

1357 DISTRIBUTION OF ACUTE INTRACRANIAL LESIONS IN SMALL FOR GESTATIONAL AGE (SGA) INFANTS DURING NEONATAL PERIOD. Jean Cacciabaudó, Mehmet Y. Dincsoy, Young M. Kim, Syamala K. Naroji, Susan Tuck. (Spon. by Norman L. Gootman). Health Sciences Center, SUNY at Stony Brook, Nassau County Medical Center, Dept. of Pediatrics, East Meadow, NY.

SGA infants are prone to subacute fetal distress which may produce growth retardation and wt loss. They are also subject to acute distress which may lead to prepartum and intrapartum cardiovascular instability, thus, to an acute intracranial bleed. Since periventricular (PVH), intraventricular (IVH) and parenchymal hemorrhage (PH) and ventricular dilatation (VD) can be detected by cranial ultrasound (US) examination, we studied 65 low birth weight (LBW) SGA infants and compared them with 65 weight matched controls. A separate gestation matched control study is in progress. Following table depicts a comparison (Number, X±SEM) between the SGA and the weight matched control groups which is based on first US:

	n	Gest (wk)	Birth wt	Apgar 5	PVH,IVH,PH	VD	Mortality
SGA	65	35.2±0.4**	1488	6.4±0.3	10(15%)	** 5(8%)	2(3%)
Control	65	31.4±0.3	1503	6.6±0.3	3(4.6%)	11(17%)	6(9%)

**p<0.001, *p<0.025, (t test or X² where appropriate)
Excess number of VD in control group and excess of PVH,IVH and PH in SGA group persisted in the 2nd and 3rd US (p<0.05). There seems to be an increased incidence of PVH, IVH, PH in SGA infants despite their more mature status as compared to the control infants who were gestationally less mature. Lesser incidence of VD in SGA infants may be related to an accelerated maturity in these infants.

†1358 PRELIMINARY RESULTS OF A RANDOMIZED TRIAL OF HIGH-FREQUENCY JET VENTILATION(HFJV) VS CONVENTIONAL VENTILATION(CV) IN SEVERE RESPIRATORY DISTRESS SYNDROME. WA Carlo, RL Chatburn, RJ Martin. CWRU, Dept. Peds, Cleve, OH

Despite potential reduction of barotrauma, no controlled data are available on the incidence of adverse effects of long-term high frequency ventilation(HFV). To compare HFJV to pressure-limited time-cycled CV we screened 208 1-2 kg neonates and randomized those fulfilling all of 6 criteria by 24 hr: 1)FiO₂>0.50; 2)peak insp. pressure(PIP)≥20cmH₂O; 3)positive end exp. pressure(PEEP)≥4cmH₂O; 4)frequency(f)≥20/min; 5)PaO₂≤90mmHg; 6) PaCO₂≥35mmHg. We randomized 18 neonates to HFJV (BW 1.5±.3kg, GA 31±2 wks) at a f=250/min and I:E=1:3, or CV (BW 1.5±.3kg, GA 30±2 wks) at 22±6 hr and managed both groups with standardized ventilatory protocols for 48 hr. PIP, mean airway pressure(Paw) and blood gases(ABG) were averaged over 48 hr. Sequential analyses of development of air leaks(AL), intraventricular hemorrhage(IVH) or death during the 48 hr, and chronic lung disease (CLD=ventilator >28 days)were performed.

	PIP	Paw	PEEP	a/A ratio	PCO ₂	AL	IVH	Death	CLD
HFJV n=8	25±8	9±2*	4.2±.7	.22±.10	38±2	2	1	0	1
CV n=10	26±4	12±3	4.5±.4	.22±.09	42±3*	2	1	1	1

Subsequent assisted ventilation and O₂ suppl. were comparable. Bronchoscopies(n=5) revealed no evidence of necrotizing tracheo-bronchitis. We conclude that 48 hr of HFJV: 1) maintained or improved ABG at lower Paw; 2) did not eliminate AL or CLD; 3) caused no apparent increase in adverse effects. This first randomized HFV trial indicates a comparable outcome to CV; larger trials will ultimately reveal if HFV is superior. ALA Ohio,ALANO

†1359 BILIRUBIN (BR) FLUX AND DISTRIBUTION IN THE BRAIN. William J. Cashore and Philip Blazar. Brown Univ., Women & Infants Hosp., Dept. of Peds., Prov., R.I.

Carotid artery injection of Evans Blue or albumin-bound bilirubin (ALB+BR) for 60 sec. in adult rats produced no cortical staining with an intact blood-brain barrier(BBB) and non-uniform "tufted" perivascular staining after barrier opening to ALB by 1.8 Molar Urea x 30 sec. Unbound BR given for 10-60 sec. to 25 rats without barrier opening, followed by carotid perfusion with saline, produced uniform staining, and the uptake of BR measured by chloroform extraction was dose-dependent (r=0.641, p<0.001). Retained BR was 11.6±6.2% (MEAN±S.D.) of the dose injected, and the permeability-surface area (P.S) product for BR was 0.13±0.05 ml·min⁻¹·g⁻¹. The estimated volume of distribution for unbound BR at 60 sec. was 195±72 μl/g. When injection of unbound BR was followed by re-infusion with 5% ALB, residual brain BR decreased as shown:

Group	N	Brain BR, ug/gm	% BR Retained	p-value (unpaired t-test)
BR + Saline	11	7.3±2.8	9.7±3.1	
BR + ALB	11	1.8±1.3	1.9±1.4	<0.01

Bound BR crossing a disrupted BBB and unbound BR crossing an intact barrier appear to have different extravascular patterns of distribution, consistent with the greater lipid solubility and capillary permeability of unbound BR, versus the tendency of ALB + BR to cross the barrier only at osmotically opened capillaries. Because ALB decreases residual brain BR, we speculate that BR is initially distributed in a "shallow" compartment and is not immediately strongly bound or irreversibly precipitated in the brain.

1360 THE APGAR SCORE REVISITED: DEVELOPMENTAL PATTERNS IN "OPTIMAL" NEWBORNS. Elizabeth A. Catlin, Marshall W. Carpenter, Benjamin S. Brann IV, Steven R. Mayfield, Philip W. Shaul, Marshall Goldstein, William Oh, Brown Univ, Women & Infants Hosp, Dept of Ped, Providence, RI

The five objective criteria used in the Apgar score to assess the newborn include four signs (tone, reflex irritability, color, respiratory drive) that depend upon developmental maturity. The immature infant, with typically flaccid muscle tone is penalized by the Apgar method for developmental immaturity. We hypothesized that in nonasphyxiated fetuses, Apgar scores should correlate directly with gestational age (lower scores with decreasing maturity). 62 parturients (gestation: 23-42 weeks) were prospectively enrolled. By objective documentation of pregnancy history, labor complications, fetal heart rate tracings, cord blood pH & BE, their fetuses were judged as normal at the time of delivery. Direct relationship between Apgar scores and gestational age following a linear regression (y=-.34x-4.8 at 1', r=0.82; y=-.28x-1.6 at 5', r=0.77) was observed. Analysis of the total score into components reveals heart rate to be least influenced by maturity. Respiratory effort and muscle tone increase with increasing maturity. Skin color improves with development at the 5' score. Reflex irritability trends upward but with more variability at 1' than 5'. These data suggest that 1) the standard Apgar score may not be appropriate for the assessment of fetal well-being in premature infants, 2) scores thought representative of asphyxia in more mature newborns may not represent asphyxia in immature infants, and 3) these normative data are useful in the assessment of fetal status at various levels of maturity.

1361 COMPARISON OF A STANDARD AND MICROVOLUME BLOOD AND MEDIA SYSTEM ON THE RATE OF DETECTION OF BACTEREMIA IN PREMATURE INFANTS. Subhash C. Chaudhary, A. J. Strano, (Sponsored by Robert E. Merrill), SIU School of Medicine, Department of Pediatrics and St. John's Hospital, Department of Microbiology.

A microvolume blood and media system was compared to a standard BACTEC anaerobic vial for its efficacy to detect microorganisms in the small volume of blood obtainable from premature infants. Each culture, when possible, included the inoculation of 0.5 ml. of blood into a BACTEC anaerobic vial (BAN) and 0.3 ml. of blood into each of an aerobic (MA) and an anaerobic (MAN) vial containing 2.7 ml. of trypticase soy broth. Following inoculation, all vials were processed identically. Of a total of 358 culture attempts, 39 were positive in one or more vials. Due to the occasional low volume of blood collected in some of the 39 positive cultures, 8 BAN and 2 MAN vials were not inoculated. Twenty cultures were positive for the same organism in all three vials. When both anaerobic cultures were done, 26 BAN and 23 MAN were positive. In the microvolume system, 31 MA and 28 MAN were positive and both were positive in 23. Differences were not statistically significant. Also, four isolates of *Candida albicans* grew in MA and MAN vials only. These results demonstrate that microvolume blood and media systems can be reliable.

1362 EFFECT OF CAFFEINE, THEOPHYLLINE, AND PHENOBARBITAL ON OCULAR BLOOD FLOW IN THE NEWBORN PIGLET. S. Chemtob, K. Beharry, N. Laudignon, J. Rex, J.V. Aranda.

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The effect of commonly used drugs in the newborn (NB) period on ocular blood flow (OBF) was evaluated in 6 groups of piglets (1-4 do). Caffeine (C) and theophylline (T) were administered at 5 and 20 mg/kg IV bolus (N= 7/grp). Phenobarbital (P) (15 and 45 mg/kg IV bolus) were administered to 2 groups of piglets (N=9/grp). Control groups were obtained for each drug evaluated. OBF was measured by radiolabelled microsphere (¹⁴¹Ce ⁴⁶Sc ⁸⁵Sr ⁹Nb); arterial and venous blood gases, hemoglobin, and drug levels were done at times 0, 15, 30, and 60 minutes.

Drug	Dose	0'	15'	30'	60'
C	5 mg/kg	96.8±62.0	59.4±19.2	83.5±100.9	126.4±76.3
	20 mg/kg	67.2±46.6	53.1±21.2	54.2±12.7	62.9±37.5
T	5 mg/kg	49.9±25.4	47.4±9.6	66.9±14.7	55.1±22.1
	20 mg/kg	45.0±18.2	46.6±11.8	36.9±9.1	51.7±16.1
P	5 mg/kg	48.2±12.8	*40.1±9.3	43.6±15.8	49.4±14.6
	20 mg/kg	47.4±22.3	39.0±14.4	*35.5±16.8	45.5±16.1

Values are OBF \bar{x} ± S.D. (ml/min/100g); *p <0.01 compared to t=0

Therapeutic doses of C produced fluctuations in OBF, an effect not observed in hypercafeinemia. Similarly both doses of T produced fluctuations in OBF. P decreased OBF transiently. A control group of animals did not show any changes in OBF. Blood pressure and blood gases remained constant, with no correlation to OBF. These suggest that C, T, and P probably exert direct pharmacologic effects on OBF. Their possible role on retinopathy of prematurity needs further studies.