

Liposomal Bupivacaine Infiltration and Transversus Abdominis Plane Block versus Standard of Care for Post Caesarean Pain Control: A retrospective chart review

Authors: Ellie Ganz; Darren Adams, MD³; Rose Maxwell⁴; Theresa Roby, RN⁵; Marilyn J Kindig, DO¹

1 Wright State University, Dayton, Ohio, USA

2 Southern Ohio Medical Center, Portsmouth, Ohio, USA

INTRODUCTION

Methods for reducing opiate use and providing satisfactory pain control after Cesarean include:

- Different anesthesia delivery techniques (TAP block, intrathecal morphine, and wound infiltration),
- Different medications or formulations (0.25% bupivacaine, tramadol, liposomal bupivacaine), and
- Changing institutional opiate prescribing guidelines to achieve desired results.

Liposomal bupivacaine (LB; Exparel 1.3%) is an extended-release, local anesthetic administered perioperatively for management of postoperative pain.

When used as a liposomal suspension, bupivacaine has a fast onset of action with a duration up to 72 hours.

AIM

To compare the anesthetic methods of wound infiltration and TAP using liposomal bupivacaine against the standard of care, postoperative opiates in their effectiveness at controlling pain and reducing opiate use after Cesarean by comparing pain scores, amount of opiates used post-op, the effect of tubal ligation on medication used and the impact of education level and previous substance abuse history.

METHODS

- Retrospective study of 402 medical records of women delivering by Cesarean from January 2018 - January 2019 at a rural hospital in southern Ohio.
- Grouped based on peri-operative anesthesia type-routine spinal (served as control), wound infiltration with liposomal bupivacaine (LB INF), and TAP with liposomal bupivacaine (LB TAP).
- All women received scheduled acetaminophen and NSAIDs but opiates were only given when requested.
- Data was collected on the amount of pain medication taken post-operatively (measured as morphine milligram equivalents (MME)) and daily pain scores.
- The effect of a tubal ligation and history of substance abuse were analyzed to determine their impact on pain, opiate use and hospital stay length.

CONCLUSIONS

LB infiltration and LB TAP significantly reduced the amount of pain medication used post-Cesarean compared to the SOC group and resulted in lower pain scores compared to the SOC group.

A tubal ligation had no effect on pain medication or pain scores whereas a substance abuse history was associated with more opiate use, higher pain scores and longer hospital stays.

Patients who only graduated from high school or less took more opiates

RESULTS

- Groups- similar for race, primary Cesarean delivery, tubal ligation performed at the time of surgery, and history of substance use.
- Groups differed on highest level of education with fewer college graduates in the SOC group.
- Education level was used as a covariate in the analyses for MME and pain scores. (Table 1).

Table 1. Demographic and Clinical Characteristics by Anesthesia Type

	SOC / Control (n=110)	LB Infiltration (n=185)	LB TAP (n=107)	p
Maternal age	25.7±5.5	26.8±5.6	27.4±5.6	<.08
Race				ns
African American	1.8% (2)	0.5% (1)	2.8% (3)	
Caucasian	97.3% (107)	97.8% (180)	97.2% (104)	
Other	0.9% (1)	1.6% (3)	0	
Highest level of education				<.001
11 th grade	20.9% (23)	10.4% (19)	5.6% (6)	
High school	56.4% (62)	46.4% (85)	52.3% (56)	
Technical School	5.5% (6)	3.8% (7)	1.9% (2)	
College	17.3% (19)	39.3% (72)	40.2% (43)	
History of substance use	26.4% (29)	23.0% (42)	23.4% (25)	ns
History of opiate use	51.7% (15)	45.2% (19)	48.0% (12)	ns[MR1]
Primary Cesarean	56.9% (62)	45.7% (84)	57.9% (62)	<.07
Tubal ligation at time of surgery	22.7% (25)	32.4% (60)	32.7% (35)	ns

- Both the LB infiltration and LB TAP groups had significantly lower total MME and average MME per day than the SOC group (Table 2)
- Patient reported pain scores on POD0 were lower in the LB infiltration group, while pain scores on POD1 were lower in both LB infiltration and LB TAP groups than in the SOC group.
- For patients who remained in the hospital on POD2 (n=172), the difference in pain scores was not significant, although the LB infiltration group continued to report the lowest pain scores.
- Total opiates used did not differ for patients who had a tubal ligation at the time of surgery versus those who did not have a tubal ligation (t= -0.60; p< .56).
- Patient reported pain scores for POD0, POD1, and POD2 were not different for women who had a tubal ligation at the time of surgery versus those who did not have a tubal ligation (POD0: t= -0.74; p<.46; POD1: t= -0.24; p<.81; & POD2: t= -0.67; p<.51).

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Table 2. Primary and Secondary Outcomes by Anesthesia Type.

Outcome	SOC (n=110)	LB Infiltration (n=185)	LB TAP (n=107)	p
Total pain medication used (MME) *	64.4±24.4	25.5±51.5 ^b	24.9±42.2	<.001
Average pain medication used/day *	25.8±8.5	9.8±18.9 ^b	9.9±15.6 ^b	<.001
Percent of women with 0 MME	0	55.1% (102)	42.1% (45)	<.001
Patient reported pain – POD0 *	5.9±1.5 ^b	4.6±1.7 ^a	5.5±1.6 ^b	<.001
Patient reported pain – POD1 *	6.3±1.4 ^a	5.3±1.7 ^b	5.6±1.7 ^b	<.004
Patient reported pain – POD2 *	6.3±1.6	5.5±1.7	5.7±1.9	<.30
Length of stay (days)	2.5±0.5 ^a	2.4±0.5 ^b	2.3±0.5 ^b	<.02

* Analyses included education level as a covariate.

(^a) denotes the group that was significantly different from the other group/s (^b).

- Patients with a history of substance use had higher amounts of opiate use regardless of anesthesia group. (See Table 3)
- Patients with a history of substance use also reported higher pain scores at all timepoints regardless of anesthesia group with one exception for the SOC group on POD2.
- Average length of stay for women with a history of substance use (2.6±0.6) was significantly higher than for women without a history of substance use (2.3±0.5; p<.001). Women with a history of substance abuse were more likely to leave the hospital after POD2 (62.5%) than women without a history of substance use who were more likely to leave the hospital after POD1 (61.5%; p<.001).

Table 3: The Impact of History of Substance Use on Opiate Use and Pain Scores.

Outcome	SOC	LB Infiltration	LB TAP	p
Total opiate use (MME)				SU: <.001
No History of SU	59.7±20.4	19.5±40.0	22.0±40.3	Anes: <.001
Has History of SU	77.2±30.0	44.9±76.5	34.4±47.3	SU x Anes: <.55
Average opiates used per day (MME)				SU: <.03
No History of SU	24.3±7.9	8.0±16.2	8.9±15.0	Anes: <.001
Has History of SU	29.7±9.1	15.8±25.5	13.3±17.3	SU x Anes: <.73
Percent of women with 0 MME				Anes: <.001
No History of SU	0	73.9% (17)	26.1% (6)	SU (Infiltr): <.02
Has History of SU	0	68.3% (84)	31.7% (39)	SU (TAP): <.03
Pain scores – POD0				SU: <.001
No History of SU	5.7±1.6	4.3±1.6	5.1±1.4	Anes: <.001
Has History of SU	6.6±1.3	5.8±1.7	6.7±1.8	SU x Anes: <.31
Pain scores – POD1				SU: <.001
No History of SU	6.1±1.5	5.1±1.6	5.3±1.6	Anes: <.01
Has History of SU	6.7±1.3	6.3±1.5	6.4±1.8	SU x Anes: <.001
Pain scores – POD2				SU: <.01
No History of SU	6.3±1.7	5.2±1.6	5.3±1.7	Anes: <.28
Has History of SU	6.1±1.4	6.4±1.5	6.5±2.0	SU x Anes: <.05
Length of Stay				SU: <.001
No History of SU	2.5±0.5	2.3±0.5	2.3±0.5	Anes: <.15
Has History of SU	2.6±0.5	2.6±0.5	2.6±0.6	SU x Anes: <.52

SU: Substance use main effect; Anes: Anesthesia group main effect; SU x Anes: Substance Use by Anesthesia group interaction effect

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CONTACT INFORMATION

Marilyn.Kindig@wright.edu