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SEGMENTAL RETICULOGRANULAR LUNG DISEASE IN INFANTS OF DIABETIC MOTHERS (IDM). Walter A. Boutwell, John G. Shutack, Thomas J. Spackman, William W. Fox. (Spon. by Jean A. Cortner), Univ. of Pa. Sch. of Med., Dept. of Peds. & Rad., and The Children's Hospital of Phila., Phila., PA.

A new pulmonary disease distinct from either respiratory distress syndrome (RDS), transient tachypnea of the newborn, or RDS type II, has been studied in 7 infants of diabetic mothers (IDM). Both standard A-P and lateral, and magnification (mag.) chest x-rays revealed a segmentally distributed coarse reticulogranular pattern and increased lung volumes but no significant increase in perihilar bronchovascular markings or thickened fissures. All mothers were insulin dependent and 6/7 had C-sections. Clinical profile of patients (means): wt. 3.1 kg., gestational age 37 wks., mechanical ventilation 2/7, CPAP 4/7.

Max.	Day 1	Day 2	Day 3
RR	90	98	80
pCO_2	50	50	44
FiO_2	.63	.63	.50

All patients survived and most were in $FiO_2 \leq .25$ by day 6. 3 pts. had pulmonary function tests on day 3: Mean compliance 3.2 ml/cm H_2O. Mean insp. and exp. lung resist. were 32 and 30 cm H_2O/L/sec. respectively. Funct. residual cap. was low in 2 pts. (mean 17 ml/kg) and normal in 1 pt. (38 ml/kg). A new clinical syndrome in large IDM's is described. It is characterized by a mild clinical course (hypercapnia, tachypnea, and hypoxemia) and a segmental coarse reticulogranular lung infiltrate confirmed by mag. chest radiographs. Although x-rays showed increased lung volumes, 2 pts. had decreased FRC.

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ALTERATIONS IN STOOL FLORA DURING ORAL KANAMYCIN PROPHYLAXIS OF NECROTIZING ENTEROCOLITIS (NEC). R. Boyle, J. Nelson, G. Peter, W. Oh. Brown Univ. Program in Med., Women & Infants Hosp., Dept. of Ped., Providence, R.I.

Oral Kanamycin prophylaxis may protect premature infants from NEC presumably by suppressing enteric colonization. In a randomized double-blind study, 49 infants received 5 mg/kg t.i.d. of Kanamycin orally 24 hrs. prior to the first feed and continued for 24 days and 50 were given placebo. The gestational ages (31.9 ± 2.1 wk M ± SEM) and birth weights (1.6 ± 0.4 kg) were comparable between the 2 groups. Treated infants had significant reduction ($p < 0.05$) in the rate of coliform colonization on day 3-5 (12 vs. 42%), 10 (32 vs. 60%), 17 (50 vs. 82%) and 24 (57 vs. 87%). Three of 49 treated infants with negative flora developed NEC, compared to 9 of 50 controls, 7 of whom had significant enteric colonization. The prophylaxis did not significantly alter the incidence of NEC but suggests a partial protection. Prophylaxis also produced a significant increase in the prevalence of Kanamycin resistant coliforms in treated infants by day 17 and 24 (48 vs. 24%, ($p < 0.05$). Because of proportionately small number of treated infants relative to nursery population (no more than 5 of 35 were being treated) nursery epidemiologic surveillance revealed no increase in Kanamycin resistant organisms during the study period. Thus, Kanamycin prophylaxis may be recommended for partial protection from NEC, but due to the emergence of potentially pathogenic Kanamycin resistant coliforms, should be used only in a limited group of high risk infants to maintain a low proportion of treated infants within the nursery population.

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EARLY DIAGNOSIS OF EARLY ONSET NEONATAL SEPSIS. R. Boyle, B. Chandler, B. Ross, W. Oh. Brown Univ. Program in Medicine, Women and Infants Hospital, Department of Pediatrics, Providence, Rhode Island.

Early onset neonatal sepsis often presents as respiratory distress. To prospectively define the criteria for its early diagnosis, a battery of laboratory tests and duplicate blood cultures wereperformed within the first 12 hrs of life in 116 consecutive infants presented with respiratory distress. Nine infants were septic (6 with group B Streptococcus, 1 each with P. Pneumonea, E. Coli and P. Aerogenosa). There was no significant difference between septic and non septic infants in gestational age, birth weight, duration of ruptured membranes, platelet count, band count, micro sedimentation rate or roentgenographic findings. Septic infants had significantly higher incidence of positive gastric gram stains for bacteria and polymorphonuclear cells, lower white blood count ($<10{,}000/mm^3$), lower absolute neutrophil count ($<4500/mm^3$) (all $p < 0.05$), and positive buffy coats for bacteria (4 of 4). Six of 7 infants had nitroblue tetrazolium (NBT) incorporation of >60% (normal in newborn <30%) or no neutrophils on the NBT smear. Using criteria of leukopenia and neutropenia defined above, all septic infants would have been identified and 23% of non-septic infants would be falsely identified. Though tedious, addition of buffy coat and NBT test to the diagnostic regimen would have identified all septic infants without false identification of non septic infants. White blood count and differential is the simplest and most reliable indicator for early diagnosis of early onset sepsis of various bacterial etiologies.

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CLINICAL EVALUATION OF A SIMPLE, RAPID, MICROMETHOD TO DETERMINE BILIRUBIN, BILIRUBIN BINDING CAPACITY, AND RESERVE BINDING CAPACITY.

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Assessment of the risk of kernicterus would be aided greatly by the availability of a rapid, accurate, micromethod for the frequent measurement of bilirubin, non-albumin bound bilirubin, albumin binding capacity and reserve binding capacity. We have evaluated such a method using the Bell Labs hematofluorometer which requires only three drops of whole blood (150µl) to measure these parameters in 77 infants, birth weight 737 to 3950 gms.

Values for albumin-bound bilirubin by this method compared favorably with total serum bilirubin values obtained by the Jendrassik-Grof method ($r=0.78$). Albumin binding capacity ranged from 14 mg/dl in the smallest infant (737 gm) to 25.6 mg/dl in an infant over 3 kg. Reserve binding capacity ranged from 5 to 35 mg/dl and correlated directly with HABA binding capacity ($r=0.76$). When bilirubin was released from red cells by addition of a drop of blood (50µl) to detergent, an increment of 1.2 to 3.7 mg/dl was found in the bilirubin values and probably represents red cell bound bilirubin. The method promises a new approach to simple rapid evaluation of the distribution of bilirubin between albumin and other binding sites in whole blood.

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RELATIVE ALKALOSIS IN MILDLY DISTRESSED TERM NEONATES. David R. Brown, Brian R. Swenson, Ian R. Holzman, and Paul M. Taylor. Univ. of Pittsburgh Sch. of Med.

The buffering reserve of mildly distressed term neonates was studied in 15 tachypneic babies with a clinically suspected aspiration syndrome, 8 of whom received HCO_3 therapy (Rx+) and 7 of whom did not (Rx-). Both groups had mean 1-min Apgar scores <5 and remained more tachypneic than controls (CON, N=17) during Days 1-4 of life. There were no differences in wt loss, birth wt, gestational age or O_2 requirement among the 3 groups and there was no difference in respiratory rate between Rx+ and Rx-.

(See TABLE) Rx+ had a lower Day 1 pH than Rx- ($p<0.05$) or CON ($p<0.01$) but had corrected to normal by Day 2. On Day 2 Rx- had a higher pH than CON ($p<0.05$). This relative alkalosis in Rx- can in part be explained by Day 1 respiratory compensation, when PCO_2 for Rx- is <CON ($p<0.001$ and <Rx+ ($p<0.02$). This compensation was augmented by endogenous generation of HCO_3 (ΔHCO_3=wt x 0.6[lowest Day 2 serum HCO_3 - lowest Day 1 serum HCO_3] - HCO_3 therapy). Rx- ΔHCO_3 was >CON ($p<0.01$) and Rx+ ΔHCO_3 was also >CON but not statistically significant.

These tachypneic term neonates generated a mean of 2-3 mEq/kg HCO_3 during the first day of life. Intravenous HCO_3 in the treatment of similar babies may thus be unnecessary.

TABLE (mean±SEM)	CON	Rx-	Rx+
Lowest pH, Day 1	7.36±0.01	7.35±0.03	7.12±0.08
Lowest pH, Day 2	7.40±0.01	7.43±0.01	7.42±0.01
Lowest PCO2, Day 1	33.5±1.1	24.6±2.0	30.4±1.7
ΔHCO_3 (mEq)	-0.7±1.4	9.4±3.2	6.3±4.6

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PHYSIOLOGICAL AND PATHOLOGICAL FACTORS AFFECTING HEART RATE VARIABILITY IN PRETERM INFANTS. Luis A. Cabal, Bijan Siassi, Bernardino Zanini, Feizal Waffarn, Joan E. Hodgman. Univ. of So. Calif. Sch. of Med., LAC-USC Medical Center, Dept. of Pediatrics.

Decreased Neonatal Heart Rate Variability (NHRV) was observed in infants dying of RDS over a decade ago; however, only recently instrumentation for its measurement has become available to the clinician. To establish the value of monitoring NHRV, 92 preterm infants were studied (B.W. 750-2500 g., G.A. 28-36 wks.). Each infant was monitored continuously during first 6 hours and for 1 hour at 24, 48 and 168 hours of life. During each hour, NHRV was quantified and related to the following parameters: sex, G.A., respiratory rate, arterial blood pressure, skin, ambient and core temperatures, blood gases, serum lactic acid, glucose and calcium levels, and the presence and severity of RDS. Discriminant analysis of data revealed that NHRV in healthy preterm infants was inversely related to heart rate level and directly related to the infant's post-natal age. In healthy babies whose range of gestation was limited to 32-36 wks., there was no significant correlation between NHRV and G.A. Decrease in NHRV was significantly related to the severity of RDS. Decreased NHRV significantly differentiated the infants with RDS from normal controls from the first hour of life and patients with RDS who died from the patients with RDS who survived after the fourth hour of life. This data reveals that NHRV a) should be corrected for heart rate level and postnatal age, b) is decreased in RDS, and c) can be used as a predictor of course and outcome from RDS.