Title: NEONATAL NEUROBEHAVIORAL RESPONSES AFTER EPIDURAL ANESTHESIA FOR CESAREAN SECTION WITH LIDOCAINE AND BUPIVACAINE

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Introduction. Scanlon's work in the early 1970's seemed to incriminate lidocaine as an agent which compromised newborn neurobehavioral function.[1] More recently, Abboud has compared the effects of lidocaine and bupivacaine on the neonate after epidural analgesia for labor and found no difference.[2] In this study we compared the effects of lidocaine and bupivacaine when used for epidural anesthesia for elective Cesarean section. We felt that this technique would more clearly demonstrate differences in neonatal drug effect since larger doses of local anesthetic would be given over a shorter period of time and the complicating influences of labor would be avoided.

Methods. Thirty-one healthy parturients scheduled for elective Cesarean section gave informed consent for participation in the study. The Clinical Research Practices Committee approved the study. The pregnancies had been free of complicating disease and were all singleton vertex presentations. Patients were given either lidocaine 2.0% or bupivacaine 0.5% by randomized choice via a lumbar epidural catheter in the routine manner. Maternal blood pressure and heart rate, uterine incision until delivery time (UD), time to sustained respiration (TSR), Apgar scores, birth weight and cord blood gases were recorded, as were maternal venous and umbilical cord blood local anesthetic levels at delivery. Neonates with Apgar scores of <7 or who were sent to the special care nursery were excluded. Two investigators, blinded as to the local anesthetic employed, performed the Early Neonatal Neurobehavioral Score (ENNS) of Scanlon at 4 and 24 hours of age on the neonates. The data were evaluated for significance by the Mann-Whitney and Wilcoxon Sign Rank tests.

Results.

	Lidocaine	Bupivacaine
N=	10	21
Drug dose (mg)	586 ± 105	145 ± 32
UA-pH	7.30 ± 0.04	7.31 ± 0.04
UA-BD (mEq/L)	-1.20 ± 3.39	0.28 ± 3.45
Drug blood levels at delivery (µg/ml)		
MV	2.65 ± 1.28	0.75 ± 0.25
UV	1.82 ± 0.62	0.27 ± 0.12
UA	1.19 ± 0.46	0.24 ± 0.11
UV/MV	0.69	0.36
ENNS:		
Alertness (4 hrs)	p = 0.04	
Sucking response (24 hrs)	p = 0.01	
All other parameters	p not signif.	

Discussion. The neonates in the lidocaine group scored as well as those in the bupivacaine group on all parameters of the ENNS. In fact, the only parameters for which there were statistically significant differences:

1. alertness at 4 hours (p=0.04)
2. sucking response at 24 hours (p=0.01

had the higher scores in the lidocaine group. This lack of depression in the lidocaine group is in agreement with Abboud's study and is even more relevant in view of the larger drug doses we used for Cesarean section (586 ± 105 mg) as compared to her labor analgesia drug doses (240 ± 17 mg). In keeping with the larger dose administered, our mean drug levels were approximately twice those of Abboud (MV 2.65 µg/ml vs 1.27, UV 1.82 µg/ml vs 0.83, UA 1.19 µg/ml vs 0.57). We concluded that lidocaine does not appear to compromise neonatal neurobehavioral function as assessed at 4 hours and 24 hours and can be used as safely as bupivacaine in obstetric anesthesia.

References.

1. Scanlon JW, Brown UW, Weiss JB, Alper MH: Neurobehavioral responses of newborn infants after maternal epidural anesthesia. Anesthesiology 40:121-128, 1974.

2. Abboud TK, Williams MD, Miller F, Henrikson EH, Doan T, Van Dorsen JP, Earl S: Comparative fetal, maternal and neonatal responses following epidural analgesia with bupivacaine, chloroprocaine and lidocaine. (Abstr.) American Society of Anesthesiologists Annual Meeting, 1981, p A315.