

Labor epidural catheter administration of lidocaine for intrapartum cesarean delivery: incidence of exceeding recommended dosages based on ideal body weight at a single center

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Background and Hypothesis

- The incidence of exceeding recommended lidocaine dosing guidelines for patients who have activation of indwelling labor epidural catheters for intrapartum cesarean deliveries is unknown.
- We sought to identify factors that predict patients who receive twice the recommended dose of lidocaine when using ideal body weight.
- We hypothesized that patients with a higher BMI are at increased risk of excessive lidocaine dosing.

Study Design: Retrospective Chart Review

Methods

- Inclusion criteria: patients with administration of lidocaine via epidural catheter for intrapartum cesarean deliveries at our hospital from **7/1/2019 to 6/30/2024**
- Exclusion criteria: patients receiving lidocaine with epinephrine or bicarbonate
- We considered a patient who received **more than 4.5 mg/kg based on ideal body weight** to have exceeded recommended dosing guidelines
- Data was entered directly into REDCap and exported for statistical analysis

Results

- 503 patients were included in the final analysis
- **417 (83%)** and **235 (47%)** received more than **4.5 mg/kg** and **7.0 mg/kg** of lidocaine administered through their epidural based on IBW, respectively
- Neither BMI nor race/ethnicity were associated with increased risk of exceeding recommended lidocaine dosing guidelines
- Compared to patients in the low dose lidocaine cohort, patients in the high dose cohort
 - Had lower parity
 - Were less likely to have an emergency obstetric indication for cesarean section
 - Were less likely to have conversion to general anesthesia
 - Had a longer time from last epidural catheter placement to entering the operating room
 - Had a longer time from entering OR to skin incision

Table 1. Demographic, physical, and clinical characteristics of the cohorts

Variable	Received greater than 4.5 mg/kg (IBW) lidocaine (N=417)	Received 4.5 mg/kg (IBW) or less lidocaine (N=86)	P value
Race/Ethnicity ^a			0.15
<i>American Indian or Alaskan Native</i>	1 (0.2%)	0	
<i>Asian</i>	7 (1.7%)	3 (3.5%)	
<i>Black or African American</i>	87 (21.0%)	21 (24.4%)	
<i>Biracial</i>	3 (0.7%)	0	
<i>Hispanic</i>	146 (35.2%)	28 (32.6%)	
<i>Native Hawaiian or Other Pacific Islander</i>	6 (1.4%)	0	
<i>Some other race only</i>	0	2 (2.3%)	
<i>White or Caucasian</i>	165 (39.8%)	32 (37.2%)	
Month of academic year (median (IQR))	6 (3-9)	7 (3-10)	0.51
Age (years) (median (IQR))	28 (23-32)	27 (22-32)	0.58
Height (cm) (median (IQR))	160.0 (154.9-165.1)	160.0 (154.9-165.1)	0.60
Weight (kg) (median (IQR))	92.8 (80.2-108.0) ^b	88.0 (76.2-101.7) ^c	0.07
BMI (kg/m ²) (median (IQR))	36.3 (31.4-40.9)	35.5 (28.9-39.8)	0.10
Gravidity (median (IQR))	1 (1-2)	2 (1-4)	0.09
Parity (median (IQR))	0 (0-1)	0 (0-2)	0.05^d
Gestational age (weeks) (median (IQR))	39.0 (37.4-39.9)	38.8 (37.1-39.9)	0.50
Emergency obstetric indication for cesarean delivery (yes)	33 (7.9%)	23 (26.7%)	<0.01*
Conversion to general anesthesia (yes)	51 (12.2%)	20 (23.3%)	<0.01*
Time from last epidural placement to entering operating room (minutes) (median (IQR))	481 (273-771)	350 (176-594)	<0.01*
Time from entering operating room to skin incision (minutes) (median (IQR))	22 (17-29)	18 (12-25)	<0.01*
Total dose of lidocaine (mg) (median (IQR))	400 (340-500)	200 (200-200)	<0.01*
Total dose of lidocaine (mg/kg) (IBW) (median (IQR))	7.3 (6.0-8.6)	3.6 (3.1-4.0)	<0.01*

a. Two patients had no data, b. N=414, c. N=85, d. less than 0.05,

Discussion

- Most patients exceeded the recommended lidocaine dose of 4.5 mg/kg and almost half exceeded the 7.0 mg/kg dose.
- Surprisingly, high BMI was not associated with increased risk of exceeding recommended lidocaine dosing guidelines based on IBW.
- Inverse correlation between high lidocaine dose and emergency indication for c-section suggests that patients had prompt conversion to general anesthesia after a brief attempt at catheter activation.
- Our study was not sufficiently powered to detect the incidence of local anesthetic toxicity.
- Future work may involve seeking multidisciplinary consensus to use epinephrine with lidocaine unless contraindicated and to potentially administer a higher dose of lidocaine based on IBW than what is currently recommended.

CONCLUSION: Our findings suggest that lidocaine toxicity poses a risk for a broad patient population and occurs with considerable frequency.