

Title: THE INFLUENCE OF pH-ADJUSTED 2-CHLOROPROCAINE ON THE QUALITY AND DURATION OF SUBSEQUENT EPIDURAL BUPIVACAINE ANALGESIA DURING LABOR: A RANDOMIZED, DOUBLE-BLIND STUDY

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**Introduction.** Hodgkinson et al<sup>1</sup> reported that epidural 2-chloroprocaine decreased the efficacy of subsequent epidural bupivacaine analgesia during labor. Galindo and Witcher<sup>2</sup> suggested that the ability of 2-chloroprocaine to alter the activity of bupivacaine might depend upon the pH of the 2-chloroprocaine solution. The purpose of the present study was to determine whether pH-adjustment of 2-chloroprocaine improves the quality and duration of subsequent epidural bupivacaine analgesia during labor.

**Methods.** The study was approved by the Institutional Review Board for research involving human subjects. Written informed consent was obtained from healthy women in labor at term. A 20 gauge polyamide catheter was inserted into the epidural space at L3-4 when the cervix was 3-7 cm dilated. One ml of study solution was freshly added to 30 ml of 2% 2-chloroprocaine. Each syringe of study solution was prepared by a pharmacist according to previous randomization and was administered in a double-blind manner. The study solution for the bicarbonate group was 1 ml of 8.4% sodium bicarbonate (1 meq/ml); the study solution for the control group was 1 ml of normal saline. (We had earlier confirmed that the addition of 1 ml of 8.4% sodium bicarbonate to 30 ml of 2% 2-chloroprocaine increased the pH from  $3.81 \pm 0.03$  to  $7.01 \pm .01$ ; 1 ml of saline did not affect the pH of 2-chloroprocaine.) Epidural 2-chloroprocaine and bupivacaine were then given according to the following schedule:

Time	Drug
0	2 ml of 2% 2-chloroprocaine
5 min	5 ml of 2% 2-chloroprocaine
7 min	3 ml of 2% 2-chloroprocaine
35 min	5 ml of 0.25% bupivacaine
36 min	5 ml of 0.25% bupivacaine

Statistical analysis was by Student t-test, Wilcoxon test, chi square, Fisher exact test, and Kaplan-Meier test as indicated.  $P < .05$  was considered significant.

**Results.** There were 15 women in the bicarbonate group and 13 in the control group. The two groups were similar with regard to maternal characteristics. There was no significant difference between the two groups in onset of analgesia after injection of 2-chloroprocaine, or in duration of analgesia after injection of bupivacaine (table).

	Bicarbonate	Control	P
Onset of analgesia with 2-chloroprocaine (min)*	12	14	NS
Duration of analgesia after bupivacaine (min)*	61	49	NS
Total dosage of bupivacaine during first stage of labor (mg)*	48	70	NS

\* Median

There was no significant difference between the two groups in pain scores over time (figure). The two groups were similar with regard to severity of motor block, incidence of hypotension, method of delivery, Apgar scores, and umbilical cord blood gas and acid-base values.

**Discussion.** Under the conditions of the present study, pH adjustment of 2-chloroprocaine did not significantly improve the quality or duration of subsequent epidural bupivacaine analgesia during labor.

**References.**

- Hodgkinson R, Husain FJ, Bluhm C: Reduced effectiveness of bupivacaine 0.5% to relieve labor pain after prior injection of chloroprocaine 2% (abstract). *Anesthesiology* 57:A201, 1982
- Galindo A, Witcher T: Mixtures of local anesthetics: Bupivacaine-chloroprocaine. *Anesth Analg* 59:683-685, 1980

