to 1.7)	.94†
In-hospital total‡	8.3 (4.0–13.9)	7.5 (3.6–13.1)	.2 (−2.3 to 2.8)	.85†
Pain scores				
First 24 hr	3.5 (1.9)	3.8 (1.8)	−.4 (−.8 to .0)	.13†
In-hospital total‡	3.5 (1.7)	3.6 (1.9)	−.3 (−.8 to .1)	.21†
As needed antiemetic administrations				
First 24 hr	2.2 (1.6)	2.1 (1.7)	.2 (−.3 to .6)	.42†
In-hospital total‡	2.3 (1.7)	2.1 (1.7)	.2 (−.3 to .7)	.45†
	n (%)	n (%)	Absolute difference, % (95% CI)	
Patients requiring no MEUs, n (%)	7 (7.9)	4 (4.4)	3.4 (−3.6 to 10.5)	.34§
30-d readmissions	3 (3.4)	3 (3.3)	0.0 (−5.2 to 5.3)	>.99¶
30-d reoperations	2 (2.2)	0 (0.0)	2.3 (−.8 to 5.3)	.25‖
30-d complications	5 (5.6)	2 (2.2)	3.4 (−2.3 to 9.1)	.28¶
30-day interventions	1 (1.1)	0 (0.0)	1.1 (−1.1 to 3.3)	.50‖

CI = confidence interval; IQR = interquartile range; MEU = morphine-equivalents units.
* Median (IQR).
† Mann-Whitney *U* test.
‡ Postoperative, until discharge.
§ 2-Prop z test.
¶ Fisher Exact test.
‖ Conditional Fisher Exact test.

there was a significant higher amount of tablet use on day 3 for the LB group (.78 tabs) compared with bupivacaine group (.46 tabs) (absolute difference, .32; 95% CI, −.01 to .65; $P = .04$), and on day 4 (LB .59 versus bupivacaine group .28; absolute difference, .31; 95% CI .00–.61, $P = .02$). On their postoperative day 7 visit, patients were asked if they avoided any narcotics at home. We found more patients in the bupivacaine group 48.1% (n = 39) compared with LB group 34.2% (n = 27) that did not consume any narcotic tablets at home but this not found to be statistically significant (absolute difference, −.14; 95% CI −.29 to .01, $P = .07$). Overall, 41.3% (n = 66) of all patients did not require any postoperative narcotics at home.

When using 2 proportion *z* test analysis, more patients reported no narcotic daily use in the bupivacaine group on postoperative day 2 through postoperative day 4, which was statistically significant (Table 4). These data suggest higher narcotic usage in the LB group during this time period. In both groups, patients rated pain control satisfaction scores high. At 1-week postoperative follow-up visit scores were similar between the 2 groups (LB 4.2/5 score, bupivacaine group 4.1/5 score; absolute difference, .1; 95% CI, −.3 to .5; $P = .71$).

Discussion

No prior randomized controlled study has compared the effects of LB versus bupivacaine alone in bariatric patients. Recently, reports of LB injections in decreasing pain requirements after surgery has been promising and this study was to assess if this was applicable in our bariatric patients. In this double-blinded, randomized control trial, patients undergoing LRYGB or SG received intraoperative port site injection of either LB or bupivacaine alone. We found there was not a significant difference in hospital opioid requirements between the 2 groups. In addition, we also found postoperative pathways, including length of stay, complications, antiemetic requirements, and patient satisfaction scores, were also similar.

More importantly, the posthospital course may shed light into the true effect of the study. Unexpectedly, we found that more patients in the bupivacaine group reportedly did not consume any opioids after discharge from the hospital. This was found to be significant on postoperative days 2 through 4. In addition, we found a higher rate of opioid usage at home in the LB group, especially on postoperative days 3 and 4. This finding was interesting as the effects of

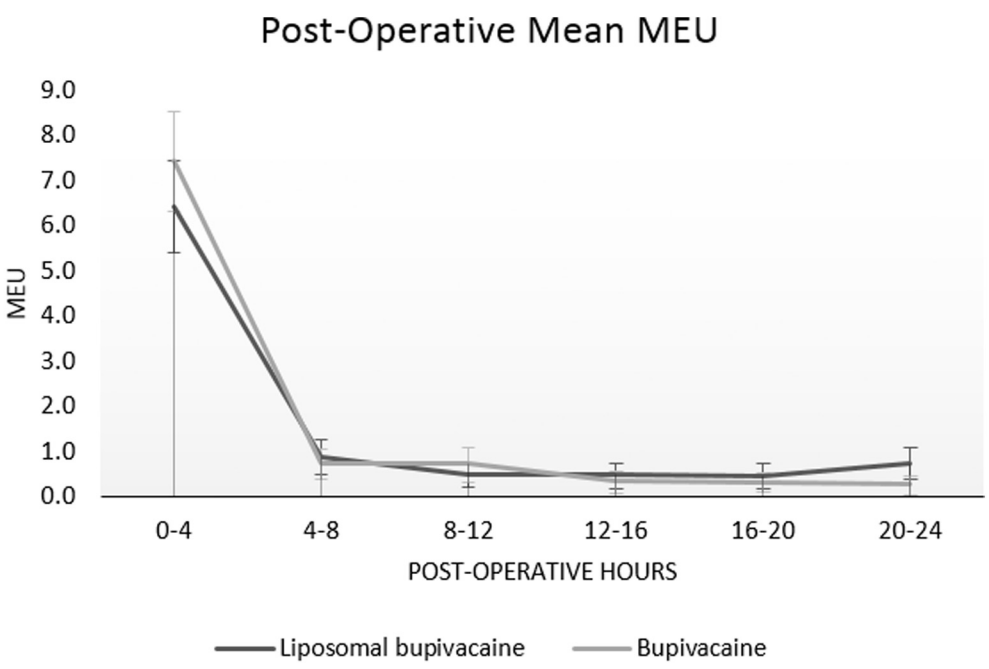

Fig. 2. Postoperative mean morphine equivalent use in 4-hour blocks.

LB can last up to 72 to 96 hours and therefore the effect of the medication in decreasing opioid use would be most pronounced during this time period [18]. We can speculate that with medication wearing off it may create an unexpected new baseline of pain that was not experienced the first few days after surgery and patients had higher pain requirements.

Our results differ than those of Bhakta et al. [19] and Robertson et al. [20] who found the use of transversus abdominis plane (TAP) blocks with LB in bariatric patients decreased postoperative hospital narcotic use. However, our methods differed as we chose to compare port site injections instead of TAP blocks, which we felt was more reproducible as TAP blocks can have more variability in injection techniques [21]. In addition, our study also used bupivacaine injections as a control instead of testing against a placebo. Comparing LB with bupivacaine has been studied in other surgical fields, however, has been deemed low quality of evidence [22]. Although there may be a role in using TAP blocks in bariatric patients, there is conflicting evidence on whether there is a significant pain reduction in TAP blocks versus trocar site infiltration [21,23,24]. Currently, there are no head-to-head comparison trials to compare directly our outcomes.

Overall, our length of stay in both groups was lower than another prospective study with established ERAS protocols

Table 4
Proportion of Patients Not Requiring Opioids

	No./n (%)		Absolute Difference, % (95% CI)	p-value*
	Liposomal bupivacaine	Bupivacaine		
Day 1	28/43 (65)	17/30 (57)	8 (-14 to 31)	0.27
Day 2	26/53 (49)	37/54 (69)	-19 (-38 to -1)	***0.032***
Day 3	28/54 (52)	39/54 (72)	-20 (-38 to -2)	***0.023***
Day 4	31/52 (60)	45/54 (83)	-24 (-40 to -7)	***0.005***
Day 5	40/51 (78)	43/49 (88)	-9 (-24 to 5)	0.12
Day 6	35/39 (90)	33/41 (80)	9 (-6 to 25)	0.14
Day 7	19/22 (86)	21/23 (91)	-5 (-23 to 13)	0.30
Day 8	7/8 (88)	7/7 (100)	-13 (-35 to 10)	0.17
Total Days	217/325 (67)	245/315 (78)	-11 (-18 to -4)	***0.002***

* 2-Prop z test.

(1.2–1.3 compared with 2.1–2.9 d) [21]. We attribute our low rates of length of stay and overall low opioid use more to the success of our enhanced recovery after bariatric surgery (ERABS) program than the type of analgesic medication injected. Before implementation of ERABS, all patients routinely received narcotics and ordered patient-controlled analgesia. After ERABS, we were able to discontinue patient-controlled analgesia use and found a similar rate of patients (4%–8%) who were able to be completely opioid free during their hospital stay.

In addition, our data suggest the average number of opioid pills required after discharge was <5 pills. Current guidelines recommend a prescription of 15 opioid pills to minimize opioid dependency [25]. Longer follow-up may address whether this leads to overall less opioid dependency. However, studies suggest less exposure to narcotics will reduce de novo opioid dependency and the potential for chronic opioid use [7,26]. This benefit may be seen even in those bariatric patients with preoperative opioid use. Despite adequate weight loss and improvement in musculoskeletal pain and other obesity-related pain, inducing co-morbidities, these patients were found to have an greater amount of opioid use several years after their bariatric surgery [27]. Overall, the goal to become completely opioid free after bariatric surgery relies on a multimodal approach and combination of different adjuncts instead of reliance on one particular injection technique or type of anesthetic medication used.

Limitations

Our study has several limitations. First, administration of study medications may have slight variation between surgeons. However, we tried to minimize this by using a larger volume for local spread to the neurovascular plane and surgeons often assisted each other in surgeries so there was less variability in technique. Second, our strict patient selection criteria may not be generalized to typical bariatric patients seen in different regions. Third, our analysis of home narcotic use was limited to returned surveys that depended on patient recollections of opioid tablet use, therefore introducing a potential recall bias. Although we performed an additional survey at the 1-week postoperative visit, we still only had 89% return of surveys with some patients missing appointments.

Conclusion

Among patients undergoing bariatric surgery under ERABS protocol, there was no significant difference in postoperative hospital opioid use in those receiving LB compared with standard bupivacaine injections. A greater percentage of patients in the standard bupivacaine group did not require any narcotics at home, on postoperative days 2 to 4, but overall was not found to be significant. To become completely opioid free after bariatric surgery, resources should be focused on multimodal approaches and combination of different adjuncts instead of reliance on one particular injection technique or type of anesthetic medication used.

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Disclosures

The authors have no commercial associations that might be a conflict of interest in relation to this article.

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