

TITLE: EFFECTS OF PROPOFOL ON THE FUNCTION OF NORMAL, COLLATERAL DEPENDENT AND ISCHEMIC MYOCARDIUM.

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Decreases of arterial pressure and increases of heart rate, which characterize the hemodynamic effects of propofol (P) (1), might be deleterious in coronary artery disease. The present study investigated the effects of P on normal, collateral dependent and ischemic myocardium in chronically instrumented dogs.

Methods: Ameroid constrictors and hydraulic occluders were placed on the circumflex coronary artery or on the anterior descending coronary artery in 8 mongrel dogs. Regional myocardial function in normal (NS), collateral dependent (CS) and ischemic (IS) segments was determined by sonomicrometry. Ischemia was produced by inflation of the hydraulic occluder until regional myocardial function decreased by 30%. Recordings were made 3, 5 and 10 min following a bolus of 5 mg/kg P IV. Statistical significances were calculated by analysis of variance.

Results: P increased heart rate (HR) and reduced mean arterial pressure (MAP) while left ventricular end-diastolic pressures remained constant. Reduction of segment shortening (SS%) of the IS was more pronounced than of the NS or the CS (Table).

Discussion: While the P-induced decreases of arterial pressure and the increases of heart rate are well tolerated in both normal and collateral dependent myocardium, ischemic myocardium responds more sensitive to these hemodynamic changes. Thus, as with all other IV-anesthetics, the determinants of myocardial well being have to be controlled meticulously during induction with P.

	control	Propofol		
		3'	5'	10'
NS-SS%	15.2	13.1	13.2+	13.3
(mm)	±2.0	±2.3	±2.4	±2.7
CS-SS%	15.6	14.0+	14.5	14.9
(mm)	±1.0	±1.2	±1.2	±1.1
IS-SS%	6.0	4.6+	4.4+	4.4
(mm)	±0.7	±0.9	±0.9	±1.1
MAP	103	89*	92+	94+
(mmHg)	±4	±4	±4	±3
HR	99	124*	114	110
(bpm)	±4	±6	±7	±9

means ± SEM, + p<0.05, * p 0.01

Reference:

- 1) Br J Anaesth 58: 969-975.

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TITLE: ALPHA-STAT VS PH-STAT: EFFECT OF VARYING BYPASS FLOW RATE UPON CEREBRAL BLOOD FLOW

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Previous studies suggest cerebral blood flow (CBF) is well maintained during hypothermic cardiopulmonary bypass (CPB), even at low systemic flow rates, but it is unknown how hypothermic blood gas management influences this phenomenon. This study was therefore designed to examine CBF during alterations in bypass flow rate with either alpha-stat or pH-stat blood gas management.

15 NZW rabbits were anesthetized with a constant infusion of fentanyl and diazepam. The bypass circuit consisted of a venous reservoir, a Biomedicus centripetal pump, and a Terumo Capiox 08 membrane oxygenator. An 18 Fr venous cannula was placed in the right atrium and two 14g arterial perfusion cannulae were placed in the femoral arteries. CBF was determined using radioactive microspheres with injection of spheres into the aortic perfusion line. Bi-brachial reference samples were obtained. Animals were randomized to pH-stat (n=7, PaCO₂ kept at a temperature corrected value of ~40mmHg) or alpha-stat (n=8, PaCO₂ maintained at 40mmHg measured at 37°C) blood gas management and cooled to 25°C (esophageal) within 20min after institution of CPB. After control measurements at a pump flow of 100 ml/kg/min, pump flow was changed in random fashion to 100, 70, and 50

ml/kg/min allowing 15 min for equilibration between each point. At the end of the experiment, the brains were removed, sectioned, weighed, and counted. CBF was calculated using standard formulas.

Data are summarized in the Figure. There were no differences in MAP (or other hemodynamic parameters) between groups at the different flows, although MAP decreased with decreasing flows. CBF was well maintained in the face of decreasing CPB flow in both groups. Although pH-stat animals had higher CBF values than alpha-stat animals at varying CPB flow rates, the change in CBF with changing CPB flow was the same for each group. The absolute difference in CBF between alpha-stat and pH-stat animals was small. Our data suggests there may be impaired cerebral CO₂ responsiveness with progressive hypothermia.

