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OSTEOPENIA AS THE MAIN FACTOR OF HEAD FLATTENING IN VLBW INFANTS. Frank Pohlandt. Department of Pediatrics, Ulm University, Ulm, Germany.

In preterm infants, particularly VLBW infants, the head is flattened during the first weeks of life. This dolichocephaly is often associated with a high arched palate and protruding eyeballs. **Hypothesis:** The flattening of the head shape in very low birth weight infants is caused by gravity and favored by osteopenia. **Method:** 1) The head shape (fronto-occipital diameter, biparietal d., biorbital d.) and the bone mineral content (BMC) of the right mid humerus were measured in 85 newborn infants within the first five postnatal days (birth weight 430 to 6760 g, gestational age 25 to 42 weeks) to obtain reference values. 2) The head shape (fronto-occipital/biparietal diameter ratio FOD/BPD) and BMC were measured in 220 VLBW infants until discharge. Multiple stepwise regression (BMDP2R) was calculated from 314 measurements to evaluate the contribution of BMC/body weight, gestational age, postnatal age, birth weight, and weight at time of measuring to the variation of head shape. **Results:** 1) The FOD/BPD ratio after birth was nearly constant during 24 - 40 weeks of gestation (FOD/BPD = -0.00179 weeks + 1.337). 2) Summary table of multiple stepwise regression analysis:

Step No.	Variable	Multiple R	Multiple RSQ	F	p
1	BMC/Body weight	0.515	0.265	84	<0.01
2	Gestational age	0.552	0.304	13	<0.01
3	Body weight	0.563	0.317	4.4	<0.05
4	Birth weight	not entered			
5	Postnatal age	not entered			

Conclusion: The BMC/ body weight ratio determined 51 % of the FOD/BPD variation in growing preterm infants. The other tested variables had only little or no detectable influence on the head shape. The changing in head shape, therefore, predominantly depended on the mineralization rate, i.e. on the amount of Ca/P supplement.

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PARATHYROID HORMONE-RELATED PEPTIDE (PTHrP) INTERACTIONS WITH RENAL RENIN AND EDRF SYSTEMS. *U. SIMEONI, C. SAUSSINE, T. MASSFELDER, M.J. MUSSO, M. FISCHBACH, J. GEISERT and J.J. HELWIG. Labo Physio Rénale, Hospices Civils - U.L.P. Strasbourg, France.*

PTHrP, the primary causative agent of the hypercalcemia associated with humoral malignancy, is so-named for its ability to act as a PTH agonist in kidney and bone. Like PTH, PTHrP is also hypotensive and vasorelaxant. But, unlike PTH, PTHrP mRNA has been localized in normal fetal and adult tissues including vascular tissue. Thus, PTHrP may serve as a local regulator of the hemodynamic of developping and adult kidney. In light of this possibility we demonstrated earlier the presence of receptors responsive to PTHrP in preglomerular vessels and its vasorelaxant action in the isolated perfused kidney (IPK) of rat. In this work, we show that 125nM PTHrP increased renin release (RR) from non filtering IPK of rat perfused at constant flow and stabilized pressure (70 mm Hg) by 161%. PTHrP reversed the inhibiting effect of hypercalcic media (2mM Ca^{2+}) and 20nM BAY-K8644 (Ca channel opener). In rabbit IPK preconstricted with norepinephrine, 1µM N_w-Nitro-L-Arg Benzyl Ester (NABE), an inhibitor of EDRF synthesis decreased by 80-90% the renal relaxation in response to 10µM acetylcholine. Parallely, NABE decreased by 20 to 40% the relaxation in response to 87nM of PTHrP. Conclusion: 1) PTHrP stimulates RR independently from macula densa and baroreceptor mechanisms by a Ca-dependent process; 2) renal vasodilatation in response to PTHrP probably involves in addition to cAMP, an EDRF-dependent process. Together with the presence of PTHrP mRNA in smooth muscle cells shown in other respects, these results support the view that PTHrP contributes locally to renal blood flow regulation.

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ATRIAL NATRIOURETIC FACTOR (ANF) PLASMA LEVELS IN NEONATES TREATED WITH MULTIPLE DOSES OF SURFACTANT(S). M.Klavdianou,C.Papagaroufalis, A.Charitou,E.Stamocosta,C.Stefanidis,B.Alevizou,E.Kitsou,M.Xanthou. B'NICU "Aghia Sophia"Children's Hospital and Dept of Nuclear Medicine,General Hospital "Laikon", Athens,Greece.

In order to test the hypothesis that changes in pulmonary compliance affect ANF levels,we measured the concentrations of ANF sequentially in 24 neonates.All infants were mechanically ventilated for severe HMD and received multiple doses (3-5) of porcine S (Curosurf).The BW was 1654±570gr (mean ±SD) and the GA 31±2.8 weeks.ANF concentrations were high on day 1 (206±198pgr/ml) before S administration,but decreased on day 2(192±123pgr/ml),in contrast to statistically significant elevations seen in neonates with HMD not treated or treated with a single dose of S.ANF further declined on day 4(93±82pgr/ml). There were not significant differences in ANF levels between neonates receiving high (600mg/kgr) and low (300mg/kgr)doses of S.Our results suggest that as lung compliance increased,after S administration,intrathoracic pressure increased,thereby decreasing venus return,atrial strech and ANF secretion.Before S administration,the ANF concentrations increased from a level of 98pgr/ml 1-2hours after birth to a maximum of 426 pgr/ml at the age of 12-24hours, as seen by others.Factors associated with higher ANF levels were the presence of PDA,and water retention (p<.05).However,we were unable to detect any significant correlation between ANF levels and creatinine clearance, FeNa, RFI or ratio water intake to urine output in this population.

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CONTROL OF THE FETAL ZONE OF THE ADRENAL GLAND IN PRETERM INFANTS.

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The hypothesis to be tested is that persistence of the fetal zone of the adrenal gland after preterm birth is due to continuing stimulation by ACTH. 22 infants of mean gestation 27.6 weeks and mean birth weight 946g were studied longitudinally between 170-360 days postconceptional age (PCA). Circulating DHEAS and its urinary metabolites were used as a measure of adrenal fetal zone function. Mean plasma DHEAS fell form 12.3 µmol l^{-1} at 176 days PCA to < 1.0 µmol l^{-1} at 350 days PCA. During the same period the plasma ACTH increased from 9 pg ml^{-1} to 48 pg ml^{-1}. After term (280 days) the plasma DHEAS became barely detectable. In individual babies urinary excretion of DHEAS metabolites remained elevated but declined between 280-300 days PCA. Dexamethasone given to one infant completely suppressed plasma cortisol and ACTH, but the plasma DHEAS and its metabolites in the urine were not suppressed to the same extent. We conclude that the adrenal fetal zone in preterm infants continues to secrete 3β-OH-5ene steroids following delivery and after term these decline. Because of the observed changes in plasma ACTH and DHEAS and the failure of dexamethasone to fully suppress the fetal zone it is likely that ACTH is not the sole regulator of the fetal zone of the adrenal gland in preterm infants.

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FATE OF OROGASTRICALLY ADMINISTERED INSULIN-LIKE GROWTH FACTORS I AND II (IGF-I AND -II) TO SUCKLING RATS

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IGF's are stimulators of mitosis and may be of importance in the regulation of intestinal growth in the neonate. Since IGF's are present in a variety of milks, we tested the hypothesis that ingested milk-borne IGF's might be available to gastrointestinal (GI) tissues and might also be absorbed to sites distant to the GI tract. Recombinant ^{125}I-IGF-I and -II in rat milk were given via stomach tube to suckling rats. Approximately 40% of IGF-I or-II cpm remained in the GI tract at 30 min post ingestion with < 1% appearing in most other organs. Gel chromatography demonstrated that much of radioactivity present in GI tract homogenates eluted together with authentic IGF. Significant differences were noted in amounts of IGF-I vs-II found in GI tissues after 30 min, particularly in stomach and intestinal wall and lumen. Exogenous IGF-I represented twice the amount of IGF-II in these tissues. Competitive binding studies confirmed that binding of radioactivity present in peaks at 7.5K MW were identical to those of native ^{125}I-IGF's. These studies show that milk-borne IGF remains intact in the GI tract of suckling rats for at least 30 min post ingestion.

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LOW SERUM GLUCOSE CONCENTRATIONS INDUCE GLUCAGON COUNTERREGULATION IN HEALTHY NEWBORNS. Ingemar Swenne, Uwe Ewald, Jan Gustafsson and Claes-Göran Östensson*. Depts of Paediatrics, Uppsala University, Uppsala and Endocrinology*, Karolinska Hospital, Stockholm, Sweden.

Before feeding regulatory mechanisms maintain blood glucose concentrations of the newborn to meet the demands of the central nervous system. The role of glucagon in this process has been investigated. Healthy, term babies without clinical signs of hypoglycemia were studied. A capillary blood sample was obtained at 3-15 hours (median 6 hours) of age, a second sample 24 hours later and serum concentrations of glucose, insulin and glucagon were measured. Glucose concentrations at the first sampling averaged 2.1 ± 0.5 mM (mean ± SD; n=51) and were positively correlated with postnatal age. At the second sampling glucose concentrations had increased to 3.0 ± 0.5 mM. Glucagon concentrations were 541 ± 219 pg/ml at the first sampling and inversely correlated with glucose concentrations. At the second sampling glucagon concentrations had decreased to 406 ± 163 pg/ml. Insulin concentrations were 12.1 ± 2.4 and 10.6 ± 2.1 µU/ml, respectively, and did not correlate with glucose concentrations. In a multiple regression analysis glucose concentrations were inversely correlated with glucagon concentrations and positively correlated with birth weights but not correlated with insulin concentrations or other neonatal and maternal characteristics. The results suggest that glucagon is part of normal counterregulation against hypoglycemia and that neonatal energy stores, as indicated by birth weight, influence the ability to maintain normoglycemia.