

**1408** IS INSULIN PUMP TREATMENT EFFECTIVE IN MANAGING THE PREGNANT DIABETIC? M. Rudolf, W. Tamborlane, R. Sherwin, P. Felig, M. Genel and D. Coustan, Depts. of Peds, Med., OB/GYN, Yale U. School Med., New Haven, CT

Normalization of maternal glucose levels reduces the risks for the infant of the diabetic mother (IDM). Since many diabetics do not achieve this goal, we examined the efficacy of insulin pump Rx in 7 class C to FR diabetics beginning at 10-27 wks gestation. Home glucose (HG) and inpatient 24 hr glucose levels (IG), the mean amplitude of glucose excursions (MAGE) and glycosylated hemoglobin (HbA<sub>1c</sub>) were measured on conventional multiple insulin injections (prepump) and after pump Rx (data mean±SD, \*p<0.05).

	HG(mg/dl)	IG(mg/dl)	MAGE(mg/dl)	HbA <sub>1c</sub> (%)
prepump	135±24	97±22	118±59	9.1±1.3
pump Rx	103±14*	86±11	65±10*	6.7±0.8*

During pump Rx mean glucose and HbA<sub>1c</sub> levels fell and glucose fluctuations were strikingly reduced by 50%.

To date 6 infants have delivered at term with no neonatal problems. There was no macrosomia (birth wt 2.7-4.1 kg) or hypoglycemia. At 2 hr of age IV GTT (0.5-1 g/kg) was normal (K<sub>t</sub> 1.3±0.3). None developed respiratory distress, significant jaundice (peak bilirubin 12.5±1.2 mg/dl), polycythemia (Hct 47±5%) or hypocalcemia (calcium 9.6±0.3 mg/dl at ~40 hr).

We conclude that insulin pump Rx is a particularly effective means of achieving normal or near normal glucose levels in pregnant diabetics. This approach may prove useful in reducing morbidity in the IDM.

**1409** ASSESSMENT OF PERINATAL FACTORS IN THE SCREENING FOR NEONATAL SEPSIS. Maria P. Ruiz, Zahida Saleem, Alfredo J. Herrera, Uma T. Salcedo, (Spon. by John Neff), St. Agnes Hospital, Department of Pediatrics, Baltimore, Maryland.

In order to determine some perinatal factors that could possibly predict neonatal infection, a retrospective study was done over a 1 year period from July 1978 to June 1979. A total number of 228 neonates were admitted to the ICU of St. Agnes Hospital. 149 of 228 were initially treated with antibiotics after cultures were drawn to rule out sepsis. 8 out of 149 were documented sepsis. 1 infant had E. coli infection, 5 had GBHS, 1 had candida, and 1 infant had Propionibacterium granulosum in blood and E. coli from the peritoneal fluid. Age of onset of symptoms varied from within first 24 hours to 4 days of life. These 8 proven sepsis were compared to the 220 admissions who served as controls and the following data were obtained.

	Sepsis Proven n = 8	Controls n = 220
PROM Over 24 <sup>o</sup>	0	24 (10.9%)
Maternal Fever Over 101 <sup>o</sup> F. (24 <sup>o</sup> Pre &/Or 24 <sup>o</sup> Post Del.)	0	8 (19.9%)
Maternal UTI (Proven)	0	2 (9.9%)
Maternal Amnionitis	0	4 (1.8%)
Apgar < 5 at 1 <sup>o</sup> or 5 Minutes	2 (25%)	52 (23.6%)
Symptoms 1st 4 <sup>o</sup> of Life	4 (50%)	109 (49.5%)
Foul-Smelling Amniotic Fluid	0	3 (1.3%)

From these data, it appears that the stated risk factors do not seem to identify infants at risk for documented sepsis.

**1410** EFFECT OF PROSTAGLANDIN SYNTHETASE INHIBITION ON FETAL AND NEONATAL ALVEOLAR PHOSPHOLIPIDS. Brian J. Russell, Glenda Gandza and Victor Chernick, Univ. of Manitoba, Dept. of Pediatrics, Winnipeg, Manitoba.

The effect of prenatally administered Indomethacin (Indo), a prostaglandin synthetase inhibitor, on alveolar disaturated phosphatidylcholine (DSPC) in the fetal and neonatal rabbit was studied. Pregnant rabbits were injected S.C. with either 0.01 M Na<sub>2</sub>CO<sub>3</sub> or 3 mg/kg Indo in 0.01 M Na<sub>2</sub>CO<sub>3</sub> b.i.d. from 27 through 29 days of gestation inclusive (3 day group). Fetuses were sacrificed on day 30 and the lungs washed with 0.9% NaCl. Newborn pups were delivered and allowed to breathe air for either 0.5 or 1.0 hours and then lung washes obtained. Pregnant does were also given Indo (3 mg/kg b.i.d.) or Na<sub>2</sub>CO<sub>3</sub> on day 29 and fetal lung washes obtained on day 30 (1 day group). Results:

	Fetus		Newborn	
	1 d.	3 d.	0.5 hr.	1.0 hr.
Control	6.91(14)	4.40(13)	6.38(9)	14.31(24)
Indomethacin	3.43(15)*	8.12(15)*	9.81(16)*	13.86(22)

\*p < .05 ( ) = number of animals

Thus during fetal life alveolar DSPC was halved by Indo by 24 hrs but doubled by 3 d. In the pups given 3 d of Indo prior to delivery alveolar DSPC was increased by 54% at 0.5 hrs air breathing but there was no effect by 1 hr. We postulate that Indo temporarily decreases fetal lung surfactant release but that fetal breathing activity is more important in determining release than prostaglandins. Furthermore, Indo does not inhibit the massive release associated with the onset of air breathing.

**1411** ALTERATION OF CEREBRAL AND MYOCARDIAL BLOOD FLOW IN NEWBORN (NB) LAMBS: ADAPTIVE RESPONSE OF MITOCHONDRIAL ACTIVITY. Linda M. Sacks, David Herbert, Craig Wagerle, Krystyna Knight and Maria Delivoria-Papadopoulos, University of Pennsylvania School of Medicine, Philadelphia, PA.

Previous studies have shown that mitochondria adapt to decreased PaO<sub>2</sub> by increasing respiratory rate (RR). The present study investigates brain and heart mitochondrial RR in 14 NB lambs during states of decreased cerebral and myocardial blood flow induced by hyperventilation at constant O<sub>2</sub> tension and content. Measurements of [Hb], blood gases, O<sub>2</sub> saturation and regional blood flow were made at various PaCO<sub>2</sub> levels. O<sub>2</sub> delivery to segments of brain and heart from which mitochondria were isolated was calculated from the blood flow to those specific segments and O<sub>2</sub> content. State 4 (substrate, no ADP) and state 3 (substrate, +ADP) RR of heart and brain mitochondria, expressed as nm O<sub>2</sub>/nm cytochrome oxidase (a+a<sub>3</sub>) were determined with glutamate-malate substrate. In the heart, as blood flow decreased from 176 to 56 ml/min/100g tissue, O<sub>2</sub> delivery decreased from 30 to 13 ml/min/100g, and mitochondrial RR increased from 145 to 250 nm O<sub>2</sub>/min. In the brain, as blood flow decreased from 197 to 18 ml/min/100g, O<sub>2</sub> delivery decreased from 30 to 4 ml/min/100g and mitochondrial RR increased from 160 to 249 nm O<sub>2</sub>/min. The reduction of blood flow at constant O<sub>2</sub> content elicited a mitochondrial response comparable to that reported during "hypoxic" tissue hypoxia. Present data indicate that when decreased blood flow compromises O<sub>2</sub> delivery and produces tissue hypoxia, heart and brain mitochondria sense low O<sub>2</sub> availability and adapt by increasing their respiratory rate.

**1412** INDIRECT DETERMINATION OF BLOOD PRESSURE (BP) IN NEONATES. Sergio O. Saia, Frank Manning (Spon. by Louis Gluck), U. of Cal. San Diego, Dept. of Ped. La Jolla.

Three instruments to determine systolic (S), diastolic (D), & mean (M) BP indirectly were evaluated in neonates <1 week old (wt. 920-4100 gm). The indirect values were compared with the corresponding direct arterial value from an umbilical artery catheter/transducer system, graphically determined from simultaneous recordings of EKG, pulse pressure, cuff pressure & indirect instrument signal. The Dinamap 847 (Critikon) & Sensomat BP (Biochem) utilize oscillometry & are fully automated with self inflating/deflating cuff, cycling & digital display. The B.P.I. NB 200 (Nicolet) analyzes Korotkoff vibrations & pulse wave transit time & requires inputs from EKG microphone & a manually operated cuff. Accuracy of the Parke<sup>R</sup> doppler method by nurses (RN's) was also ascertained. The Nicolet was extremely accurate for S & D, but required significant technical skill. The Sensomat accurately determined S but both it and the Dinamap were not very accurate for D or M. However, they are easy to use & may be just as precise as the doppler method when used by RN's in an ICU plus provide D & M BP.

	Mean Diff. (±SD)mmHg(Indirect-Art.)			Corr. Coeff.			BP (N)
	S	D	M	S	D	M	
Nicolet	-2.4(3.2)	--	-0.8(2.4)	0.97	--	0.96	45
Dinamap	4.4(7.3)	0.2(4.3)	-3.5(3.4)	0.66	0.80	0.83	32
Sensomat	-2.3(3.6)	-0.9(5.9)	-2.8(7.3)	0.89	0.80	0.70	35
Doppler(RN)	-8.4(6.1)	--	--	0.63	--	--	25

**1413** FOLLOW-UP OF INFANTS 501-1500 GM BIRTHWT. DELIVERED TO RESIDENTS OF A GEOGRAPHICALLY DEFINED REGION WITH PERINATAL INTENSIVE CARE FACILITIES. Saroj Saigal,

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In an attempt to minimize the selection bias inherent in reporting the outcome of premature infants from a particular Neonatal Intensive Care Unit (NICU), this study presents data on all 294 live births 501-1500 gm birthweight born to residents in the Hamilton-Wentworth Region during 1973-78. The survival rate was 31.9% in infants <1000 gm compared with 82.6% in infants between 1001-1500 gm. In all, 184 infants (62.6%) were discharged alive and 37 of these weighed <1000 gms. The mean BW of the survivors was 1216 ± 214 gm and the mean gestation was 30.0 ± 2.9 wks with 18.0% being small-for-gestational-age. Respiratory Distress Syndrome (RDS) occurred in 40% and assisted ventilation (IPPV) for RDS and/or apnea was used on 33% of survivors. A prospective follow-up was performed on 136/184 survivors born and/or transferred to the Regional NICU; a single assessment was obtained on the remaining 48 survivors born and treated in the Community Hospitals. Five infants (2.7%) were lost and another 5 infants (2.7%) died after discharge. Major neurological handicaps including cerebral palsy, hydrocephalus, microcephaly, blindness, deafness and mental retardation occurred in 30/179 (16.8%) infants. The incidence of major handicaps was 30% among babies who received IPPV, versus 10% in those who did not. Within the IPPV and non-IPPV groups, there were no significant differences in handicap rates by 500 gm BW class.