Impact of age and gender on longitudinal indexes of left ventricular systolic function in a normal paediatric population

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Background: Age and gender may have a relevant impact on left ventricular (LV) longitudinal function in normal adults, but these effects in paediatric patients have not been fully explored. We aimed at investigating these associations in a population with relatively wide age range.

Methods: Fifty-six patients aged 1-16 years (age 7.5±3.8 years, 51.8% female), with unremarkable history and no evidence of cardiovascular or systemic disease, were studied by echocardiography. Tissue Doppler was used to assess LV peak longitudinal velocity at systole (S’), early diastole (E’), and late diastole (A’). Values measured at the septal and lateral site of the mitral annulus were averaged. The ratio of peak early diastolic LV filling velocity to E’, an established index of LV filling pressure, was also calculated.

Results: Average S’, E’ and A’ were 8.3±1.6 cm/s, 15.2±2.6 cm/s, 6.4±1.4 cm/s. Higher velocities were found at the lateral site than the septum for both S’ and E’ (p<0.0001), but not for A’ (p=0.80). Average E/E’ was 5.9±1.5, with lower values at the lateral site than the septum (5.3±1.3 vs 7.2±1.7, p<0.0001). Age showed positive relationships with S’ (R=0.49, p<0.0001) and E’ (R=0.44, p<0.0001), and negative relationships with A’ (R=-0.28, p=0.034) and E/E’ (R=-0.40, p<0.0001). The association with age was stronger for lateral S’ (R=0.53, p<0.0001) than septal S’ (R=0.29, p=0.030; p<0.0001 by comparison of correlation coefficients) whereas those with E’, A’, and E/E’ were not significantly different between the two annular sites. Male and female subjects showed similar S’ (8.4±1.7 vs 8.2±1.5 cm/s, p=0.77), E’ (15.8±2.7 vs 14.7±2.4 cm/s, p=0.09), A’ (6.4±1.5 vs 6.4±1.3 cm/s, p=0.94), and E/E’ (6.0±1.1 vs 6.1±1.4 cm/s, p=0.75). No gender differences were found in septal or lateral velocities as well. In multivariable analysis adjusting for confounding factors, age remained positively associated with S’ (β=0.488, p<0.001) and E’ (β=0.342, p<0.001), and negatively with E/E’ (β=-0.492, p<0.001), whereas the association with A’ was no longer evident (β=0.185, p=0.55). Gender was not associated with any longitudinal index.

Conclusions: In a population of paediatric patients aged 1-16 years, age, but not gender, had a considerable impact on LV longitudinal dynamics.