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A score based on echocardiographic parameters highly predicts atrial fibrillation

Hagemus J.; Sieweke JT.; Biber S.; Schallhorn S.; Neuser J.; Berliner D.; Bauersachs J.; Bavendiek U.

Hannover Medical School, Hannover, Germany

Background: Several scores indicating patients at high risk for atrial fibrillation (AF) have been developed. Early detection of AF supported by AF risk score is important to prevent embolic events such as ischemic stroke in these patients. However, specifity and sensitivity of AF risk scores available have to be improved. Echocardiographic parameters may significantly improve the diagnostic value of AF risk scores.

Purpose: To investigate whether a new AF risk score (LaHAsPa) including echocardiographic parameter of LA function and remodeling identifies patients with AF and is not inferior to other published AF risk scores (CHADS2-, ATLAS-, ARIC, simple CHARGE-AF-Score).

Methods: This monocentric, prospective, semi-blinded, controlled study screened 319 patients between 10/2017 and 04/2018 for eligibility. 290 patients were included after applying in- and exclusion criteria (Exclusion criteria: cardiac surgery in the past, highly graded valvular heart disease, pulmonary vein isolation or ablation of any other form of atrial arrhythmias in the past, myocardial ischemia in the recent past, class Ia antiarrhythmic therapy and AF during echocardiography). Standard parameters of heart function were determined by routine transthoracic echocardiography (TTE) as well as parameters indicating left atrial remodeling (Septal/lateral total atrial conduction time (s/l PA-TDI), left atrial volume index (LAVI)/a`). Two different investigators, blinded to each other and to AF status, determined the LaHAsPA-, CHADS2-, ATLAS-, ARIC, simple CHARGE-AF Score.

Results: Out of 290 patients (age 59.5 [45-71] yrs, female 121 (41.7%)) 66 patients had AF in the medical history. sPA-TDI and LAVI/a` are significantly altered in patients with AF compared to patients without of AF (sPA-TDI: 145 [117-158] vs. 111 [98-124], $p < 0.001$; LAVI/a`: 4.5 [3.7-6.9] vs. 3.1 [2.4-4.1]). Multivariate Cox regression proportionality analysis highlighted sPA-TDI, and LAVI/a` as markers for prediction of AF (sPA-TDI: HR 1.11, 95%CI 1.00-1.23, $p < 0.04$; LAVI/a`: HR 1.911, 95%CI 1.2-3.04). The LaHAsPA-Score, including hypertension, age, sPA-TDI and LAVI/a', identified patients with AF with high specificity and sensitivity (area under the curve 0.993, 95%CI 0.99-1.0). Subsequently cut-off values determined for CHADS2-, ATLAS-, ARIC and simple CHARGE-AF Score, McNemar test for dichotomous distribution on dependent collectives highlighted the powerful predictive value of the LaHAsPA-risk Score.

Conclusion(s)

We demonstrate, that septal PA-TDI and LAVI/a` are highly predictive for AF presence. Our new AF score LaHAsPA consisting of variables easily to be determined in daily routine stratifies AF risk with high specificity and sensitivity. It might facilitate risk-dependent decision-making and potentially identifies patients with AF more precisely compared to commonly used AF scores. Additional prospective studies at greater scale are warranted to test this intriguing hypothesis.