TITLE: EFFECTS OF PROPOFOL ON CORONARY CIRCULATION AND MYOCARDIAL PERFORMANCE OF AN ISOLATED RABBIT HEART

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Induction of anesthesia using Profopol (PRO) is generally associated with a marked decrease in arterial pressure. This effect seems to be mainly due to a vasodilator effect of PRO. However, a direct negative inotropic effect of PRO remains controversial. In addition, direct effects of PRO on coronary vasculature have not been fully investigated.

A blood perfused isolated rabbit heart preparation (modified Langendorff technique) was used to determine the potential direct effects of PRO on coronary circulation and myocardial performance. Human stored RBC's were whashed and resuspended in a modified Krebs-Henseleit buffer. Blood was oxygenated and equilibrated to achieve a normal acid-base balance. After quick preparation, the aorta was cannulated and retrograde aortic perfusion was performed. The speed of coronary pump which reflects coronary blood flow (CBF) may vary to maintain a constant perfusion pressure at 80 mm Hg. A cannulated fluid-filled balloon was placed in the left ventricle (LV) in order to monitor LV pressures. The balloon was inflated to maintain constant LV volume and to produce a LV end diastolic pressure (LVEDP) of 10 mmHg. The atria were paced at a constant rate of 130 b/min. After baseline measurements, PRO concentration in the perfusate was increased from 10^{-5} to 10^{-3} M. Six experiments were obtained.

	PROPOFOL CONCENTRATION				
	Basal	10^{-5} M	3 10^{-5} M	10^{-4} M	3 10^{-4} M	10^{-3} M
CBF ml/min/g	2.04±0.33	2.10±0.36	2.12±0.38	2.35±0.46	2.47±0.35**	2.65±0.31**
dP/dt max mm Hg/s	1750±264	1758±260	1791±276	1833±218	1841±260	1858±296
dP/dt min mm Hg/s	1350±248	1308±248	1316±253	1416±242	1408±248	1383±264

** p<0.01 vs Basal

Relevant data are presented in the table. No significant effect of PRO on myocardial contractility (dP/dt max) or on isometric relaxation (dP/dt min) was observed even at the highest concentrations. A potent direct vasodilator effect is observed at supratherapeutic concentrations. These data suggest that cardiovascular effects of PRO are related to a peripheral vasodilator effect .

TITLE: DOES PROPOFOL SENSITIZE THE HEART TO EPINEPHRINE ?

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It has been demonstrated that the sensitization of heart to arrhythmogenic action of epinephrine (EPI) could be produced not only by volatile anesthetics but also by intravenous anesthetics[1]. The present study was carried out to determine the arrhythmogenic threshold of EPI during propofol anesthesia in comparison with thiopental and etomidate anesthesia.

23 mongrel dogs were used. 8 dogs were anesthetized with propofol alone (10mg/kg iv followed by infusion at 0.67mg kg^{-1} min^{-1}), 8 dogs were anesthetized with thiopental alone (20mg/kg iv followed by continuous infusion), and 7 dogs were anesthetized with etomidate (2mg/kg iv followed by infusion at 0.13mg $\cdot$ kg^{-1} min^{-1}) plus alcuronium (0.2mg/kg). The dogs were intubated endotracheally and mechanically ventilated. Lead II of the electrocardiogram was monitored continuously. EPI was infused via femoral vein at logarithmically spaced increasing rates until the arrhythmogenic dose (AD) was reached. The AD was defined as the dose that produced four or more premature ventricular contractions within 15sec. When the criterion for AD was satisfied, a blood sample was drawn via femoral artery to measure plasma concentration of EPI. Data were analyzed by one-way analysis of variance followed by Scheffe's test. Statistical significance was defined as $P<0.05$.

The ADs of EPI during propofol, thiopental, etomidate anesthesia are tabulated (table 1). The AD of EPI during propofol anesthesia was significantly lower than that during etomidate anesthesia.

The results show that although the arrhythmogenic threshold of EPI during propofol anesthesia is higher than that during thiopental anesthesia, it is far lower than that during etomidate anesthesia, and is comparable to that during halothane anestesia reported previously[1]. It is suggested that propofol probably have a sensitizing action on heart to arrhythmogenic action of EPI.

Reference
1. Anesthesiology 71:929-935, 1989

Table 1. The Arrhythmogenic dose and plasma concentration of EPI during propofol, thiopental, or etomidate anesthesia (mean ± SEM).

		Arrhythmogenic threshold of EPI	
Anesthesia	n	Dose (μ g·kg^{-1} min^{-1})	Plasma level (ng/ml)
propofol	8	2.51 ± 0.43*	23.6 ± 8.5*
thiopental	8	0.77 ± 0.04*	10.7 ± 1.5*
etomidate	7	10.7 ± 1.17	222.0 ± 36.3

*P<0.05 compared with etomidate value.