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O21. Identifying Distinct Clinical Subgroups in Heart Failure with Mildly Reduced Ejection Fraction using clustering

Introduction:
Heart failure (HF) is a heterogeneous syndrome with three subtypes based on ejection fraction (EF): HF with reduced (HFrEF), mildly reduced (HFmrEF), and preserved EF (HFpEF). The subtypes HFmrEF and HFpEF have limited guideline recommended therapies. So far, trials have shown neutral results and it is argued that the reason for this could be the heterogeneity in these subtypes. Cluster analysis can characterize heterogeneous patient populations and could serve as a stratification and prognostic tool in clinical trials and healthcare. Several studies have undertaken cluster analysis in patients with HFpEF, but this has not yet been done in patients with HFmrEF. Therefore, the aim of this study was to identify clusters in HFmrEF and compare cluster prognosis.

Methods:
Latent Class Analysis (e.g., unsupervised clustering) has been performed in a Dutch cross-sectional HF registry-based dataset (N = 2078). Number of clusters was determined combining aBIC and clinical meaning of the clusters. Identified clusters were validated in the long-term Swedish HF registry (N = 5503). In Sweden, mortality and hospitalization in the clusters was compared using a Cox proportional hazard model, with a Fine-Gray sub distribution for competing risks and adjustment for age and sex.

Results:
Six clusters have been discovered: 1) a cardio-renal phenotype; 2) a female-atrial fibrillation phenotype; 3) a low-comorbidity phenotype; 4) a wide-QRS phenotype; 5) a metabolic phenotype; and 6) an ischaemic-male phenotype. Significant differences for hospitalization and mortality rates were found between all subgroups, showing lowest and highest mortality and hospitalization rates for the ischaemic-male and the metabolic phenotype, respectively.

Conclusion:
The current clustering model characterized patients in HFmrEF and increases understanding of heterogeneity in HF. The found clusters were robust, have clinical meaning, and show differences in mortality and hospitalization, which means that this model could be valuable as a stratification and prognostic tool in clinical trials and healthcare.