Abstract: P1325

Insights into cardiac functional alterations after a 246 km ultra-marathon race based on simultaneous 4-chamber longitudinal strain assessment.

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Topic(s):
Tissue Doppler, Speckle Tracking and Strain Imaging

Citation:
European Heart Journal - Cardiovascular Imaging (2019) 20 (Supplement 1), i901

Background: It is well documented that prolonged intense exercise such as marathon running, transitorily alters cardiac function. However, previous studies have focused on single chamber assessment rather than describing the impact of ultra-endurance (UE) exercise on inter-chamber functional relationships.

Purpose: The aim of the study was the evaluation of the acute effects of UE exercise on intra-, inter- and atrioventricular coupling.

Methods: Echocardiographic assessment was performed the day before and at the finish line of "Spartathlon": A 246 Km ultra-marathon. 2D speckle-tracking echocardiography was performed in all 4 chambers in the same cardiac cycle, including the interventricular and interatrial septum in the longitudinal strain (LS) measurements for both ventricles and atria accordingly (Figure). Peak deformation values and temporal parameters adjusted for heart rate were extracted from the derived curves.

Results: Out of 60 participants initially screened, 25 athletes (19 males, 46.4±6.9 years old) finished the race in 33:16±1:59 hours. Both left (LV) (-20.9±2.3 pre- to -18.8±2% post-, p=0.009) and right ventricular (RV) strain (-22.9±3.6 pre- to -21.2±3% post-, p=0.04) decreased post-race, even though remaining within normal range for the vast majority of athletes (85%), whereas peak atrial [right (RA) and left (LA)] strains did not change (p=0.12 and 0.95). RV strain alteration after the race was not correlated with athletes’ age or years of training, training distance or training time per week but was inversely associated with finishing time (R²=0.26, p<0.001) (Figure). RV/LV, LV/LA, RV/RA and RA/LA peak values’ ratios remained unchanged from pre to post-race. Although right chambers’ time-to-peak values were shorter compared to the left ones, all chambers’ strain curves peaked later post-race (p<0.001 for all).

Conclusions: Despite subtle changes in LV and RV strain, 4 chamber deformation values remained within normal range even after running a 246 km ultra-marathon, maintaining the inter- and atrioventricular concordance.
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