Anesthesiology
V 75, No 3A, Sep 1991

POSTER SESSION XI

A569

TITLE: EFFECTS OF EPINEPHRINE AND VOLATILE ANESTHETICS ON CONDUCTION VELOCITY IN CANINE PURKINJE FIBERS

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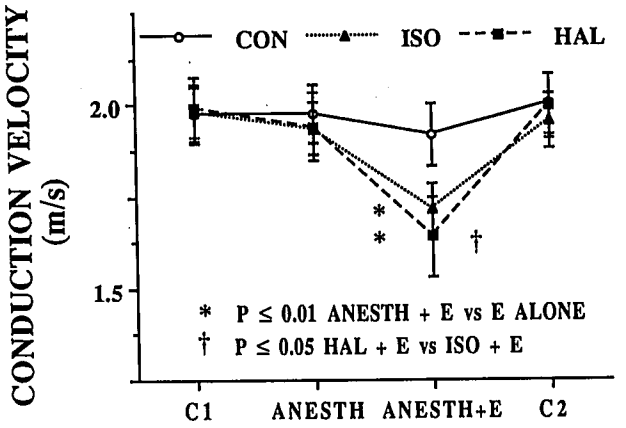
Reynolds et al.[1] initially reported that the negative dromotropic effect of halothane (H) on Purkinje fibers (PF) is potentiated by epinephrine (E) and suggested that a specific interaction between E and H on conduction may contribute to sensitization of the myocardium by halothane to the dysrhythmic actions of catecholamines. However, other investigators[2] have not found a negative dromotropic interaction between H and E. The present study was designed to evaluate the effects of E on the conduction velocity of canine PF in the absence and presence of H and isoflurane (I).

After Institutional Animal Care Committee approval, free running left ventricular false tendons were obtained from 12 hearts following sacrifice during halothane anesthesia. Segments were mounted in a 2 ml chamber and superfused with Krebs' solution equilibrated with 97 % O_2 and 3 % CO_2. Bipolar electrodes placed at the proximal (septal) end of the tendons were used to stimulate the preparations at 150 bpm (CL 400 msec). Two intracellular microelectrodes were utilized to obtain PF action potentials. The upstrokes were amplified and displayed at a fast sweep on a digital oscilloscope. Conduction velocity (CV) was calculated from measured interelectrode conduction times and distance under each experimental condition. Krebs' solution was pre-equilibrated with 1% H and 1.5% I, producing bath concentrations of 0.4 mM and 0.4 mM, respectively (gas chromatography). E was added at a concentration of 5 μM. The sequence of experimental conditions was randomized to minimize time-dependent changes and the effects of E alone and E with H and I were studied in each preparation. The values of CV obtained were compared utilizing ANOVA and Duncan's range test.

The minimum values of CV found during 10 min exposure to E alone and E with I or H are compared in the figure (mean±SE).



E, H and I alone did not cause significant change in CV compared to initial (C1) or final control values (C). However, E in the presence of H or I decreased CV more than E alone ($P \leq 0.01$). In addition the decrease of CV with E was greater with H than with I ($P \leq 0.05$).

These results suggest that E in combination with volatile anesthetics may slow PF conduction and that this negative dromotropic effect may be greater with H than with I.

References:
1) *Res Comm Chem Path Pharmacol* 9:633, 1974.
2) *Anesth Analg* 72:11, 1991.

A570

Title: THE ROLE OF THE α-ADRENOCEPTOR SUBTYPE DURING MESENTERIC VENOCONSTRICTION IN RESPONSE TO CELIAC GANGLION STIMULATION

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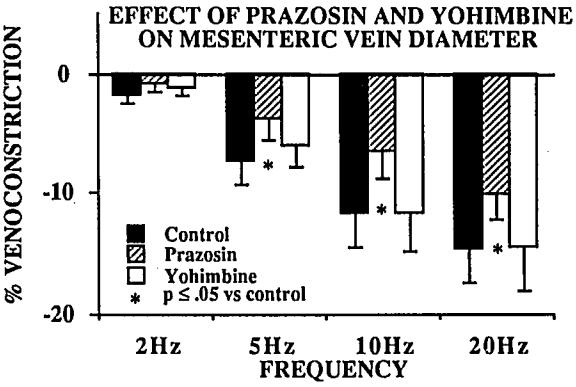
The splanchnic venous circulation is in part controlled by changes in sympathetic efferent tone.[1,2] Although both α_1 and α_2 receptors are recognized to produce constriction of vascular smooth muscle in many circulatory beds, little is known about the role of these receptors in mediating constriction of mesenteric capacitance veins. Direct electrical stimulation of the celiac ganglia, as well as acute hypoxia or acute hypercapnia, produce neurally mediated mesenteric venoconstriction.[3,4] The purpose of this study was to quantify α-adrenoceptor-mediated mesenteric venoconstriction and to compare the relative contribution of the α_1 and α_2 subtypes in this response.

Six chloralose-anesthetized rabbits (1.0-1.6 kg) were studied. Surgical preparation consisted of tracheotomy for control of ventilation, femoral venous cannulation for infusion and femoral arterial cannulation for continuous arterial pressure and heart rate monitoring. A pair of silver electrodes was attached to the celiac ganglion for electrical stimulation. A 13 cm loop of terminal ileum was exteriorized and superfused with physiological salt solution (PSS) which contained propranolol (10^{-6} M) for blockade of β-adrenoceptors. The mesentery was transilluminated and continuous measurements of mesenteric vein diameter were made in response to sequentially administered celiac ganglion stimulation of 2, 5, 10, and 20 Hz (90 sec duration) in the presence of the α_1-antagonist prazosin (10^{-7} M), or the α_2-antagonist yohimbine (10^{-6} M). These antagonists were added to PSS and allowed to equilibrate for 30 minutes. There were no systemic hemodynamic effects after exposing the mesenteric preparation to the PSS containing either of these antagonists. The mean percent changes in mesenteric vein diameter are shown in the figure.



There is a graded mesenteric venoconstriction in response to increasing frequency of celiac ganglion stimulation. These responses were significantly attenuated in the presence of the α_1-antagonist prazosin but not the α_2-antagonist yohimbine. These results suggest that the α_1-adrenoceptor is primarily responsible for the mesenteric venoconstriction in response to celiac ganglion stimulation.

References:
1. *Am. J. Physiol.* 256: H162, 1989
2. *Am. J. Physiol.* 256: H1066, 1989
3. *FASEB J.* 4: A1190(#5365), 1990
4. *Anesthesiology* (abstract): A632, 1990