

*Interesting Electrocardiogram***CONGENITAL HEART DISEASE - POST SURGICAL REPAIR**

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THIS 14-YEAR-OLD had corrective open heart surgery when he was 3 years old. He is now asymptomatic and has competed successfully on a U.S. Swim Team for several years.

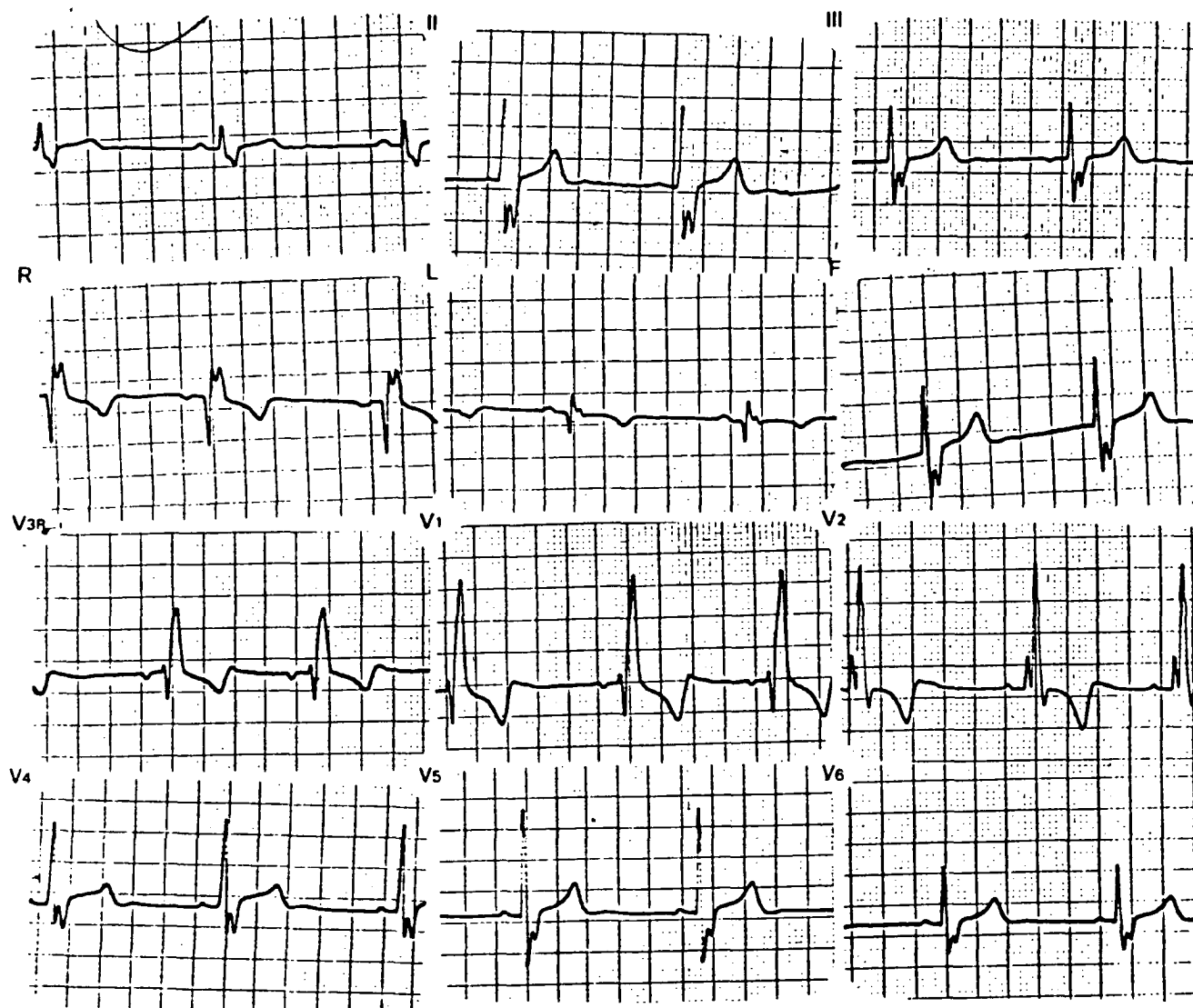
The child was known to have had cyanotic congenital heart disease since birth. At age 2 weeks he had a cardiac catheterization which revealed a ventricular septal defect, a low or primum atrial septal defect with a cleft tricuspid valve (this cluster of defects all stem from one developmental deficiency in the septum) and probably a coarctation of the aorta. He was followed closely and the lower extremity pulses eventually developed adequately. He had a second cardiac catheterization at 2 years of age, and there was no longer any evidence for coarctation. There was a large (upper) ventricular septal defect, no clear evidence for a separate atrial defect, and a large left-to-right shunt with pulmonic to systolic flow rate of 5:1. The child had numerous upper respiratory infections and two episodes of pneumonia. There was a loud P2 and a loud systolic murmur with thrill along the left sternal border and a diastolic rumble over the back (this murmur is due to the large shunt with large pulmonary blood flow returning to the mitral valve). The pre-operative electrocardiogram showed complete right bundle branch block and right ventricular hypertrophy. Chest X-ray showed cardiac enlargement and a left aortic arch; there was increased pulmonary vascularity, as expected with this large shunt. He had successful repair of his ventricular septal defect and cleft tricuspid valve at age 3 years and 4 months. He became asymptomatic. He was examined at age 10 years and again at age 14 years (current examination) and no murmur or other abnormalities were found. Blood pressure ranged between

100/60 and 110/70 and peripheral pulses are normal. He wished to enter an exercise program in school and, therefore, a treadmill test was done.

The electrocardiograms at rest and during the exercise test are interesting. There is a complete right bundle branch block and right hypertrophy (see size of R' in V1 and V2). Lead AVL faces the hypertrophied right ventricle and thus closely resembles AVR and V1. This electrocardiogram is unchanged from his pre-operative tracing, and of course, will never change even through his cardiac defects are corrected. The exercise test, which achieved a rate of 160/min. did not produce any arrhythmia. The reason for the exercise test was to assess any production of arrhythmia and not to survey ST depression since in the presence of complete right bundle branch block no ST deviations can be evaluated. This test might be misread as to "ST depressions" if one did not measure the wide QRS (0.12-0.13 sec.) and see that the notch on the ascending limb of the S wave only mimics the ST. The true ST (see arrow at 24') is not depressed.

Mortality expectations in such cases as this 14-year-old boy would be near that experienced in select and ultimate tables, as he has a fully corrected condition. The only residual abnormality - aside from his right bundle branch block - is right ventricular hypertrophy, but this is not a progressive disorder since the stimulus for it was the large pulmonary blood flow which is no longer present. There remains a real but modest risk of bacterial endocarditis. He is, of course, aware of the need for prophylaxis for infections and dental or surgical procedures.

Resting ECG



Treadmill Exercise Test

