

NEONATOLOGY

PERIPHERAL BLOOD FLOW IN INFANTS WITH HYALINE MEMBRANE DISEASE. Bruce D. Ackerman, Michael D. Goldberg and Kristina S. Mrozinska. (Intr. by Norman Gootman) State University of New York at Stony Brook, Dept. of Pediatrics and Long Island Jewish-Hillside Medical Center, New Hyde Park, N. Y.

Blood flow was studied by venous occlusion plethysmography in 13 infants requiring either continuous positive airway pressure (CPAP) or assisted ventilation for hyaline membrane disease. Infants were studied at one to 5 days of age. Individual infants were studied on up to 4 different days. The system used consisted of a blood pressure cuff applied to the thigh and a mercury strain gauge applied circumferentially to the mid-calf (Kidd et al, 1966). Arterial blood pressure (BP) was measured directly. Venous occlusion was accomplished by inflating the cuff to a pressure below that of the diastolic BP. Blood flow ranged from 3.8 to 14.3 ml/100 gm of tissue/minute. For each infant, values were reproducible on a given day, but labile from day to day. The observed values were higher than those reported by Kidd et al, possibly because of changing practices regarding intravenous fluids and blood transfusion. Changes in blood flow could not be predicted from changes in BP, central hematocrit, or volume of blood withdrawn for laboratory studies. Blood lactate, base deficit or requirements for intravenous bicarbonate could not be predicted from blood flow. CPAP at pressures up to 6 cm H₂O did not significantly reduce blood flow. A low blood flow in the first 24 hours suggested that blood transfusion was more likely to be required subsequently during the course of the disease.

PULMONARY BLOOD FLOW (PBF) IN LAMBS WITH HYALINE MEMBRANE DISEASE (HMD). Alexander C. Allen, Dora A. Stinson, Hugh M. MacDonald and Paul M. Taylor. Univ. of Pittsburgh Sch. of Med. Magee-Womens Hosp., Dept. of Pediatrics, Pittsburgh, Pa.

Effective PBF is low during the course of HMD (Chu et al, *Pediatrics*, 35:733, 1965). It is not known whether this change is central in the etiologic chain of events or simply a secondary phenomenon. Total PBF was measured during the first 4 hr of life in lambs with and without HMD. At 129-133 days' gestation a pre-calibrated electromagnetic flow transducer with non-occlusive zero was implanted on the postductal portion of the common pulmonary artery of 8 fetal lambs which were returned to the amniotic cavity for 7 days and then delivered by C-section at 136-140 days' gestation. After birth a Swan-Ganz catheter was floated into a branch pulmonary artery for pressure measurements. By clinical and blood gas criteria, 4 lambs had no distress or developed mild HMD; 4 developed moderate or severe HMD. PBF increased sharply from less than 50 ml/Kg/min just before delivery to 299-735 ml/Kg/min 21 to 33 min after the first gasp and stabilized at lower levels by 1 hr of age. No differences in the pattern of the PBF surge or in the PBF levels attained during and subsequent to the surge were observed between the two groups. Severely acidotic lambs with HMD had pulmonary vascular resistance (PVR) values similar to those of lambs with no distress or mild HMD. The data suggest that decreased PBF is not central in the pathogenesis of ovine HMD and that the prematurely born lamb with HMD lacks the ability to increase PVR when acidotic.

THE IMPACT OF NEONATAL INTENSIVE CARE. Billy F. Andrews (Intr. by Ogden C. Bruton) Univ. of Louisville, Sch. of Med., Louisville Gen. Hosp., Dept. of Ped., Louisville.

Application of new understanding, equipment and techniques to the care of high risk newborns has led to a generalized decrease in neonatal mortality. Studies related to morbidity and follow-up are under way in our own and in other centers. In Kentucky, a state which ranks very low economically, a reduction of approximately 30% in neonatal mortality has occurred in 10 years. In one of the first nurseries to develop neonatal intensive care a reduction of over 40% was recorded.

Major contributing factors in this achievement have been the development of neonatal intensive care units in the state's two medical schools, intra- and extra-mural programs for education of medical and nursing personnel, improvement in regional care with few infants born in hospitals with under 1000 deliveries, and family practitioner, obstetric and pediatric cooperation.

Tables, graphs, pictures will be utilized to illustrate changes in patterns of mortality, equipment, education, care and types of problems encountered.

IATROGENIC COARCTATION OF THE AORTA. Anthony V. Beran, Kenneth G. Proctor, Robert F. Huxtable, Univ. of CA, Col. of Med., Dept. of Ped., Irvine, CA. (Intr. by Thos. L. Nelson)

Reported complications of umbilical artery catheterization include thrombosis, infection, vessel perforation, extremity blanching, and visceral necrosis. Catheter placement in an artery produces a partial acute mechanical obstruction equivalent to coarctation of the aorta. The immediate consequences of such obstruction have not been reported. To investigate this, experiments were performed in 10 New Zealand rabbits (1.6-3.5 kg). Common iliac artery blood flow (BF), gracilis muscle oxygen availability (O_{2a}) and subcutaneous temperature (SQT) in the foot were measured on the right side of the animal. The left side was used for catheter insertion and measurement of arterial blood pressure (BP). French (F) 3.5 and 5 catheters were inserted through the femoral artery, advanced 15 cm, and left in place for 10 min. The 3.5F had no effect on the BF, BP, O_{2a} and SQT in 10 of 16 determinations. In 3 of 6 remaining animals, O_{2a} decreased slightly, while in 3 others weighing <2 kg, O_{2a} decreased 100%. In 11 determinations, 5F catheters produced BP increase, SQT decrease from 31.6±2.1°C to 30.2±1.7°C, and decrease in O_{2a} and BF to 23±31% and 35±38% of normal respectively. Reduction in BF, O_{2a} and SQT by catheters is related to relative dimensions of vessel and catheter and to distance of catheter insertion. These variables should be considered during clinical application of arterial catheters. Undesirable changes could be detected by continuous differential monitoring of core and extremity SQT or extremity O_{2a}.

AN EVALUATION OF LOWER LIMB CIRCULATION IN INFANTS HAVING HAD INDWELLING UMBILICAL CATHETER DURING THE NEO-NATAL PERIOD. B. Bétend⁺, B.H. Doray⁺ and H. Bard. Univ. of Montreal, Dept. of Ped., Ste-Justine Hosp., Montreal, Canada.

Arterial thrombosis have been demonstrated by aortography after umbilical arterial catheter removal in infants having required blood gas monitoring via umbilical artery catheters during the neonatal period (*Pediatrics* 50:6, 1970).

In order to evaluate the long term effects on the lower limb circulation in these infants blood pressures (BP) were measured by Doppler ultrasound technique on sixteen 1-2 year old infants who had indwelling umbilical artery catheter during their neonatal period. The measurements were compared to control infants of similar age. The results of this study showed no difference in lower limb BP between the two groups.

This could suggest that indwelling umbilical artery catheters used during the neonatal period do not cause long term effects on lower limb circulation.

GROWTH, DEVELOPMENT AND HEARING IN PREMATURE INFANTS WHO RECEIVED PHOTOTHERAPY. K. Bhupathy, D. Vidyasagar, L. Hamilton, J. Engbring and R.S. Pildes. Cook County Hospital and Univ. of Illinois Coll. of Med., Depts. of Pediatrics, Chicago, Ill.

To determine the effect of phototherapy on subsequent growth and development, a group of 81 low birth weight infants, 56 phototherapy (P) and 25 controls (C) were examined at 6, 9, 12 mos. P and C groups were chosen retrospectively on a random basis. Mean (±S.E.M.) birth wt of P infants was 1601±40gm and of C, 1669±56gm. Mean gestational age of P was 32.6±0.3 wks. and of C, 34±0.4 wks (p <0.05). At 6 mos, there were 31 P and 13 C; at 9 mos, 29 P and 18 C and at 12 mos, 20 P and 12 C infants. There were no differences in wt, length and head circ. at 6 and 9 mos. At 1 year, length of P infants was significantly (p <0.05) less than in C infants (70.5±0.6 Vs 74.5±1.4cm respectively). Motor and mental D.O. (Bayley Infant Scales) were similar in both P and C groups at 6 and 9 mos. At 1 year, P group had a significantly (p <0.05) higher motor (102±3) and mental (109±3) than C infants (94±2 and 96±4). This was due to the persistent presence of 2 C infants with low scores. Neurological exams at 1 year showed absence of any gross abnormalities in either groups although minimal abnormalities were seen in 3 of 20 P and 5 of 12 C infants. This difference was not significant. Electroencephalographic audiometric (EEA) exams in 33 P and 15 C infants did not show any significant differences. Phototherapy, therefore, did not appear to have any adverse effects on the subsequent development of premature infants even though P infants were of lower gestational age at birth.