Hydration status, BMI and troponin as factors of an impaired exercise tolerance in women over 40 with arterial hypertension

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Purpose: The aim was to identify factors influencing maximal oxygen uptake (VO2max) and early identification of hypertensive women at risk of heart failure (HF).

Methods: The 185 consecutive females with controlled hypertension were divided according VO2max quartiles. The patients underwent echocardiography, non-invasive body mass analysis, spiroergometry and hemodynamic parameters. Regression analyses determined predictors of the lowest VO2max (quartile 1: VO2max <17 ml/kg/min).

Results: Females with the worst oxygen consumption had significantly higher level of high sensitive cardiac Troponin T (hs-cTnT) [p=0.001], higher values of the left atrial (LA) volume, late diastolic mitral annulus velocity (A'), ratio of peak velocity of early diastolic transmitral flow to peak velocity of early diastolic mitral annular motion (E/E') [p=0.0003, p=0.02, p=0.04; respectively] and lower E' [p=0.001] compared to controls. Women with the worst exercise capacity had higher body mass index (BMI) and fat content (kg and %) [p<0.0001], higher fat free mass (FFM) (kg) [p<0.0001], higher total body water content (TBW) [p=0.0002] as well as extracellular body water content (ECW) [p<0.0001] and intracellular body water content (ICW) [p=0.005], ECW/TBW x 100% [p<0.0001] and metabolic age [p<0.0001] compared to counterparts. In a multiple logistic regression model independently associated with VO2max were: ECW/TBW x 100% (OR 4.45, 95% CI: 1.77–11.21; p=0.002) Figure 1, BMI (OR 7.11, 95% CI: 2.01–25.11; p=0.002) Figure 2 and hs-cTnT level (OR 2.69, 95% CI: 1.23–5.91; p=0.013).

Conclusions: High-sensitivity cardiac troponin may serve as early biomarker of heart failure in hypertensive women. Hydration status should be considered in overall hypertensive women care. There is an importance of body mass compartments analysis in early identification of hypertensive females at risk of heart failure.
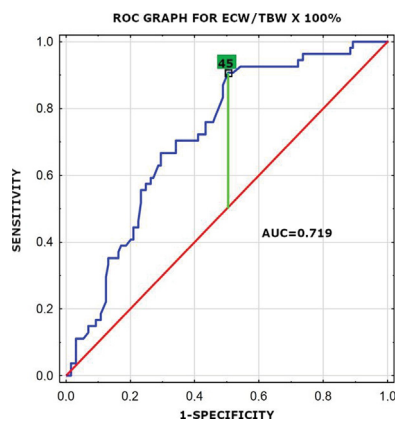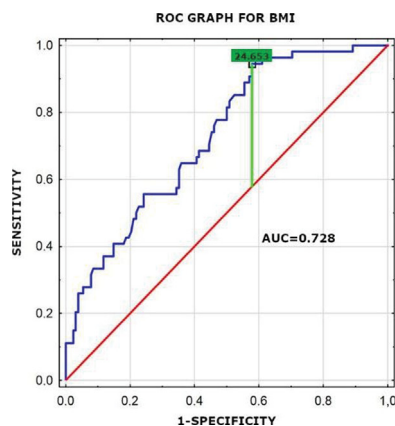

Figure 1

Figure 2