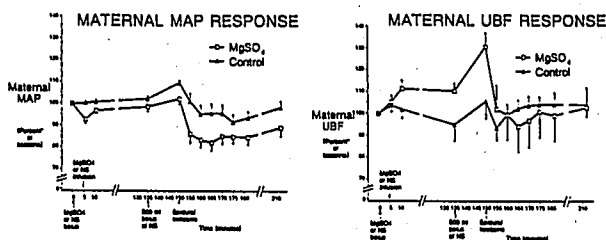


Title: DOES MAGNESIUM SULFATE WORSEN MATERNAL HYPOTENSION DURING EPIDURAL ANESTHESIA IN GRAVID EWES?
Authors: Vincent RD, Chestnut DH, Sipes SL, Thompson CS, DeBruyn CS, Bleuer SA
Affiliation: Departments of Anesthesia and Obstetrics and Gynecology, University of Iowa College of Medicine, Iowa City, IA. 52242

Introduction. Obstetricians often give magnesium sulfate (MgSO₄) to treat preterm labor or to provide seizure prophylaxis in preeclamptic women. In an earlier study, MgSO₄ exacerbated maternal hypotension during hemorrhage in pregnant sheep.¹ The purpose of this study was to determine if MgSO₄ worsened maternal hypotension during epidural anesthesia in gravid ewes.
Methods. The protocol was approved by the Animal Care Committee. Mixed breed ewes were obtained from a commercial breeder at 118 d of timed gestation (term = 145 d). At 120 d, surgical instrumentation was performed during general anesthesia. Each animal recovered at least 3 d before experimentation. Each experiment was performed with the animal standing (supported by a cloth sling) within an approved transfer cart. The experimental sequence was: 1) T=0, i.v. MgSO₄ bolus 4 g over 5 minutes followed by an infusion of MgSO₄ at 4 gm/hr, or i.v. N.S. bolus followed by N.S. infusion; 2) T=135 min, 500 ml bolus of N.S. i.v.; 3) T=150 min, epidural administration of 2% lidocaine. Both experiments were performed in each animal (n=11) in random order, but only one experiment was done each day. Statistical analysis was by repeated measures ANOVA. P < 0.05 was considered significant.

Results. Epidural injection of lidocaine (10.0 ± 0.4 ml) resulted in a mean ± SEM sensory level of T-10 ± 1 in the MgSO₄ group and

T-10 ± 1 in the control group. Across time, maternal MAP was slightly lower (P=0.0001) in the MgSO₄ group than in the control group. But when compared with pre-epidural measurements, the magnitude of the decrease in MAP during epidural anesthesia was similar in the two groups. Epidural anesthesia did not change fetal acid-base status or oxygenation in either group. The maternal MAP and UBF responses are illustrated in the figures below.



Discussion. If applicable to humans, the present study suggests that MgSO₄ may increase the likelihood of modest hypotension during epidural anesthesia in normotensive pregnant patients. However, this change may not be associated with increased risk to the fetus.

References

1. Chestnut DH, Thompson CS, McLaughlin GL, Weiner CP. Does intravenous infusion of ritodrine or magnesium sulfate alter the hemodynamic response to hemorrhage in gravid ewes? *Am J Obstet Gynecol* 1988;159:1467-1473.

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TITLE: EFFECTS OF ROPIVACAINE ON UTERINE BLOOD FLOW IN PREGNANT SHEEP
AUTHORS: A.C. Santos, M.D., D.J. Wlody, M.D., H. Pedersen, M.D., H.O. Morishima, M.D., M. Finster, M.D.
AFFILIATION: Depts. Anesth, SUNY, Stony Brook, NY 11794; SUNY, Brooklyn, NY 11203; Columbia Univ., New York, NY 10032.

The adequacy of uteroplacental circulation is an important determinant of fetal well-being, and is easily affected by drugs and anesthetic procedures. Intradermal injections of ropivacaine (R) have resulted in vasoconstriction of cutaneous blood vessels⁽¹⁾, but it is unknown whether R is also a uterine vasoconstrictor. We decided to investigate the effects of R, administered to pregnant ewes, on uterine artery blood flow (UBF) and fetal condition. Infusions of bupivacaine (B) and epinephrine (E) are being given for comparison.

Four chronically instrumented pregnant ewes, near term, have been studied so far. Surgical preparation included application of an ultrasonic flowmeter to the branch of the uterine artery perfusing the pregnant horn. The following drugs were infused (mg/kg/min) into the maternal vein in a random sequence, at approximately 24 hrs intervals: 1) R 0.2 for the initial 15 min, then 0.075 for 45 min. 2) R 0.1 for 15 min, then 0.058 for 45 min. 3) B 0.1 for 15 min, then 0.058 for 45 min. 4) B 0.77 for 15 min, then 0.0385 for 45 min. 5) E 0.2 µg/kg/min for 30 min. Arterial

blood pressure and heart rate of both mother and fetus, as well as intraamniotic pressure (AFP) and UBF were recorded continuously. Arterial blood samples were withdrawn from the mother and fetus prior to, and during the infusion, for determination of pH, Pco₂ and PO₂, as well as plasma R and B concentrations, where appropriate, using a gas chromatographic technique. Values obtained during drug infusion were compared with controls using ANOVA for repeated measures. p<0.05 was considered significant.

Maternal and fetal plasma concentrations of local anesthetics did not exceed 2.64 and 0.81 µg/ml, respectively. AFP remained stable throughout the infusion. So did the UBF, except for the significant reduction noted after 30 min of E infusion (see table). Fetal vital signs and acid-base balance were not altered by any drug infusion.

Mean ± SEM Uterine Blood Flow (ml/min)

Time (min.)	0	15	30	45	60
R Hi	511±89	430±68	480±90	465±83	503±73
R Lo	480±70	473±64	483±62	493±52	480±46
B Hi	448±82	485±81	428±62	430±59	418±83
B Lo	452±82	435±87	411±72	420±79	418±80
E	507±58	383±93	363±83*	-	-

The preliminary results, obtained so far, suggest that clinically relevant plasma concentrations of R in the ewe have no adverse effects on the uterine blood flow.

References

- 1) *Anesthesiology* 71: 69-74, 1989.