

Yoganathan R., Langappullige B.M.

**PROGRESSIVE RIGHT HEART REMODELING AND SYSTOLIC DYSFUNCTION
IN DIFFERENT FORMS OF ATRIAL FIBRILLATION**

Tutor: associate professor Maroz-Vadalazhskaya N.N.

*Department of Internal Diseases, Cardiology and Rheumatology with Advanced Training and
Retraining Course
Belarusian State Medical University, Minsk*

Relevance. Atrial fibrillation (AF) is the most common tachyarrhythmia affecting 3-5% of the population. Multiple studies have been conducted predominantly focused on left side cardiac remodeling while AF effect on the right side of the heart and its underlying mechanisms have been consequently overlooked and understudied.

Aim: the aim of our study was to investigate the association between atrial fibrillation severity and the extent of right-sided cardiac remodeling.

Materials and methods. Patients, admitted to cardiology department from 04.01.2025-26.02.2025 due to atrial fibrillation and underwent full protocol of transthoracic echocardiography were included in study. Fifty patients were divided into groups: 1 - paroxysmal ($n = 21$), 2 - persistent ($n = 23$), and 3 - permanent AF ($n = 6$) group with similar baseline habitual characteristics and comorbidities. Right atrial (RA) and ventricle (RV) function were assessed with the use of multiple echocardiographic parameters according to EACVI and ACC guidelines across all three groups. Statistical analysis performed via the software “Analysis Toolpak”. Data are presented in mean value.

Results and discussion. Left atrial volume index increased from 36.2 ml per m² (group 1) to 50.5 ml per m² (group 2) and 66.4 ml per m² (group 3) across AF groups, while left ventricular ejection fraction remained within normal limits (68.9%, 57.3% and 60.8%) in groups 1, 2 and 3 respectively.

Descriptive statistical analysis demonstrated an increase across AF groups in RA volume (50.7 ml, 89.00 ml 102.7 ml), RA volume index (28.4 ml per m², 43.0 ml per m², 54.4 ml per m²), and RA pressure (4.9 mmHg, 6.3 mmHg, 10.3 mmHg), while TAPSE decreased (21.0 mm, 19.3 mm, 16.7 mm) in groups 1, 2, 3 respectively, $p < 0.05$ for all the parameters.

Spearman correlation showed positive associations between increasing AF severity and right atrial parameters: RA volume ($r = 0.52$), RA pressure ($r = 0.56$), and RA volume index (RAVI) ($r = 0.37$), and a negative association between AF severity and TAPSE ($r = -0.51$), with no correlation for RV diameter ($r = -0.02$). Single-factor ANOVA confirmed differences between groups for RAVI ($p = 0.03$), RA volume ($p = 0.003$), RA pressure ($p = 0.01$), and TAPSE ($p = 0.03$). Calculated pulmonary artery systolic pressure (22.0 to 34.0 to 28.5 mmHg in groups 1, 2 and 3 respectively, $p > 0.05$) did not show a consistent increase across AF groups but might be underestimated in group 3 patients with impaired RV systolic function.

Conclusions. Our study demonstrates that RA remodeling increases with AF severity, with significant RA enlargement in patients with permanent AF. Worsening of RV systolic function (TAPSE) while antero-posterior RV size remained unchanged may indicate early subclinical functional impairment and highlight the importance of targeted treatment towards the right chambers. The increase in both LA and RA volume indices supports suspicion that AF is a bi-atrial disease, whereas the worsening of RV systolic function provides clinically relevant marker of AF severity, progression, and risk even before the development of left ventricle systolic dysfunction.