TITLE: REACTIVE HYPEREMIA AFTER HYPOTHERMIC CIRCULATORY ARREST IN DOGS
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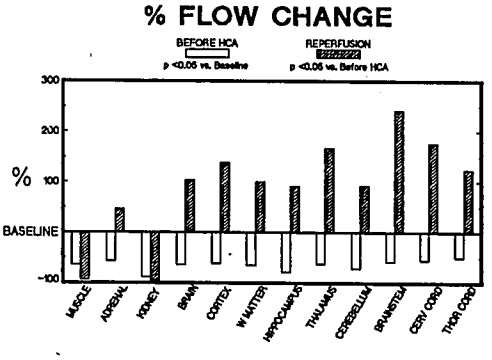
Hypothermic circulatory arrest (HCA) is extensively used in surgical management of congenital cardiac defects. We previously reported the protective effects of hypothermia on neurological outcome and brain histology after one hour circulatory arrest (CA) in dogs. However the effects of HCA on cerebral blood flow (CBF) still remain controversial. Regional CBF and organ blood flow were studied following one hour HCA.

Six adult mongrel dogs anesthetized with Na pentobarbital, were cooled to 10°C with a combined surface/cardiopulmonary bypass (CPB) technique (alpha stat, Hct 25%). Rectal and esophageal temperatures were monitored. Using radiolabelled microspheres blood flows were measured: 1) before CPB at 37C: 2) before HCA at 10°C, flow rate 50 ml/Kg/min; 3) at reperfusion <15°C, flow rate 50/ml/Kg/min. Repeated measures ANOVA of log transformed data and Tukey's test for multiple comparisons were used.

Cooling decreased blood flow in all sampled areas ($p<0.05$)(Fig.). At reperfusion total CBF increased sevenfold compared to before HCA ($p<0.05$). Regional CBF followed a similar pattern ($p<0.05$). Hyperperfusion was also observed in the cervical and thoracic cord and in the adrenals as well ($p<0.05$). Renal and muscle flows suffered a further decrease at reperfusion ($p<0.05$).

Following HCA there is cerebral reactive hyperemia similar to that observed after normothermic CA. Preserved autoregulation after a safe period of HCA may explain the redistribution of blood flow observed at reperfusion. We are investigating long term CBF/metabolism coupling following HCA.



A624

TITLE: **THE EFFECT OF PROPOFOL ON HEPATIC BLOOD FLOW**
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Hepatic blood flow has been shown to decrease with the administration of inhalation anesthesia [1]. The dose-related changes in hepatic blood flow during continuous infusion of propofol are demonstrated in this study.

Ten beagles were instrumented to measure global and regional left ventricular function in an acute open-chested model, in accordance with the Animals (Scientific procedures) Act of the U.K. (1986). In three animals, coronary blood supply was normal, while in the other seven subjects the left anterior descending coronary artery had been critically constricted. After instrumentation, propofol was infused for 35-minute periods at 200, 300, 400 and 500 $\mu g.kg^{-1}.min^{-1}$. Hemodynamic recordings were made at the end of each infusion period and indocyanine clearance curves (IC, a relative indication of hepatic blood flow [HBF] were estimated during the last 10 to 15 minutes at each infusion rate). Blood samples were collected at 30 minutes to determine blood propofol concentrations (PC) using HPLC. Two-way ANOVA with Duncan mean separations, ANOVA for repeated measures and correlation analysis were conducted on the data with a SAS program 5.18.

As there were no significant differences in global function between the animals with normal and compromised myocardium the data have been grouped together. HBF, arterial pressure (SAP), and cardiac output (CO) were decreased in a dose-dependent manner ($p<0.01$; table). In two animals, there were correlations between HBF and CO ($r>0.94$, $p<0.05$) and in another four animals correlations between HBF and infusion rate ($r>0.74$, $p>0.05$). Although high correlation coefficients between HBF and PC were suggested, data did not achieve statistical significance.

Table: N=10, Mean (SD), *=$p<0.01$ (ANOVA for repeated measures).

Infusion Rate (µg/kg/min)	200	300	400	500
SAP (mmHg)	127 (13)	107 (11)	91(22)	79 (14) *
CO (ml/min)	1695(571)	1516(406)	1413(584)	1135(473)*
IC (ml/min)	154.5(69.3)	113.4(32.7)	100.7(31.3)	89.8(16.9)*
PC (µg/ml)	8.1(1.3)	11.7(3.4)	16.1(5.2)	23.7(8.7) *

Propofol, like inhalational anesthetics, therefore decreases hepatic blood flow in a dose-dependent manner. This may merely be a reflection of the decrease in CO; although the correlation of HBF with infusion rate in more animals than HBF with CO, suggests that other factors may be important. As propofol undergoes hepatic metabolism, which is flow-dependent, clearance of the drug may be affected by the decrease in HBF at high infusion rates.

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Reference: 1. Br J Anaesth 52:1079-86, 1980