THE THICK SEPTUM: ECHOCARDIOGRAPHIC DIFFERENTIATION OF ITS CAUSES.

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Asymmetrical septal hypertrophy (ASH)has been defined as thickness of the interventricular septum exceeding that of the left ventricular posterior wall by a ratio of 1·3:1. To date it has been associated only with idiopathic hypertrophic subaortic stenosis (IHSS) or its precursor. Therefore, one would expect to find ASH only in the cardiomyopathic patient or in his relatives. It is a dominant with complete penetrance.

A previously undescribed presentation of ASH is now documented in a group of pediatric patients demonstrating ASH associated with right ventricular wall hypertrophy in various cardiac lesions and in some normal newborns. The lesions studied include VSD, coarctation of the aorta, severe congenital aortic stenosis with pulmonary arterial hypertentension, pulmonary vascular obstructive disease, and patent ductus arteriosus. None of these patients had a family history of IHSS and none of the family members who had echocardiograms were affected. The normal newborns with ASH with or without right ventricular hypertrophy had regression of ASH with time.

Therefore, septal thickness must be interpreted in relation to the thickness of the right ventricular wall as well as the left ventricular wall and with caution in newborns as there may be temporal regression to normal.

MASKED PULMONARY VENOUS OBSTRUCTION IN INFANCY.

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A new complex consisting of total anomalous pulmonary venous return (TAPVR), obstructive in type, which was masked by complicated intracardiac lesions with resulting decreased pulmonary blood flow (PBF) was seen in three infants. They survived longer than do those with the usual obstructive form of TAPVR. In two infants cineangiography did not fill the pulmonary bed enough to visualize the PVR. Both infants had shunts performed for cyanosis and both died. The third infant, following the shunt,developed pulmonary edema. Review of the preoperative films showed faint visualization of the TAPVR below the diaphragm. Total repair was attempted without success.

Awareness of the possibility of obstructed anomalously draining pulmonary veins is essential in the evaluation of the infant with complicated lesions resulting in decreased PBF to avoid the pulmonary edema and death which may follow a palliative shunt procedure. Inability to visualize or enter any pulmonary veins from the left atrium at catheterization should arouse suspicion. Angiography should be directed at filling the pulmonary bed as much as possible to visualize the PVR. At operation,measurement of pulmonary arterial pressure may be helpful,and careful inspection of the PVR should be diagnosed.

HYPERTENSION IN A NEW YORK CITY HIGH SCHOOL POPULATION: PREVALENCE AND EVALUATION. Lenore S. Levine, John E. Lewy, Maria I. New. Cornell Univ. Med. Coll., Dept. of Ped., New York City.

A screening program for hypertension was conducted in a New York City high school of 2,058 students. Hypertension was defined as 140/90 or above. Of the 1873 students tested 46 were hypertensive on repeated exam. Of these, 28 consented to hospitalization to evaluate possible renal, cardiac and endocrine causes of hypertension. The patients (23 females, 5 males) were 14-19 yrs. old. In the hospital, ambulatory blood pressures taken every 2-4 hrs. revealed 8 students had frequent hypertension, 18 had infrequent hypertension and 2 were normotensive. The following determinations were made: serum electrolytes, Ca, Phos, TP and A/G, BUN, creatinine, cholesterol, protein electrophoresis, lipoprotein electrophoresis, plasma renin activity (PRA), T4, FSH & LH, 17β-ol-androgens, specific gravity and osmolarity after overnight thirst, creatinine clearance, urinary metanephrine and 17-KS, 17-OH and aldosterone excretion; cardiac series, bone age, ECG and rapid sequence IVP. Abnormal results were: 9 elevated serum cholesterol; 3 low PRA; 8 high PRA; 3 left ventricular hypertrophy on ECG; 7 abnormal urinalyses; 3 abnormal urine cultures and 10 low urine Sp. Gr. All other studies were normal and no specific cause for the hypertension was found in this evaluation. Obesity was present in 75%. Since effective antihypertensive treatment has been demonstrated to reduce the incidence of secondary cardiovascular disease, such a study is a necessary and valid public health measure.

A COMPARATIVE STUDY OF THE NATURAL HISTORY OF POST-SURGICAL(ACQUIRED)AND SPONTANEOUS(CONGENITAL)JUNCTIONAL RHYTHM

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Serial electrocardiograms of 14 patients who developed junctional(J)rhythm in the post-operative period(group A) were compared to tracings of 11 patients who had spontaneous J rhythm (group B). The mean (M) age was 8 years in group A and 4.2 in group B. Both were followed for a similar period(average 6.8 years).Initial J rate was higher in group A (M 64/min) than in group B(M 45/min)and was independent of age. In group A the J rate decreased from 64 to 45/min. and it did not decrease further. J rate was obtainable within 1 week of surgery in only 3 patients of group A and in all was greater than 90/min. This rate decreased also to M 42/min. with maximum decline in the first month. J rate in group B remained constant throughout. Atrial rate in group A was slightly higher than J rate and M atrial/junctional ratio(AJR)was 1.2:1. Atrial rate decreased parallel to J rate indicating sinus node dysfunction. In group B atrial rate was variable, independent of J rate and always higher than J rate with AJR of 2.2:1(M).Group A was found to have an unstable J rate during the early months,but J rate stabilized thereafter with intermittent episodes of brady-tachyarrhythmias seen as a complication of associated sinus node dysfunction.

ESTIMATION OF SUBENDOCARDIAL ISCHEMIA IN VALVAR AORTIC STENOSIS IN CHILDREN. Alan B. Lewis, Michael A. Heymann, Julien I.E. Hoffman, Paul Stanger, Abraham M. Rudolph Univ. of Calif., Dept. of Ped., San Francisco.

Eighty-four cardiac catheterizations were reviewed in infants and children with isolated valvar aortic stenosis to evaluate the presence of subendocardial ischemia. An index of myocardial oxygen supply/demand was calculated from the left ventricular(LV) and aortic (Ao) pressure pulses. Supply was estimated by multiplying the area between Ao and LV pressures during diastole, i.e. Diastolic Pressure Time Index(DPTI), by arterial oxygen content(C). Demand was estimated by the systolic pressure time index(SPTI) from the area under the LV tracing during systole. The oxygen supply/demand ratio was expressed as: DPTI X C/SPTI. A ratio<10 has been shown experimentally in animals to be associated with a reduction in the LV subendocardial/subepicardial flow ratio. With severe stenosis (AVA<.7cm^2/m^2) an increasing number of patients develop supply/demand ratios<10. Patients with AVA<.7cm^2/m^2 but heart rates (HR)<100/min maintain adequate ratios>10, whereas patients with severe stenosis and HR>100/min all have ratios< 10 consistent with subendocardial ischemia. It is concluded that HR is a critical factor in the production of a reduced myocardial oxygen supply/demand ratio in patients with severe valvar aortic stenosis. This ratio is easily calculated from data obtained at cardiac catheterization and appears to be useful in identifying possible subendocardial ischemia in patients with aortic stenosis.

DIAGNOSIS OF CYANOTIC CONGENITAL HEART MALFORMATIONS IN INFANTS BY REAL-TIME, TWO-DIMENSIONAL ECHOCARDIOGRAPHY. Barry J. Maron, Walter L. Henry, James M. Griffith, Robert M. Freedom, David T. Kelly and Stephen E. Epstein, NIH, Nat. Heart & Lung Inst., Bethesda, Md. & Dept. of Pediatrics, Johns Hopkins Hosp., Baltimore, Md. (intr. by Helen B. Taussig).

The accuracy of real-time, two-dimensional echocardiography in diagnosing malformations of the great vessels was assessed in 11 infants (aged 5 to 29 months) with angiographically documented transposition of the great arteries (TGA), tetralogy of Fallot (TF) or pulmonary atresia. Adequate studies were obtained in 10 of the 11 infants. A great artery cross-sectioned by the echo beam (i.e., scanning the heart perpendicular to its long axis, at the origin of the great arteries) appears as a circle; when sectioned longitudinally it is sausage-shaped. TF was characterized by normally related great arteries; a posteriorly positioned circle (aorta) and an anterior, sausage-shaped structure (RV outflow tract). In pulmonary atresia, a large posterior circle (aorta) and an anterior sausage-shaped structure, ending proximal to the pulmonary valve (atretic outflow tract) were seen. In TGA, a posterior circle (pulmonary artery) was associated with another circle (aorta) which was located anteriorly and to its right (D-transposition). Thus, this technique provides a painless, rapid and accurate means of diagnosing congenital malformations of the great arteries in infants. It therefore may obviate the need for complete angiographic studies in some seriously ill infants with cyanotic congenital heart disease.