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Association Of Patient Demographic, Physical, And Clinical Characteristics With Prolonged Bladder Catheterization Time Following Cesarean Delivery: A Single Center Study

Schuster J, Stacey JK, Hofkamp MP
Baylor Scott & White Medical Center – Temple

BACKGROUND

- Prolonged bladder catheterization → increased risks of urinary tract infections, patient discomfort, delayed recovery, and prolonged hospital stays.¹
- Standard practice of catheterization in cesarean deliveries to prevent bladder distention and manage urinary output
- Limited data on the factors influencing the duration of catheter use.

HYPOTHESIS

We hypothesized that patients who received an increased dose of intrathecal bupivacaine would have prolonged bladder catheterization times.

METHODS

- Electronic medical records were manually inspected for patients with cesarean delivery (CD) from January 1, 2023 to December 31, 2023.
- Inclusion criteria: Patients who had CD with single injection spinal or combined spinal anesthesia with complete bladder catheterization data
- Patients in the top one third and bottom one third of bladder catheterization times were included in the final analysis.
- Exclusion criteria: Patients who attempted labor, underwent general anesthesia during CD, and patients in the middle third of bladder catheterization times



RESULTS



- 839 cesarean deliveries → 492 had spinal or CSE → 366 met inclusion criteria → 233 in final analysis
- Odds ratio of 0.05 mg increase in intrathecal morphine was 2.91 (95% CI 1.37 – 6.15; p <0.01).
- Odds ratio of 2.5 mg increase in intrathecal bupivacaine was 0.70 (95% CI 0.4 – 1.21; p 0.2)
- C-statistic: 0.65

Multivariate logistic regression

Variable	Units	Odds ratio	95% Confidence intervals		P value
Age	2 years	1.07	0.97	1.19	0.18
Body mass index	2 kg/m ²	1.04	0.97	1.12	0.29
Multiple gestation		1.97	0.62	6.27	0.25
Combined spinal epidural anesthesia vs single injection spinal anesthesia		1.23	0.69	2.20	0.48
Intrathecal bupivacaine	2.5 mg	0.70	0.40	1.21	0.20
Intrathecal morphine	0.05 mg	2.91	1.37	6.15	0.005
Operative time	5 minutes	1.08	0.98	1.18	0.12

Bivariate analysis

Variable	Shorter bladder catheterization time cohort (N=120)	Longer bladder catheterization time cohort (N=113)	P value
Race			0.73
American Indian or Alaskan Native	1 (1%)	1 (1%)	
Asian	2 (2%)	6 (5%)	
Black or African American	22 (18%)	22 (19%)	
Hispanic	28 (23%)	28 (25%)	
Native Hawaiian or Other Pacific Islander	3 (2%)	3 (3%)	
White or Caucasian	64 (53%)	53 (47%)	
Age (years) (median (IQR))	29 (26-34)	31 (27-34)	0.09
Height (cm) (median (IQR))	162.6 (157.5-167.6)	160.0 (157.5-167.6)	0.69
Weight (kg) (median (IQR))	90.2 (77.5-107.0)	91.6 (81.9-109.9)	0.23
Body mass index (kg/m ²) (median (IQR))	35.0 (30.6-40.0)	35.0 (30.6-40.7)	0.14
Gravidity (median (IQR))	3 (2-4)	3 (2-4)	0.78
Parity (median (IQR))	1 (1-2)	1 (1-2)	1.00
Multiple gestation (yes)	5 (4%)	11 (10%)	0.09
Gestational age (weeks) (median (IQR))	38.0 (36.0-39.0)	38.1 (36.3-39.0)	0.96
History of cesarean delivery (yes)	77 (64%)	68 (60%)	0.53
Month of academic year (median (IQR))	5 (3-8)	6 (3-8)	0.70
Emergency obstetric indication for cesarean delivery (yes)	4 (3%)	7 (6%)	0.36
Anesthesia technique			0.16
Single injection spinal	63 (52%)	49 (43%)	
Combined spinal epidural	57 (48%)	64 (57%)	
Intrathecal bupivacaine 0.75% dose (mg) (median (IQR))	11.6 (10.5-12.0)	11.2 (10.5-12.0)	0.31
Intrathecal morphine			0.008
0.15 mg	107 (89%)	86 (76%)	
0.20 mg	13 (11%)	27 (24%)	
Operative time (minutes) (median (IQR))	46 (38-55)	49 (40-61)	0.04
Quantitative blood loss (ml)	456 (283-635)	523 (337--654)	0.28
Intraoperative and postoperative morphine milligram equivalent (mg) (median (IQR))	0 (0-20)	0 (0-20)	0.46
Time from bladder catheter placement to removal (hours) (median (IQR))	7.0 (6.6-7.5)	13.2 (10.7-17.2)	<0.001*



DISCUSSION & CONCLUSIONS

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- Patients who had 0.2 mg of intrathecal morphine were 190% more likely to be in the longer catheterization cohort compared to patients who had 0.15 mg of intrathecal morphine (independent association)
- An increased dose of intrathecal bupivacaine was not independently associated with prolonged bladder catheterization times
- The results of this study provide further evidence of the benefits of lower intrathecal morphine doses
- Limitations of this study include lack of data on micturition times vs catheter removal times to evaluate for urinary retention

REFERENCES

1. Macones GA, Caughey AB, Wood SL, et al. Guidelines for postoperative care in cesarean delivery: Enhanced recovery after surgery (ERAS) society recommendations (part 3). American Journal of Obstetrics and Gynecology. 2019;221(3). doi:10.1016/j.ajog.2019.04.012