Heart failure patients show increase of white matter lesions in MRI-imaging: LIFE-Adult-Study

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Background: Heart Failure (HF) is a risk factor for stroke and dementia and is associated with cognitive impairment. However, whether or not HF is directly linked to structural brain changes is unknown. White matter lesions (WML) are common structural alterations in the white matter of the brain and their prevalence increases with age. They are associated with cerebral ischemia and cognitive dysfunction. However, there are only a few reports on HF and WML.

Purpose: We hypothesized that the presence and duration of heart failure are associated with WML.

Methods: LIFE Adult is a population-based study whose participants are a representative sample of the city of Leipzig, Germany (approximately 580,000 inhabitants). All study participants (18-80 years of age) underwent an extensive core assessment program (5-6 h) including structured medical interviews, medical and psychological questionnaires, physical examination and bio specimen collection. A subgroup of 2490 participants additionally underwent cerebral MRI (cMRI). The Fazekas Score was used for the classification of the WML (none or mild WML versus moderate or severe WML). Raters were blinded to other medical information of study participants. History of HF and other diseases were ascertained as part of the self-reported medical history questionnaire.

Results: Mean age was 64 years and 46 % were female. On univariate analysis age, troponin T, NT-proBNP, body mass index, history of acute myocardial infarction, stroke, HF and diabetes were positively associated with WML. On multivariate analysis, only age, hypertension, stroke and HF were associated with WML. Interestingly, the Odd's ratio (OR) for HF was 2.5 (95% confidence interval (CI) 1.1;5.6) and numerically higher than the OR for stroke (OR 2.0 (95% CI 1.0; 3.8)). Additionally, the OR increased with longer duration of HF (OR 1.3 for HF-duration < 3 years, OR 1.7 for HF 4-6 years duration and OR 2.9 for HF-diagnosis > 6 years).

Conclusion: HF is independently associated with structural brain damage, i.e. WML. Future research is needed to elaborate whether WML could be a therapeutic target for treatment targeting cognitive decline in HF.