Title: PANCURONIUM ENHANCES A-V CONDUCTION IN ANESTHETIZED DOGS

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Introduction. Pancuronium is known to increase heart rate in both man and animals. Such an increase may be harmful in patients with myocardial disease since it increases myocardial oxygen demand. Pancuronium (PAN) shortens AV nodal conduction time (AVN) in halothane (HALO)-anesthetized dogs[1], but its effect during enflurane (ENFL) anesthesia has not been reported. Since HALO and ENFL have contrasting effects on cardiac conduction and refractory periods[2], we determined the effect of PAN on conduction and refractory periods during HALO and ENFL anesthesia in dogs.

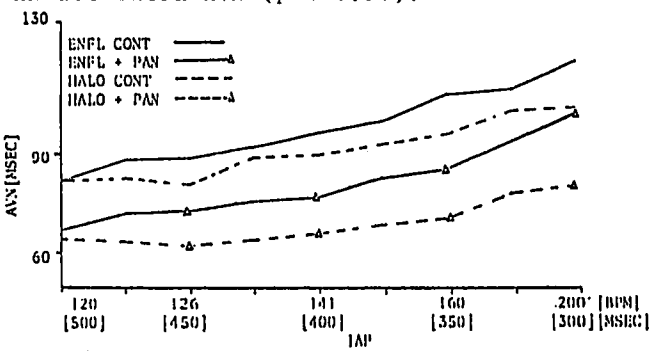
Methods. Healthy unpremedicated dogs (N=20) were alternately anesthetized by inhalation with either HALO or ENFL. Dogs were equilibrated to end-tidal anesthetic levels equivalent to 1.25 MAC. Following induction, the trachea was intubated and ventilation was controlled with an Ohio Fluidic ventilator. Normocapnea ($P_{a}CO_2$ 38-45 torr), normothermia (37.0-38.0° C) and pH (7.36 ± .01) were maintained. Conduction and refractory period measurements were made utilizing His-bundle electrocardiographic and atrial stimulation techniques previously described[3]. Control measurements were made with either HALO or ENFL followed by measurements after the addition of iv PAN (0.1 mg/kg).

Results. His-Purkinje and ventricular conduction was not altered by PAN with ENFL or HALO. Mean femoral arterial pressure in spontaneously beating hearts was not altered by the addition of PAN in both HALO and ENFL dogs. Data (Mean ± SEM) for PAN effects on spontaneous heart rate (SHR), AV nodal conduction time (AVN) during SHR, the atrial effective refractory period (ATERP), and the AV nodal functional refractory period (AVFRP) are shown in the table:

	ENFL		HALO	
	CONT	PAN	CONT	PAN
SHR (bpm)	106±2	112±2*	110±5	126±5*
AVN (msec)	82±2	76±2*	84±3	71±2*
ATERP (msec)	139±4	156±6*	123±5	127±9
AVFRP (msec)	280±7	269±6*	247±6	247±5

*(p < 0.05 PAN versus CONT)

The addition of PAN did not affect the rate dependence of AVN during incremental increases in high right atrial-paced heart rates (IAP), but at each paced cycle length PAN decreased AVN (p < 0.05).



Discussion. Pancuronium increased spontaneous heart rate and decreased AV nodal conduction time during both SHR and IAP measurements. The atrial effective refractory period was prolonged and the AV nodal functional refractory period was shortened by PAN during ENFL anesthesia; but there was no effect of PAN on these variables during HALO anesthesia. Pancuronium's enhancement of AV nodal conduction increases the likelihood of a ventricular response to rapid supraventricular rhythms, which, as noted earlier, would jeopardize patients with myocardial disease. Factors which shorten ATERP (e.g. acetylcholine) are known to facilitate the production of both stimulated and spontaneous atrial arrhythmias. Enflurane, however, prolongs the ATERP as its concentration increases and decreases the likelihood that premature atrial stimuli will cause premature atrial beats.[2] Pancuronium also prolongs the ATERP during enflurane anesthesia, and, thus, may also protect against the occurrence of atrial arrhythmias during enflurane anesthesia.

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References.

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