217 INTRAVASCULAR CANNULATION IN NEONATES. Sheryl Stevens, Shyan Sun (Spon. by Richard Rapkin) UMD-NJ Med. Sch., Children's Hosp. of NJ, Dept of Neonatology, Newark, N.J.

Previous studies have documented that catheters or intravascular needles have a finite functional life in the neonate. During a 6 month period (1984) we studied 164 intravascular insertions in our NICU. A 25 gauge 3/8" Abbott steel butterfly needle, a 24 gauge Prevue angiocatheter and a 22 gauge Argyle medicut catheter were compared to determine: (1) frequency of their use; (2) their lifespan in relation to: (3) insertion sites; (4) types of solutions; (5) frequency and success of personnel inserting the cannulae. Butterfly needles were used most frequently (76%) with a mean duration of 15.3 hours; angiocatheters-frequency 19%, duration 30 hrs; medicuts frequency 5%, duration 134.5 hrs. NICU nurses most frequently inserted cannulae (73%) followed by residents (13%), neonatal fellows (11%) and neonatologists (3%). Cannulae inserted by nurses lasted an average of 18.1 hrs, residents 13.6 hrs and fellows 28.2 hrs. Cannulae infusing D5W lasted 27.6 hrs, D10W 8.3 hrs, D10W with lytes 21.1 hrs and dextrose with amino acids 16.5 hrs. Preference of site selection and relationship of sites to the duration is shown:

Site	Scalp	R hand	L hand	R arm	R foot	L foot	L arm
Frequency(%)	25	14	11	11	10	8	8
Duration(hr)	14.1	20.6	22.8	15.1	13.5	13.5	29.4

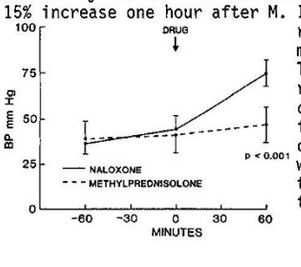
Our impression is that longevity of cannulation is dependent on discriminant choice of cannula type, site of insertion, solution to be infused, and experience of personnel.

† 218 VALIDATION OF THE NEAR INFRARED SPECTROPHOTOMETRIC METHODOLOGY FOR MEASURING CEREBRAL BLOOD VOLUME CHANGES. Judith Stiff, David A. Wilson, Daniel F. Hanley, Richard J. Traystman, Mark C. Rogers. Johns Hopkins Medical Institutions, Johns Hopkins Hospital, Departments of Anesthesiology/Critical Care Medicine and Neurology, Baltimore, MD 21205

Spectrophotometric methods (IRM) of measuring cerebral blood volume (CBV) provide qualitative estimates of this variable, but to date the method has not been validated. In this study we evaluate IRM with a double-indicator method of CBV measurement. Regional cerebral blood flow (rCBF) was measured by the microsphere method in four pentobarbital dogs. Light at 775, 815 and 905 nm was presented to the brain and changes in relative CBV computed from the reflectance signals. Absolute CBV was calculated from the equation CBV = rCBF/60 X t, where t is the mean transit time of cardiogreen dye injected into a carotid artery monitored via the 815 wavelength. Mild hypercapnia ($PaCO_2$; 34 ± 2 to 54 ± 3 mmHg) increased rCBF from 29 ± 4 to 95± 33 ml/min/ 100gm and shortened t (8.2 ± 1.8 to 6.0 ± 2 sec). CBV increased from 3.7 ± .4 to 8.7 ± 3.6 ml/100gm. Moderate hypercapnia ($PaCO_2$ = 72 ± 4 mmHg) further increased rCBF to 244 ± 69 ml/min/100gm and shortened t to 4.4 ± 2.2 sec. CBV was 14.1 ± 3.8 ml/100gm. In each study a significant correlation was found between the change in relative and absolute CBV measurements. The overall correlation was r = .961. We conclude that IRM is a potentially useful technique for obtaining qualitative, continuous changes in CBV. Supported by NS-20020.

● 219 COMPARATIVE EFFECTS OF NALOXONE AND METHYLPREDNISOLONE IN INFANTS WITH SEPTIC SHOCK. M. Torres, R. Veliz, M. Durand (Spon. by J.E. Hodgman). Universidad Nacional Autonoma de Mexico, La Raza Med. Ctr., Mexico City; and USC School of Med., LAC-USC Med. Ctr., Dept. of Ped.,Los Angeles.

Septic shock constitutes a serious problem requiring urgent therapy. Naloxone (N) has a potential role in this therapy; however, in pediatric patients the reports are confined to isolated cases. Further, the efficacy of methylprednisolone (M) in shock has not been established. We studied 15 infants with septic shock; 8 randomly received N (0.01 mg/kg IV) and 7 received M (30 mg/kg IV). Heart rate, mean arterial blood pressure (flush method), capillary refill, differences in temperature and hematocrit, serum lactate and arterio-venous oxygen difference (Ca-vO_2) were measured one hour before, at the time and one hour after administration of N or M. We found that mean blood pressure (BP) increased by 70% one hour after N administration as compared to a 15% increase one hour after M. In addition, there was a greater reduction in Ca-vO_2 following administration of N than M (P<0.05). There was no major change in heart rate and levels of serum lactate did not decrease. Our preliminary findings suggest that N significantly increases BP in infants with septic shock. Early administration of N may be effective in the therapy of these infants.



● 220 HYPOTENSIVE AUTOREGULATION OF CEREBRAL BLOOD FLOW DURING HYPOXIA. Richard J. Traystman, David A. Wilson, Raymond C. Koehler, Cecil Borel, M.Douglas Jones, Jr., and Mark C. Rogers. The Johns Hopkins Medical Institutions, Johns Hopkins Hospital, Departments of Anes./Crit. Care Med. and Pediatrics, Baltimore, MD 21205

We determined whether cerebral blood flow autoregulation is altered during hypoxic hypoxia in 10 anesthetized, ventilated dogs. Cerebral blood flow (CBF) was measured globally and regionally (rCBF) via the cerebral venous outflow and radiolabelled microsphere techniques. Mean arterial blood pressure was lowered from control (120 mmHg) in decrements of 10 mmHg. Each level of pressure was maintained for 5 min. Cisterna magna pressure and cerebral venous outflow pressure were maintained at 0 mmHg. $PaCO_2$ and pH were maintained constant throughout the experiment. The lower limit of autoregulation during normoxia (PaO_2=88 torr) was approximately 58 mmHg. At that point, CBF began to decrease from control levels of 25 ml/min down to 10 ml/min at 30 mmHg. Cerebral vascular resistance (CVR) decreased as cerebral perfusion pressure (CPP) decreased, but continued to decrease beyond the lower limit of autoregulation. With further reduction in CPP (to 30 mmHg), CVR sharply increased. With hypoxia (PaO_2=25 torr), CBF increased to 70 ml/min, but the lower limit of autoregulation was only slightly altered (63 mmHg). Microsphere measurements of rCBF confirmed these results. We conclude that cerebral autoregulation is intact during severe hypoxia. These data demonstrate that the classically defined lower limit of autoregulation is not the point of maximal cerebral vasodilation. Supported by NS-20020.

† 221 EFFECT OF DECREASING LEVELS OF OXYGEN DELIVERY ON TOTAL BODY OXYGEN CONSUMPTION IN GROWING LAMBS. Ambrose Vallone. (Spon. by F.H. Morriss) University of Texas Med. Sch. at Houston, Dept. of Ped., Houston.

To determine the effect of decreasing systemic oxygen delivery (SOD) on oxygen consumption (Vo2) in the growing neonatal subject, we conducted 15 studies in 5 three week old lambs. SOD was lowered by progressive pericardial tamponade. SOD was measured as the product of cardiac output (CO) and arterial oxygen content. CO was measured by thermodilution. Pulmonary mixed venous and arterial blood were used to measure Po_2, O_2 saturation and hgb. Measurements were made every twenty minutes in unanesthetized, spontaneously breathing lambs in which decremental decreases in CO were produced. The change in Vo2 with decreasing SOD was analyzed by grouping data in decreasing ranges of SOD. The chart presents the mean± SD in each range:

SOD range	25-30.9	20-24.9	16-19.9	11-15.9	9-10.9	7-8.9	3-7.9
SOD (cc/kg/min)	26.9 ±1.8	22.3 ±1.7	18.1 ±1.2	12.8 ±1.2	10.1 ±.6	8.1 ±.6	5.1 ±1.0
Vo2 (cc/kg/min)	13.1 ±1.6	11.3 ±1.1	11.0 ±1.0	8.8 ±.7	7.8 ±.7	6.4 ±.6	4.1 ±.9
O_2extraction %	48.6 ±4.8	50.3 ±5.8	60.8 ±4.3	68.9 ±5.2	77.9 ±8.3	79.7 ±6.0	80.3 ±2.6

The increase in extraction and the decrease in Vo2 were both significant by ANOVA ($p < .001$). The data suggest that Vo2 falls in the growing lamb despite an initial, but submaximal increase in extraction. The growing animal may be particularly compromised by decreases in SOD.

222 INCREASED CARDIAC OUTPUT(CO) DURING HIGH-FREQUENCY JET VENTILATION(HFJV). JH Weiner, RL Chatburn, WA Carlo (Spon. A.Fanaroff),CWRU,Dept.Peds.,Cleve,OH

High airway pressure during assisted ventilation may impair cardiac function. Because adequate gas exchange may be accomplished at lower airway pressures with HFJV, we compared cardiac function during conventional(volume) ventilation(CV) with that during 1-3 hours of HFJV(frequency 150-200/min, I:E 1:3-1:6). CO(L/min/m^2) was determined by thermodilution, in triplicate, in 8 patients aged 2 mos.-7 yrs. on the 1st to 3rd day following correction of congenital heart disease. Heart rate(HR), central venous(CVP), pulmonary artery(PAP), left atrial(LAP), mean blood (MBP) and distal endotracheal tube pressures including peak inspiratory(PIP), positive end expiratory(PEEP) and mean airway pressures(Paw) were continuously monitored. Blood gases from CVP, PAP and LAP lines were obtained. No patient had evidence of intracardiac shunting or pulmonary regurgitation.

	CO	HR	MBP	PIP	PEEP	Paw	PaO_2
CV	3.1±.6	138±20	72±15	25±5	4±1	6.8±1.2	107±30
HFJV	3.4±.4	140±16	73±13	11±3	3±1	4.8±2.2	93±26
	p<0.05	NS	NS	p<0.01	p<0.01	p<0.01	p<0.05

CVP,PAP,LAP,pCO_2,pH and HCO_3 were comparable during both CV and HFJV. Despite the decreased PaO_2 during HFJV, O_2 delivery (cardiac index X O_2 content) did not change (256±150ml/min/m^2 to 263±136). We conclude that post-cardiac surgery HFJV increased CO and maintains comparable ventilation at reduced PIP, PEEP and Paw. HFJV may be advantageous in patients with cardiovascular compromise by allowing for improvement in cardiac hemodynamics.

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