1384 PULMONARY EFFECTS OF FUROSEMIDE IN PREMATURES WITH LUNG DISEASE

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20 consecutive prematures with hyaline membrane disease (HMD) were randomized into 10 controls (CG) and 10 treated patients(TG) at 7 days of age if they still required ventilator assistance or oxygen (F_{IO_2} < 0.21). The TG received a single bolus IV dose of furosemide (F) 1mgm/k/day for 4 days and the CG received no diuretic. Mean gestational age of TG was 29 weeks (range 26-31) and of CG was 30 weeks(range 27-36). Birth weight of TG was 1024 gm (range 740-1200) and of CG was 1260gm(range 840-2360). All 20 infants had arterial blood gases and lung compliance (CL) measured at 2 hours, diuresis, natriuresis, F excretion and serum F levels monitored for 6 hours. At 2 hours after F dose, the TG demonstrated improved lung compliance($p < .01$). This improvement was not sustained over the 72 hour study period. The mean A-a DO_2 in the TG tended to decrease over 2 hours after the F dose($p=0.05$) with improvement at 72 hours. Mean urine volume during 6 hours in TG was 33.9±21 ml and in CG was 25.3± 13 ml($p=.35$NS). 6 hour sodium excretion was 1.76 mEq(TG) anf 1.45 mEq(CG). There was no correlation between 2 hour serum F levels and 2 hour percent CL change. Urine was collected between time 0-2 hours after F dose. On day 4, the 2 hour CL change correlated with this 2 hour urine volume($r=0.82$, $p<0.05$) the 2 hour urinary sodium($r=0.94$, < 0.05) and the 2 hour urine F($p=0.07$). Despite poor renal clearance of F the pulmonary effects are related to its diuretic effect. The lack of sustained pulmonary effect is explained by the brief diuresis.

1385 FRESH FROZEN PLASMA (FFP) IN NEONATAL SEPSIS.

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This study was undertaken to determine whether the infusion of FFP, in the treatment of neonatal sepsis, enhances phagocytic and chemotactic activity in neonatal sera.25 neonates with presumptive sepsis or meningitis were,by random selection,given infusions of either FFP or 5% albumin (A), 10 ml/K, on 3 successive days. (A) treated infants constituted the control group.14 infants received FFP, and 11 received (A).Birth weights were comparable.Sepsis or meningitis was documented in 48%.Neonatal sera were obtained prior to the first infusion, 1 hr after the second and 24 hrs after the third. Phagocytic capacity of sera was assessed by a quantitative fluorimetric assay; chemotactic potential by Boyden modification.Additionally, 10 components of complement of the classical and alternative pathways were measured serially in 10 of the patients.Phagocytic and chemotactic activities were expressed as % of normal adult activity.Though mean pre to post-infusion increments showed a 15-20% rise in phagocytic activity in both the FFP and (A) groups,the variances were broad and these changes did not achieve statistical significance; nor were significant differences appreciated between groups or in those with sepsis compared to those without.Chemotactic activity showed no increments with infusion.Similarly,no consistent changes in levels of complement were discerned after infusion.We conclude that the infusion of FFP in neonatal sepsis does not enhance phagocytic and chemotactic activity in neonatal sera.

1386 PHOTOTHERAPY EFFECT ON INSENSIBLE WEIGHT LOSS IN HUMID ENVIRONMENTS

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Several investigators have concluded that increases in insensible water loss (IWL) occur when phototherapy (ptx) is introduced during the care of infants in low humidity environments. Clinical observation of discrepancies between anticipated and actual IWL from babies receiving ptx in high humidity environments suggested a retrospective study of IWL in these low birth weight (LBW) infants under ptx. Twenty newborns, with birth weights 750-1500 g, were studied. All received ptx while housed in incubators controlled to maintain skin temperatures of 35.5-36.5°C. Environmental temperatures were stable and all incubators were set to deliver maximal (80-95%) humidity. IWL was estimated as [Δwt-(fluid administered-urinary output)]/kg/d. Each day of care was categorized as a day on or off ptx. The first and last days on ptx were compared with the nearest day fully off ptx. There was no statistical difference in either fluid or calories administered/kg/d when days on were compared to days off ptx. The median IWL on ptx was -15cc/kg/d, (range -111 to 90cc/kg/d) and off ptx -8cc/kg/d, (range -67 to 121cc/kg/d). The median difference (IWL on ptx)-(IWL off ptx) of -4cc/kg/d was insignificant (range -93 to 85cc/kg/d, p=.4). In fact, in 40% of cases, IWL off ptx was greater than IWL on ptx. The results indicate that in a high humidity environment IWL over a 24 hr period in a LBW infant is not predictably increased by ptx.

1387 INFLUENCE OF FORCED CONVECTION OF HEATED AIR ON INSENSIBLE WATER LOSS (IWL) AND TOTAL HEAT LOSS (THL) IN LOW BIRTHWEIGHT (LBW) INFANTS.

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LBW infants in forced convection incubators are exposed to a constant flow of heated, humidified air. This may affect evaporation of water from the skin by decreasing the boundary layer of still air surrounding the body. We therefore studied IWL and THL in 24 LBW infants in a forced convection incubator (FCI) with air velocity 15-30 cm/sec measured 10 cm above the matrass as well as in an incubator with air velocity 1-2 cm/sec (non forced convection incubator NFCI) at their neutral thermal environment and 50% relative humidity. Results are presented in the table:

Group	Birthweight (kg)	Ins. Water Loss (ml/kg/d)	Total Heat Loss (Kcal/kg/d)
I	1.305 ± 0.185 (n = 12)	26 ± 4 (NFCI)	46.2 ± 8.0 (NFCI)
		41 ± 12 (FCI)*	53.4 ± 6.6 (FCI)*
II	1.837 ± 0.267 (n = 12)	27 ± 8 (NFCI)	39.0 ± 5.2 (NFCI)
		35 ± 11 (FCI)*	46.5 ± 6.6 (FCI)*

*$p < 0.01$

In the forced convection incubator (FCI) IWL in very-LBW infants (group I infants) is increased by a mean 58% as compared to IWL in the same infants in the NFCI. Similarly in LBW infants (group II infants) EHL is increased by a mean of 26% when in the FCI. Consequently THL is significantly increased in both groups of infants when in the FCI. It is concluded that forced convection incubators do not provide an optimal physical environment for LBW infants.

1388 THE INFLUENCE OF FREE FATTY ACIDS (FFA) AND GLUCOSE INFUSION (GI) ON SERUM BILIRUBIN (BIL) AND BILIRUBIN BINDING TO ALBUMIN.

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This report describes the risk incidence of a large group (N=1271) of jaundiced neonates to bil toxicity through measurement of serum albumin saturation by salicylate displacement (saturation index or SI) and the role of FFA and GI in this problem. RESULTS: 12 jaundiced neonates (bil=13.9 mg/dl) with high SI (7.8±0.6%), history of poor oral intake but no hemolytic disease nor drug exposure were treated with GI at a rate of 1g/kg/h for 1-2 h. After GI, there was a significant ($p<0.01$) fall in SI (Δ= -4.1%), bil (Δ= -0.9 mg/dl), FFA (Δ= -0.48 mEq/L) principally oleic (Δ= -6.5%) and linoleic (Δ= -3.2%) acids and a rise in serum insulin (Δ= +17.8 mcu/ml, $p<0.005$). These changes were not due to simple dilution since serum total protein did not significantly fall (Δ= -0.2 g/dl, $p<0.10$). Routine SI measured in 1271 infants with bil ≥ 10 mg/dl showed 154 (12%) infants to have SI (>7%): 50% were fullterm, only 24% had hemolytic disease and none had exposure to drugs. GI was given to 82 of these infants (mean bil=14.7 mg/dl; mean SI=8.6%). After GI, there was a significant ($p<0.01$) fall in bil (Δ= -1.2 mg/dl) and SI (Δ= -3.7%) in 76/82 (93%) infants treated. No rebound to high SI occurred within 24 h after GI. CONCLUSION: Our study indicates that by routine testing, a high percentage (12%) of infants with bil ≥ 10 mgs% are at or near risk to bilirubin toxicity as indicated by a SI ≥ 7%. These infants should be identified since treatment with GI is simple and highly effective in lowering both bil and SI probably through a mechanism of insulin release. The favorable response in most cases to GI indicates that serum FFA, particularly oleic and linoleic acids, play a major role clinically in bil binding to albumin.

● 1389 SEX DIFFERENCES IN LUNG AND ADRENAL NEUROSYMPATHETIC DEVELOPMENT.

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Adrenergic mechanisms are known to be important in the synthesis and release of pulmonary surfactant and in the prevention of neonatal respiratory distress syndrome (RDS). We studied neurosympathetic development in the lung and adrenal glands in male (M) and female (F) fetal and newborn rabbits. Tissue levels of catecholamines, norepinephrine (NE), epinephrine (E), and dopamine (DA) were measured using a sensitive radioenzymatic assay. Beta adrenergic receptor development in the lung was studied using the tritiated radioligand dihydroalprenolol. Neurosympathetic innervation of the lung was assessed by measuring tissue NE levels which increased gradually from 27 day fetuses to 8 day old newborns. Sex differences were not significant. Lung β-receptor number was significantly elevated in F over M at each gestational age and throughout the neonatal time period investigated ($p<0.005$) Adrenal gland content of E, NE and DA increased exponentially with advancing developmental age ($p<.005$). Adrenal E was significantly ($p<.01$) elevated in F as compared to M fetuses as was the proportion of E. Adrenal NE and DA were similar in M and F fetuses. Sex differences were not significant in the newborn animals. Conclusions: 1) Lung β receptor development but not innervation is accelerated in F fetuses; 2) Adrenal maturation is accelerated in F fetuses; 3) Delayed neurosympathetic and neurohumoral development may explain the male susceptibility to RDS.