

A Novel Diagnostic Score Integrating Atrial Dimensions to Differentiate between the Athlete's Heart and Arrhythmogenic Right Ventricular Cardiomyopathy

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Objective: The 2010 Task Force Criteria (TFC) have not been tested to differentiate ARVC from the athlete's heart. Moreover, some criteria are not available (myocardial biopsy, genetic testing, morphology of ventricular tachycardia) or subject to interobserver variability (right-ventricle regional wall motion abnormalities) in clinical practice. We hypothesized that atrial dimensions are useful and robust to differentiate between both entities and proposed a new diagnostic score based upon readily available parameters including echocardiographic atrial dimensions.

Methods: In this observational study, 21 patients with definite ARVC were matched for age, gender and body mass index to 42 athletes. Based on ROC analysis, following parameters were included in the score: indexed right/left atrial volumes (RAVI/LAVI ratio), NT-proBNP, RVOT measurements (PLAX and PSAX BSA-corrected), tricuspid annular motion velocity (TAM), precordial TWI and depolarization abnormalities according to TFC.

Results: ARVC patients had a higher RAVI/LAVI (1.76 ± 1.5 vs 0.87 ± 0.2 , $p < 0.001$), lower right-ventricular function (fac: 29 ± 10.1 vs 42.2 ± 5 , $p < 0.001$; TAM: 19.8 ± 5.4 vs 23.8 ± 3.8 mm, $p = 0.001$), higher NT-proBNP (345 ± 612 vs 48 ± 57 ng/l, $p < 0.001$). Our score showed a good performance, which is comparable to the 2010 TFC using those parameters which are available in routine clinical practice (AUC 93%, $p < 0.001$ (95% CI: 87-99) vs AUC 97%, $p < 0.001$ (95% CI: 93-100)). A score of 6/12 points yielded a specificity of 91% and an improved sensitivity of 67% for ARVC diagnosis as compared to a sensitivity of 41% of the above mentioned readily available 2010 TFC.

Conclusions: ARVC patients present with significantly larger RA compared to athletes, resulting in a greater RAVI/LAVI ratio. Our novel diagnostic score includes readily available clinical parameters and has a high diagnostic accuracy to differentiate between ARVC and the athlete's heart.