

1332 POSTNATAL CHANGES IN SKELETAL MUSCLE AND SERUM SODIUM IN THE NEONATAL RABBIT PUP - EVIDENCE FOR AN INTRACELLULAR SODIUM RESERVOIR. David M. Coulter and Timothy R. Lapine, Departments of Pediatrics, Primary Children's Med Ctr & The University of Utah, Salt Lake City, Utah.

We measured serum and skeletal muscle Na and K by flame photometry and muscle water by desiccation in 49 rabbit pups at birth and 39 at 72 hours of age.

	Day 1	Day 3	P
Muscle (meq/gm fat free dry wt)			
Na	0.669 ± 115 *	0.542 ± 103	.0001
K	1.367 ± 164	1.219 ± 188	.004
H ₂ O (ml/gm)	6.25 ± 71	5.43 ± 44	.0001
Serum			
Na	138 ± 13	145 ± 18	
K	5.9 ± 1.5	5.5 ± 1.5	

*Mean ±SD

Muscle Na was greater in animals whose postnatal weight gain was relatively low, a pattern similar to that which we have described for total body and muscle water (Pediatr Res 14:1122, 1980). This decrease in muscle Na coincident with a rise in serum Na suggests that in the first 72 hours of life Na is mobilized from the intracellular space.

† 1333 EFFECTIVENESS OF EARLY PHOTOTHERAPY IN VERY-LOW-BIRTH-WEIGHT (VLBW) INFANTS. M. Curtis-Cohen, G.E. Stahl, J. Ennever, W. Speck and R.A. Polin. Depts. Peds., Children's Hosp. of Phila. & Univ. of PA Sch. of Med., Phila., PA & Rainbow Babies Hosp. & Case Western Reserve Sch. of Med., Cleve., OH.

Routine initiation of phototherapy (PT) within a few hours of birth in VLBW infants has been suggested as a means of modifying the severity and duration of hyperbilirubinemia (HB). The purpose of this study was to determine whether early PT alters the course of HB in VLBW infants. 16 preterm infants, (BW 878 ± 56 g; EGA 27.6 ± 0.4 weeks - mean ± SEM) were randomly assigned to receive PT either within 8 h of birth (E) or after BR reached 5 mg/dl (L). Irradiance at 450 nm was controlled at 12uw/cm²/nm with a Healthdyne Cavitron PT unit. BR values were measured B.I.D., and specimens for configurational (ZE) and structural (LUM) photoisomers were obtained once each day for analysis by HPLC. Age and BR at the onset of PT, peak BR, age at peak, rate of rise of BR, and total duration of PT were compared for both treatment groups.

	Age at Onset (h)	Initial BR (mg/dl)	Peak BR (mg/dl)	Age at Peak (h)	Rate of Rise BR (mg/dl/h)	Duration PT (h)
E	4.9 ± 0.9	2.3 ± 0.2	6.3 ± 0.6	84 ± 10.4	0.04 ± 0.02	180 ± 23.3
L	25.3 ± 2.4	5.8 ± 0.3	7.2 ± 0.5	75 ± 15.0	0.11 ± 0.05	113 ± 21.1
	p<.001	p<.001	NS	NS	NS	p<.05

A significant rise in both ZE and LUM (p<.005) independent of BR concentration was seen following the onset of PT in all patients.

This data suggests that the clinical course of HB is not altered in infants receiving early PT compared with infants whose PT was begun at 5 mg/dl. In addition, infants receiving early PT were exposed to PT for a significantly longer time. Since PT may be associated with serious side effects, its prophylactic use does not appear to be justified. (NIH Grant RR-00240)

1334 HYPOVISCOSITY OR HYPERVISCOSITY IN FULLTERM AND LOW BIRTH WEIGHT NEONATES? S.J. Danoff, W.H. Reinhart, S. Usami, S. Chien, and L.S. James. Columbia Univ., Coll. of Phys. & Surgs., Depts. of Peds. & Physiology, N.Y.

Whole blood viscosity is determined by hematocrit, plasma viscosity, red cell deformation, and red cell aggregation. Hyperviscosity is thought to be prevalent in neonates due to polycythemia and diminished red cell deformation. Recent studies in animals and full term infants have demonstrated decreased blood viscosity related to lower plasma viscosity. Extending these observations, we examined hemorheologic parameters in a group of low birth weight neonates (500-1500gms) compared to pregnant and nonpregnant females and full term neonates measuring whole blood viscosity, plasma viscosity, red cell deformation, and red cell aggregation. A new capillary microviscosimeter based on Poiseuille's law was developed, providing viscosity measurements on 0.2ml samples. Blood from low birth weight and full term neonates is significantly hypoviscous when compared to that of adults. This hypoviscosity is related to low plasma viscosity due to lower plasma proteins and fibrinogen in neonates. Assessment of red cell deformation by filtration through 2.6um and 6.9um pores revealed that red cell deformation is comparable in neonates and adults in the 6.9um pore, but significantly lower when the larger neonatal red cell filtered through the 2.6um pore. The full term neonate, in spite of polycythemia and larger red cells, is hypoviscous compared to adults with the same Hct. The low birth weight infant is even more hypoviscous than adults and full term infants due to lower plasma viscosity, proteins and Hct. This could be considered another adaptive mechanism protecting the neonate during its transition from the intrauterine to extrauterine environment.

1335 NIFEDIPINE REVERSES LATE PERSISTENT HYPOXEMIA AFTER RESUSCITATION OF ASPHYXIATED LAMBS AT BIRTH. Dennis Davidson, Robyn J. Barst, and S. Alex Stalcup.

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Persistent pulmonary hypertension of the newborn (PPHN) is a disorder associated with perinatal asphyxia which leads to severe hypoxemia in the neonatal period. In studies of the transitional circulation in lambs, we found that some lambs who experienced acute intrapartum or postnatal hypoxemia developed a late persistent hypoxemia (LPH) despite successful resuscitation and grossly normal appearing lungs, a course similar to PPHN. Because nifedipine (NP), a calcium antagonist, has therapeutic benefits in some forms of pulmonary hypertension, we treated lambs demonstrating LPH 30-60 mins after birth with sublingual NP (10-20 mg). Fetal lambs (0.95 term) were chronically instrumented with amniotic and femoral arterial and venous catheters to continuously monitor systemic arterial pressure and heart rate as well as arterial blood gases in utero, during Caesarean section delivery (spinal anesthesia) and after birth (AB). Seven lambs with hypoxemia and acidosis were resuscitated (R) between 1-30' AB by continuous mechanical ventilation (PaCO₂ 25-35 mmHg) with 100% O₂ and NaHCO₃ for pH <7.25, BE <-10. Comparisons of PaO₂ (mmHg)² were made between three groups of lambs.

Group	2' post R	30-60' AB	30-60' after saline or NP
No LPH, n=2	151-311	310-448	310-448
LPH/no NP, n=2	95-309	39- 70	53- 68
LPH/ NP, n=3	77-411	60- 69	251-298

We conclude that NP can reverse LPH and may be useful in PPHN by blocking pathologic pulmonary vasoconstriction.

1336 BLOOD PRESSURE (BP) IN THE VERY LOW BIRTHWEIGHT NEWBORN (VLBW) - A LONGITUDINAL STUDY. David B. DeWitte, M. Douglas Baker, M. Jeffrey Maisels. Penn State Univ Col of Med, M. S. Hershey Med Ctr, Dept of Peds, Hershey, PA.

With the exception of the first hours to days of life there is little information on blood pressures in VLBW infants. We documented an excellent correlation between aortic BP and oscillometric measurements (Narco Oscillometer) in sick VLBW infants over a wide range of BP (r=0.97-0.99). We then performed daily BP measurements by oscillometry in a group of sick newborns with birthweights <1500 g over the first 28 days of life. Results (mean±SD).

Day	1	7	14	21	28
n	23	25	25	22	21
Syst	43.5±5.9	53.0±3.7	52.4±3.3	54.5±3.6	56.0±4.5
Mean	33.7±5.3	41.3±3.9	42.0±3.1	43.7±3.5	43.3±3.3
Diast	26.4±4.8	32.2±3.0	32.3±2.2	34.0±3.0	33.8±2.8

We also performed simultaneous upper and lower extremity BP in 7 VLBW and 10 term infants in the first 12 days and found the levels to be virtually identical (r=0.99). These data provide reference values for BP in sick VLBW infants in the first month of life and show only a small increase after day 7. Contrary to some previous data, there is no difference between upper and lower extremity blood pressure in the newborn.

1337 BLOOD SELENIUM (Se) CONCENTRATIONS IN INFANTS OF DIABETIC MOTHERS (IDM). Mehmet Y. Dincsoy, Shang-Yao Chen, Young M. Kim, Foazia Siddiq, Platon J. Collipp.

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Since there is a relationship between prostaglandin metabolism, Se and glutathione peroxidase (GSH-PX), and diabetics are reported to have low levels of Se and prostacyclin, we have wondered whether some of the problems which occur in IDM (cardiomyopathy and persistent fetal circulation) might be related to Se deficiency. We studied Se in whole blood of IDM (within 1-2 days after birth) and their mothers. The IDM had a birth weight (mean±SD) of 3857±1075 gm, gestational age of 37.8±1.5 wks, 1 and 5 minute Apgar scores of 7.3±2.7 and 8.8±1.7 respectively. Correlation between the maternal and infants' blood Se concentration in IDM group was not significant. Comparison between IDM, normal full term newborn (NB) infants, and the mother of IDM follows:

Groups	n	Birth Wgt. (gm)	Ges. Age (wks)	Se (ng/ml)	GSH-PX (units)
IDM	9	3857±1075	37.8±1.5	111.9±15.2	NA
Full Term NB	8	3287± 584	39.5±1.4	103.8±25.2	25.2±4.1
Mother of IDM	7			111.1±15.4	NA

*p <0.05, NA=not available

This preliminary study did not find unusually low Se in whole blood of IDM or their mothers, but because of the potential importance of Se in IDM, a larger study is still indicated.