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SERUM URIC ACID CONCENTRATION AS AN INDEX FOR SEVERE PERINATAL ASPHYXIA. Luc JI Zimmermann, Hugo Devlieger, Paul Casaer, Jacques Jaeken, Ephrem Eggermont. Dept of Pediatrics, Div of Neonatology, Sophia Children's Hospital, Rotterdam and University Hospital Gasthuisberg, Leuven.

Recently, purine degradation products, especially hypoxanthine, have been studied in relation to perinatal asphyxia. However the final degradation product, uric acid (UA) received little attention. We previously showed a correlation between cord UA levels and Apgar scores in a low risk population. Here we report on serum UA concentrations in relation to perinatal asphyxia. During a period of half a year serum UA and creatinine (CREA) concentrations were measured in blood samples taken from 275 newborns admitted to the NICU in Leuven. In 67 patients, UA and CREA were also measured in a urine sample on the first day of life. A negative correlation was found between the 1 min Apgar score and both the maximal serum UA concentration in the first 24h ($r = -0.23$, $p<0.025$) and the corrected excretion of UA = ($urine_{UA}$ x $serum_{CREA}$)/$urine_{CREA}$ ($r = -0.45$, $p<0.005$). All newborns were classified as normal, moderate or severe with respect to perinatal asphyxia. Newborns with severe asphyxia ($n=14$) needed to have obvious neurological and cerebral ultrasound abnormalities at discharge. No significant differences were found in serum UA levels between the groups on the day of birth and the day thereafter due to the large variation in the normal group (303 ± 71 and 351 ± 172 µmol/l). However, on each of the days 2 to 10, serum UA levels were significantly ($p<0.05$) higher in the severe asphyxia group compared to the other groups. Moreover, all 13 newborns with severe asphyxia who had serum UA measured on day 2 or later had values higher than the normal range (defined as mean + 2SD of the normal group: 357, 297 and 172 µmol/l on days 2,3 and 4). We conclude that newborns with severe perinatal asphyxia have increased levels of serum UA between days 2 and 10 of life.

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VASCULAR RESPONSES IN THE NEONATAL ISOLATED PERFUSED RABBIT KIDNEY: INTERACTIONS BETWEEN ANGIOTENSIN II AND NITRIC OXIDE. Jet M.L. van Zwet, Umberto Simeoni, Jean-Jacques Helwig. Dept of Peds, lab of Renal Cellular Physiology, Strasbourg University Hospital, France.

There is evidence for a critical role of the interaction between endogenous Endothelium-Derived Relaxing Factor or Nitric Oxdide (NO) and Angiotensin II (Ang II) in the control of adult renal hemodynamics. This study was designed to explore if such NO-Ang II interaction exists in the isolated developing rabbit kidney, perfused in presence of indomethacin 10 µmol/L and to see how such interaction evolves with renal maturation. Results: In rabbits' with a postnatal age of 7 and 20 days, it was shown that under control conditions, vasoconstrictory responses to low concentrations of Ang II (10^{-10} mol/L) decrease with kidney' age from 15,8% to 8,9%, whereas responses to high concentrations of Ang II (10^{-8} mol/L); increase with kidney development from 32,3% to 55,6%. Competitive inhibition of NO synthase by nitro-L-arginine methyl ester (L-NAME) (100 µmol/L) augmented, vasoconstrictory responses to 10^{-10} mol/L Ang II by about 80% in kidneys of both 7 and 20 days. In both cases, L-arginine (substrate of NO synthase), was able to reverse the effect of L-NAME. At both ages, the effect of L-NAME on 10^{-8} mol/L Ang II was markedly more discrete. In conclusion, 1) the developing kidney does exhibit an Ang II-NO interaction, which is related to a low concentration of Ang II and appears to be stronger earlier in the process of nephrogenesis. 2) Since vasoconstrictory responses to high conc. of Ang II increased and vasoconstrictory responses to low conc. of Ang II decreased with age, developmental changes in the vasoconstrictory and NO-dependent vasodilatory component of Ang II action appear to evolve differently during nephrogenesis (a developmental change in relative attribution of different AT receptor subtypes may perhaps be involved in both phenomena).

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OXYGEN THERAPY AND MATURATIONAL DIFFERENCES IN INFANTS WITH BRONCHIOLITIS.
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Fifteen infants (3 wks to 8 mth) treated for bronchiolitis were monitored while in head-box oxygen (total of 840 hrs) with SaO2, pulse rate, activity, microphone, ECG heart rate, chest and abdominal excursion, were recorded to a computer aided display and analysis system (CARDAS). 8 were term and 7 were ex-preterm infants.

Sleep disruption was marked. Term infants had tachypnea, range in quiet sleep (QS):49-71 [normal infants: 38-25 between 1 & 6 months]; obstruction (usually partial) with increased thoraco-abdominal phase angle (**TAPA**; Normals QS: 11 ± 1; term bronchiolitis: 40 ± 13; active sleep (AS): 130 ± 19). Arousals periodically relieved progressive hypoxemia/hypoventilation. Ex-preterm infnats hypoventilated with progressive hypoxia. All had periodic breathing (PB) usually terminating the hypoventilation and increasing the SaO2. The PB cycle length was 12-14 sec with <10 sec apneas. 2 infants had periods of long central or mixed apnea (some >30 sec); the fall in SaO2 from a "flat" 100% (hyperoxia) and bradycardia was delayed before arousal and onset of breathing occurred.

1] The responses of ex-preterm infants are consistent with inhibitory mechanisms prevailing over excitatory ones from obstruction or airway irritation since they had minimal chest wall distortion and more apnea, apparently promoted by hyperoxia in some of them.

2] Clinical staff were unaware of these events and were misled by intermittent SaO2 measurements, not recognising hyperoxia, apnea, or true from false hypoxemia. High dependency care was probably unnecessarily prolonged by relying on intermittent pulse oximetry.

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MEASUREMENT OF BRONCHIAL OBSTRUCTION BY RESPIRATORY INDUCTANCE PLETHYSMOGRAPHY (RIP) IN SCHOOL CHILDREN
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Previously reported studies documented that the ratio of time taken to reach peak expiratory flow to total expiratory time (Tme/TE) measured by pneumotachograph (PTG) agreed with those measured by RIP [1].
We used RIP to measure Tme/TE before and after bronchial challenge with cold air (CACH) in a group of 22 school-aged children with history of asthma.
Noncalibrated rib cage (T), abdominal (A) and summed T+A (S) signals were differentiated to flow from which TTme/TE, ATme/ TE and STme/TE were calculated. Surface measured values were compared to pre- (a) and postchallenge (b) values of FEV1% predicted as well as PTG measured Tme/TE. The differences of prae- and postchallenge values (d) of these variables were also compared.
All, pre- and postchallenge values of Tme/TE, STme/TE, TTme/TE and ATme/TE significantly correlated with corresponding values of FEV1. Good correlation was also found between dFEV1 and dTme/TE ($p<0.01$) and dSTme/TE ($p<0.01$). dATme/TE better correlated with dFEV1 ($p<0.01$) when compared to dTTme/TE ($p<0.05$). Similarly, the close agreement was found between values for aTme/TE (range 0.22 - 0.39) and aSTme/TE (range 0.18 - 0.38) with mean (95% CI) within-pair difference of 0.04 (-0.03,+0.11; max. diff. 0.14) and aATme/TE (range 0.21- 0.33) with a mean difference of 0.02 (-0.01,+0.06; max.diff. 0.12).
Conclusion: Tme/TE, STme/TE and ATme/TE correlated with FEV1 and could be used as a good measure for bronchial obstruction even in non-cooperative subjects.
Ref.[1] Stick S et all. Amer Rev Respir Dis 1992; 145:A252

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A NEW HPLC TECHNIQUE FOR THE ANALYSIS OF SURFACTANT PHOSPHOLIPID COMPOSITION AND SATURATION
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An isocratic HPLC system for the separation of all major phospholipid species was developed using ultraviolet (UV) absorption (205 nm) and subsequent fluorescence (FL) detection with 1,6-diphenyl-1,3,5-hexatriene. For FL the sensitivity was almost identical for all phospholipids except phosphatidylinositol and lysophosphatidylcholine, but for UV absorption there were great differences depending on the saturation of phospholipid fatty acids. Dipalmitoylphosphatidylcholine showed nearly no UV but good FL response. UV to FL ratio was characteristic for phosphatidylcholines with different fatty acid saturation. Quantitation of phospholipids with HPLC using Monomethylphosphatidylethanolamine(dioleoyl) as an internal standard gave the same results as phospholipid phosphorus quantification after thin-layer chromatography. Analysis of surfactant preparations from sputum of cystic fibrosis patients show a significant decrease in phosphatidylcholine and phosphatidylglycerol, and an increase in sphingomyelin and phosphatidylethanolamine. The UV to FL ratio of phosphatidylcholine was increased in cystic fibrosis, indicating a decreased saturation of bronchial phosphatidylcholine in these patients.

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IMPROVED HOLDING CHAMBER FOR TREATMENT OF YOUNG ASTHMA CHILDREN WITH PRESSURIZED METERED DOSE INHALERS (P-MDI)
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In vitro $T_{\frac{1}{2}}$ (aerosol) was less than 10 sec in a polycarbonate holding chamber compared to a $T_{\frac{1}{2}}$ (aerosol) of longer than 30 sec in a steel holding chamber. A prototype holding chamber of 220 mL was cast in steel, and was equipped with a two-way low-resistance valve with a small dead space to ensure a rectified inspiratory flow from the spacer and expiratory flow outside the spacer. This prototype was tested against a traditional 750 mL polycarbonate single-valved holding chamber for the delivery of budesonide aerosol from P-MDI to children in the age-range of 0-7 years suspected of asthma. The polycarbonate was primed with benzalkonium chloride prior to use to avoid the confounding effect of the material. Both holding chambers were equipped with closely fitted face masks for children less than 48 months old. One hundred and sixty five children suspected of asthma, equally distributed as regards age from 0 to 7 years, inhaled one dose of budesonide from one of the holding chambers for 60 seconds. A filter was interposed between the holding chamber and the face mask adsorbing all particles delivered to the child. The mean dose fraction inhaled from the prototype approximated 38% irrespective of age, whereas the large-volume holding chamber exhibited a highly significant age-related decrease from approximately 44% in the older children down to 19% in infants. The difference in the doses of aerosol delivered was significant among children less than 3 years of age.
In conclusion, a small-volume holding chamber of steel with valve control of both in- and exhalation and a face mask would improve for the treatment of young children and infants with aerosol from P-MDI.