

PEDIATRIC ANESTHESIA I

A913

TITLE: HISTOLOGIC CHANGES FOLLOWING INTRATHECAL INJECTION OF 8% TETRACAINE IN THE NEONATAL RABBIT.
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INTRODUCTION: Spinal anesthesia for the high-risk neonate is increasingly popular.^{1,2} The effects on the developing spinal cord, however, is unknown. This study examines histopathologic changes in the spinal cord following intrathecal injection of a known injurious concentration of tetracaine.³

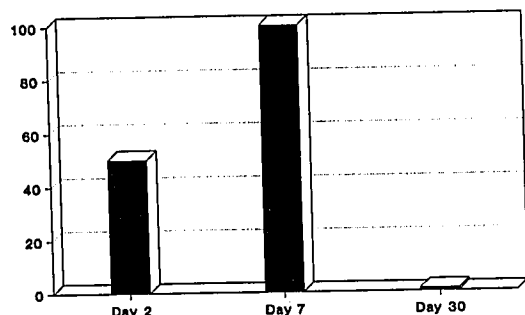
METHODS: A modification of Ready's method was employed.³ Following tail twitch stimulation with a 25 gauge needle, hyperbaric tetracaine 8% was injected at the S1-S2 interspace. Thirty-six New Zealand White (NZW) neonatal rabbits were randomized into three treatment groups: 8% tetracaine (T), normal saline (NS), or control. Animals were sacrificed at 2, 7, or 30 days post injection, and the spinal cords examined by a blinded neuropathologist using electron and light microscopy.

RESULTS: Clinical recovery was complete within 1 h in all groups. The tetracaine group, however, manifested a progression of histopathologic changes at 2 and 7 days that were different from control and NS groups. Two days after injection, rare myelin sheaths in 2/4 specimens were dilated, with minimal edema noted within the white matter. This appeared to progress until 7 days. 4/4 showed moderate numbers of dilated myelin sheaths and their component axons swollen and often fragmented. These rare myelin sheaths also contain microglial cells (axonophagia). At 30 days after injection of T there was no longer any apparent difference from controls by either electron or light microscopy. (figure)

DISCUSSION: A question often asked is whether the use of spinal anesthesia in preterm neonates in whom myelination is not complete may have deleterious long term effects in the developing spinal cord. Our results suggest that with clinically useful local anesthetic concentrations, there should be no histopathologic evidence of long term injury in the developing spinal cord.

REFERENCES: 1. Anesth Analg 63:359, 1984; 2. Anesthesiology 72:838, 1990; 3. Anesthesiology 63:364-370, 1985

% Cords with Myelin Edema Changes



Days Following 8% Intrathecal Tetracaine

A914

SPINAL LIDOCAINE: AN OPTIMAL AGENT FOR INGUINAL HERNIORRHAPHY IN INFANTS
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INTRODUCTION: Use of higher than reported doses of hyperbaric tetracaine and bupivacaine (1.0 mg/kg) for spinal anesthesia in 30 infants allowed the herniorrhaphy to be completed without the need for supplementation (in press). The duration of motor block, however, delayed the discharge. The present study was designed to evaluate if spinal lidocaine in the dose of 5mg/kg¹ (higher than reported in literature) could provide satisfactory anesthesia (no supplementation) and discharge times.

METHODS: The study was approved by human subjects committee and written informed parental consent was obtained. Forty-five infants < 1 year of age participating in the study were divided into 3 groups of 15 each. Groups I and II received 1mg/kg of tetracaine or bupivacaine as 0.5% hyperbaric solution, respectively, and Group III received 5mg/kg of lidocaine as 2.5% hyperbaric solution. Routine monitors were applied prior to and intravenous catheter placed following administration of subarachnoid block. Demographic, technical, hemodynamic and anesthetic variables were recorded in each case. Parametric data was analyzed using ANOVA.

RESULTS:

PARAMETER	GROUP I (Tet 1.0mg/kg)	GROUP II (Bup 1.0mg/kg)	GROUP III (Lid 5.0mg/kg)
Gest age (in wks) mean ± SDM	35.2±4.87	36.07±5.3	33.46±5.7
Conceptual age (in wks) mean ± SDM	46.73±6.8	50.86±7.15	45.8±6.17
Birth weight (in gms) mean ± SDM	2648±1144	2430±1222	2025±1008
Duration of surg anesth (mins) mean ± SDM	177.57±25.04	121.28±38.44	86.86±27.80
Supplementation	None	1 (GA) Tech. Failure	None
High block (vent support)	1	None	None

CONCLUSIONS: Five mg/kg of hyperbaric lidocaine provided not only satisfactory anesthesia (no supplementation) but also significantly shorter duration of anesthesia (86.86 ± 27.80) compared to 1.0mg/kg tetracaine and bupivacaine. None of the patients had significant hemodynamic changes requiring pharmacological intervention. One case of high block requiring assisted ventilation (15 minutes) occurred in tetracaine group. We conclude then 5.0 mg/kg of lidocaine is an optimal local anesthetic for inguinal herniorrhaphy in infants.

REFERENCES:

1) Anesth Analg 1987;66:5148.