Inflammation and fibrosis biomarkers are related to atrial dysfunction in patients at risk of atrial fibrillation

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Introduction: Arterial hypertension mitral regurgitation and endurance training are risks factors for incidental atrial fibrillation (AF). Left atrial (LA) remodeling in the context of volume and pressure overload may be the substrate for AF development. Inflammation and subsequent fibrosis may be related to the development of this atrial remodeling. Our aim was to analyze if there is any correlation between inflammation and fibrosis biomarkers and left atrial dysfunction in blood samples of subjects with hypertension or mitral regurgitation and in endurance athletes.

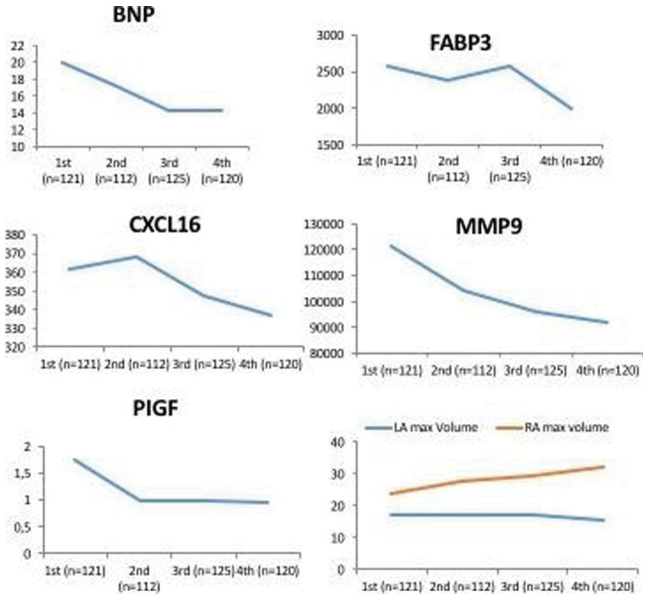
Methods: A population of 478 subjects at risk of atrial fibrillation were enrolled to this study. The cohort was composed by 275 endurance athletes, 185 patients with arterial hypertension and 32 with moderate to severe mitral regurgitation. All patients underwent 2D (two-dimensional) echocardiography with speckle-tracking analysis (LA strain and LA strain-rate) and 3D (three-dimensional) echocardiography to assess LA volume and volume-based function. Furthermore, blood samples were obtained to measure plasma levels of BNP, troponin-I and the following fibrosis and inflammatory biomarkers: MMP-9 (Matrix Metalloproteinase 9), CXCL16 (CXC chemokine), CXCL6, FABP3, PIGF, OSM, endocan-1.

The whole cohort was divided into quartiles according to their reservoir strain value (surrogate of atrial relaxation impairment), and correlation between biomarkers, atrial 2D volumes and 3D volumes was calculated.

Results: Quartile ranges regarding reservoir strain (RS) were: 1st quartile (<28.9%), 2nd quartile (28,9%-32,1%), 3rd quartile (32,95–35,4), 4th quartile (>35,4%).

The first quartile (worse left atrial reservoir function) was mainly composed by hypertensive and mitral regurgitation subjects while the 4th quartile (with larger left atrium but better reservoir function) was mostly integrated by athletes. The 1st quartile (worse atrial function) showed higher levels of fibrotic (MMP-9) and inflammatory biomarkers (CXCL16, FABP3, PIGF, BNP, Troponin-I and PIGF) as compared to the other quartiles.

Conclusions: Inflammation and fibrosis biomarkers (CXCL16, FABP3, PIGF and MMP-9) are higher in subjects with worse LA reservoir function. This suggests a correlation among inflammation (fibrosis) and atrial dysfunction in a population at risk for AF development.



Biomarkers according RS quartiles