●109 NEWER CARDIOTONIC AGENTS -- BENEFICIAL EFFECTS ON NEWBORN MYOCARDIUM. Thomas S. Klitzner, Yehuda Shapir, Timothy L. Degner, Ross R. Ravin, William F. Friedman. Dept. of Peds., UCLA Med. Ctr., L.A., Ca.

Previous data has suggested a deleterious action of Amrinone (Am) on newborn (NB) myocardium. An investigation of the relationship between dose, age, and contractility has been undertaken using isolated right ventricular papillary muscles from NB (0-5 days), juvenile (J) (18-29 days), and adult (A) New Zealand white rabbits. At least six rabbits were studied in each age group using four sequential concentrations of Am (30, 100, 200, 500 mcg/ml). Peak tension (PT), maximum rate of tension development (+dP/dt) and maximum rate of relaxation (-dP/dT) were measured after a fifteen minute equilibration period at each concentration. Repeated measures analysis was used to compare dose response data between age groups. T-tests were used to compare normalized data from the various age groups at a given concentration. Adult heart demonstrated an increase in PT, +dP/dt and -dP/dT with each increase in Am concentration. NB and J heart demonstrated a significant ($P<0.05$) decrease in PT and +dP/dt for only the lowest dose of Am. In contrast to NB the lowest dose did not depress -dP/dT in J. Above 200 mcg/ml, NB and J hearts demonstrated a significant ($P<0.05$) increase in PT, +dP/dt, and -dP/dt. These results suggest that higher concentrations of Am enhance contractility in NB and J myocardium. While the dose dependence of A heart is monotonic, the NB and J response is biphasic, suggesting multiple and age dependent mechanisms of action. The differential effect of Am on -dP/dT in NB and J hearts implies a developmentally determined action of Am on Ca^{2+} sequestration in addition to its positive inotropic effect.

●110 "IDIOPATHIC" LEFT VENTRICULAR TACHYCARDIA IN CHILDREN: CHARACTERIZATION AND TREATMENT Kazuyuki Koike, Peter S. Hesslein, Cameron D. Finlay, William G. Williams, Robert M. Freedom, Richard D. Rowe. The Hospital for Sick Children, Divisions of Cardiology & Cardiovascular Surgery, Toronto, Canada.

Benign ventricular tachycardia (VT) in children usually arises from the right ventricle. By contrast, the implications of idiopathic left ventricular tachycardia (LVT) in children have not been examined. Between September 1981 and September 1986 we identified 28 children with VT who had no physical, ECG or x-ray evidence of underlying heart disease. Eight of these (28%) had VT localized to the LV and are the basis of this report. Age at presentation ranged from 0.8-14.8 years (median 1.3 years). All 8 had symptoms (heart failure 4/8, syncope 3/8, chest pain 2/8). Initial echocardiogram was nonspecific (reduced function 3/8, increased LV trabeculation 1/8). Cardiac catheterization pressures were normal in all 8, with angiographic evidence of posterobasal aneurysm in 2/8 and increased LV trabeculation in 1/8. Cardiac biopsy was abnormal in only 2/5. Electrophysiologic study (EPS) localized VT to the LV in all 8. VT was spontaneous in 4/8, inducible in 4/8, and sustained in all 8. Trials of an average 5.1 drugs/patient led to successful treatment in 6/8. Two others had a successful surgical cure.

We conclude that angiography, biopsy and EPS may reveal subtle causes of "idiopathic" LVT. Unlike right VT, LVT is usually symptomatic. In all cases of LVT, treatment is warranted, and a successful outcome achievable.

111 ECHOCARDIOGRAPHIC DIFFERENTIATION BETWEEN ANOMALOUS LEFT CORONARY ARTERY FROM THE PULMONARY TRUNK AND DILATED CARDIOMYOPATHY Kazuyuki Koike, Norman N. Musewe, Jeffrey F. Smallhorn, Robert M. Freedom, Richard D. Rowe. University of Toronto, The Hospital for Sick Children, Division of Cardiology, Toronto, Canada.

Direct visualization of an anomalous left coronary artery from the pulmonary trunk (ALCA) is not always possible by cross-sectional echocardiography (CSE). By contrast, a large right coronary artery (RCA) in ALCA can usually be seen. We reviewed the diagnostic value of the RCA diameter measurement by CSE in the differentiation between ALCA and dilated cardiomyopathy (DCM) of other etiology. In 28 controls, RCA increased with age; RCA(mm) = 0.781 log(months) + 0.639 (r=0.829, SEE=0.306), but RCA/aortic root ratio (RCA/AO) showed no variation with age (11.9±2.0%). Morphometric criteria for ALCA was made as RCA larger than the 95% confidence limit of normal or RCA/AO larger than 17%. Diagnostic criteria of (1) direct visualization of ALCA, (2) diastolic flow in pulmonary artery by Doppler echocardiography and (3) RCA morphometry were assessed in 10 patients with ALCA (3-105 mos; median 8.5 mos) and 11 with DCM (2-113 mos; median 7 mos) by blind observers.

RESULT: There were no false positive diagnoses of ALCA. Sensitivity was 40% by (1); 40% by (2); 70% by (3); 60% by (1+2); and 80% by (1+3). Interobserver agreement was assessed in 18 patients and was significantly concordant: r=0.934 for RCA and r=0.905 for RCA/AO.

CONCLUSION: Careful visualization and measurement of RCA can accurately confirm a diagnosis of ALCA.

●112 **REDUCED HEART LIPID PEROXIDATION IN DILATED CARDIOMYOPATHY.** Daniela Lax, Shu-Lun Zhang, Ying Li, Lee Williams, James M. Berry, Joseph Elsperger, Nancy A. Staley, George R. Noren, Stanley Einzig, University of Minnesota, Dept. of Ped., Minneapolis.

Nitrofurantoin induced pulmonary fibrosis may result from free radical(FR) production and subsequent lipid peroxidation(LPO). Furazolidone(FZ), a nitrofuran antibiotic, causes a dilated cardiomyopathy(CM) in turkeys(TK); however, the mechanism of this CM is unknown. Our study was designed to determine if FR injury contributed to this CM. 40 TK were fed FZ (0.5mg/g of feed) starting at hatch. 16 survivors were evaluated by 2D echocardiography and blood pressure(BP) measurements at 5-8 wks. 5 birds with the most severe cardiac dilatation and left ventricular(LV) dysfunction were selected for study and sacrificed by decapitation. LV homogenates(with 1mM deferoxamine) were assessed for LPO by 2 methods: 1) The thiobarbituric acid reaction - malondialdehyde(MDA) production, nmol MDA/100mg prot; 2) Lipid hydroperoxide(HP),nmol/100mg prot. LV superoxide dismutase(SOD, nitrite units/g wet wt) was also measured(Table). Systemic BP in FZ birds was reduced compared to control(CON) birds(72±12 vs 153±5mmHg,$p<0.001$).

LV	MDA	HP	SOD
CON(n=5)	86±3	74±14	6700±259
FZ (n=5)	70±4*	29±7*	6570±1056

*$p<0.02$ vs CON; values = mean±SE

LV LPO was reduced in the FZ birds with severe cardiac dilation. SOD levels were similar in CON and FZ birds. In a separate study in which FZ was added to LV homogenates in vitro (2-10mg/g wet wt), FZ did not increase MDA production(data not shown). Thus, although chronic FZ administration produced severe cardiac dilation and dysfunction, our data does not support FR damage as a mechanism for this CM. In fact, reduced LV LPO in FZ CM could be consistent with a protective mechanism.

●113 **THE EFFECTS OF ISCHEMIC CONDITIONS (HYPOXIA AND GLUCOSE DEPRIVATION) ON CALCIUM REGULATION IN THE NEONATAL RAT MYOCARDIUM.** Nicholas J. Lodge and Henry Gelband. Univ. of Miami School of Medicine, Department of Pediatrics, Miami, FL.

The effects of hypoxic ($pO2 < 40$ mmHg)/glucose-free media on resting sarcolemmal calcium (Ca) permeability and cellular Ca content in the neonatal (2-4 day old) rat atrium were studied using isotopic Ca (45Ca). Experiments (each > 12 atria) were completed at 37°C. The atria were then placed in 4°C Tyrode's solution containing 6.8 mM Ca/5 mM EGTA for 45 min to displace extracellular 45Ca. Ca uptake (sarcolemmal Ca permeability) was increased significantly from 45.3±16.5 (SD) to 85.8±28.5 µmol/kg following 2 hr exposure to hypoxic/glucose-free solution ($p < 0.001$) and from 37.0±8.2 to 124.9±16.2 µmol/kg ($p < 0.001$) following 3 hr exposure. After 2 hr, Ca content was increased from 0.69±0.25 to 1.00±0.17 mmol/kg and after 3 hr from 0.84±0.24 to 2.70±0.62 mmol/kg ($p < 0.001$ from both). Cooling tissues to 27°C during the Ca uptake period (1 min) reduced control Ca uptake from 32.5±14.5 to 20.0±5.5 µmol/kg, a 38% decrease ($p < 0.01$), and the uptake measured in hypoxic/glucose-free tissues (3 hr) from 100.4±18.7 to 75.6±14.2 µmol/kg, a 25% decrease ($p< 0.001$). At 7°C, Ca uptake under both conditions was reduced by ~80%. Control and 3 hr hypoxic/glucose-free Ca uptakes were not affected by diltiazem (5x10-6 M). In conclusion, hypoxic/ glucose-free conditions in the neonatal rat atrium increase sarcolemmal Ca permeability and cellular Ca content. We hypothesize that the increased permeability is not the result of "breaks" in the sarcolemma (temperature sensitivity of the increased Ca uptake) nor Ca flux via diltiazem-sensitive Ca channels, but may result indirectly from the rise in intracellular sodium during these conditions.

114 PRIMARY PULMONARY HYPERTENSION IN PEDIATRIC PATIENTS AT ALTITUDE. James P. Loehr, Reginald L. Washington, James W. Wiggins, Henry M. Sondheimer, Michael S. Schaffer and Robert R. Wolfe (Sponsored by Ernest K. Cotton). University of Colorado School of Medicine, Department of Pediatrics, Denver, Colorado.

Five patients (4-9 yrs.) presented in five years with primary pulmonary hypertension (PPH). Each was initially evaluated for seizures or syncope. Two sisters (#1&2) were Hispanic and resided at 5,200'. Two brothers (#3&4) were black and resided at 5,200'. An only child (#5) resided at 9,000'.

Cardiac catheterization with hyperoxia was performed in all and one received additional prostaglandin I2 (PGI2). Structural heart disease was ruled out in all. Resistance ratios (R.R.) were calculated in room air and 100% O2.

Patient	Room Air - R.R.	PGI2 - R.R.	100% O2 - R.R.	Status
1	0.84		0.73	Dead
2	1.23		1.18	Dead
3	0.63		0.31	Alive
4	1.16		0.70	Alive
5	1.09	0.94	0.76	Dead

Three of the five patients died 9.2 months after diagnosis. Two of the deaths (#1&2) occurred after steady clinical deterioration at 5,200'. The third child (#5) dramatically improved after moving to sea level but died five days after returning to altitude. One of the black males has significantly improved since moving to sea level (#4) and his brother with milder disease has spontaneously improved while remaining at altitude (#3).

PPH is a rare and rapidly fatal disease in childhood. In patients presenting at altitude, the clinical course may be altered or reversed by moving to sea level.