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COMPARISON OF LEFT VENTRICULAR MYOCARDIAL STRAIN AND TWIST IN ATHLETES VERSUS NON-ATHLETES USING 3D SPECKLE TRACKING ECHOCARDIOGRAPHY

Tomoya Suda, MD[a], Kazukuni Hirabuki, MD[a], Noritaka Hata, MD[a], Yuki Sano, MD[a], Takahiro Uechi, MD, PhD[a], Hiroko Miyauchi, MD[a], Takehiro Tsukada, MD, PhD[a], Ai Hirasawa, PhD[b], Takeaki Matsuda, MD, PhD[a], Shigeki Shibata, MD, PhD[a]

[a] Emergency Department, Kyorin University Hospital, Tokyo, Japan

[b] Department of Health and Welfare, Faculty of Health Sciences, Kyorin University, Tokyo, Japan

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Background: Determinants of left ventricular (LV) myocardial deformation properties in the athlete's heart are poorly known. Aim of the present study was to assess the LV strain components and twist using 3D speckle tracking echocardiography (STE) in population of athletes and non-athletes.

Methods: Male college athletes and non-athletes underwent 3D echocardiography (Epic7, Philips) at supine rest. End-diastolic volume (EDV), end-systolic volume (ESV) and stroke volume (SV) were estimated from 3D LV volume curve constructed using automatic detection of endocardium with commercial computer software (LV Analysis 3.1, TomTec). Ejection fraction (EF) was calculated by the following formula; 100*SV/(EDV-ESV). Global longitudinal strain (GLS), global circumferential strain (GCS), and twist were assessed by 3D STE with the commercial software (LV Analysis 3.1, TomTec).

Results: A total of 13 male college athletes (age, 22±1 yrs old) and 9 male non-athletes (age, 27±3 yrs old) were assessed by 3D echocardiography. EDV(116.3±19.5ml vs. 79.1±18.9ml, mean±SD, P<0.0001, unpaired t-test), ESV(45.1±8.6ml vs. 31.0±8.6ml, P=0.001), SV(71.2±11.8ml vs. 48.0±10.8ml, P<0.0001) and GCS (-30.9±2.0% vs. -28.2±3.5%, P=0.025) were significantly higher in athletes than in non athletes, while EF (61±3% vs. 61±3%, P=0.53), GLS (-19.7±2.7% vs. -19.3±2.7%, P=0.765) and twist (13.6±5.8º vs. 15.8±11.0º , P=0.54) were not different between the athletes and non-athletes.

Conclusion: Our results suggest that college level athletes have an increased myocardial function at rest when compared with sedentary peers as elicited by GCS of the 3D STE in addition to LV volumes. The GCS differences may be the result of the exercise-induced changes in the endocardial myofibers.