EFFICACY OF FOUR MEANS OF NEONATAL THERMAL PROTECTION. Christian Courpotin, Paul H. Perlstein, Wm. J. Keenan (Intr. by James M. Sutherland), Univ. of Cincinnati. Col. of Med., Dept. of Ped., Cincinnati.

To compare the efficacy of different methods of neonatal thermal protection, oxygen consumption ($\dot{V}_{O_2}$) and deep rectal temperature (T_r) were followed for the first 3 hours of life. $\dot{V}_{O_2}$ was measured using a calibrated open circuit system. Groups of 15 vigorous mature infants were studied in 4 thermal environments: 1) swaddled with a blanket in an open bassinet at room temperature (25°C) 2) swaddled in a double-layer plastic bag with head shield and placed in a bassinet at room temperature 3) placed nude under a radiant heater (750 watts at 80 cm), and 4) placed in a double-layer plastic swaddler with head hood under the radiant heater. At 30 minutes of age the T_r fell least in plastic swaddled infants under a heater (36.8°C±.30) and most in babies under the heater alone (36.2°C±.2.6); $\dot{V}_{O_2}$ was least for swaddled infants under a heater (8.0 cc/kg/min±.3). At 3 hrs swaddled infants under a heater had the highest T_r (37.5±.12) and lowest $\dot{V}_{O_2}$ (5.75±.25). Over the observation period (3 hrs) infants swaddled in plastic under a radiant heater consumed less (8%) oxygen than the mean in the other groups and best maintained deep temperature.

REGIONAL NEWBORN CARE AND THE AMERICAN INDIAN NEONATE.

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In 1971 we reported (SPR) a reduction in neonatal mortality in Arizona associated with the establishment of a statewide system for newborn transport and intensive care. From its inception the program included State supplemental funding of catastrophic illness and transport costs for American Indian newborns delivered in or transported to State-designated newborn intensive care centers. The cumulative Indian neonatal mortality rate for the Phoenix Indian Service Area for the 3 years preceding establishment of this program (1964-66) was 18.9 deaths/1000 live births. During the first 3 years of the program (1968-70) cumulative Indian neonatal mortality rate fell to 10.3 deaths/1000, and during the next 3 years (1971-73) to 9.0 deaths/1000. These data suggest that previously high mortality rates among American Indian newborns have been reduced by active inclusion into the general regional newborn transport and intensive care program.

PROLONGED HYPOGLYCEMIA IN INFANTS OF PRE-DIABETIC MOTHERS TREATED WITH THIAZIDE DIURETICS. Marco Danon, Hans H. Bode, and Joseph B. Warshaw, Harvard Med. Sch., Massachusetts Gen. Hosp., Children's Service, Boston.

Three infants (A, B, and C) developed unusually severe neonatal hypoglycemia within 24 hours of birth. Plasma insulin levels ranged between 25 and 45 uU/ml when blood glucose was below 20 mg%. In contrast to the brief period of hypoglycemia characteristic of infants of diabetic mothers, hypoglycemia in these neonates persisted for at least ten days despite provision of more than 40 Gm of glucose/kg/day. All three mothers had received thiazides during the last trimester. Because thiazides are known to inhibit insulin secretion an evaluation of drug influence on the maternal post-partum glucose tolerance was undertaken with the following results: Unmodified glucose tolerance tests indicated chemical diabetes in mothers A and B; mother C was normal. Tolerance was further reduced by cortisone priming, or thiazide treatment in mothers A and B. Combined therapy rendered mothers A and C frankly diabetic.

We conclude thiazide treatment was responsible for aggravating pre-diabetes in the mothers of infants A, B, and C. Maternal hyperglycemia predisposed to adaptive hyperinsulinism in the fetuses and thus contributed to their severe, prolonged hypoglycemia after birth. We suggest more cautious use of thiazides in pregnancy until further investigations have proven their use safe.

THE EFFECT OF EXCHANGE TRANSFUSION ON PULMONARY FUNCTION OF INFANTS WITH SEVERE RESPIRATORY DISTRESS SYNDROME (RDS). M. Delivoria-Papadopoulos, J.H.Chen, P.A.Branca, L.D.Miller, R. E.Forster and A.B.Dubois: Depts. of Ped. and Physiology, University of Pennsylvania Sch.of Medicine, Phila., Penna.

The present study was designed to investigate the mechanism of improvement of infants weighing 1200 gms. at birth or more with RDS, receiving an exchange transfusion as an adjunct to usual therapy. The present studies were designed to investigate the mechanism of improvement. Measurements of minute volume ($\dot{V}_E$), lung compliance (C_L), pulmonary resistance (R_L), and blood gases were made in 6 infants with the biochemical, and radiological diagnosis of severe RDS at birth. Following a two volume exchange transfusion with fresh CPD blood, lung mechanics improved significantly in that esophageal pressure excursions, relative to tidal volume, decreased to 0.5, 0.5, and 0.6 of control values in 3 of the infants while in the other 3 there was no significant change. In all infants the respiratory pattern improved and in most respiratory rate decreased. The shift to the right in the oxyhemoglobin equilibrium curve following exchange transfusion resulted in an increased venous PO_2 and pH, PaO_2 and $PaCO_2$. These data suggest that whereas in some infants the improvement in mechanics of breathing could explain the improvement after exchange transfusion, in others, different mechanisms seem to be responsible.

INDIRECT MEASUREMENT OF ARTERIAL BLOOD PRESSURE (BP) IN NEWBORNS (NBs) UTILIZING DOPPLER ULTRASOUND.

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The purpose of this study was to determine systolic blood pressure values in normal NBs as well as in distressed infants using an ultrasonic Doppler transducer and a newly designed sphygmomanometer cuff. To establish normal values, 100 full term and premature babies were studied during the first week of life. The values for systolic pressure (SP) in normal full term infants ranged between 45 & 65 mmHg in the first 2 days & 55 to 75 mmHg over the next 2 weeks. SP in pretermatures (weight 1500 to 2250 gms) ranged from 40 to 60 mmHg. The SP in pretermatures correlated better with weight and post-natal age than with gestational age. Significant hypertension was noted in 34 of 40 (85%) babies born of mothers receiving methadone treatment. SP ranged from 90 to 120 mmHg & remained elevated for up to 3 weeks. The elevated SP was not related to maternal BP, or to the babies symptoms or therapy. Hypertension was also noticed in some babies with low Apgar scores & elevated levels of PCO_2 , however, severe asphyxia neonatorum was associated with hypotension. Significant hypotension in the range of 30 mmHg was recorded in NBs with RDS, intracranial bleeding, sepsis, and maternal administration of Mg SO_4 for eclampsia. Babies born of mothers with diabetes, essential hypertension, and eclampsia were normotensive. Our BP measurements have proven to be useful in clinical management of sick NBs and the technique currently employed is simple, accurate, and reliable.

LONG-TERM EFFECT OF PHOTOTHERAPY ON VISUAL FUNCTION VELMA DOBSON AND RICHARD M. COWETT (INTR. by LEO STERN) BROWN UNIVERSITY AND PROVIDENCE LYING-IN HOSPITAL

Controversy exists over the possible untoward effects of phototherapy as treatment for neonatal hyperbilirubinemia. Of particular concern has been the possibility of damage to the eye. In a previous study scotopic visual function was found to be normal in 4-year-old children who had received prolonged exposure to room light (90 ft.-c.) in an intensive care nursery (Dobson, Riggs, & Siqueland). This study has now been extended to a group of 15 4-year-olds who were exposed to phototherapy (500 ft.-c.) for at least 42 consecutive hours in the neonatal period. Visual function was examined through the use of the electroretinogram (ERG), a technique which is capable of detecting loss of scotopic vision due to retinal damage in light-exposed animals. The results are as follows:

SUBJECTS	MEAN ERG AMPLITUDE (MICROVOLTS)	LUMINANCE (L_c) FOR RESPONSE AT TIME (t) OF DARK ADAPTATION
No Phototherapy	19.3 ±5.7 (±S.D.)	$L_c = 4.51e^{-.054t}$
N=16		
Phototherapy	15.3 ±4.4 (±S.D.)	$L_c = 4.16e^{-.051t}$
N=15	(t=1.96, P=.05)	(F= 1.1, P=.05)

There are no significant differences in mean ERG amplitudes or rates of dark adaptation between those children who were placed under phototherapy and those who were not. The children also underwent ophthalmological examination. To date we have no evidence that visual impairment was incurred by children who had been subjected to phototherapy in the neonatal period.