

163

EFFECT OF AGE AND HEART RATE(HR) ON ATRIOVENTRICULAR CONDUCTION (AVC) AND ITS SEGMENTS. Mohinder K. Thapar, Paul C. Gillette, Baylor College of Medicine, Texas Children's Hospital, Dept. of Pediatrics (Cardiology), Houston

Findings differ as to the effect of age and HR on normal AVC. Previous studies which included children with normal hearts and patients with severe congenital heart disease, yielded conflicting results. Therefore, we analyzed data of 70 children, 3 days to 18 years, with normal electrocardiograms. Of these 70 children 46 were normal. The others had mild pulmonary stenosis (9), small ventricular septal defect (6), small patent ductus arteriosus (PDA) (3), bicuspid aortic valve(2) and mild aortic stenosis, mild aortic insufficiency, mild pulmonary hypertension and post-operative coarctation with PDA in 1 each. Multiple linear regressions were performed with age and cycle length (CL) as the independent variables and conduction time from high right atrium(HRA) to low right atrium (LRA), LRA to His potential (H), H to ventricle(V), HRA-V, and P-R interval as dependent variables. The significance of the data is shown in the table below. AVC intervals

PARAMETERS	R VALUE	P VALUE
age,P-R	0.39	<0.001
age,HRA-V	0.394	<0.001
age,HRA-LRA	0.277	<0.028
age,LRA-H	0.243	<0.043
age,H-V	0.104	<0.391

increased with age, mostly due to increase in HRA-LRA and LRA-H. Although CL varied with age it had no effect on the AVC. This data supports the concept of age-dependent increasing parasympathetic influence on the atria and AV node. We conclude that age of the subject must be considered in evaluation of AVC time.

164

ELECTROCARDIOGRAPHIC DIFFERENCES IN BLACK AND WHITE CHILDREN. Mohinder K. Thapar, P. Syamasundar Rao, Rollie J. Harp. Medical College of Georgia, Department of Pediatrics, Augusta, Georgia.

Despite a general clinical impression that the electrocardiogram (ECG) of black (B) children differs from that of white (W) children, none of the normal standards in children have taken race into consideration. Biographic data, ECGs, Frank vectorcardiograms (VCGs), and echocardiograms were obtained in 204 normal children (B-97, W-107) ages 3-17 yrs and 144 measured parameters and 57 computed variables were analyzed. The children were divided into 3-5, 6-10, 11-14 and 15-17 yr age groups. In each race, sex related differences were found in the 11-17 yr age group and none were observed below 10 yrs of age. There were no ECG differences ( $p>0.05$ ) between races in the 3-5 yr olds and few minor differences in 6-10 yr old children. However, major differences were observed in the 11-17 yr olds. The VCG data were similar. The height, weight, body surface area, blood pressure, hemoglobin, chest circumference and AP diameter of the chest were found to be similar ( $p>0.1$ ) in both B and W children. However, left ventricular (LV) posterior wall (PW) thickness, interventricular septal thickness and anterior chest wall (ACW) to mid-LV distance or LV muscle mass were different ( $p<0.5$  to  $<0.01$ ) in the age sex groups with ECG differences. These data confirm the previously suspected ECG differences in B and W children. This difference appears related to the quantitative differences in LV muscle or to the depth of the LV from ACW. It is suggested that separate normal standards should be used for evaluation of ECG voltage in B and W children beyond 6 yrs of age.

165

MANAGEMENT OF PATENT DUCTUS ARTERIOSUS IN PREMIES WEIGHING LESS THAN 1500 GRAMS. Nestor J. Truccone, Eugene Cepeda, Edward W. Green, Zita Q. Ferooki, Jose Martinez, Ali Rabbani and Ronald Poland. Wayne State University School of Medicine, Children's Hospital of Mich. and St. John Hospital, Detroit, Michigan.

The management of very small premature infants with cardio-respiratory failure (CRF) associated with a patent ductus arteriosus (PDA) remains controversial. Nineteen premies averaging a weight of  $1204\pm 67$  grams and a gestational age of  $30.6\pm 0.5$  weeks were included in the study. All patients were in CRF requiring mechanical ventilation and had clinical evidence of a hemodynamically significant left to right ductal shunt. All patients were treated initially for 48 hours with digitalis, diuretics and fluid restriction. Four patients (21%) responded well and required no further treatment. Seven patients underwent surgical closure of the PDA. Two of those patients died later on with severe lung disease. Eight patients were treated with oral Indomethacin(I) at 0.1 to 0.2mg/kg q 8 hs(3 doses). Five of those patients (62%) responded well and were extubated. Two patients(25%) did not respond to (I) and required surgical closure of the PDA. One patient showed signs of PDA closure following (I) but expired later with severe lung disease. These preliminary results suggest that a trial of medical therapy with digitalis, diuretics and fluid restriction is justified in all premies under 1500 grams with CRF and PDA for a period of 48 hours. If no improvement occurs, a course of oral (I) may be helpful. Surgical PDA closure should be reserved for patients not responding to the decongestive and Indomethacin treatments.

166

CARDIOVASCULAR RESPONSES OF NEWBORN PIGLETS IN ENDOTOXIC SHOCK. David L. Wessel. (Spon. by S. Evans Downing). Yale University School of Medicine. Department of Pathology, New Haven, CT.

Circulatory responses to endotoxemia have been well described in adult animal models but not in the newborn. Ten piglets (mean age, 4.6 days) were anesthetized and given E. Coli endotoxin, 5 mg/kg, i.v. Cardiac output (CO), arterial and central venous pressure, pulmonary artery and pulmonary artery wedge pressure (PAWP), arterial blood gas values and serum glucose concentration were measured. Seven piglets survived the three hour protocol. After a slight early elevation in mean arterial pressure there was a decline over the first hour until a plateau was reached at 60% of control. This continued for the duration of the experiment. After an initial drop in CO substantial recovery occurred, followed by a slowly progressive decline. This was accompanied by profound hypoglycemia. Five controls showed no significant circulatory changes. Five pigs older than four weeks were given endotoxin and none survived beyond two hours. Other differences in the older animals included the absence of a plateau phase of hypotension; failure of CO to recover after the early drop; a substantial rise in PAWP; transient hyperglycemia preceding the profound hypoglycemia; and more rapid progression of metabolic acidosis. It is concluded that the newborn piglet is more resistant to the effects of endotoxin than is the older pig. This may be attributable to differences in vasomotor responsiveness.

167

EXERCISE-INDUCED VENTRICULAR ECTOPY IN COMPLETE HEART BLOCK, Robin B. Winkler, Michael D. Freed, Alexander S. Nadas, Children's Hospital Medical Center, 300

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Twenty-four patients(pts)with complete heart block(CHB), ages 3 to 29 years(mean 17), underwent graded maximal treadmill exercise tests. Leads II, AVF and V5 were recorded continuously for 3 minutes prior to, during and 15 minutes following exercise. Fifty normal children and young adults served as controls. Of 24 pts with CHB, 16(67%)developed Low grade 2(frequent premature ventricular contractions(PVC)or higher ventricular ectopic activity(VEA)on effort; 2(8%)of these also had VEA at rest. None of the controls had resting VEA and in only one(2%)was it elicited by exercise ( $p<0.001$ ).

Among 13 pts with CHB without associated heart disease(NHD), none had VEA at rest; 9(69%)had VEA on effort. VEA was elicited in 4/7(57%)pts with CHB and associated cardiac defects(HD)and in 1/4(25%) with surgically(S)induced CHB.

Of 8 pts with QRS width  $>0.10$  seconds(3 NHD, 2 HD, 2 S), 7 (88%)developed severe VEA, Low grade 3(multifocal PVC) or higher; 2/8 of these(25%)had severe VEA at rest. Of the 16 pts with QRS  $\leq 0.10$ , none had severe VEA at rest and it was induced in 4 (25%) ( $p=0.005$ ).

Unsuspected significant VEA was elicited by exercise testing in a majority of pts with CHB, most pronounced in those with QRS widening. We think that VEA may represent a threat to the lives of some CHB pts, and recommend exercise testing in pts with CHB, including those without associated defects.

168

CHRONIC HIGH ALTITUDE RESIDENCE AND SYSTEMIC BLOOD PRESSURE IN SCHOOL-AGED CHILDREN. Robert R. Wolfe and James R. Murphy. Spon. by Frederick C. Battaglia University of Colorado School of Medicine, Colorado General Hospital, Department of Pediatrics, Denver, Colorado.

Studies suggest that chronic adult residents at high altitude have lower blood pressures than comparable individuals living at sea level. 2780 children aged 6-20 yrs., living near sea level (el. 36 ft) or at high altitude (el. 10,200 ft) had indirect systemic blood pressure measured with standardized techniques. Korotkoff 1-4-5 sounds, morphometric measures (ht., wt., triceps skinfold thickness), pulse, age, sex, and ethnic origin (white-Hispanic) were recorded. A 3 factor analysis of variance was used separately for each of the 3 dependent variables - Korotkoff 1-4-5 sounds. The 3 main factors in this model were elev., sex, and race. In addition, age and Quetelet index were used in all of the analysis as covariables. These 2 covariables were selected from among 4 initial candidates - age, QI, skinfold, and pulse - on the basis of separate multiple regressions done for each elev.,sex, and race combination. The P values quoted in this abstract are based upon appropriate F-statistic from the analysis of variance table. Children at all ages living at altitude had significantly lower ( $p<.001$ ) Korotkoff 1-4-5 values than children at sea level. Hispanic children had significantly lower blood pressures ( $p<.001$ ) than white children. The mechanism of the blood pressure lowering effect of chronic altitude residence remains speculative but higher pulse rate at altitude suggests that cardiopulmonary conditioning isn't an important factor.