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CONGENITAL CARDIOGENIC SHOCK AS A RESULT OF PERINATAL ASPHYXIA. Luis A. Cabal, Udayakumar P. Devaskar, Bijan Siassi, Joan E. Hodgman. Univ. of So. Calif. Sch. of Medicine, LAC-USC Medical Center, Dept. of Pediatrics.

Effective treatment of cardiogenic shock (CS) as a result of severe perinatal asphyxia (PA) in preterm infants is dependent on its early recognition and differentiation from RDS. Four preterm infants weighing 1240-2300 g., G.A. 32-34 wks., who had abnormal fetal heart rate pattern and acidosis, developed CS shortly after birth. All were severely depressed at birth and required prolonged resuscitation. ECG, heart rate (HR) and variability, aortic pressure (ABP), right atrial pressure (RAP), core and toe-skin temperatures, arterial blood gases, glucose, calcium, and lactic acid (LA) were measured in all. Respiratory failure requiring assisted ventilation, tachycardia, decreased HR variability, hypotension, elevated RAP, decreased toe and core temperatures, markedly elevated LA and alveolo-arterial oxygen gradients were noted in each shortly after birth. Initial chest radiographs revealed cardiomegaly and diffuse alveolar and interstitial edema. One infant improved spontaneously while 3 infants required isoproterenol infusion in the first 6 hours. One infant died of persistent CS while 2 infants responded dramatically showing reversal of abnormal findings listed above, enabling discontinuation of assisted ventilation within 24 hours. This data suggests that severe PA may result in myocardial dysfunction leading to CS in preterm infants. Although presentation of CS resembles HMD, it can be differentiated by chest X-rays, elevated RAP and markedly elevated LA. Early use of isoproterenol can reverse severe heart failure leading to rapid recovery.

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CLINICAL USE OF INDWELLING PROBE MEASURING PO₂ AND PCO₂ BY GAS CHROMATOGRAPHY. Thomas A. Clarke, Frank L. Mannino (Sponsored by Louis Gluck), Univ. of Calif. San Diego, Dept. of Pediatrics, La Jolla, Ca.

We have successfully used a system (Sentorr™, Ohio Medical Prod.) which automatically measures arterial PO₂ & PCO₂ every 4 min. without blood sampling. A modified Sherwood 5 Fr. umbilical arterial catheter (UAC) is placed at L3-4 level. A 2 Fr. dual lumen probe is inserted through the UAC with the distal sampling end protruding 3 in. beyond the UAC tip. The probe hub has a Y-connector allowing IV infusion, blood sampling & B.P. monitoring. A gas sample automatically is aspirated & analyzed in a gas chromatograph & the results displayed digitally. Eight acutely ill patients, birth wt. 1.7-4.1 kg & gestational age 34-41 wks. were studied. Arterial blood gas values (ABG) were compared to simultaneous Sentorr values:

	ABG Range (torr)	Sentorr vs ABG (torr)	%paired values	The accuracy of the Sentorr Pco ₂ in all ranges & of Pao ₂ in the clinically desirable range (50-70 torr) was satisfactory. Two patients had congenital heart disease & accounted for all discrepancies in the P _{o2} range 0-50 torr, perhaps from poor blood flow past the probe tip. The system would be difficult to use in infants <1.5kg because of probe size. This instrument provides an accurate semi-continuous record of P _{o2} & Pco ₂ without blood loss.
Paco ₂	18-109(N=107)	±5	90	
Pao ₂	29-310(N=107)	±10	60	
Pao ₂	0-50 (N=30)	±10	60	
Pao ₂	51-100(N=37)	±5	70	
		±10	89	

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GLUCOSE INTOLERANCE IN PREMATURE INFANTS WITH MASSIVE INTRACRANIAL HEMORRHAGE (ICH). Eugene E. Cepeda, David M. Heilbronner and Ronald L. Poland, Department of Pediatrics, Wayne State University and the Children's Hospital of Michigan, Detroit, Michigan.

The hospital course of 60 premature infants with massive ICH were reviewed and compared to 60 controls matched for sex, birth weight, gestational age and date of birth. Intrapartum complications (p<.01), complicated delivery (p<.05), low Apgar score (p<.05) and hyaline membrane disease (p<.0005) were all seen more commonly in the ICH patients.

37/60 patients with ICH had a recorded blood sugar > 200 mg/dl while only 10/60 controls showed that level of hyperglycemia (χ²= 21.9, p<.0001). Glucose infusion rates at the time of the highest recorded blood sugar correlated weakly with the highest recorded blood sugar in the control group (.06>r>.05) and not at all in the ICH group.

The mean glucose infusion rate of the hyperglycemic (> 200 mg/dl) control patients (9.8 ± 1.2 mg/kg/min) was significantly higher than that of the normoglycemic controls (6.9 ± 1.0 mg/kg/min) (p<.05). The mean glucose infusion rate of the hyperglycemic ICH patients (7.6 ± 0.5 mg/kg/min) was not significantly different from that of the normoglycemic ICH patients (8.2 ± 1.9 mg/kg/min).

Glucose intolerance was not related to the site of ICH found at autopsy.

We conclude that sudden glucose intolerance in a premature infant may be a sign of massive intracranial hemorrhage.

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EXPERIENCE WITH TRANSCUTANEOUS OXYGEN (tcPO₂) MONITORING IN ROUTINE NEONATAL INTENSIVE CARE. Thomas A. Clarke, Frank L. Mannino, Louis Gluck, Univ. of Calif. San Diego, Dept. of Pediatrics, La Jolla, Ca.

The usefulness, accuracy and practicality of tcPO₂ monitoring (Roche 5301 oxygen monitor with chart recorder) by general nursing personnel on acutely ill infants in a newborn intensive care nursery were studied. In the first 8 months 67 patients were monitored with birth weights from 640 to 4500 gm and gestational ages from 26 to 42 weeks for total duration of 2471 hours (range 2 to 324 hours). There were no serious complications. TcPO₂ monitoring was especially useful in managing infants with severe respiratory diseases requiring assisted ventilation, hyperoxic infants and infants without indwelling arterial catheters. The monitor was extremely helpful as a trend monitor, showing immediate changes in oxygenation. 824 simultaneous arterial PO₂ & tcPO₂ data points were compared. The overall correlation coefficient was 0.83; 58% of values were within ±10mmHg. Correlation coefficients as high as 0.98 have been obtained in research studies. Our lesser accuracy in a clinical situation was due partly to imprecise instrument calibration and improper application of the skin electrode by busy ICU nurses. Poor skin perfusion in ill infants also may have affected the correlation. In summary, tcPO₂ monitoring by general nursing personnel in an intensive care nursery is safe and very helpful in following oxygenation trends but in a clinical situation it may not be relied upon for absolute PO₂ values.

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TRANSPORT OF SICK NEONATES <1.5kg BIRTHWEIGHT:PERSONNEL REQUIREMENTS. Graham W. Chance, J. Derek Matthew, Janice Gash, Gloria Williams, Kathrine Cunningham. Hospital for Sick Children, Toronto, Canada.

The effect of transport of sick neonates by skilled personnel with necessary equipment on physiological parameters on admission to a neonatal intensive care unit and on outcome, was evaluated in a controlled study. In phase I routine care by staff from the hospital of birth was compared with that provided by a trained nurse/physician team. In phase II care in transport was provided for each infant by only one of the trained nurses of phase I. Results (mean±SD) for infants <1.5kg birthweight are presented:

	Phase I Assist	Phase I Control	Phase II (Assist)
Number studied	22	12	49
Birthweight(g)	1167±258	1086±274	1092±252
Adm. rectal Temp. (°C)	36.5±1.0**	35.0±1.6	36.2±1.21**
Adm. B.P. (mmHg)	58.2±15.9**	46.0±14.2	51.9±16.2
Adm. pH	7.31±0.12*	7.23±0.16	7.23±0.14
Adm. PaO ₂ (mmHg)	63.1±33.1	55.8±19.8	71.4±52.9
Deaths	3**	5	21
ICU Stay (Survivors, days)	19.1±21.8*	28.6±17.3	22.5±13.8
Hospital Stay (Survivors, days)	37.9±20.7**	62.4±23.6	42.9±17.6*

Significant difference from Controls *p<0.05, **p<0.01.

We conclude that two trained individuals, one being preferably a physician, are necessary for safe transport of infants <1.5kg birthweight.

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USE OF TRANSCUTANEOUS OXYGEN (tcPO₂) MONITORING DURING INFANT TRANSPORT. Thomas A. Clarke, T. Allen MERRITT, Frank L. Mannino (Sponsored by Louis Gluck) Univ. of Calif., San Diego, Dept. of Pediatrics, La Jolla, Ca.

During transport from outlying hospitals, critically ill neonates may be exposed to inappropriate levels of oxygen for prolonged periods. This study was undertaken to determine the feasibility and usefulness of tcPO₂ monitoring during transport of infants with respiratory diseases. A standard Roche 5301 oxygen monitor was powered by a portable battery/AC-DC inverter system. The electrode drift was less than 2% for periods up to 120 min. with no interference in recording from ambulance motion. The skin electrode was placed on an infant's thigh immediately after arrival at the referring hospital. Seven infants, gestational age 28-41 weeks, birth weight 820-3490 gm, four of whom required intubation and ventilation, were evaluated. The tcPO₂ ranged from 48-98 torr on initial reading at the referring hospital, providing an objective assessment of the infant's oxygenation. With the transcutaneous monitor the F_{IO2} could be adjusted rapidly to required levels and adequate assisted ventilation established when needed. Unstable infants were identified readily by the large change in tcPO₂ with minimal handling. Paired values of tcPO₂ & Pao₂ were within ±10 torr (range Pao₂ 42-112) in 70% of measurements. In 3 patients the tcPO₂ readings remained in an adequate therapeutic range throughout transport. Two patients had significant lowering (greater than 40 torr) of tcPO₂ from various procedures during transport. In summary, we have found tcPO₂ monitoring useful during transport of unstable ill infants.