Title: EPIDURAL ANESTHESIA FOR CESAREAN SECTION IN DIABETICS

Authors: S. Datta, M.D., W.U. Brown, Jr., M.D., G.W. Ostheimer, M.D., J.B. Weiss, M.D. and M.H. Alper, M.D.

Affiliation: Department of Anesthesia, Harvard Medical School; Boston Hospital for Women, 221 Longwood Avenue, Boston, Massachusetts 02115

Introduction. Previously we reported that infants of diabetic mothers who had spinal anesthesia for cesarean section were more acidotic at delivery than those whose mothers received general anesthesia (1). The average umbilical artery pH in the infants of diabetic mothers delivered with spinal anesthesia was 7.20. We were interested in comparing the results with epidural anesthesia in this special group of parturients.

Methods. Sixteen diabetic mothers (Class A to Class R) received 0.75% bupivacaine for epidural anesthesia (average dose = 112.5 mg) for elective cesarean section according to our published protocol (2). The patients were divided into two groups depending upon the umbilical artery pH at delivery: higher than 7.20 (Group A) or 7.20 and lower (Group B). Incidence of hypotension, maternal and neonatal acid-base data, amniotic fluid pH, and bupivacaine concentrations were compared in the two groups. From blood samples at 30 minutes, 1, 2, 4, 8, and 12 hours, the half-life of bupivacaine was calculated in 9 babies, 4 from Group A and 5 from Group B. The protocol was approved by the BHW Research Advisory Committee; informed consent was obtained from all subjects.

Results.

Table 1. Patient Characteristics

Number of Patients	Group A n=6	Group B n=10
Maternal Age (years)	28 ± 1.4*	28 ± 1.4
Maternal Height (inches)	64 ± 1.6	65 ± 1
Maternal Weight (pounds)	160 ± 6.7	151 ± 5.5
Gestational Age (weeks)	38 ± 0.7	38 ± 0.3
Class of Diabetes (number)		
B	1	0
C	3	3
D	1	3
E	0	0
F	1	2
R	0	2
Induction to Delivery Interval (min)	48 ± 2	50 ± 3
Uterine Incision to Delivery Interval (sec)	98 ± 11	97 ± 14
Birth Weight of Babies (g)	3582 ± 372	3474 ± 180
Apgar Score < 7 (number)		
1 min	0	3
5 min	0	1

(*mean ± S.E.)

Table 2. Significant Results

	Group A	Group B	P
Incidence of Hypotension	0%	50%	< 0.001
MA			
pH	7.44 ± 0.01*	7.42 ± 0.01	NS
BD	1.9 ± 0.6	2.0 ± 1.1	NS
UV			
pH	7.33 ± 0.01	7.25 ± 0.01	< 0.001
UA			
pH	7.26 ± 0.02	7.16 ± 0.01	< 0.001
BD	5.0 ± 1.2	10.0 ± 0.6	< 0.005
ΔBD (UA-MA)	3.1 ± 0.5	7.6 ± 1.1	< 0.01
Amniotic Fluid pH	7.13 ± 0.02	7.0 ± 0.01	< 0.001
Bupivacaine Concentration (μg/ml)			
MV	0.34 ± 0.02	0.33 ± 0.02	NS
UV	0.13 ± 0.01	0.18 ± 0.01	< 0.025
UA	0.10 ± 0.001	0.11 ± 0.01	NS
UV-UA	0.03 ± 0.007	0.07 ± 0.01	< 0.025
UV/MV	0.37 ± 0.02	0.56 ± 0.04	< 0.005
Half-life in newborn (hrs)	2.5 (n=4)	9.3 (n=5)	p < 0.001

Discussion. The severity of the diabetes was somewhat greater in the patients of Group B who also showed a higher incidence of hypotension. Both of these factors may contribute to the fetal acidosis. The higher concentration of bupivacaine in the umbilical vein blood of the infants of Group B may be the result of the lower pH and "ion trapping" of the weak base, local anesthetic on the fetal side of the placenta (3,4). The markedly prolonged half-life of bupivacaine in the blood of the more acidotic infants may result from a greater total amount of anesthetic transferred from mother to baby in these infants, slower release of the drug from more acidotic tissues, or alterations in fetal blood flow secondary to acidosis.

References.

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