Echocardiographic Nomograms for Upper Abdominal Aorta Pulsed-Doppler Parameters and Size in Healthy Caucasian Children.


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Background: Abdominal aorta pulsatility and blood flow patterns are important indicators for the diagnosis, as well as estimation of disease severity in congenital heart disease. Despite their routine use, reference values for these indexes are lacking.

Methods: We prospectively studied abdominal aorta pulsed-wave Doppler systolic peak velocity, deceleration time, systolic and diastolic duration, and two-dimensional vessel diameters in systole and diastole in healthy Caucasian Italian children. Heteroscedasticity was accounted for by White or Breusch-Pagan test. Age, weight, height, heart rate (HR) and body surface area (BSA) were used as independent variables in different analyses to predict the mean values of each measurement. Structured Z scores were then computed.

Results: In all, 853 subjects (age 0 days-17 years; 45% females; BSA 0.12-2.12 m2) were studied. The Haycock formula was used when presenting data as predicted values (mean ± 2 SDs) for a given BSA and within equations relating echocardiographic measurements to BSA. The predicted values and Z-score boundaries have been presented.

Conclusions: We report pediatric echocardiographic nomograms for multiple proximal abdominal aorta parameters including pulsed-wave Doppler peak systolic velocities, deceleration time, systolic-diastolic wave duration and two-dimensional vessel diameter variations. Our results demonstrate significant variations of these functional indexes with age that should be taken into account in clinical practice. At lower ages, steeper and shorter pulsed-wave Doppler peak velocity and limited pulsatility should be expected as physiologic findings.

Figure 1: z-score charts of abdominal aorta pulsed-wave Doppler peak systolic velocity and systolic deceleration time.