P744

The main influencing factors of cardiac adaptation effecting the diastolic and right ventricular function in peripubertic athletes

Szabo D.[1]; Horanyi A.[1]; Nagy D.[2]; Melczer CS.[2]; Acs P.[2]; Cziraki A.[1]; Sarszegi ZS.[1]

[1]University of Pecs, Heart Institute, Pecs, Hungary
[2]University of Pécs, Faculty of Health Sciences, Institute of Physiotherapy and Sport Science, Pécs, Hungary

Introduction: Several studies examined the effects of regular training in peripubertic athletes' heart, focusing on the left ventricle (LV). Their normal LV values are showing significant differences from adult athletes. In contrast, there are no specific normal ranges of the diastolic function and the right ventricular (RV) parameters in this age group. Moreover, the results of the latest studies are inconsistent through the different inclusion criteria and influencing factors.

Purpose, methods: The purpose of our study was to examine the specific diastolic and RV parameters of peripubertic athletes and compare them to the available normal values of adult athletes or healthy age-matched non-athletes. Furthermore, we were looking for the effects of the main influencing factors [lean body mass (LBM), body surface area (BSA), age, gender, training time, sporting discipline] on the echocardiographic parameters. 146 children and young adults (athletes, triathletes, basketball players, soccer players) were included between the age of 9 and 20 years (119 males, 27 females, 16,1 ±2,55 years). Specific 2D and tissue Doppler echocardiographic examinations were performed with one-lead continuous ECG gating.

Results: Examining the LV we did not find any significant differences comparing to the latest normal LV values by age. Significant positive correlation was found between the LV parameters, age and LBM. In comparison to adult athletes' diastolic parameters, significantly ($p< 0,001$) higher E, lower A values and higher E/A ratio was detected. However, we found significantly ($p< 0,001$) higher lateral, septal and average e' values and significantly ($p< 0,001$) lower E/e' ratio compared to both reference groups. Therefore, the supernormal diastolic values of our athletes exceeded not only the diastolic performance of the age-matched non-athletes but also the adult professionals. Moreover, significantly ($p< 0,001$) lower structural and functional RV parameters were detected in the young athletes than the adult ones. In comparison to the peripubertic non-athletes significantly ($p< 0,001$) higher structural parameters, higher tricuspid S wave, RV end-diastolic and end-systolic area values were found. Contrary, there was no differences between the tricuspid annular plan excursion (TAPSE) values. Based on multivariate analysis we found remarkable correlation ($r= 0,527$, $p< 0,001$) between the diastolic or RV parameters and the common effect of the main influencing factors: LBM, BSA, age and training time.

Conclusion: There are no clearly defined normal values of diastolic and RV parameters in peripubertic athletes, however we also detected remarkable left and right ventricular changes in this young age group. Well-defined cut-off values should be applied to differentiate pathological conditions. The main influencing factors of the echocardiographic parameters are LBM, BSA, age and training time having additive effects on the cardiac adaptation.