

Risk factors for early concentric left ventricular remodelling in women and men at risk for heart failure

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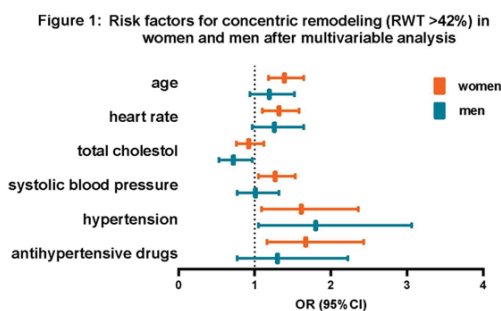
Background/Purpose: Heart failure with preserved ejection fraction (HFpEF) is currently hard to treat, and more prevalent in women as compared to men. Therefore, focus on prevention is key. Concentric remodelling is considered a pre-stage of HFpEF, yet knowledge on distributions and risk factor relations are scarce. Therefore, we identified the prevalence of early remodelling in women and men, and studied risk factors for early remodelling in women and men at risk for heart failure.

Methods: Clinical and echocardiographic data from 880 individuals, included in the HELPFul cohort were analysed (mean age 62.9 ±SD 9.3 years, 68.6% women). Relative wall thickness was calculated with the formula $(2 \times \text{LVPWD})/\text{LVEDD}$ and expressed as percentage. Concentric remodelling was defined as a relative wall thickness >42%. The relationship of classical cardiovascular risk factors, anthropometric -, lifestyle -, and pregnancy factors with relative wall thickness was tested using uni- and multivariable analyses for women and men separately. The association of continuous variables with relative wall thickness was analysed per standard deviation (SD) increase.

Results: Relative wall thickness was similar for both men (mean 43.2 ±SD 9.5) and women (mean 42.6 ±SD 8.1). Concentric remodelling (RWT >42%) was present in 49.1% of the population. Multivariable analyses showed that age, heart rate, systolic blood pressure, hypertension, and the usage of antihypertensive medication were independently associated

with relative wall thickness in women. In men, heart rate and hypertension were independently associated with relative wall thickness. No associations were found for lifestyle factors such as smoking and alcohol intake. In women, there was no significant association of hypertensive pregnancy disorders and gestational diabetes with relative wall thickness. When relative wall thickness was dichotomized with >42% as cut-off for concentric remodelling the same risk factors remained independently associated in women. Per SD increase age, systolic blood pressure, heart rate, a diagnosis of hypertension and usage of antihypertensive medication were associated with an increased risk of concentric remodelling (OR=1.39 (95% CI: 1.18–1.64), 1.27 (95% CI: 1.05–1.53), 1.32 (95% CI: 1.10–1.58), 1.61 (95% CI: 1.09–2.36) and 1.67 (95% CI: 1.16–2.43), respectively) (Figure 1). In men, only a diagnosis of hypertension was a risk factor for concentric remodelling (OR=1.80 (95% CI: 1.05–3.06)).

Conclusion: Left ventricular concentric remodelling was as common in women as in men visiting outpatient cardiology clinics and found in half of the population. No sex-specific -, or lifestyle related risk factors could be identified. A relation with hypertension was evident in both sexes, but surprisingly no association of hypertensive pregnancy disorders was found. Concentric remodelling in women and men remains a common, but poorly understood, phenomenon that warrants further attention.



RWT, relative wall thickness. Age (crude model) per SD: ±9.02 years in women, ±9.78 years in men; heart rate (corrected for age, systolic blood pressure and B-blocker use) per SD: ±11.9 bpm in women, ±13.2 bpm in men; total cholesterol (corrected for age, systolic blood pressure, BMI and statin use) per SD: ±1.12 mmol/L in women, ±1.20 mmol/L in men; systolic blood pressure (corrected for age, heart rate, total cholesterol, BMI and antihypertensive medication usage) per SD: ±20.1 mmHg in women, ±18.9 mmHg in men. Hypertension and antihypertensive medication usage are both corrected for age, systolic blood pressure and BMI.