145 RELATIONSHIP OF INTRAVASCULAR ARTERIAL PULSE PRESSURE (PP) AND SYMPTOMATIC PDA IN VLBW INFANTS. H.C. Tien, T.J. Wei, S. Jun (Spon. by R. Rapkin) UMD-NJ Med. Sch, Children's Hosp. of NJ, Neonatology, Newark,NJ

To study the relationship between intravascular arterial PP and the development of symptomatic PDA in VLBW infants (BW <1500 gm), 13 preterm neonates (m GA 27.5 wks range 25-31 wks, m BW 975 gms range 560-1360) were systematically and continuously monitored in terms of, (1) the onset of diuresis, (2) changes in FiO_2, (3) x-ray evidence of increased pulmonary flow, (4) continuous arterial PP (determined via UA or radial line), (5) pulse pressure/systolic BP ratio (PP/SBP), (6) daily LA/AO ratio and (7) characteristic PDA murmur. Seven patients developed symptomatic PDA which is defined as the combination of aforementioned items 3,7, and LA/AO ratio of >1.2. Retrospective analysis of PP (mmHg) in 7 symptomatic (sym) and 6 asymptomatic (asym) infants revealed the following:

	Day 1	Day 3	Day 5	Day 7	Day 9	Day 11
Sym PDA	13±2	14±3	19±4	21±3	22±6	28±5
Asym PDA	14±5	14±7	16±4	17±5	15±3	16±3
P	NS	NS	NS	<0.05	<0.025	<0.0025

From 7th day on, PP between the two groups became significantly different and PP/SBP ratio exceeding 48% in symptomatic infants. All infants who had PP of 22 mmHg or more before 7th day went on to develop full blown symptomatic PDA. None of the asymptomatic infants had PP exceeded 22 mmHg during the study period . We conclude that PP of >22 mmHg during the first 7 days of life is a good predictor of sym development of PDA in VLBW infants.

146 SEQUENCE AND TIMING OF EVENTS ASSOCIATED WITH SYMPTOMATIC PATIENT DUCTUS ARTERIOSUS (PDA) IN VLBW INFANTS. H.C. Tien, T.J. Wei, S. Sun (Spon. by R. Rapkin) UMD-NJ Med. Sch., Children's Hosp. of NJ Neonatology, Newark, N.J.

To observe the timing and sequence of appearance of presenting signs of symptomatic PDA, we continuously and systematically monitored, (1) the onset of diuresis (through intake and output calculation), (2) changes in FiO_2 , (3) x-ray evidence of increased pulmonary flow, (4) pulse pressure (determined through UA or radial line), (5) pulse pressure/systolic pressure ratio (PP/SBP), (6) daily LA/AO ratio and (7) the first appearance of PDA murmur in 7 VLBW (<1500 gm) infants from birth until most PDA symptoms fully developed. The chain of events began with the onset of diuresis on an average of the 4th day (range 2-8 day) with an abrupt increase in mean urine output of 450% (range 231-775%) compared to the previous day. The FiO_2 requirement invariably dropped below 30% one day after the onset of diuresis (i.e. av. 5th day). 12 to 24 hrs later (6th day) the evidence of increased pulmonary flow presented itself on x-rays, this was the time when PP began to widen. By the 7th day of life PP reached 20 mmHg or above and PP/SP ratio exceeded 48% (range 43-55%). Clinical evidence of bounding pulses was obvious at this time. By the 8th day (range 6-11th day) LA/AO ratio had reached >1.2 and on an average of the 9th day (range 7-10th day) the typical PDA murmur finally appeared. Although the timing of appearance may differ in each case, the sequence of events remained the same. Understanding the order of these events helps manage PDA better.

●147 LONG TERM MANAGEMENT PROBLEMS IN CARNITINE DEFICIENT CARDIOMYOPATHY. Marjorie E. Tripp, Austin L. Shug, (Spon. by Rene Arcilla). Department of Pediatrics, University of Chicago and Department of Neurology, University of Wisconsin, Madison, Wisconsin.

Systemic carnitine deficiency (SCD) can cause congestive cardiomyopathy (CCM) and dysrhythmia, with or without myopathy, hypoglycemia, and encephalopathy. In many cases, SCD is due to renal tubular loss (RTL) of carnitine esters. We studied 2 patients with SCD and CCM, treated for 4 and 2½ years with L-carnitine (C). Pre-Rx studies included: plasma C, 4.8 and 8.4 mcM (NL 35-55); muscle C, 30.0 and 82.1 nmol/gm (NL 2500-5000); LV ejection fraction (EF), 45% and 32%. Patient 1 had syncope with sinus node dysfunction; patient 2 had bradycardia with fasting. After 1 year of C at 50-75 mg/kg/d, muscle C was 1273 and 3103 nmol/gm, EF was 65% and 61%. LV wall and septal thickness were > 3 S.D. above mean. 24 hour fasts did not cause hypoglycemia or dysrhythmia, but mild ketonemia occurred. When C was withheld, RTL persisted and plasma C fell within 12 hours (12.7 and 23.3 mcM). Urine C remained high (663 mcM/L (NL 330 ± 30) despite low plasma C. In both patients, symptoms recur episodically. Patient 1 had worsening LVH with strain, bradycardia, and syncope after a pubertal growth spurt (plasma C 19.8 mcM). Patient 2 had pericardial effusion during febrile illness. Both had normal EF at these times. Both now take C, 150 mg/kg/d to maintain plasma C. SCD is a C dependent state, with increased RTL during growth and stress. Patients with SCD and normal EF may become symptomatic. Although EF may be corrected, syncope, dysrhythmias and other life-threatening complications can result when C doses fail to replace RTL.

†148 NATURAL HISTORY OF VENTRICULAR SEPTAL DEFECTS (VSD) George F VanHare, Lynn Soffer, Mark Sivakoff, & Jerome Liebman Case Western Reserve University,Rainbow Babies & Childrens Hosp., Div. of Ped. Cardiology, Cleveland.

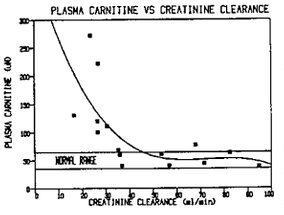
We examined cardiac catheterization (cath) data of 104 children with VSD and left to right shunt, with 1st cath in the 1st year and a later cath without intervening surgery. 19% had pulmonic stenosis (PS) initially. Of the remaining 84, 20% later developed PS, leaving 67. 12% of the 67 VSD's were small, with right ventricular systolic pressure/left ventricular systolic pressure (RVSP/LVSP)≤.39, 27% were ½ systemic (RVSP/LVSP .40-.60), 29% were 2/3 systemic (RVSP/LVSP .61-.74) and 32% were nonrestrictive (NR) (RVSP/LVSP .75-1.0). For the 67 without PS, pulmonary artery (PA) systolic pressure fell or was unchanged on later cath in 100%, 89%, 83%, & 57% of the small, ½ systemic,2/3 systemic and NR groups respectively. Mean PA pressure fell or was unchanged in 100%, 89%, 80%, & 39% respectively. RVSP/LVSP fell more than .10 in 50%, 78%, 83%, & 52% respectively. Thus the defect got smaller in 40/67 for all groups. Pulmonary vascular resistance (PVR) increased in 7/67, and these 7 were all in the 2/3 systemic or NR groups.

41 of the 104 patients had 2 caths in the first year. 28/41 never had PS, and of these 28, 14 were NR and 10 were 2/3 systemic. Of the 14 NR, 7 got smaller and 3 of the other 7 increased PVR. Of the 10 in the 2/3 systemic group, 8 became smaller and 2 increased PVR.

We conclude that for patients with 2/3 systemic or NR VSD's, it is much more common for the defect to get smaller than for the PVR to increase.

149 ELEVATED PLASMA CARNITINE (C) IN PATIENTS WITH IDIOPATHIC CARDIOMYOPATHY. L.J.Waber, A.M.Feldman and K.L.Baughman, Johns Hopkins Univ & Hosp, Depts of Peds & Med, Baltimore (Spon. by D. Valle)

In patients with dilated cardiomyopathies, plasma C has been reported to be both below and above the normal range. Others have postulated that elevated plasma C reflects increased C synthesis. Renal excretion is the only route for C loss. We hypothesized that elevated plasma C might be related to impaired renal function. We measured plasma C and creatinine clearance in 15 patients with dilated cardiomyopathy, aged 19 to 64 yrs. Plasma C and creatinine clearance were negatively correlated (Fig, r=-.59, p<.02). In one of the patients, a rise in plasma C from 72.8 to >200 uM (nl 35-65 uM) occurred in a 7 day period accompanying an increase in creatinine from 1.0 to 5.0 mg%. Two patients demonstrated significant decreases in plasma C (250.6 to 61.2 and 89.9 to 42.1 uM) after treatment of CHF and restoration of their elevated serum creatinines to normal. Seven out of 8 patients with elevated plasma C (>65 uM) had creatinine clearances below 35 ml/min (Fig). The results indicate that in patients with dilated cardiomyopathy, elevated plasma C reflects compromised renal function rather than increased C synthesis.



●150 DEVELOPMENTAL CHANGES IN THE FRANK-STARLING RELATIONSHIP IN THE CHICK EMBRYO. Armin J. Wagman, Norman Hu, and Edward B. Clark, Pediatrics and The CV Center, Univ. of Iowa, Iowa City, IA

We are studying control mechanisms in the embryonic cardiovascular system. We hypothesize that stroke volume increases directly with preload as the chick embryo develops from stage 18 (3 days) to 29 (6 days), a 16-fold increase in embryo weight. Mean dorsal aortic blood velocity ($\overline{V}$) was measured with a 20 MHz pulsed-Doppler velocity meter; mean blood flow ($\overline{Q}$) was calculated using $\overline{V}$ and aortic diameter. $\overline{Q}$÷HR equals stroke volume index. dV/dt was electronically derived. Peak stroke volume was measured in response to intravenous injection of increasing volumes of chick Ringer's solution. Volumes ranged from 6.8 to 157 µL per gram embryo wet weight, permitting comparison of the volume response at different stages. A minimum of 5 embryos were studied for each volume. Data were tested by ANOVA and regression analysis. Heart rate decreased less than 6% for all stages. Stroke volume changed less than 3% in controls. With volume infusion maximum peak stroke volume increased 29% for stage 18, 83% for stage 24, and 46% for stage 29. Stroke volume increased linearly in all stages with slopes of 3.9 at stage 18, 4.7 at stage 24, and 5.5 at stage 29. dV/dt increased with volume infusion for all 3 stages. Although there is considerable change in embryo and ventricular weight, heart geometric shape, and myofibril myocyte volume and alignment, the relationship between preload and stroke volume is similar at each stage. We conclude that the Frank-Starling mechanism functions over a broad range of development in the preinnervated embryonic heart.