

Title: MATERNAL AND FETAL LIDOCAINE CONCENTRATION FOLLOWING SUBARACHNOID BLOCK FOR CESAREAN SECTION

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Introduction. Because of the small amount of local anesthetic used for subarachnoid block and also due to its presumed slow absorption into the vascular system, it is commonly believed that blood levels of local anesthetics from this procedure are negligible. In 1979 Giasi, et al, (1) for the first time reported plasma levels of lidocaine during spinal anesthesia. They found no significant differences between the maximum venous plasma concentrations of lidocaine following epidural (0.41 + 0.07 μ g/ml) and subarachnoid injection (0.32 + 0.07 μ g/ml) of lidocaine 75 mg. The patient population in their series was nonpregnant. We were interested in determining plasma concentrations of lidocaine in maternal and fetal blood after spinal anesthesia for cesarean section. We also correlated local anesthetic concentration with maternal and fetal pH.

Methods. Fifteen healthy parturients undergoing elective cesarean section were studied. Lidocaine 55-65 mg was used for the subarachnoid block. All patients received at least 1500 ml of Ringer's lactate solution and routine left uterine displacement was used in all cases. At the time of delivery, maternal arterial and venous blood and umbilical vein and artery blood were collected. Induction-delivery (I-D) and uterine-incision delivery (U-D) were noted in all cases. Apgar scores were determined by the pediatrician. Maternal and neonatal acid-base values and local anesthetic concentrations were determined from blood samples drawn at delivery.

Results.

Table 1. Patient Characteristics

Number of Patients	15
Total dose of lidocaine(mg)	58 \pm 1.2*
I-D interval(min)	13 \pm 1
U-D interval(sec)	126 \pm 18
Apgar score <7	
1 min	2
5 min	0

Table 2. Acid-base values

Maternal artery	
pH	7.40 \pm 0.01*
B.D. (mEq/l)	2.5 \pm 0.5
Umbilical vein	
pH	7.31 \pm 0.02
Umbilical artery	
pH	7.25 \pm 0.01
B.D. (mEq/l)	3 \pm 0.6
Δ BD (Umbilical artery B.D. - Maternal artery B.D.)	0.5 \pm 0.5

Table 3. Local anesthetic concentration (μ g/ml)

Maternal vein	0.63 \pm 0.14*
Umbilical vein	0.17 \pm 0.02
Umbilical artery	0.11 \pm 0.02
Fetal/maternal ratio (UV/MV)	0.40 \pm 0.06

*Mean \pm S.E.

In only three neonates was the umbilical artery pH below 7.20. The fetal/maternal concentration ratio of lidocaine in these three cases averaged 0.54, not significantly different from that in the remaining 12 patients (0.31).

Discussion. Our results show that lidocaine is detectable in both maternal and fetal blood following subarachnoid injection but the concentrations are quite low compared with those following its use in epidural block. Comparison with the data of Giasi et al (1) shows that the blood level in their nonpregnant subjects 15 minutes after the subarachnoid injection of 75 mg of lidocaine was approximately 1/2 of that measured by us in pregnant patients 13 minutes after the subarachnoid injection of 58 mg of lidocaine.

Reference.

- Giasi, R.M., D'Agostino, E. and Covino, B.G.: Absorption of lidocaine following subarachnoid and epidural administration. *Anesth Analg* (Cleve) 58:360-363, 1979.