

**1489** IN VITRO STUDIES OF ENDOTHELIAL AND SMOOTH MUSCLE CELLS FROM FETAL LAMB DUCTUS ARTERIOSUS SUGGEST MECHANISM OF CLOSURE Marlene Rabinovitch, Michelle Mullen, Toni Watchurst, Lyn Hsu, George Jackowski, Peter Olley. University of Toronto, The Hospital for Sick Children, Div. Cardiology, Toronto, CANADA

To help elucidate the mechanism of ductus arteriosus (DA) closure, we cultured endothelial (E) and smooth muscle (SM) cells from fetal lamb DA and compared their structural and biochemical properties with those from pulmonary artery (PA) and aorta (Ao). Cells from 3-8 different lambs were examined at passages (P) 1-3 by phase contrast light microscopy (LM) and at P1 by transmission electron microscopy (TEM). In E cells at P2, Factor VIII production was assessed by immunofluorescence and angiotensin converting enzyme activity (ACE), using <sup>3</sup>H benzoyl-phe-ala-pro as substrate. At P3, E + SM proteins were extracted and profiled using 2D sodium dodecyl sulfate polyacrylamide gel electrophoresis (2D-PAGE). No structural features on LM distinguished cells by site of origin other than E or SM: on TEM, DA and Ao cells were similar but PA E cells had a more pronounced cytoskeleton and SM, more vesicles. DA E cells were characterized by increased density of Factor VIII fluorescence, decreased ACE (.26 ± .05 vs .42 ± .07 in PA and .50 ± .12 in Ao, p < .05 ANOVA) and absence of two proteins, one specific to PA (pI 5.2 - 5.6, Mr 72K) the other to Ao (pI 4.2 - 4.3, Mr 48K). DA SM also lacked a protein triplet found in Ao and PA (pI 5.1, Mr 50K) (pI 5.2, Mr 23K) (pI 5.25, Mr 55K). ACE studies have been repeated under fetal hypoxic conditions and the decrease in DA was no longer apparent. While the significance of absent proteins in ductal function remains to be elucidated, decreased ACE in room air may allow for accumulation of bradykinin, a DA constrictor and increased Factor VIII may mediate subsequent thrombus formation.

**1490** UPDATING INTRAUTERINE GROWTH CURVES: Tonse N. Raju, Steve Miller, Dharmapuri Vidyasagar, University of Illinois Hospital, Department of Pediatrics, Chicago.

Since classification of infants at birth into proper intra-uterine (IU) growth categories is vital for risk assessment, we tested whether the widely used Colorado (C) standards, (Lubchenco et al, 1963) which were based on a small sample of 5635 white infants (18% premature), would be appropriate to classify today's urban infant population of mixed ethnicity. Data from 32,076 singleton liveborn infants born in 13 University of Illinois (UI) network hospitals between 1982-83 were analysed. 51% of infants were white, 25% black and 19% hispanics. 2075 infants were < 36 weeks. **RESULTS:** For all gestational ages between 32-42 weeks, the 10th, 50th and 90th percentile (PC) weights from UI data were 2-28% higher than the C standards. (P < 0.0001). Frequency of our infants who would be classified into SGA, (<10th PC) and LGA (>90th PC) groups using both standards are in the table.

Weeks	32		34		36		38		40		42	
	UI	C	UI	C	UI	C	UI	C	UI	C	UI	C
% SGA	10%	7.5%	9.3%	5%	10%	8%	10%	4.7%	10%	2.9%	10%	3%
% LGA	10%	15.7%	9.7%	13.7%	10%	11%	10%	14.3%	10%	19%	10%	26%

Since C weights were lower at all gestations, C standards under-counted SGA frequency and over-counted the LGA frequency in our population. Thus with C standards 5100 infants (16% of total) were classified into wrong intra-uterine growth categories. A spectrum of morbidity risk analysis (Apgar score, Mat. Diabetes etc) in these infants suggest that all our infants should be classified using UI standards rather than C standards. We conclude that regional IU growth standards must be developed for proper classification of infants at birth.

**1491** VISUAL EVOKED POTENTIALS (VEP) IN PRETERM INFANTS WITH INTRAVENTRICULAR HEMORRHAGE (IVH). Rajam S. Ramamurthy, Michael D. Berkus, Karen Brown (Spon. by C. Grose). The Univ of Texas Health Sci Ctr at San Antonio, Dept of Pediatrics, San Antonio, Texas.

The VEP as a measure of brain dysfunction was evaluated in 52 infants <35 weeks gestation. The test was done daily on day 1, 2, 3 and 4 and weekly until discharge using a CA1000 Nicolet machine with flash stimulus (Rate 1.3/sec, repetitions 50). The latency of the most prominent positive wave (P2) is reported. IVH was documented by daily cranial sonograms, intracranial pressure (ICP) and clinical evaluation. 21 of the 52 infants had IVH; 31 did not. IVH infants had significantly lower birthweight, gestation, neurological score and higher ICP. 6 infants had IVH on the day of birth, 13 within 4 days and 2 at 3 wks. In non-IVH infants the mean ± 2SD P2 latency decreases with increasing gestational age from 0.309 ± .04 msec at <30 wks to 0.298 ± .02 at >37 wks. Considering the maturational factor the P2 latency of IVH infants was within 2SD for the mean prior to the bleed. Following a grade III or IV bleed the VEP was absent bilaterally regardless of the site of bleed but was again elicitable by the second week. The P2 remained normal in grade I and II bleeds and was prolonged by 3-4 wks if ventriculomegaly occurred. 4 infants with apnea in the non-IVH group had VEP loss. It appears that VEP is affected by multiple factors that probably interfere with cerebral circulation and oxygenation. Along with sonograms that document anatomical disruption, the evoked responses that indicate functional disruption provide some insight into brain injury in its acute phase.

**1492** BRAINSTEM AUDITORY EVOKED RESPONSE (BAER) IN PRETERM INFANTS WITH INTRAVENTRICULAR HEMORRHAGE (IVH). Rajam S. Ramamurthy, Michael D. Berkus, Karen J. Brown, Christina M. Fernandez, Maria G. Rendon (Spon by Charles Grose). The Univ of TX Health Sci Ctr at San Antonio, Dept of Pediatrics, San Antonio, TX.

The usefulness of BAER as an indicator of brain dysfunction in IVH was evaluated in 52 infants <35 wks gestation. A CA1000 Nicolet machine with click stimulus at 75 db (rate 23/sec, duration 100 μsec, 2000 repetitions) was used to test each ear on day 1, 2, 3, 4 and weekly until discharge. The latency of wave V which was most consistently present is reported. IVH was documented by daily cranial sonograms. 21 infants had IVH and 31 did not (Grade I-7, Gr II-8, Gr III-4, Gr IV-2). 7 infants with Grade II IVH progressed to ventriculomegaly at discharge. The mean ± 2SD wave V latency in non-IVH infants decreases from 7.93 ± 1.60 msec at (<30 wk), 8.2 ± 1.62 (31-32 wk), 8.27 ± 1.62 (33-35 wk), 7.54 ± .90 (>36 wk), the difference being significant beyond 36 wks (p < .02). For each of the above gestational ages a significantly smaller number of IVH infants showed an auditory response (p < .001); however, there was no significant difference in latency when a response was obtained: 8.39 ± 1.66 (32 wk), 7.66 ± 1.44 (33-35 wk), 7.53 ± .98 (>36 wk). For both groups BAER was most consistently elicited by 34 wks whether or not the infant was on the ventilator. These findings indicate that IVH is associated with global brain dysfunction that suppresses the evoked response; however, it may not indicate specific hearing impairment. BAER may be valuable to document brain dysfunction and recovery in the acute phase of IVH.

**1493** THE EFFICACY OF CHEST PHYSIOTHERAPY (CPT) ON THE FIRST POSTNATAL DAY IN INFANTS WITH RDS. D. Raval, D. Cuevas, A. Mora, T.F. Yeh, R.S. Pildes. Cook County Hosp., Dept. of Ped., Univ. of Ill., Chicago, Ill.

To study the efficacy of CPT (vibration, percussion and suction) on the first postnatal day, 20 infants (mean ± S.D. B.W. 1.2 ± 0.4 kg, G.A. 30 ± 2 wks, Postn. A. 4.9 ± 3.5 hr) with RDS and on asst. vent. shortly after birth were randomly assigned to two grs. Gr. I (10) with CPT, Gr. II (10) ET suction only. CPT or suction were performed every 2 hrs. Vibration and percussion were performed for 15 seconds in 4 different postures, followed by ET suction. The parameters evaluated included: blood gases, pH, mean airway pressure (MAP), ET secretion, incidence of air leaks, IVH, PDA.

	MAP (cmH <sub>2</sub> O)		PaO <sub>2</sub> /FIO <sub>2</sub> (mmHg)		PaCO <sub>2</sub> (mmHg)	
	I	II	I	II	I	II
Baseline	10.3 ± 1.3	10.1 ± 1.1	59 ± 35	54 ± 14	42 ± 7	47 ± 7
8 hrs	10.8 ± 1.7	11.8 ± 1.6	74 ± 35	66 ± 27	41 ± 8	43 ± 10
16 hrs	10.1 ± 2.0	12.7 ± 1.9*	75 ± 40	71 ± 22	40 ± 10	36 ± 5
24 hrs	10.3 ± 2.6	11.6 ± 4.0	75 ± 35	68 ± 24	41 ± 10	44 ± 8

Infants in Gr I had sign. (p < 0.05) lower MAP than Gr II at 16 hrs. The blood gases and pH were comparable. There was no sign. difference between the groups in ET secretions per suction at 0-8, 8-16 and 16-24 hrs (Gr I 0.1 ± 0.1, 0.1 ± 0.1, 0.1 ± 0.1 gm vs Gr II 0.1 ± 0.2, 0.1 ± 0.1, 0.1 ± 0.1 gm respectively) and in incidence of air leaks (2/10 vs 3/10). IVH (7/10 vs 3/10), PDA (4/10 vs 5/10) and duration of O<sub>2</sub> and IMV therapy. However, Gr I infants had sign. (p < 0.05) higher incidence (5/10) of severe IVH (>Grade II) than Gr II (0/10). We conclude that vibration and percussion are not beneficial and may be detrimental during the first postnatal day.

**1494** NEONATAL POLYCYTHEMIA AND THE DURATION OF LABOR James S. Rawlings. (Spon. by J.W. Bass) Tripler Army Medical Center, Dept. of Pediatrics, Honolulu, HI

Elevated intrauterine hydrostatic pressures occurring during labor may redistribute blood within the fetoplacental unit in the direction of the fetus. The induction of fetal intravascular hypervolemia is a recognized precursor of neonatal polycythemia. Prolonged labor might thus occur more commonly in association with neonatal polycythemia. To investigate this hypothesis, data from neonatal and obstetric records relating to the births of 30 polycythemic neonates were compared to analogous data from records relating to the births of 100 randomly selected normocythemic neonates. Infants in the two groups were similar for gestational age, gender, birth weight, Apgar scores, and mode of delivery. The umbilical cord was clamped immediately after the delivery of each infant in both groups. Mothers in the two groups were similar for age, gravidity, parity, and obstetric complications. Mothers in the polycythemic group had a greater incidence of hypertension (23% vs. 11%); however, the difference was not highly significant. Mean duration of labor (±SD) in the polycythemic group was 9.0 ± 5.8 hours with a range of 1 to 26 hours. Duration of labor in the normocythemic group was 8.9 ± 6.1 hours with a range of 0 to 30 hours. There was no significant difference in the two groups in the duration of labor or in the duration of ruptured fetal membranes prior to delivery. There was no correlation of calculated neonatal blood volumes per kilogram birth weight with duration of labor in the polycythemic group. Prolonged labor is unlikely to be an important factor in the pathophysiology of neonatal polycythemia.