POSTER SESSION V

A292

Title: EFFECTS OF HYPEROSMOTIC SALINE SOLUTIONS IN CORONARY CIRCULATION

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Introduction. Infusion of hyperosmotic saline solutions has been suggested for use in resuscitation from hemorrhagic shock. Previous studies attempting to describe the effects of these solutions in the coronary solution were complicated by unstable systemic hemodynamic conditions (1) or unphysiologic constant-flow coronary perfusion conditions (2). The present study was undertaken in which hyperosmotic saline solutions were infused directly into a coronary artery of the in situ canine heart perfused at constant pressure with systemic hemodynamic parameters controlled.

Methods. The study was conducted in compliance with our Institutional Animal Investigation Committee. The left anterior descending coronary artery (LAD) of 10 anesthetized, open chest dogs was cannulated and perfused at 100 mmHg via an extracorporeal reservoir. Values for peak (PK) and steady sate (SS) coronary blood flow (CBF; in ml/min/100g) were obtained with an electromagnetic flowmeter. Local venous blood was collected so that steady state values for myocardial oxygen consumption (MVO_2, in ml/min/100g) could be calculated. Percent segmental shortening in LAD bed was evaluated with ultrasonic crystals. Measurements were obtained under control conditions. and during intracoronary infusions (2 ml/min) of hyperosmotic saline solutions (2.5, 5.0 and 7.5 %). Measureents of aortic pressure, left ventricular dP/dt max, and heart rate, were obtained.

Results. The hyperosmotic saline solutions caused an immediate pronounced increase in coronary blood flow (table below) which, at constant perfusion pressure, reflected significantly reduced coronary vascular resistance. This blood flow increase waned rapidly (3-5 min) to a more moderately elevated steady state value. Both the peak and steady state increases in coronary blood flow varied as a direct function of osmolarity. Myocardial oxygen consumption and percent segmental shortening were not affected by hyperosmotic saline. Global cardiac and systemic hemodynamic parameters did not change during the intracoronary infusions.

	Control		2.5%	5.0%	7.5%
CBF	108±17	PK	152±20*	228±47*	373±55*
		SS	120±18	138±23*	159±19*
MVO_2	7.7±1.0		7.6±1.0	8.4±1.3	7.0±0.6

Results are Mean±SE. * P<0.05.

Discussion. Hyperosmotic saline solutions caused osmolarity-dependent coronary vasodilation. Although the maximal response was transient, modest vasodilation persisted once steady state conditions were attained. The constancy of segmental shortening and myocardial oxygen consumption in the perfused myocardium suggests that this steady state coronary vasodilation was due to a direct relaxing effect on vascular smooth muscle rather than being secondary to metabolic autoregulation. The rapid return of coronary vasomotor tone during exposure to hyperosmotic saline implies relatively intact vasodilator reserve for autoregulatory adjustments during period immediately following resuscitation.

References

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TITLE: EVALUATION OF GASTRIC EMPTYING IN SEVERE BURN PATIENTS

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Fluid and nutritional support play an important role in the management of burned patients.[1] The current policy on fasting before anesthesia for avoiding aspiration pneumoinia may disturb the nutritional balance in such patients and affect overall wound healing and recovery because the fast is prolonged.[2] Many factors that affect the gastric emptying rate have been identified, and these factors dictate the policies on the fasting time before anesthesia.[3] Because no information was available as to whether the gastric emptying rate is disturbed by severe burn, we designed a study to estimate the gastric emptying rate by determining the oral absorption kinetics for acetaminophen in severely burned patients.

Ten adult patients suffering from 2nd degree burns (more than 20% of total body surface area), and 20 normal healthy volunteers who were used as controls were studied (with informed consent and approval by the Investigation Review Board of the National Defense Medical Center). After an 8-hour fast, the subjects ingested 0.5 gm acetaminophen with 200 ml water. The plasma concentrations of acetaminophen were determined by high-performance liquid chromatography, and the absorption kinetics was estimated by the time taken to reach the maximum plasma concentration (T_{max}), by the maximum plasma concentration (C_{max}) itself and by the area under the plasma concentration-time curve ($AUC_{0\text{-}120\,min}$).

The results showed that T_{max} was 33±24 min in patients and 39±24 min in the healthy volunteers. The $AUC_{0\text{-}120\ min}$ and C_{max} were 556±190 μg/ml.min and 9.5±3.5 μg/ml in patients and 539±131 μg/ml.min and 7.8±2.8 μg/ml in the volunteers, respectively. There were no statistically significant differences between the two groups in T_{max}, $AUC_{0\text{-}120\ min}$, and C_{max} (Figure).

We concluded that severe burn does not affect the stomach emptying rate itself. We will perform further studies to determine the exact time needed preoperatively for stomach emptying after intake of a liquid, semi-liquid, or solid diet.

References

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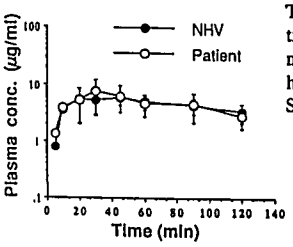

The plasma concentration-time plot of oral acetaminophen (NHV: normal healthy volunteer; mean± S.D.)