TITLE: MULTIFOCAL CEREBRAL BLOOD FLOW (CBF) AND GLOBAL METABOLISM (CMR) AFTER PROLONGED CARDIAC ARREST IN DOGS. EFFECT OF MILD HYPOTHERMIA (34°C).

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Hypothermia decreases CBF and metabolism (CMR) to the same degree in normal dogs. These variables and lCBF (by stable Xe-CT) were monitored in a dog outcome model of VF cardiac arrest 12.5 min no flow -- with (n=5) vs. without (n=5) mild hypothermia (34°C) induced with reperfusion for 1h postarrest. The latter has been shown to mitigate brain damage (1,2). With standard postarrest life support at brain T 37.5°C (n=5), global hyperemia was followed by gCBF 55%, heterogeneous lCBF and % trickle flow voxels worse than baseline, for 12h postarrest, and then normalized. CMRO2, which was 3.3±0.8 ml/100g per min at baseline, recovered from near 0 to baseline values postarrest over 3h. With mild hypothermia, gCBF and lCBF were not significantly different from values in the normothermic group. CMRO2 remained lower early postarrest. In another series (n=2x6) (Fig.), the cerebral O2 utilization coefficient (O2UC = CMRO2/art. O2 transp.) did not increase (worsen) as much during 34° than during 37.5°C postarrest. The lactate/oxygen index (LOI) data suggest lesser lactate produced and washed out in the hypothermic group during the first 30 min postarrest. Conclusion: Mild hypothermia does not change postischemic hypoperfusion, but mitigates the postarrest decrease in O2 supply/demand relationship; by suppressing CMRO2. Mild hypothermia should be explored for the duration of postarresthypoperfusion.

References:
1) Leonov, et al, JCBF Metab 10:57-70, 1990.
2) Sterz, et al, Crit Care Med, May 1990, abstract.
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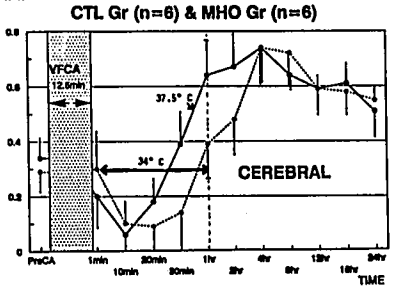
CHANGES OF OXYGEN UTILIZATION COEFFICIENT
CTL Gr (n=6) & MHO Gr (n=6)



A303

TITLE: EPINEPHRINE REVERSES BUPIVACAINE-INDUCED CARDIAC ARREST IN RATS

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Introduction: It has been alleged that bupivacaine-induced cardiac arrest (BICA) is difficult to treat. However, recent evidence suggests that different mechanisms of and durations of cardiac arrest and different species have different dose-response curves for epinephrine (E) and resuscitation. We therefore studied the dose of E required to achieve restoration of spontaneous circulation (ROSC) after BICA.

Methods: 14 rats of 372-532 gm body weight were anesthetized with halothane 0.2-0.5% in N2O/O2 50%/50% and paralysis maintained with pancuronium. The femoral artery and vein were cannulated for monitoring blood pressure and ABGs, and for drug administration. Rectal temperature and EKG were monitored also. After ventilation with 100% O2 for 1 min and then with room air, bupivacaine (B) was infused at 5 mg/kg/min until mean arterial pressure (MAP) was <10 mmHg or pulse pressure <5 mmHg. Cardiopulmonary resuscitation (CPR) was then begun and escalating doses of E given every min: 10, 20, 50, 100, 200 and then 200 mcg/kg every minute for 5 min until ROSC (MAP>80 mmHg). After ROSC, MAP was supported with norepinephrine and arterial base deficit corrected to <5 mEq/L with sodium bicarbonate. Life support was continued for 2 hrs after ROSC. Dose-response curves were analyzed with respect to LD50 and ED50 and 2 hr survival with respect to LD50 and ED50 with Fisher's Exact Test.

Results: Cardiac arrest uniformly occurred after a period of hypotension with severe bradycardia followed by asystole. Cardiac arrest occurred when B 22.0 ± 4.5 mg/kg (mean ± SD) had been given. The LD50 was 23.8 mg/kg. ROSC was possible in 12 rats of the 14; 1 died of complications of CPR and 1 failed to respond to high dose E. The range of E doses required was 30-1020 ug/kg with an ED50 of 60 ug/kg. Of rats receiving E ≤ ED50, 4/6 survived 2h with life support. Of those receiving E>ED50, only 1/7 survived 2h in spite of life support (NS).

Conclusion: With sufficient epinephrine, BICA can be reversed, at least transiently. The greater the dose of E required the higher was the likelihood of subsequent refractory hypotension. Our results suggest that high dose epinephrine may be of benefit in treating bupivacaine induced cardiac arrest.