

A821

TITLE: MAGNESIUM SULFATE (M) ON REFLEX SYMPATHETIC VASOCONSTRICTION (RSV) AND HYPOTENSION (HT) DURING PERICARDIAL TAMPONADE (PT) AND ACUTE HEMORRHAGE (AH)

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This study examines the effect of M on RSV and HT induced by PT or AH.

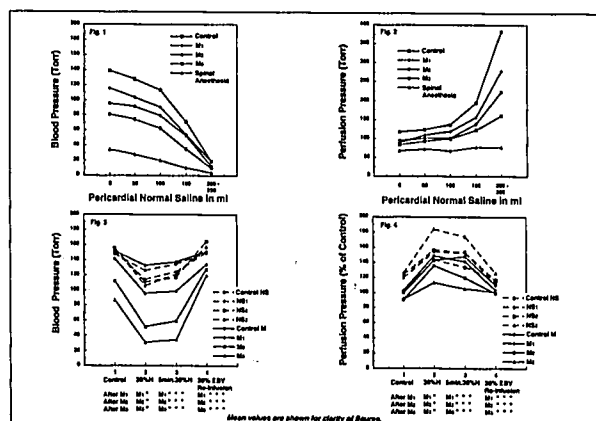
Blood pressure (BP) was monitored in 30 dogs with one hind limb (sympathetic intact) isolated for autoperfusion. Perfusion pressure (PP) was recorded. HT was produced by either 1) PT with normal saline (n = 11) (NS: 50 up to 250 cc) injection into the pericardial sac causing tamponade to circulatory arrest (CA). The NS was then removed, allowing recovery (Figs 1, 2); or 2) AH to 30% of estimated blood volume (30% H) (n = 12). After 5 minutes (5 min. 30%H), blood reinfusion allowed recovery (Figs 3,4).

Each procedure was done as a control and after infusion of M 2 g IV then 1 g/hr IV (M1), or M 3 g IV then 1.5 g/hr IV (M2) or M 4 g then 2 g/hr IV (M3) and finally after spinal anesthesia. In 7 dogs in AH, NS was infused instead of M. At each procedure PP to the isolated limb was recorded as a measure of RSV. PP was shown as torr or % of control.

During M1, M2 and M3 perfusion norepinephrine (NE) 1 µg was injected intra-arterially into the autoperfused limb before PT. Data are expressed as mean ± SEM with p < 0.05 considered significant by student group and paired t test.

1) PT caused a marked rise in PP. The increase was incrementally reduced by M1, M2 and M3. The differences were significant from control and from each other. 2) AH caused a rise in PP. This was incrementally reduced by M1, M2 and M3. The differences were significant from control and from each other. When compensatory RSV decreased by M, the HT by PT and AH was aggravated. All RSV responses to both PT and AH was obliterated by spinal anesthesia.

M decreased RSV response to HT in a dose dependent manner. NE experiments suggest that some of M effect is a direct depression of arterial constriction.



A822

Title: Does calcium chloride increase blood pressure and uterine blood flow during hemorrhagic hypotension in hypermagnesemic gravid ewes?

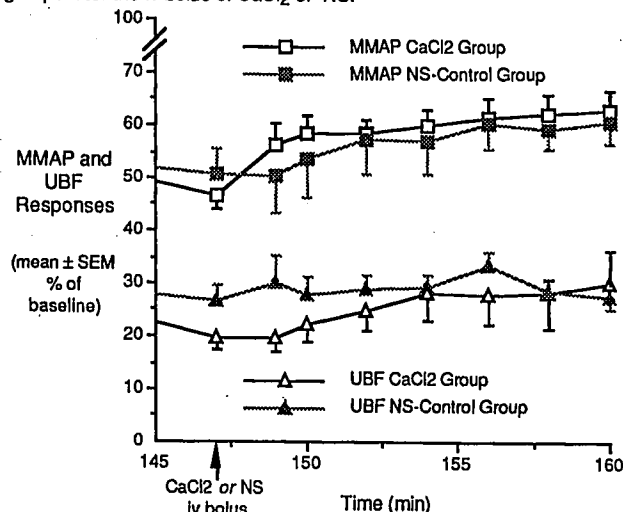
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Introduction: Magnesium sulfate ($MgSO_4$) worsens maternal hypotension during hemorrhage in pregnant sheep.¹ This may result from $MgSO_4$ -induced relaxation of vascular smooth muscle and interference with compensatory cardiovascular responses to hemorrhage. Calcium chloride ($CaCl_2$) causes inhibition of $MgSO_4$ -induced vasodilation *in vitro* and might reduce the magnitude of hypotension during hemorrhage in hypermagnesemic animals.² The purpose of this study was to determine whether $CaCl_2$ administration during hemorrhagic hypotension improves maternal and fetal hemodynamic measurements in hypermagnesemic pregnant sheep.

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. The experimental sequence included: 1) T=0: $MgSO_4$ 4 g iv; 2) T=5: Infusion of $MgSO_4$ 4 g/h iv; 3) T=90: Maternal hemorrhage 20 ml/kg over 55 min.; 4) T=147 min: $CaCl_2$ 10 mg/kg iv ($CaCl_2$ group) or normal saline 0.1 ml/kg iv (NS-Control group); 5) T=160: Transfusion of collected maternal blood over 1 h. Both experiments were performed in each animal (n=8) 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: Maternal mean arterial pressure (MMAP) increased slightly ($P \leq 0.004$) after both iv $CaCl_2$ and iv NS (fig.). The MMAP response after the iv bolus of $CaCl_2$ was not significantly different from that observed after iv NS. Uterine blood flow (UBF) measurements did not increase significantly following the iv bolus of either $CaCl_2$ or NS (fig.). Further, fetal PO_2 and pH responses were similar in both groups after the iv bolus of $CaCl_2$ or NS.



Discussion: $CaCl_2$ administration did not significantly improve maternal MMAP, UBF, fetal PO_2 or fetal pH during hemorrhagic hypotension in hypermagnesemic pregnant sheep.

References:

1. Am J Obstet Gynecol 159:1467-1473, 1988
2. Anesthesiology 67:A636, 1987

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