TITLE: PREGNANCY DOES NOT ALTER THE THRESHOLD FOR CNS TOXICITY TO LIDOCAINE IN RATS

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INTRODUCTION: Local anesthetics are often administered in large doses to pregnant patients undergoing obstetric procedures. The MAC for inhalation agents is decreased in pregnancy.[1] Biochemical changes may contribute to the exaggerated responses seen with intrathecally and epidurally administered local anesthetics in pregnancy.[2] Little information is available regarding the potential difference in lidocaine seizure thresholds in pregnant and non-pregnant subjects. Therefore, we measured the threshold for CNS toxicity in male, non-pregnant female, and pregnant female rats given intravenous lidocaine.

METHODS: Three groups of age-matched Sprague-Dawley rats (male, non-pregnant female, and pregnant female) were anesthetized with 4% halothane in 100% O_2. After tracheostomy, the rats were mechanically ventilated and anesthesia was maintained with 0.8% halothane in 30% O_2/balance N_2O. Femoral arterial and venous catheters were placed surgically. D-tubocurarine (0.6mg) and heparin (100 USPu) were administered i.v. Total surgical time was limited to 30 min. Normocarbia was maintained. Forty-five min after the induction of anesthesia, the halothane was discontinued, and ventilation was continued with 30% O_2/70% N_2O. Fifteen minutes later, lidocaine (2.3mg/kg/min) was begun by continuous infusion. At the onset of EEG seizure activity, arterial blood was withdrawn. Plasma lidocaine concentrations were measured by gas chromatography. All results are expressed as mean±S.D. Statistical analysis was by one-way ANOVA. $P<0.05$ was considered significant.

RESULTS: We did not observe statistically significant differences between the three groups in the MAP, duration of lidocaine infusion, total mg dose of lidocaine, or plasma lidocaine concentrations (Lido Conc) at the onset of seizure activity (see table). Arterial blood gas/pH values were not different amoung groups. Hematocrits were decreased in the pregnant group.

Measurements at Onset of Seizure Activity

Group	n	MAP (mmHg)	Lidocaine (mg)	Lido Conc (mg/ml)
Male	21	101±26	12.1±3.7	11±6
Female	21	82±25	11.7±2.6	12±5
Pregnant Female	24	85±17	11.1±2.6	11±4

DISCUSSION: Despite similar hemodynamic, blood gas, and acid-base measurements, no differences between groups were observed for CNS thresholds for toxicity to lidocaine (i.e., onset of seizures). These data suggest that there are no pregnancy-specific alterations in CNS sensitivity to lidocaine. Others[3] noted that pregnancy enhanced toxicity to bupivacaine but not mepivacaine in gravid ewes. Collectively, these results suggest that pregnancy does not alter the CNS toxicity of all amide local anesthetics.

REFERENCES: 1. Anesthesiology 1974; 41: 82-83. 2. Anesthesiology 1983; 58: 184-187. 3. Anesthesiology 1989; 70: 991-995.

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Title: ULTRASOUND EXAMINATION OF STOMACH CONTENTS IN PREGNANT PATIENTS

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The risk of aspiration of stomach contents during obstetrical anesthesia was recognized by Mendelson in 1946. Although he described the syndrome of acid aspiration, the only deaths in his clinical study were the result of aspiration of solid food remaining in the stomach many hours after the cessation of oral intake. A non-invasive method to determine the actual stomach contents of parturients may help to identify factors responsible for delayed gastric emptying as well as define the risk of aspiration in individual patients. Therefore we tested the ability of ultrasound imaging to non-invasively identify the stomach contents of laboring and non-laboring pregnant volunteers.

Methods. Informed consent was obtained. A real-time ultrasound transducer was used with a linear phased array probe (5MHZ). The patients were in the right decubitus position with the head of the bed elevated to 45°. Transverse views of the stomach were obtained by positioning the scanner under the left costal margin and scanning up to the xiphi-sternum. Identification of the stomach was confirmed by observing the effect of drinking 1-2 cups of water. All examinations were performed in a blinded manner.

Results. A preliminary study demonstrated that the stomach was easily visualized by ultrasound in ten healthy non-pregnant volunteers scanned immediately after eating solid food or following an overnight fast. Ultrasound permitted detection of chewed food in the stomach that was originally the size of a chocolate bar. Next, 10 healthy term parturients not in labor were scanned at varying post-prandial times and the results compared to 10 healthy parturients already in labor. As shown in Table 1, most of the laboring patients had solid food present in their stomach, whereas most non-laboring patients did not. The presence of food in the stomach of the laboring patients was best related to the time interval between the last oral intake and the onset of painful contractions (data not shown).

Discussion. The present study demonstrates that high resolution ultrasonography is capable of non-invasively identifying the stomach contents of parturients. These preliminary results confirm the clinical impression that emptying of the stomach is delayed for many hours following the onset of labor.

Table 1 Percent of Pts. with Food in the Stomach

Hours (h) NPO	0-4h %	4-8h %	8-12h %	12-24h %
Not in labor	100(n=2)	0(n=2)	0(n=1)	0(n=5)
In labor	---	100(n=1)	---	55(n=9)

n = total number of patients in that group