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IS PULMONARY ARTERY PRESSURE IN THE VERY LOW BIRTHWEIGHT INFANT AT 7 DAYS A PREDICTOR OF CHRONIC LUNG DISEASE? Bryan Gill, Michael Weindling. Department of Child Health, University of Liverpool, Liverpool Maternity Hospital, Liverpool L7 7BN, UK.

The relationship between changes in pulmonary artery pressure (PAP) in VLBW infants between days 1 and 28 and the development of chronic lung disease (CLD) was studied. PAP was assessed non-invasively by measuring the time to peak velocity:right ventricular ejection time ratio (TPV:RVET) of the pulmonary artery Doppler signal. This correlates negatively with PAP. 54 VLBW infants were studied. 34 developed CLD; 20 did not and acted as controls.

Results: The TPV:RVET rose similarly in the two groups over the first 3 days. However, already by day 7 there was a significantly lower TPV:RVET in the CLD group vs controls (p=0.004). Using a value for TPV:RVET 0.34 as indicating raised PAP, its predictive value for the development of CLD increased from 78% on day 7 to 100% on day 28.

Conclusion: The TPV:RVET ratio appeared to be a sensitive indicator of changes in PAP. It might be useful for the early prediction and development of treatment strategies for CLD.

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BIOCHEMICAL AND BIOPHYSICAL EVALUATION OF TRACHEAL ASPIRATES IN PRETERM INFANTS: CLINICAL IMPLICATIONS: L.Gortner1, S. Bühler and E. Weller,1University Childrens's Hospital, Med. University Lübeck
Background: Natural surfactant(SF,SF-RI1)administration results in improved gas exchange in RDS whereas infants suffering from congenital pneumonia (CP) exhibit a diminished response following SF(Monatsschr Kinderheilk (1990) 138: 274-278).We therefore investigated tracheal aspirates of infants with RDS and CP with respect to biochemical and biophysical properties, who were given rescue-treatment (FiO >0.5 for paO >50 mmHg).
Patients and Methods:78 tracheal aspirates (>12h post SF) were obtained from 12 infants with RDS (median GA 28.5 wks, b.w.1169g) and 13 infants suffering from CP (GA 26.7, b.w. 947g) after administration of 0.5 ml/kg b.w.0.9% saline for routine suctioning. Analysis of phospholipids (PL) was performed by encymatic determination, total protein (Prot) content by the Lowry-Method.Biophysical properties (γ min/max)were evaluated by a modified Enhorning pulsating bubble surfactometer.Respirator settings of the respective periods were correlated to biochemical and biophysical parameters.

	PL(mmol/l)	Prot(g/l)	γmin(mN/m)	γmax(mNm)	FiO	PIP(cmH O)
RDS(n=12)	0.268±0.07	1.13±0.25	36.8±1.67	53.9±1.72	0.39±0.05	21.0±0.7
CP (n=13)	0.152±0.04	0.98±0.14	35.2±1.58	51.5±1.75	0.51±0.04	23.2±1.0

All data: mean ± SE. Differences in biochemical and biophysical properties are without statistical significance.
Conclusion: We were unable to explain differences in clinical response following administration of SF in infants suffering from RDS versus CP by biochemical and biophysical analyses of tracheal aspirates.

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HYALURONAN AND WATER CONTENT IN LUNGS FROM RABBIT PUPS BORN PRETERM AND SUBSEQUENTLY KEPT IN AIR OR OXYGEN. Hans Johnsson, Gunnar Sedin, Anders Jonzon and Torvard Laurent. Departments of Pediatrics, Physiology and Medical Chemistry, Uppsala University, Uppsala, Sweden.

Adult respiratory distress syndrome is associated with increased lung hyaluronan and water content (Am Rev Resp Dis 1989;139:682-87). As increased lung water also can cause neonatal disturbances, the present study was undertaken to study the effects of oxygen on lung hyaluronan and lung water in preterm rabbit pups. Some pups were kept in oxygen while controls were kept in air. Pups were sacrificed and lungs were taken at ages 2-7 days after birth. The water content was measured as wet/dry weight, and hyaluronan with HA 50 (Pharmacia).

Results: In pups breathing air lung water content decreased (p<0.001) during the first day after birth and then remained at a low level. In pups born 1(a) and 2(b) days before term and breathing oxygen, higher hyaluronan levels were seen at 7(a:n=7, p<0.1) and 6(b:n=5, p<0.001) days after birth, than in control pups breathing air (a:n=7, b:n=7). The higher content of hyaluronan was accompanied by a higher (a:p<0.05, b:p<0.01) water content than in controls.

Conclusion: Lung hyaluronan and lung water increase in preterm rabbit pups during oxygen exposure.

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ANTENATAL TREATMENT WITH THYROTROPIN RELEASING HORMONE (TRH) FOR PREVENTION OF NEWBORN LUNG DISEASE. Philip L Ballard, Roberta A Ballard, Robert Creasy, Ian Gross, James F Padbury and Collaborators in the TRH Study Group. Depts of Pediatrics & Obstetrics, Mt Zion Hosp & UCSF, San Francisco, Univ. of Texas, Houston, Yale Univ., New Haven, and Harbor-UCLA, Los Angeles.

Although prenatal corticosteroid therapy is efficacious and safe it does not always prevent RDS, and infants of low birth weight often develop chronic lung disease. To study effects of thyroid hormone, we performed a blinded, randomized trial in which 404 women with threatened preterm delivery at <32 wk gestation received betamethasone plus TRH (4 doses of 400 μg at 8-h intervals) or betamethasone plus placebo. 103 fully treated infants of <1500 g birth weight were evaluated for outcome. TRH therapy did not affect total RDS (47.3% vs 58.3% in control) or occurrence of severe disease (12.7% vs 25% in control, p=0.11). Significantly fewer TRH-treated infants developed chronic lung disease (requirement for supplemental O_2 at 28 days of age), 17.6% vs 43.9% in control (p<0.01). TRH increased maternal plasma TSH by 100% at 2-4 h after treatment and decreased levels by 28-34% at 5-36 h. In cord blood of treated infants delivered at 2-6 h, TSH, T_3 and PRL were all increased about 2-fold vs control and free T_4 was increased 19%. In infants delivering at 7-36 h, cord TSH and T_3 were decreased 62 and 54%, respectively, and all thyroid hormones were lower at 2 h of age. Conclusion: Prenatal TRH therapy produces a sustained elevation of fetal thyroid hormones and reduces the occurrence of chronic lung disease in premature infants. Pituitary-thyroid function is transiently suppressed after treatment, to a greater extent in fetus than mother.

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RAPID IMPROVEMENT IN RESPIRATORY COMPLIANCE AFTER PORCINE SURFACTANT. Glover R, Stenson B, Wilkie R, Laing I, Parry G, Tarnow-Mordi WO. Ninewells Hospital & Medical School, Dundee and Simpson Memorial Maternity Pavilion, Edinburgh

Treatment with surfactant is associated with a rapid improvement in oxygenation, but no work has yet demonstrated a rapid increase in respiratory compliance (Crs). Using a computerised passive expiratory flow technique, we measured respiratory compliance immediately before, at 3 hours and 12 hours after the first dose of surfactant (Curosurf) in 33 infants with respiratory distress syndrome and a/A ratio < 0.22. Using the same technique in an earlier reference population, no infant with Crs ≥ 2ml/cm $H_2$0/m had biochemical evidence of surfactant deficiency. There was an increase of 6% in mean Crs at 3 hours after surfactant (NS: p = 0.227). Excluding 3 infants with initial Crs ≥ 2 ml/cm $H_2$0/m, the increase in Crs at 3 hours was 13% (p = 0.016). In keeping with previous experience, there was rapid improvement in oxygenation, with a mean reduction in FiO_2 of 45% of its initial value 3 hours after surfactant (p < 0.001). All 3 infants with an initial Crs of ≥2 ml/cm $H_2$0/m had lower Crs 3 hours after surfactant. In the infants whose initial Crs was < 2 ml/cm H_2O/m Crs increased by 38% (p <.001) and FiO_2 decreased by 52% (p <.001) 12 hours after surfactant. These data suggest, for the first time, that porcine surfactant rapidly improves Crs, in parallel with improvements in oxygenation. This technique may identify infants who are most likely to benefit acutely from surfactant.

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EPIDEMIOLOGIC ANTECEDENTS OF PERSISTENT PULMONARY HYPERTENSION OF THE NEWBORN. Linda J. Van Marter, Alan Leviton, Marcello Pagano, Elizabeth N. Allred. Harvard Medical School, Children's Hospital, Joint Program in Neonatology, Boston, MA, U.S.A.

Despite the clinical and public health significance of Persistent Pulmonary Hypertension of the Newborn (PPHN), little is known about the syndrome's epidemiologic origins. Between July 1985 and April 1989 we interviewed a total of 103 mothers of case and 309 mothers of control infants who were hospitalized at two Harvard-affiliated neonatal intensive care units. A priori hypotheses focused on events linked to three potential pathophysiologic events: 1) inhibition of prostaglandin synthesis (i.e., maternal intake of aspirin and nonsteroidal anti-inflammatory agents [NSAIDs]), 2) fetal hypoxemia (i.e., maternal cigarette and marijuana smoking), and 3) vasospasm (i.e., maternal cocaine abuse). Two of our principal hypotheses were supported: odds ratios (OR) (95% confidence intervals [CI]) for the variables of greatest interest were: smoking=2.0 (1.2,3.4), NSAIDs=3.6 (1.3,10.3), aspirin products=2.1 (.89,5.1), and illicit drugs=2.6 (.88,7.7). Very low prevalence of confessed illicit drug use among our subjects precluded drug-specific analyses. We have tested a number of multivariate models using logistic regression to control for factors used as measures of socioeconomic status. In each model, maternal use of aspirin products and/or NSAIDs during pregnancy was linked with significantly increased risk of her infant developing PPHN, minimum OR (95%CI)=2.1 (1.3,3.4). These data may have important implications regarding future prevention of PPHN.