

Relationship between Systolic and Diastolic Function during Exercise in a Healthy Pediatric Cohort.

Cifra B., Dragulescu A., Manlhiot C., Slorach C., Friedberg M.K., Mertens L.
Hospital for Sick children, Toronto, Canada.

Introduction: The normal relation between systole and diastole in response to exercise has not been previously described in a pediatric population. The aim of the current study was to evaluate systolic and diastolic durations by pulsed tissue Doppler imaging and the resultant systolic to diastolic duration ratio (S:D ratio) during exercise in a normal pediatric cohort using semi-supine cycle ergometry stress echocardiography (SSCE).

Methods: A total of 38 healthy children (22 females) were recruited. Median age at the study was 14 years (range 8 to 18 years). A stepwise SSCE protocol was used. Systolic and diastolic duration was measured at rest and at incremental HR from pulsed tissue Doppler sampled at the lateral mitral annulus. S:D ratio was calculated. The relationship with increasing HR was evaluated for each parameter by plotting the values at each stage of exercise versus HR.

Results: Pulsed tissue Doppler images could be measured in all subjects during exercise. A linear relationship was observed between HR systolic duration and S:D ratio, but the relation between diastolic duration and HR was exponential (see figure).

Conclusions: This study provides the normal variability of systolic and diastolic time duration, and of the derived S:D ratio, measured at incremental HR during exercise in a healthy pediatric cohort. These data can be used as reference to evaluate alterations of systole/diastole relationship with increasing HR in different pediatric disease conditions.

