B2

TITLE: ENTERAL NUTRITION INCREASES MESENTERIC BLOOD FLOW IN RATS DURING VASOPRESSIN ADMINISTRATION

AUTHORS: P.R. Roberts, MD, M.H. Wall, MD, K.W. Black, LATG, M. Shouse, MS, R.C. Prielipp, MD

AFFILIATION: Dept. of Anesthesiology, Wake Forest University School of Medicine, Winston-Salem, NC 27157

Vasopressin (AVP) is used widely to treat hypotension occurring after cardiopulmonary bypass, during septic shock, and during cardiopulmonary resuscitation (1). However, AVP is a very potent vasoconstrictor of the mesenteric circulation. Mesenteric ischemia adds significantly to the pathogenesis of multiorgan failure (2). Conversely, enteral nutrition (EN) may improve mesenteric blood flow (MBF). We hypothesized that EN will preserve MBF in rats given AVP infusions.

Male Sprague-Dawley rats (n=8/group; 325-350 gm) were anesthetized with intraperitoneal α-chloralose and pentobarbitol. The animals were mechanically ventilated; femoral arterial and venous lines were inserted and ultrasonic flow probes were placed on the superior mesenteric artery. The EN groups also had a duodenal feeding tube placed. Normothermia, acid-base status, and oxygenation were maintained during the study period. Measurements were made 90 min after instrumentation (baseline, BL) and at 45-min intervals. LR received lactated ringers (LR) (5 cc/hr). LR+AVP received LR and AVP (at 5, 10, and 25 μU/min for 45 min at each dose; 5 cc/hr total). NUT received peptide-based EN (Crucial®, Nestle Nutrition, Deerfield IL) at 2 cc/hr and 3 cc/hr IV LR. NUT+AVP received EN and AVP (at 5,10 and 25 μU/min; 5 cc/hr total). Data were analyzed by repeated measures ANOVA ($P<0.05$ considered significant). Data are presented as % of BL±SEM (see table).

Group	MAP (AVP 5 μU/min)	MAP (AVP 10 μU/min)	MAP (AVP 25 μU/min)	MBF (AVP 5 μU/min)	MBF (AVP 10 μU/min)	MBF (AVP 25 μU/min)
LR#	108±4	112±5	111±4	98±10	103±10	111±14
LR+AVP	115±6	123±5	135±10*	121±15	135±16	72±5*
NUT#	107±5	110±6	113±6	101±9	92±11	93±8
NUT+AVP	110±6	136±8**	138±9**	158±21**§	162±23**	76±13

#= LR and NUT data at same times, no AVP given; *=p<0.05 LR vs. LR+AVP; **=p<0.05 NUT vs. NUT+AVP; §=p<0.05 LR+AVP vs. NUT+AVP

This is the first report of EN increasing MBF during concurrent AVP infusion. EN significantly increases MBF at low AVP doses, probably preserves MBF at moderate doses of AVP, but the high AVP doses uniformly cause a decrease in MBF. Interestingly, this study did not demonstrate a rise in MBF in these non-fasted animals with EN alone. Whether observed effects are the result of a unique interaction of this peptide-based nutritional formula and AVP, or can be generalized to administration of nutrients with other vasoactive drugs is unknown. EN may prevent splanchnic ischemia in patients receiving AVP infusions. Thus, these findings offer a therapeutic regimen that could diminish development of multiorgan failure.

References: 1) J Cardiovasc Surg 1998;39:619-623; 2) J Crit Care 1994;9:198-210.

B3

TITLE: THE INFLUENCE OF INCREASING SEVERITY OF ILLNESS ON ICU READMISSION RATES OVER TIME

AUTHORS: Andrew L. Rosenberg, M.D., Timothy P. Hofer, M.D., M.Sc., Rodney A. Hayward, M.D., Cathy Strachan, MSRN, Charles M. Watts, M.D.

AFFILIATION: Department of Anesthesiology and Critical Care, University of Michigan, Ann Arbor, MI 48109

PURPOSE: Increased emphasis on fiscal restraint has led to shorter hospital stays and influenced the admission and discharge criteria for ICU patients. There is concern that admitting fewer patients for monitored care and/or discharging more acutely ill patients from the ICU will lead to increased readmission rates. To date, no study has evaluated this. We studied ICU readmission rates over a 4.5-year period during which time institutional efforts were made to reduce low-acuity, monitored patient admissions to a tertiary care ICU.

METHODS: Patient characteristics including demographics, daily acute physiology scores, admission diagnoses, treatment status (monitored vs. active) and observed to predicted mortalities and lengths of stay were prospectively collected in an APACHE III clinical database for 4,684 consecutive admissions to the medical ICU at The University of Michigan Hospital from January 1, 1994 to April 1, 1998. Changes over time for these variables and ICU readmission rates were analyzed using analysis of variance (ANOVA) for continuous variables or Chi-square for categorical variables.

RESULTS: Admissions to the ICU for monitored care were significantly reduced from 16% to 9% during the study period (p=.002). Consequently, patients in the ICU were more acutely ill at the time of admission and discharge as reflected by the 10% increase in admission APS (p=.001) and the 16% increase in discharge APS (p=.001) (Table). Readmission rates, however, did not change significantly throughout the study period (range: 8% to 10.5%, p=.6). Furthermore, lengths of stay (LOS) and mortality, adjusted for severity of illness, did not significantly change (Table).

CONCLUSIONS: Significant reductions (44%) in the proportion of monitored patients in a large academic medical ICU were accompanied by a significant increase in overall acuity for the ICU population without a significant increase in readmission rates, lengths of stay or risk-adjusted mortality. Readmission rates do not appear to be sensitive to increased triage pressures or to overall ICU severity of illness.

SUPPORTED BY: The Robert Wood Johnson Foundation Clinical Scholars Program and VA Health Services Research and Development Services

Variable	1994	1995	1996	1997	1998	p-value
Low-risk Monitor (%)	16	14	12	12	9	.002
Admit APS	50	50	53	54	55	.001
Discharge APS	43	43	48	50	50	.001
ICU LOS (d)*	1.1	1.1	1.1	1.3	.09	.7
Hospital Mortality*	0.9	1.1	0.8	0.7	0.9	.8
ICU Readmission Rate	**8.0**	**8.9**	**10**	**10.5**	**9.9**	**.6**

* Ratio of observed to predicted length of stay and mortality rates