1020 HYPERAMMONEMIA IN LOW BIRTH WEIGHT INFANTS.

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Hyperammonemia (ammonia nitrogen level >90 umol/L) during the first week of life was observed in 5 of 9 infants weighing ≤1000 grams at birth. Ammonia nitrogen levels ranged between 40 and 214 umol/L. Liver function tests were normal. None of these infants had received either oral or parenteral protein supplement.

All 9 infants were receiving assisted ventilation. As part of their supportive care, each infant received one or more transfusions of blood or blood products during the period prior to obtaining the serum ammonia nitrogen level. The following blood products were analyzed for their ammonia nitrogen content:

Products	Ammonia nitrogen (umol/L) mean (range)
Salt Poor Albumin (Hyland)	756 (741-770)
Fresh Frozen Plasma	72 (60-104)
Platelets	440
Packed Red Cells	60

Infants received between 5 and 16 umol ammonia nitrogen/Kg body weight. Regression analysis of serum ammonia nitrogen levels and transfused umol ammonia nitrogen/Kg body weight revealed a correlation coefficient of +0.85.

The use of products with high ammonia content represents an exogenous source of ammonia which may contribute to elevated serum ammonia nitrogen levels in some low birth weight infants.

1021 DETERMINATION OF SERUM BILIRUBIN BY SKIN REFLECTANCE,

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A non-invasive method to determine neonatal serum bilirubin concentration from skin reflectance was developed. Spectral reflectance measurements using a novel fiberoptic reflectometer (400-750 nm, 8 sec scan time) were performed on the blanched skin (3 cm^2 area) on the back of 108 infants. The predicted bilirubin value from the skin reflectance was calculated as a function of the percent reflectance at 420, 460 and 510 nm. This 3-wavelength function was derived from the Kubelka-Monk theory relating reflectance to the absorption and scattering properties of the skin.

The correlation of the bilirubin value predicted from the triple wavelength function and the actual serum bilirubin value for 217 determinations in 108 black and white infants showed a correlation coefficient (R) of 0.78 ($P < .00001$). The 95% confidence limit for the predicted bilirubin value compared to the actual bilirubin value was ± 1.6 mg%. The 103 samples in the 48 black patients showed an R of 0.86 ($P < .00001$) with a 95% confidence limit of ± 1.5 mg%. The 114 determinations in the 50 white infants showed a 95% confidence limit of ± 1.4 mg%.

Skin reflectance can serve as a screening tool for predicting serum bilirubin concentration in black and white neonates.

1022 PHOTOTHERAPY DOES NOT INCREASE THE SISTER CHROMATID EXCHANGE FREQUENCY IN PREMATURE INFANTS.

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Conventional cytogenetic techniques have failed to detect chromosome breakage in infants due to phototherapy. Sister chromatid exchange (SCE) analysis now permits a more sensitive examination of the impact of bilirubin plus light on human chromosomes. *In vitro* exposure of adult lymphocytes to 20 mg/dl bilirubin, 2 x 10^5 J/m^2 white fluorescent light, or to both resulted in 16.6, 17.8, or 17.0 SCE/cell, respectively; levels not significantly greater than the control of 17.2 SCE/cell (54-61 cells per value, all cultures 1% DMSO). *In vivo* response was examined in a double-blind study of 9 premature infants, 5 undergoing phototherapy (35 ± 8.4h) and 4 controls matched for wt. (1531 ± 375g), age (30-35 wks. gestation) and serum bilirubin (7.5 ± 1.7 mg/dl). The pre- and post-treatment SCE frequencies in the treated group (8.2 - 11.7 and 7.1 - 10.7/cell, approx. 20 cells examined per infant) did not differ significantly either between themselves or from parallel measurements on controls (9.0 - 11.7 and 7.7 - 11.6 /cell), and chromosomal breakage was negligible in all cases. Our results differ from those of a differently designed study (Lancet 2: 1084, 1977) which observed increased SCE frequency due to phototherapy. Interindividual variations in SCE in our study were significant, and infant SCE frequencies were significantly lower than those typical for untreated adult cells (15.5 ± 0.2/ cell). Our present data provide evidence that phototherapy does not demonstrably alter SCE frequency in premature infants.

1023 PREDICTIVE VALUE OF VAGINAL AMNIOTIC FLUID L/S RATIO IN PREMATURE RUPTURE OF MEMBRANES

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Use of the L/S ratio in management of pregnancy complicated by premature rupture of membranes (PROM) is well documented. Samples are usually obtained by amniocentesis, but there are complications and limitations to that approach. The availability of amniotic fluid per vaginum with PROM suggests attention be given to vaginal fluid determinations. Specimens collected by protocol were obtained from 25 women with pregnancies ranging from 29 to 36 weeks, PROM, and no other complications.

All infants were managed in our ICN and pulmonary diagnosis was rigidly defined. Twenty-three infants with L/S ratios from 1.3 to 5.8 had no respiratory problems. Two infants, both of 32 weeks gestational age, developed respiratory difficulties: 1 with L/S ratio of 1.1 had RDS, and 1 with L/S ratio of 2.4 had aspiration pneumonitis. Of 23 cases with no respiratory problems, 2 L/S ratios were immature (1.3 and 1.4) and 5 were transitional (1.6 to 1.9). No infants had signs of sepsis. This range of results is comparable to studies reporting samples obtained by amniocentesis. Our study to date suggests that vaginally obtained amniotic fluid for L/S determination has predictive value for neonatal pulmonary maturity and is useful in the management of PROM.

1024 APGAR SCORES IN INFANTS LESS THAN 1500 GRAMS (LBW)

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Apgar scores have been used to assess intrapartum asphyxia and to predict the association of perinatal insult with ultimate outcome. We tested the association of the one-minute Apgar Score and intrapartum asphyxia in LBW infants (n-38) by measuring umbilical artery pH and base excess (BE) from double clamped cord and by comparing infant survival with One- and Five-minute Apgar scores (n=153).

There was no correlation between Apgar score and cord pH or BE. pH varied from 6.91 to 7.55 and BE from -18 to -3 in the LBW infants with one-minute Apgar scores of 3 or less. In infants with Apgars of 4-7, pH varied from 7.13 to 7.50 and BE from -13 to -4. No consistent effect of anesthesia was apparent. Survival was not predicted by cord pH or BE.

85% of LBW infants with one minute Apgars of 7 or greater survived. 46% of LBW infants with Apgars of 3 or less survived. The 5 minute Apgar score was also imprecise in predicting survival, since 25% of LBW infants with Apgars <3 survived and 14% with Apgars >7 expired.

The Apgar score is not a reliable reflection of the intrapartum condition in LBW infants and is an imprecise predictor of survival. Low Apgar scores in LBW infants should not be used, formally or informally, to decide intervention in the delivery room.

1025 DEVELOPMENTAL ASPECTS OF HEART RATE, RESPIRATORY RATE, AND APNEA DURING SLEEP IN NORMAL INFANTS.

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Post natal age related changes in cardiac and respiratory variables were examined in 49 infants (premature to 6 months of age) by multi-channel polygraphic recordings of heart rates (HR), respiratory rates (RR), and apnea measured as percent time of sleep spent in apnea of 5-20 seconds duration (AP), during quiet sleep (QS) and rapid eye movement sleep (REM). Statistically significant age and sleep state related changes were demonstrated for HR, RR, and AP. HR and RR decreased significantly from the premature to the newborn infants (25% and 32% respectively); increased from the newborn to the 1 month infants (25% and 75% respectively); decreased again during the next 3 to 4 months to levels intermediate to those of newborn and 1 month infants. HR and RR were higher during REM than during QS across all age groups. AP was highest among premature infants (2.5%), decreased among newborn infants (0.1%), but increased significantly in infants 2 to 4 months of age (1.5%). Across all age groups AP during REM was higher then during QS. The oscillatory nature of HR, RR, and AP demonstrated in this study in normal infants during maturation probably reflects the development of the autonomic control of cardiac and respiratory functions. Exaggeration of these oscillations may be responsible for prolonged apnea and bradycardia in some infants subsequent to the newborn period.