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RIGHT VENTRICULAR GLOBAL AND FREE WALL STRAIN IN ELITE BASKETBALL ATHLETES WITH RIGHT VENTRICULAR ENLARGEMENT

Poster Contributions
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Background: The role of right ventricular (RV) structural and functional adaptations in the athlete's heart is emerging. Although RV enlargement (RVE) is common in this population, the current methods of assessing RV function are limited. We hypothesized that speckle tracking-derived global longitudinal strain (GLS) and free wall strain with conventional RV measurements would provide a robust method of assessing RV function in elite athletes.

Methods: National Basketball Association draftees (N=61) underwent echocardiography from 2011 to 2012. Conventional and strain measurements were obtained in all participants. RV strain was quantified by GLS and free wall measures. RVE was defined as an RV diastolic basal diameter ≥ 4.2 cm. RV free wall strain was calculated as an average of the RV basal, mid, and apical strain measures.

Results: The prevalence of RVE is 36.1% (N=22). RV free wall strain (-24.8%) is greater than RV GLS (-21.5%) for all participants (p<0.001). Conventional RV functional parameters are similar in those with and without RVE. RVE participants have a greater left ventricular GLS (p=0.050), RV GLS (p=0.039), and RV free wall strain (p=0.042).

Table 1: Clinical and Echocardiographic Parameters of Elite Basketball Athletes with and without Right Ventricular Enlargement (RV Basal Diameter ≥ 4.2cm)

Clinical & Echocardiogram Characteristics	Normal Right Ventricular Size (N= 39) (Mean Value ± SD)	Right VentricularEnlargement (N=22) (Mean Value ± SD)	P-value
Age (years)	21.1 (1.7)	21.0 (1.5)	0.770
Body Surface Area (kg/m2)	2.3 (0.1)	2.4 (0.2)	0.015
Heart Rate (bpm)	52.1 (8.2)	52.2 (8.1)	0.936
Left Ventricular EF (%)	57.4 (5.6)	56.7 (7.3)	0.641
LVIS (cm)	1.0 (0.1)	1.0 (0.1)	0.709
LVPW (cm)	1.1 (0.1)	1.1 (0.1)	0.505
LVIDD (cm)	5.4 (0.4)	5.5 (0.4)	0.541
LAVI (ml/m2)	21.2 (3.5)	21.9 (3.0)	0.405
RVIDDBASAL (cm)	3.7 (0.3)	4.5 (0.2)	<0.001
RVIDDMID (cm)	2.4 (0.3)	2.7 (0.4)	0.005
RVIDDLONG (cm)	7.5 (0.5)	7.9 (0.7)	0.004
TAPSE (cm)	2.5 (0.4)	2.7 (0.4)	0.192
RVFAC (%)	46.2 (7.6)	45.6 (9.2)	0.656
RVSM (cm/s)	13.8 (2.3)	13.1 (2.6)	0.249
LV GLS, Two-Chamber (%)	-18.7 (-2.1)	-19.9 (-2.7)	0.050
LV GLS, Four-Chamber (%)	-18.3 (-1.9)	-18.9 (-2.4)	0.285
RV GLS (%)	-20.9 (-3.2)	-22.6 (-2.6)	0.039
RV Free Wall Strain (%)	-24.1 (-4.1)	-26.1 (-3.0)	0.042

EF, ejection fraction; LVIS, left ventricle interventricular septum; LVPW, left ventricle posterior wall; LVIDD, left ventricular internal diastolic dimension; LAVI, left atrium volume index; RVIDD, right ventricle internal diastolic dimension; BASAL, basal measurement; MID, mid chamber measurement; LONG, longitudinal measurement; TAPSE, tissue annular plane systolic excursion; FAC, fractional area change; RVSM, right ventricle peak systolic velocity; GLS, Global longitudinal strain; RV, right ventricle ; bpm, beats per minute

Conclusion: RVE is common in elite basketball athletes. Conventional structural and functional parameters are limited in the assessment of RV function. RV strain quantification of the free wall appears to be a promising indicator of RV function. In elite athletes with RVE, normal functional parameters suggest a potential physiologic adaption.