279 DOPAMINE REGULATION OF GLOMERULAR FILTRATION RATE AND RENAL BLOOD FLOW IN YOUNG AND ADULT RAT. THE POSSIBLE ROLE OF DA_2 RECEPTORS.

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Dopamine (DA),widely used for treatment of acute prerenal failure (APRF),induces renal vasodilation and increase in glomerular filtration rate (GFR).The exact mechanism of DA action has not been clarified.Two types of DA receptors (1 and 2) have recently been identified.DA_1 is linked to adenylate cyclase activation,while DA_2 is not, and might be linked to calcium. DA_1 is predominantly found in the nonglomerular renal vessels,while in the glomeruli only DA_2 has been demonstrated. DA has successfully been used for treatment of APRF in preterm infants, but little is known about developmental differences in the renal response to the drug.We examined the renal hemodynamic effects of low dose (0.2 and 1.0 /ug/kg/min) DA in young (Y, 24 d old) and adult (A, 60 d old) rats, and also tried to evaluate the possibility of calcium linkage and the role of the DA_2 receptors by performing studies with and without verapamil (a potent calcium channel blocker,VP,20 /ug/kg/min) infusions. **Single nephron (SN) GFR** was measured in 10 Y and in 10 A rats. In A rats 0.2 DA induced a 32% ($p < 0.01$) and 1.0 DA a 45% ($p < 0.001$) increase in SNGFR. In Y rats the increase of SNGFR was somewhat smaller, but with 1.0 DA it was statistically significant (33%,$p < 0.001$). In 8 adult rats the addition of VP abolished the DA induced increase in SNGFR. **Blood flows (BF)** were determined in 32 A rats with microsphere technique. 1.0 DA alone significantly increased renal cortical, renal medullary and mesenterial BFs. The addition of VP significantly decreased the DA induced increase of the renal cortical BF, but did not influence the DA induced vasodilation in the renal medulla and mesenterium.

Conclusions: Y rats can respond to low dose DA but certain dose dependent differences might exist between Y and A rats suggesting a maturational process for DA receptors and/or effector responses. At 1.0 DA the drug induced increase of **renal cortical BF** is mainly modulated by **calcium linked receptors**,which we assume are **DA_2s**, while in the **renal medulla and mesenterium** the cAMP linked DA_1 plays the main regulating role.

280 PARALLELISM BETWEEN THE ACTIVATION OF THE ADENYLATE CYCLASE (AC) IN BRAIN MICROVESSELS AND THE TRANSENDOTHELIAL ALBUMIN TRANSPORT IN NEWBORN PIGLETS WITH EXPERIMENTAL PNEUMOTHORAX (EPT).

P. TEMESVARI, F. JOO*, G. ADAM*, and E. ECK. Department of Pediatrics, University Medical School and Biological Research Center, Szeged, Hungary*. It is experienced in daily clinical practice that neonatal pneumothorax frequently results in severe brain damage. The exact molecular mechanism underlying the events are still not fully understood. Microvessels were isolated from brains of neonatal piglets (n=15) with EPT in the critical phase (as apnea appeared, MABP fell, and EPT was terminated) and 4, 8 and 24 hours thereafter. The AC activity was determined. In other experiments, Evans blue extravasation was quantitatively measured in the corresponding stages (n=2o). The affinity for substrate (K_M) and the maximal velocity (V_{max}) of the AC in the brain microvessels were increased parallel to the degree of extravasation of Evans blue dye. This parallelism was obvious 4 and 8 hours after the critical phase. However, at 24 hours the AC activity in the brain microvessels reached the control value (animals without EPT) together with a significant reduction of Evans blue transport. Our results suggest that, in the course of brain oedema formation induced by EPT, the activation of AC in the brain microvessels is an important trigger for increasing the macromolecular transport through the blood brain barrier.

281 The Red Blood Cell Aggregation Value (AW) in Neonates and their Mothers in Comparison with the AW of Children and Normal Women

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The red blood cell aggregation value (AW) measured after a three step rotation procedure by means of electrical cell volume analysis was found to be significantly increased in men with coronary artery disease and in patients with diabetic arteriosclerosis. In a group of 143 healthy volunteers we found AW values of 17.6% $\pm$ 10.4 ($\bar{x} \pm$ SD). The upper limit of normal AW values was defined to be 27%. Further investigations were made to evaluate the AW in various physiological and pathological conditions. Neonates (N = 21; $\bar{x}$ of AW = 9.5%; blood was taken from umbilical vein at birth) and their mothers (N = 21; $\bar{x}$ of AW = 49.7%) were compared with normal volunteer children (5-11 years; N = 14; $\bar{x}$ of AW = 17.2%) and normal women (18-43 years; N = 15; $\bar{x}$ of AW=18.0%). The comparison between the groups was performed with the non-parametric Wilcoxon test. AW values of the group of neonates were significantly ($2P \leq 0.001$) lower than those of the children group, while their mothers had AW values significantly increased to those of the normal women group ($2P \leq 0.001$). Measurement of the AW in neonates and their mothers could be helpful to recognize pathological situations at birth.

282 DEFINING POLYCYTHEMIA: A REAPPRAISAL

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The first cases of neonatal polycythemia were described over 25 years ago. To date, controversy still exists as to what critical level of hematocrit (hct) should be utilized to define this syndrome. The most common definition has been a venous hct of 65% or greater. Values as low as 60% or as high as 70% have also been suggested. In addition, the relationship between polycythemia and hyperviscosity is poorly described. We re-evaluated the definition of polycythemia based on neonatal symptoms and long-term outcome at 1-2 yrs of age and evaluated the relationship between hct and viscosity. The subjects were infants referred for further screening because of high hcts. Viscosity measurements were made using the methods and standards of Cross et al. (1973). Viscosity and venous hct were coded for 225 infants. Follow-up was available on 158 (70%). Among infants studied, elevated viscosity measurements were not limited to those with venous hcts of 65% or greater. Eleven percent of infants had an abnormal viscosity, although hct was less than 65%. The enrollment mechanism did not permit identification of the lowest hct at which abnormal viscosity could be found. Infants whose venous hcts were between 65 and 69% were as likely to have neonatal symptoms as infants with hcts between 60 and 64%. Infants with markedly abnormal hcts (>69%) had similar neonatal courses. Infants with symptoms in more than one organ system varied from 26-30% of each group. Similarly, outcome measurements were not different among the three groups. No evidence of long-term sequelae was found in 44-65% of the children. In conclusion, determinations of a critical level of hct does not fully account for the effects of neonatal hyperviscosity. It is also likely that additional factors influence peripheral blood flow and must be considered when attempting to predict which infants with elevated hcts will have neonatal symptoms or long-term sequelae.

283 NEONATAL POLYCYTHEMIA: SCHOOL-AGE PERFORMANCE.

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We report a longitudinal study of children who had neonatal hyperviscosity (HV). The original cohort consisted of 111 HV infants prospectively identified at birth and matched with 110 control infants who had low peripheral hematocrits. Criteria for matching included birthweight, gestational age and Apgar scores. Neonatal, intrapartum and two-year evaluations were coded. HV subjects were more frequently meconium stained, ($p<0.005$) and had more neonatal hypoglycemia ($p<0.005$) than did controls. Four children died prior to follow-up. At two years of age HV children had more neurologic diagnoses ($p<0.005$) and motor delays ($p<0.005$). School age assessments for the same groups were made at a mean of 7 years. Evaluations included Slosson IQ, Wide Range Achievement Test (WRAT) for Arithmetic, Reading and Spelling, a scored neurologic examination (PANESS), Beery Visual Motor Test, reflex testing and timed fine motor skills. Forty-seven HV and 39 controls have been evaluated to date. There were no significant differences between the two groups in IQ, Beery, PANESS or WRAT scores. Two children had abnormal reflexes. Beery tests revealed more than a 6 month delay in 18 control (46%) and 29 HV subjects (53%), NS. When 2 and 7-year outcomes were compared only 2 of the 20 subjects who had abnormalities on the earlier follow-up now had no delays. More than one delay was present in 15 of 22 children with abnormal outcome at 2. Ten of 36 who were normal at 2 now had more than one low score ($p<0.01$). Outcome at school age was best correlated with maternal IQ scores.

CONCLUSIONS: 1. Neurologic handicaps and motor delays at two are associated with lower achievement scores at seven. 2. The children with HV examined in this study did not differ from weight-matched control infants from a similar medically-indigent population.

284 THE INFLUENCE OF PRETERM DELIVERY ON RED CELL FILTERABILITY IN NEONATES - INFERENCES AS TO PATHOGENESIS OF CLINICAL COMPLICATIONS OF PREMATURITY.

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Short gestation correlates with impairments in red cell filterability at birth. We used Nuclepore blood cell suspension filtration (Jones et al, 1985).

Gestation Age (weeks)	Pore-occupation times (seconds)
27	20.40
30	4.34
35	2.50
40	1.22

There was no correlation between pore occupation time and mean red cell volume or leukocyte count. Irrespective of the cellular pathological cause(s) for this prematurity-related impairment of red cell filterability, this finding may reflect important in vivo phenomena: the pathogenesis of haemolysis, jaundice and circulatory stagnation, thrombosis and haemorrhage in neonatal life may depend in part on this malfunction of the fetal red cell after birth.

J.G. Jones et al (1985) Br. J. Haem. 59, 541-546.