1282 EFFECT OF CONSTANT DISTENDING PRESSURE (CDP) ON CARDIAC FUNCTION IN NEWBORN INFANTS.

Anne Cornet, Ruth Collins-Nakai, David Schiff*
University of Alberta, Edmonton, Alberta, Canada.

The cardiac function of 11 newborn infants (mean gestational age 34 ± 3 weeks and mean birth weight 2500 ± 780 g) requiring CDP for respiratory distress was serially assessed by M mode echocardiogram prior to CDP and 1/2 hour after establishment of CDP at ± 5 cm of H₂O. Six infants received constant negative pressure (CNP) and 5, constant positive airway pressure (CPAP). There were no significant changes in stroke index, left ventricular systolic time intervals, left atrium/aortic ratio, ejection fraction, and % dimension change of the left ventricle, with changes in CDP. The ratio of right ventricular pre-ejection period to ejection time (RVPEP/RVET) was constantly decreased after introduction of CDP, more so with CNP than with CPAP (0.49 ± 0.11 to 0.35 ± 0.07 after CNP, $p < 0.01$; 0.45 ± 0.10 to 0.34 ± 0.01 , after CPAP, $p < 0.05$). Cardiac index decreased after CNP (1.98 ± 0.79 to 1.16 ± 0.50 , $p < 0.05$) but did not change after CPAP (1.38 ± 0.14 to 1.58 ± 0.52 , $p < 0.9$). PaO₂ increased after both CNP and CPAP (61 ± 13 to 92 ± 22 after CPAP, $p < 0.01$; 58 ± 9 to 82 ± 13 after CNP $p < 0.02$). These results suggest that the increased PaO₂ after CDP decreases pulmonary resistance as measured by RVPEP/RVET. Other parameters of myocardial function are unaffected by CDP at a level of ± 5 cm of H₂O.

1283 RIGHT VENTRICULAR DYSFUNCTION IN PREMATURE INFANTS: Wesley Covitz, Mary Hardy, Harry Davis, Lynn Reyes

(Spon by P.S. Rao), Section of Pediatric Cardiology, Medical College of Georgia, Augusta.

The purpose of this study was to determine the relationship of pulmonary systolic time interval ratios (PSTI) to ductal shunting (DS) in premature infants. Echocardiograms were obtained on 102 infants (Wt < 2.4 Kg) at 1-28 days of age (mean 5.6) because of symptomatic DS. They were divided into 2 groups based on PSTI (Group I $< .35$, n=57; Group II $> .35$, n=45). They were compared for age, weight, surface area, chamber dimensions, aortic root size, left ventricular time intervals and contractility. No significant differences were found except that Group II infants were younger. Echocardiographic left heart volume overload was found in 40/57 (70%) of Group I and 33/45 (73%) of Group II infants. No differences in the incidence of DS, chamber size or left ventricular function were seen with elevated PSTI's. Elevated pulmonary vascular resistance was expected to reduce DS. The lack of an effect of high PSTI's on DS suggests that the high PSTI's were not reflecting increased pulmonary resistance. Elevated PSTI's in premature infants with a patent ductus arteriosus are likely to be due to right ventricular dysfunction from coronary insufficiency or hypoxia.

1284 MECHANISMS OF BILIRUBIN AND BILIVERDIN EFFECTS ON MEMBRANES. Marilyn L. Cowger, Kiyoshi Kawai, Albany Med. Coll. Dept. Peds., Lab. Bioenergetics, SUNYA, Albany NY

The effects of unconjugated bilirubin (UBR) and biliverdin (BV) on the physical state of phospholipid (PL) membranes were studied using black lipid membranes (BLM) and erythrocyte ghost membranes. At physiologic pH UBR produced green spots (precipitates) on BLM composed of asolectin (AS) and phosphatidyl serine (PS) at 4:1, and increased electric resistance at and below pH 7.4. Above pH 7.4 the electric resistance decreased. BV did not affect electric resistance.

UBR delayed the formation of the bilayer structure of PL (AS: PS=4:1). When cholesterol was also in the membrane (4:1:2) the delay was even greater and this effect was seen at all pH levels.

UBR inhibited (Na⁺, K⁺, Mg⁺⁺)-ATPase activity of erythrocyte membranes; the degree of inhibition varied according to the reaction temperature, being greater at lower temperatures. UBR increased activation energies. The data suggests the induction of a change in the physical state of PL associated with membranes.

UBR, BV and an artificial conjugated bilirubin (CBR) were evaluated for effects on mitochondrial ATPase activities. The association constant of CBR with bovine serum albumin was determined to be 1.2×10^5 M⁻¹ (200 fold less than UBR). Preliminary data show a biphasic effect of UBR on Mg⁺⁺-ATPase activity of intact mitochondria stimulating below and inhibiting above 250 μM UBR. BV inhibits mitochondrial ATPase only when the membrane is destroyed indicating its inability to permeate the membrane (supported by NIH).

1285 LOW RISK CESAREAN SECTION: IS A PEDIATRICIAN REQUIRED? Carolyn Crawford and Elaine McCombs (Spon. by Alfred Bongiovanni). U. of Pa., Sch. of Med., Pa. Hosp., Dept. of Ped., Phila., Pa.

Pediatric house staff have routinely attended all cesarean section (CS) and high risk vaginal (HRV) deliveries at Pennsylvania Hospital, a tertiary care perinatal center. This study compared the need for resuscitation (Apgar < 6 at 1 minute) with the presence of risk factors and mode of delivery. High risk factors were defined as: Pregnancy < 36 weeks, meconium, breech presentation, multiple gestation, fetal distress, vaginal bleeding, chorioamnionitis and severe pre-eclampsia. Indications for CS regarded as low risk were: repeat, failure to progress and cephalopelvic disproportion. 2679 deliveries from Jan.-Sept. 1980 were analyzed with the following results:

Risk	Mode of Delivery	1 Min. Apgar < 6	1 Min. Apgar ≥ 6	Total	X ² Analysis
Low	Vaginal	N=51	N=1745	N=1796	
Low	Cesarean	N=7	N=282	N=289	Not Significant
Low	Vaginal	N=51	N=1745	N=1796	
High	Vaginal	N=59	N=328	N=387	$P < 0.005$
Low	Cesarean	N=7	N=282	N=289	
High	Cesarean	N=134	N=73	N=207	$P < 0.005$

The data indicate that, in the absence of risk factors, the mode of delivery did not influence the need for resuscitation and that pediatric attendance at delivery should be based on the presence of risk factors rather than the mode of delivery.

1286 IMPROVED PREDICTION OF FETAL LUNG MATURITY IN DIABETIC PREGNANCIES. M. Douglas Cunningham, Harlley E. McKean, Dept. of Pediatrics, College of Medicine, Univ. of Kentucky, Lexington (Spon. by Jacqueline A. Noonan).

Following planned termination of pregnancy, infants of diabetic mothers (IDM) have shown a continued vulnerability to the respiratory-distress syndrome (RDS) suggesting false-positive fetal lung maturity testing. Adequacy of the lecithin/sphingomyelin (L/S) ratio for predicting RDS was studied in 56 diabetic (DM) and 50 nondiabetic (ND) pregnancies. Amniotic-fluid samples (n=130) were assayed for 1- and 2-dimensional (dim) thin-layer chromatographic (TLC) L/S ratios, and phosphatidylglycerol (PG) and phosphatidylinositol (PI) assays. L/S ratios for all pregnancies by both TLC techniques revealed higher 1-dim values from 36-38 wk gestation ($P < 0.01$). Per cent PI was increased for ND over DM before 34 wk ($P < 0.03$), otherwise it did not delineate gestational age for either group. PG appeared in the surfactant complex beyond 34 wk ($P < 0.001$), however, when L/S ratios were 2 to 2.9, it appeared in only 16.7% of DM pregnancies vs 50% of ND ($P < 0.02$). PG was absent in 37% of all pregnancies > 38 wk with L/S ratios > 3 . PG detection by class of DM was delayed for class A pregnancies beyond 36.5 wk ($r=0.6551$, $P < 0.007$). Respiratory distress developed in 3 infants (2.9%): 2 ND had transient tachypnea (1.9%), 1 IDM had RDS (0.95%). We conclude: 1) 2-dim TLC improves phosphatide identification, 2) PG, if present, confirms fetal lung maturity in conjunction with positive L/S ratios, and 3) the L/S ratio remains the best available indicator of fetal lung maturation, irrespective of maternal diabetes.

1287 EFFECTS OF ROUTINE PROCEDURES ON TRANSCUTANEOUS OXYGEN TENSION (TcPO₂) IN NEONATES, A QUANTITATIVE APPROACH. David Danford, S. Miske, & R. Nelson, Dept of Pediatrics, Univ. of Nebraska Medical Center, Omaha, Nebraska.

Neonates in the intensive care unit are subjected to many routine procedures, some of which have been qualitatively observed to decrease oxygenation. This study quantitatively compares the changes in TcPO₂ during 122 observations of 10 care procedures with the intrinsic variability of the TcPO₂ at the time of the procedures. Standard deviations (SD) of TcPO₂ were measured by planimetry from continuous recording in undisturbed infants over a 10 minute control period immediately prior to each procedure. The decrement of TcPO₂ during the procedure (immediate) and the change of TcPO₂ five minutes after completion of the procedure (late) were measured. The Table displays both mean change in TcPO₂ (1) in mmHg and the mean change in TcPO₂ divided by the mean SD of the control period for each procedure (2).

	IMMEDIATE		LATE			IMMEDIATE		LATE	
	(1)	(2)	(1)	(2)		(1)	(2)	(1)	(2)
Xray	-18.2	-4.0	+1.3	+0.3	Nipple	-14.6	-1.8	+6.2	+0.8
Percussion	-17.6	-2.8	+9.6	+1.5	Photo Rx	-10.1	-1.8	+2.1	+0.4
Heelstick	-12.7	-2.7	+5.9	+1.3	TCM	-7.6	-1.7	+0.9	+0.2
Weighing	-15.0	-2.0	+3.1	+0.4	Vitals	-7.2	-1.6	-2.8	-0.6
Gavage	-14.5	-2.0	+7.8	+1.1	Δ Diaper	-7.2	-1.1	+3.0	+0.4

The significant decreases in oxygenation with particular procedures indicate areas in which changes in techniques might be applied to the benefit of the neonate. New techniques for these procedures may be evaluated by the methods used in this study.