1015 DEVICE FOR INDIRECT MEASUREMENT OF MEAN ARTERIAL PRESSURE, Maynard Ramsey III, John S. Curran, (Spon. by Lewis A. Barness), Applied Medical Research Corporation, Tampa, Florida; University of South Florida, College of Medicine, Department of Pediatrics, Tampa, Florida

The measurement of blood pressure in the premature neonate presents many difficulties. A new device has been developed which allows the noninvasive determination of mean arterial pressure (MAP). The device uses an occluding cuff which may be placed on any of the extremities and chooses as MAP the lowest cuff pressure at which the oscillations in cuff pressure are maximum.

The device was tested in a series of 36 studies involving eleven infants whose weights ranged from 3.3 Kg to 800 Gm. The studies were conducted by comparing the pressure measured using the indirect device, with that pressure measured from an umbilical artery catheter. Where possible, determinations were made on the forearm, bicep, calf, and thigh. Where this was not possible, only the thigh or the bicep was used. The mean error between the two methods was .86 mmHg and the average standard deviation was 2.9 mmHg.

Although the measurement of blood pressure in small infants remains more difficult than similar measurements in adults, it was found that with appropriate precautions, accurate results could be achieved over a wide range of pressures and physiological states.

1016 THE VALUE OF CONTINUOUS POSITIVE AIRWAY PRESSURE IN THE DIFFERENTIATION OF CARDIAC FROM PULMONARY CYANOSIS IN NEONATES P. Syamasundar Rao, Brenda L. Marino and Alex F. Robertson. Medical College of Georgia, Department of Pediatrics, Augusta, Georgia.

The PaO_2 response to 8-10 cm water continuous positive airway pressure (CPAP) was determined in thirty-five cyanotic neonates with PaO_2 < 50 torr in FIO_2 of 80-100% in order to determine whether CPAP was useful in differentiating cyanosis of cardiac origin from that of pulmonary origin. Based on the final diagnoses there were 21 infants with cyanotic heart disease (CHD), 11 with pulmonary parenchymal disease (PPD) and 3 with persistent fetal circulation (PFC). The results are tabulated below:

	Birth weight kg.	Gest. Age wks.	Median Age hrs.	PaO_2 in 80-100% O_2-Torr	PaO_2 on CPAP - Torr	P Value of Δ PaO_2	P Value between Groups
CHD	3.1	40	30	33	29	0.10	<0.01
PPD	2.3	36	18	41	74	0.05	
PFC	3.3	37	12	39	42	0.10	NOT CALC.

The pH, $PaCO_2$, and bicarbonate values did not significantly change after CPAP. Despite attaining statistical significance as a group, some PPD infants did not increase PaO_2 with CPAP. The results indicate that CPAP is not as definitive as previously suggested but may be used as an adjunctive test in differentiating CHD from PPD. Increase of PaO_2 >10 with CPAP suggests PPD and nonsignificant increase in PaO_2 does not rule out PPD. Irrespective of initial PaO_2, the final PaO_2 in 80-100% FIO_2 with CPAP >50 torr would suggest PPD and <50 torr suggests CHD.

1017 IN UTERO VERSUS POSTPARTUM TRANSPORTATION OF HIGH-RISK INFANTS. Peggy J. Rapoport, David L. Bolam, Yoshio Miyazaki, and Charles L. Paxson, Jr., U. of Neb. Coll. of Med., Peds., Omaha, (Spons. by G.C. Rosenquist).

Increased survival of high-risk infants (HRI) born in tertiary care centers has led to the concept that in utero transportation of the HRI is superior to postpartum infant transportation. We evaluated this concept by comparison of 40 infants transported in utero (IUT) with 40 infants transported in the first postpartum day (PPT). Infants were selected by comparing all IUT with the next consecutive admission transported from the same town or an equal distance (±50mi). Infants were then matched for gestational age (±2wk), birth weight (±100gm), and primary neonatal disease. Transport mortalities and other features of the two groups were then carefully analyzed for significance.

The IUT were no different from the PPT in number of mothers with >1 risk factor, toxemia, diabetes, or multiple births. More of the PPT were preterm ($p<.05$) and more IUT suffered premature rupture of membranes ($p<.005$). No differences were found in Apgars pH, TSP, serum glucose, or primary neonatal disease. Neither group suffered significant hypothermia. 37 infants required ventilation but no differences existed in peak ambient oxygen or end expiratory pressure requirements. Mean age of PPT at admission was 7.7 hours, and mean transport distance was 100 mi. Transport mortality was 12%, 10%, for IUT, PPT, respectively. Survival time for infants expiring in the first month and hospitalization time for neonatal survivors were similar. This study suggests that early PPT may be as valuable as IUT for the high-risk newborn.

1018 ACUTE SUDDEN HYPERTENSION IN THE NEWBORN PERIOD. Ekkehard W. Reimold, Univ. of Texas, Southwestern Med. School, Dept. of Pediat., Dallas, Texas.

After an initial normotensive period the blood pressure rose in 3 infants at the age of 6 days, 8 days and 4 weeks to 180-230 mmHg. In each case an umbilical artery catheter had been inserted because of respiratory distress on the first day of life to the level of T-10, L-3 and L-6 and remained in place for 3, 4½ and 11 days. Cardiac, intestinal, hematologic and metabolic complications were observed in addition to congestive heart failure, abdominal mass, hepatomegaly, vomiting, irritability, weight loss. The IVP was unremarkable in 1 case but visualized poorly one or both kidneys in the other 2 cases. Abdominal angiography showed thrombosis of the renal artery with partial occlusion of the lumen and extensive irregularities and narrowing of the abdominal aorta. Peripheral or renal vein renin were 11.8, 9.4 and 13 ng/ml/hr.

In all 3 infants the hypertension was controlled by medical antihypertensive treatment. They are now normotensive at the age of 12-18 months and only 1 infant still requires antihypertensive treatment. A reevaluation shows one nonfunctioning kidney in 1 case, persistent irregularities of abdominal arteries with normal IVP in the third case.

These findings suggest development of renovascular hypertension caused by thrombosis of the renal artery or its branches. The thrombosis most likely was induced by placement of the umbilical catheter.

1019 THE RELATIONSHIP BETWEEN APNEA AND HEART RATE IN PREMATURE INFANTS. Jonelle C. Rowe, William J. Flanagan, William A. Hodson, and David E. Woodrum. University of Washington School of Medicine, Dept. of Pediatrics, Seattle.

The relationship between apnea (AP) and heart rate (HR) was determined in 8 premature infants (gestational age 27-31 weeks) during their 1st 5 days of life. Inspection of 276 hours of continual recording of respiration (impedance pneumograph), mean HR and intra-aortic pressure demonstrated 286 episodes of apnea (≥ 20 seconds, preceded by 2 minutes of uninterrupted breathing). In 94% of these apneic events, a drop in HR (10-110 bpm) followed the onset of apnea, with a mean delay in onset of HR drop of 9.7 ± 4.0 seconds. The drop in HR never preceded the onset of apnea and on only 2 occasions began simultaneously with the onset of apnea. The drop in HR appears to be a secondary response rather than part of the primary phenomenon. The hypothesis that the magnitude of the drop in HR is indicative of the significance of the apnea to the infant was tested by examining 17 pairs of apnea when the 2nd apnea occurred < 2 minutes after the first. (In 10 cases, the 2nd apnea occurred < 30 seconds after the 1st.) The HR nadir of the 2nd event compared to the 1st event was the same (within 10 bpm) or higher in 16 of the 17 pairs. The data suggest that a drop in heart rate invariably occurs as a response to apnea, but that the magnitude of the drop does not reflect the physiologic significance of the apnea to the infant.

1020 PEROXIDASE TECHNIQUE FOR THE DETECTION OF PHOTOCHEMICAL LESIONS IN INTRACELLULAR DNA. Regina M. Santella, Herbert S. Rosenkranz and William T. Speck. Col. of Physicians and Surgeons, Columbia University, Babies Hosp., Department of Pediatrics, New York, New York 10032.

Recent work in our laboratory demonstrating the intracellular DNA-modifying potential of phototherapy with and without physiologic photosensitizing agents (riboflavin) has generated some concern since many carcinogens, mutagens and/or teratogens derive their activity from a similar ability to modify DNA. The purpose of the present report is to characterize this intracellular DNA-modification utilizing a technique which may prove useful in identifying photochemical changes in the genetic material of irradiated infants. Human (KB) cells, treated with phototherapy in the presence of riboflavin were exposed to rabbit anti-nucleoside antibodies. These antibodies, which react with free base residues, are capable of reacting with single stranded, denatured or partially denatured regions of the DNA. The cells were then exposed to peroxidase labelled sheep anti-rabbit antibody. Examination of the cells revealed light activated riboflavin photooxidation of the guanine residues. These changes were observed at wavelengths of light (450 nm) identical to those utilized in phototherapy and with a total light dosage (141 μwatts cm2) significantly less than that received by a newborn in our nursery during a 24-hour period. Further development of this technique might prove useful in demonstrating similar changes in cells of illuminated infants and thereby permit us to intelligently define the risk-benefit ratio of phototherapy in our newborn populations.