Heart rate response during exercise and pregnancy outcome in women with congenital heart disease.


Abstract
Background:
Cardiopulmonary exercise testing is often used to evaluate exercise capacity in adults with congenital heart disease including women who are considering pregnancy. The relationship between cardiopulmonary exercise testing parameters and pregnancy outcome has not been defined.

Methods And Results:
We conducted a multicenter retrospective observational study of women with congenital heart disease who had undergone cardiopulmonary exercise testing within 2 years of pregnancy or during the first trimester. Cardiopulmonary exercise testing variables included peak oxygen consumption and measures of chronotropic response: peak heart rate, percentage of maximum age predicted heart rate, heart rate reserve (peak heart rate-resting heart rate), and chronotropic index [(peak heart rate-resting heart rate)/(220-age-resting heart rate)]. We identified 89 pregnancies in 83 women. There were 4 spontaneous abortions and 1 termination. One or more adverse cardiac events occurred in 18%; congestive heart failure in 14%, and sustained arrhythmia in 7%. Peak heart rate (odds ratio [OR] 0.71; 95% confidence interval [CI] [0.53, 0.94]; P=0.02), percentage of maximum age predicted heart rate (OR 0.93; 95% CI [0.88, 0.98]; P=0.01), and chronotropic index (OR 0.65; 95% CI [0.47, 0.90]; P=0.01) were associated with a cardiac event. Neonatal events occurred in 20%. Peak heart rate (OR 0.75; 95% CI [0.58, 0.98]; P=0.04), percentage of maximum age predicted heart rate (OR 0.94; 95% CI [0.89, 0.99]; P=0.02), heart rate reserve (OR 0.8; 95% CI [0.64, 0.99]; P=0.04), and chronotropic index (OR 0.73; 95% CI [0.54, 0.98]; P=0.04) correlated with a neonatal event. Peak oxygen consumption was not associated with an adverse pregnancy outcome.

Conclusions:
Abnormal chronotropic response correlates with adverse pregnancy outcomes in women with congenital heart disease and should be considered in refining risk stratification schemes.

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