

TITLE: FOR EPIDURAL ANALGESIA IN LABOR, IS 0.25% BUPIVACAINE BETTER THAN 0.5%?

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**Introduction:** With epidural analgesia we use bupivacaine for labor, mainly because of its long duration of action. For delivery we use chloroprocaine because of its rapid onset and short duration of action, thus reducing the Recovery Room staying time and minimizing the need for urinary catheterization. There is a controversy concerning the optimum concentration of bupivacaine. Bupivacaine 0.5% produces adequate analgesia, but theoretically it may possess undesirable side-effects. Its motor blocking properties may prolong the second stage of labor, interfering with fetal head descent and rotation and leading to a higher incidence of instrumental delivery, cesarean section, and fetal trauma. Therefore, would it be better to use 0.25% bupivacaine? Our study was designed to test this hypothesis.

**Method:** The protocol was approved by the Research Committee and the patient's consent was obtained. In a double-blind study, 80 normal parturients in labor with vertex presentation were randomly divided into 2 groups of 40 each. When the patient complained of labor pains, the cervical dilatation and effacement were determined. An epidural catheter was inserted and a total of 8 to 11 ml of the unknown solution, either 0.5% or 0.25% bupivacaine without epinephrine was injected. Following each epidural injection, the effects on pain, motor power and bearing down reflex, the extent of block, the vital signs and fetal heart rate were recorded every 5 minutes for 30 minutes. The analgesia score was: 0 = no relief, 1 = partial relief, 2 = complete relief but aware of contractions, 3 = complete relief and unaware of contractions. The motor-block score was: 0 = no motor weakness, 1 = able to flex knee and move foot, 2 = only able to move foot, 3 = unable to move lower limb. When the patient was ready for delivery, the fetal station and presentation were verified, then 2% chloroprocaine (13 to 18 ml) was injected to provide adequate analgesia for delivery. The 1- and 5-minute Apgar scores, the umbilical venous and arterial blood gases, and plasma levels of bupivacaine in maternal venous, umbilical venous and arterial blood using gas chromatography were determined. The neonatal ABS neurobehavior score<sup>1</sup> was measured at 60 minutes postpartum. The data were analysed using  $\chi^2$  and Student paired t-test, with  $p < 0.05$  being significant.

**Results:** There was no difference between the 2 groups in maternal age, height, gravidity, parity, or gestational age. With 0.5% bupivacaine, analgesia was more frequent, more profound, and lasted longer, and the block was more spread (table). Despite the higher incidence and degree of motor weakness and the early loss of perineal sensation with 0.5% bupivacaine, there was no statistical difference between the 2 groups in duration of first or second stage, the interval from initiation of the block to delivery, the incidence of malpresentation, mid-

forceps delivery, vacuum extraction, cesarean section, fetal trauma, Apgar scores, fetal blood gases or ABS score. With 0.5% bupivacaine, the drug levels were higher in maternal venous, umbilical venous, and arterial plasma; but the umbilical venous to maternal venous ratio was not different.

**Discussion:** The use of chloroprocaine for delivery should not change the results of our study because of its use in both groups after labor took its course, the fetal position and presentation were determined, and the method of delivery was decided. Based on our results showing 0.5% bupivacaine to have no adverse affect on the course of labor or fetal outcome while having superior analgesic characteristics, 0.5% bupivacaine is a better choice than 0.25%.

#### Reference:

1. Amiel-Tison C, Barrier G, Shnider SM, et al: A new neurological and adaptive capacity scoring system for evaluating obstetric medications in full term newborns. Anesthesiology 53: S322, 1980.

Table  
Comparison Between 0.5% and 0.25% Bupivacaine

Variable	0.5% bupivacaine (n=40)	0.25% bupivacaine (n=40)
Volume of each dose (ml)	9.5 ± 0.2	9.3 ± 0.1
Successful block: analgesia score ≥ 2: n (%)	36 (90%)	28 (70%)*
Sensory score	2.42 ± 0.1	1.97 ± 0.1**
Number of blocked segments	10.1 ± 0.5	8.1 ± 0.3*
Duration of analgesia (min)	103.8 ± 12.9	72.4 ± 8.2*
Motor-block score	0.75 ± 0.1	0.37 ± 0.05**
Retaining all motor power; n%	14	26**
Duration of first stage (min)	480.0 ± 44.7	447.9 ± 38.0
Duration of second stage (min)	55.8 ± 7.3	55.0 ± 6.2
Initiation of epidural-to-delivery time (min)	143.9 ± 13.7	150.0 ± 16.6
Total dose of bupivacaine (mg)	58.78 ± 3.5	32.13 ± 2.03**
Oxytocin augmentation: before epidural: n (%)	8 (20%)	11 (28%)
after epidural: n (%)	0 (0%)	2 (5%)
Abnormal fetal head presentation n (%)		
Occipito-transverse	2 (5%)	1 (2.5%)
Occipito-posterior	2 (5%)	2 (5%)
Method of delivery: n (%)		
Low forceps	24 (60%)	20 (50%)
Spontaneous	7 (18%)	5 (12%)
Vacuum	3 (7%)	7 (18%)
Midforceps	4 (10%)	3 (8%)
Cesarean Section	2 (5%)	5 (12%)
Cephalhematomas: n (%)	0	1
Fetal decelerations n (%)	6 (15%)	5 (12%)
Number of epidural injections before delivery dose	1.3 ± 0.1	1.4 ± 0.1
Total dose of bupivacaine (mg)	58.78 ± 3.5	32.13 ± 2.03**
Plasma levels of bupivacaine (µg/ml)	n = 20	n = 22
Maternal venous	0.45 ± 0.06	0.29 ± 0.02#
Umbilical venous	0.12 ± 0.01	0.07 ± 0.009*
Umbilical arterial	0.14 ± 0.02	0.06 ± 0.009*
U.V./M.V.	0.29 ± 0.05	0.26 ± 0.03

- Means ± SE  
- Significant differences: \*  $p < 0.05$ ; \*\*  $p < 0.01$