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TWO-DIMENSIONAL ECHOCARDIOGRAPHIC (2DE) FEATURES OF THE SINGLE VENTRICLE (SV). Mirka Zednikova, Thomas Di Sessa, Henry Heins, Gustavo Hernandez, Josephine Isabel-Jones, Barbara Sternlight, William Friedman, UCLA Medical Center, Dept. Pediatrics, Los Angeles, California.

A prospective study was undertaken in children with SV(7), straddling tricuspid valve(STV)(2), tricuspid atresia(TA)(3) and complete atrio-ventricular canal(CAVC)(5) to determine the reliability of 2DE to diagnose SV. Left parasternal long axis(LAV), short axis (SA), apical 4 chamber(A4C) and subcostal views were employed and the findings were compared to angiographic data. The 2DE features of SV are: 1) In LAV atrioventricular valve-semilunar valve(AVV-SLV) discontinuity was identified. No anterior outflow chamber(AOC) was imaged. 2) In the SA scan from the apex to base, the AOC in the levo position was imaged in those patients with L-TGA. No AOC was identified in 2 patients with dextrocardia, and one patient with bilateral conus. All patients had an irregularly shaped ventricular cavity due to multiple papillary muscles distributed circumferentially around the chamber. 3) The A4C view identified the number of AVV. The bulboventricular ridge, however, was not consistently imaged. In contrast those patients with TA and STV had: 1) AVV-SLV continuity in LA; 2) Two normally positioned papillary muscles in the left ventricular cavity in SA. A hypoplastic right ventricle and ventricular septal defect was seen in all patients with TA in the A4C view. The findings in CAVC were similar to those previously reported. The subcostal view was not helpful. The most optimal 2DE views to differentiate SV from similar congenital defects are the SA scan combined with the A4C view.

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ACUTE POSTNATAL REGULATION OF PYRUVATE CARBOXYLASE ACTIVITY BY COMPARTMENTATION OF ADENINE NUCLEOTIDES.

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In the term rat liver, crossover studies reveal that pyruvate carboxylase (PC) is rate-limiting for gluconeogenesis. Within 1 hr of birth, the rate of gluconeogenesis increases 4 fold, even though there is no net synthesis of PC. (Biochem. J. 124:265(1971)) This suggests that PC is inactive at birth, and becomes active within a short time. PC is localized in the mitochondrial compartment, and requires ATP as a substrate. Since the total adenine nucleotide content (ATP+ADP+AMP) of the matrix increases right after birth (Archiv. Biochem. Biophys. 201:564(1980)), we considered whether the resulting increase in matrix ATP concentration might cause an increase in PC activity. We found that PC activity measured in intact isolated mitochondria increased ~ 3 fold within a few hours of birth, in parallel to a ~ 3 fold increase in the total matrix adenine nucleotide content. The increase in PC activity could be brought about *in vitro* by incubating isolated newborn mitochondria with exogenous ATP under conditions shown to promote the net accumulation of adenine nucleotides. Conversely, adult mitochondria specifically depleted of matrix adenine nucleotides had proportionately lower PC activity. We concluded that acute regulation of PC can occur by compartmentation of adenine nucleotides. This mechanism probably provides for the rapid 4-5 fold increase in gluconeogenesis which occurs within 1-2 hrs of birth, without the need for new enzyme synthesis. [Supported by NIH HD11697 and NS 14936.]

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EFFECT OF INDOMETHACIN ON THE CARDIOVASCULAR AND ACID BASE STATUS OF CHRONICALLY INSTRUMENTED PREGNANT SHEEP.

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Indomethacin (Indo) has been used to inhibit premature labor. Maternal and fetal responses to IV administrations of Indo (0.5mg/Kg/3 min; mean total 32.9 mg) were evaluated in two ewes at gestational ages 118-139 days (N=5). Maternal and fetal aortic blood samples were drawn at 0,5,15,30,45,60 and 90 min. from the start of infusion. No significant fetal changes were observed. Maternal changes were as follows; blood pressure increased immediately following infusion from 84.2± 3.35 mmHg at baseline to 99.7± 3.73 mmHg (p<0.01) and returned to 88.8± 2.51 mmHg at 15 min. Baseline heart rate was 121± 16.5 beats/min which decreased to 90± 13.4 beats/min at 5 min. (p<0.005) and returned to baseline values thereafter. Uterine blood flow increased by 12.6% at 5 min. and returned to baseline values within 45 min. Hemoglobin concentration decreased from a baseline of 9.1± 0.26 gm% to a nadir of 8.3± 0.28 gm% at 5 min. (p<0.005). A gradual recovery to 8.5± 0.36 gm% was observed at 90 min and was statistically insignificant (NS). O₂ content similarly decreased from a baseline of 12.5± 0.32 volume% to 11.5 ± 0.32 volume% at 5 min. (p<0.01). Recovery ensued at 60 min. to 11.9± 0.43 volume%. Maternal pH, PCO₂, PO₂, O₂ saturation, base excess, bicarbonate and CO₂ content were NS. Indo had no short term deleterious effects on fetal and maternal acid-base balance at the dosage administered.

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RESERVE ALBUMIN CAPACITY FOR BILIRUBIN MEASURED BY SEPHADEX ADSORPTION (SA) AND BY ABSORBANCE DEVIATION (AD) AT SATURATION OF PRIMARY ALBUMIN-BINDING SITES.

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The Reserve Bilirubin Binding Capacity (RBBC) of albumin is an indicator of the chances for brain damage due to kernicterus in the neonate. This study compares the RBBC of the neonatal serum by SA (Clin. Chem. 18(1):43, 1972) to that of AD (described elsewhere in this Program Issue, APS-SPR). The two methods were correlated in 54 pairs of measurements done on 25 neonates.

STATISTICS	SA	AD
No. of obs.	54	54
Mean	15.3	19.9
Std. Dev.	4.8	6.2
Min. - Max. Values	2.5 - 25.0	2.5 - 32.5
Correlation	+0.5	

Data shows that the results obtained by both methods are related (p < .001) with a correlation of +0.5. By altering pH and ionic strength from those in our previous work, RBBC results obtained by AD more closely resemble the values of SA.

Determination of RBBC by AD is more time-efficient, uses a smaller quantity of serum, and could be performed with equipment usually available in most laboratories.

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GLUCAGON AND CYCLIC-AMP ACTION ON GLUCONEOGENESIS IN HEPATOCYTES FROM SUCKLING AND ADULT RATS. Marc-A. Beaudry, Amechand Boodhoo, (Sponsored by D. Schiff).

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The dose response to exogenous glucagon (10⁻⁹ to 5 X 10⁻⁷M) and Cyclic-AMP (10⁻⁵ to 10⁻³M) on gluconeogenesis from 5mM lactate was determined during incubation of hepatocytes from fed or fasted sucklings (S) (16 - 19 days old) and adult rats (A). Hepatocytes from fed sucklings had a blunted response to glucagon when compared to fed adult cells (% over basal, $\bar{x} \pm S.E.M.$: 50% ± 8 (S) vs 135% ± 15% (A). With fasting for 24 hours, the response to glucagon by adult cells was completely blunted, but not significantly affected in sucklings. When glucagon receptor was bypassed by stimulation of gluconeogenesis with exogenous Cyclic-AMP, a similar response as with glucagon was obtained. Dibutyryl Cyclic AMP did not improve their response. Theophylline 10⁻³M increased by 25% the response to Cyclic-AMP of all groups but did not restore it to the level found in hepatocytes of fed adults. We conclude that the observed resistance to glucagon in suckling cells extends past the level of the receptor. The resistance to Cyclic-AMP is not primarily mediated through phosphodiesterase activity. A similar resistance is acquired when adult rats are fasted. Glucagon resistance in sucklings may reflect a similar cellular adaptation as that seen in adults when fasted and may be unrelated to their maturity. (Grant from Canadian MRC # MA - 6328)

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ROLE OF NUTRITION IN THE HEPATIC RESISTANCE TO GLUCAGON OF SUCKLING RATS. Marc-A. Beaudry, Amechand Boodhoo, (Sponsored by D. Schiff). Department of Pediatrics, University of Alberta, Edmonton, Alberta, Canada.

We studied the effect of premature weaning of suckling rats (at 17 days of age) to isocaloric high carbohydrate (H-CHO) or high fat diet (H-F) on the response of their isolated hepatocytes to glucagon. Hepatocytes were isolated from fed animals 72 hours after initiating the experimental diets. The effect of glucagon (10⁻⁹ to 5 X 10⁻⁷M) on gluconeogenesis from 5mM ¹⁴C- lactate was determined during incubations of 30 minutes. Basal gluconeogenic rates were, $\bar{x} \pm SD$: 7 ± .1 (C), 1.8 ± 0.5 (H-CHO) and 20.5 ± 6.1 (H-F) μ Mole/gm of wet weight. Maximal stimulation of gluconeogenesis by glucagon over basal was 70% for control (unweaned) 67% for high fat and over 350% for high CHO group. Thus, premature weaning to high CHO diet restored sensitivity to glucagon to a level even greater than seen in cells from fed adult rats. Changes from control in basal gluconeogenic rates may represent enzymatic induction and repression secondary to the diets. We conclude that glucagon resistance in older suckling rats is not related to maturity of the animals but reflects a metabolic adaptation to their natural high fat diet (maternal milk). (Grant from Canadian MRC # MR-6328)