Comorbidity patterns and health-related outcomes in older adults with atrial fibrillation: nationwide population-based findings from swedish national patient register

L. Dai¹, A.C. Larranaga¹, C. Damiano², P. Cordsen³, H. Luo⁴, J. Wastesson⁵, K. Johnell⁵, G. Onder⁶, F. Triolo¹, C. Amrouch⁶, M. Petrovic⁶, G. Lip⁷, S.P. Johnsen³, D.L. Vetrano¹

¹Karolinska Institute, Aging Research Center, Department of Neurobiology, Care Sciences and Society, Stockholm, Sweden
²Università Cattolica del Sacro Cuore, Rome, Italy
³Aalborg University, Danish Center for Health Services Research, Aalborg, Denmark
⁴The University of Hong Kong, Department of Social Work and Social Administration, Hong Kong, China
⁵Karolinska Institutet, Department of Medical Epidemiology and Biostatistics, Stockholm, Sweden
⁶Ghent University, Department of Geriatrics, Ghent, Belgium
⁷University of Liverpool, Liverpool Centre for Cardiovascular Science, Liverpool, United Kingdom of Great Britain & Northern Ireland

On behalf of The AFFIRM study investigators

Funding Acknowledgements: Type of funding sources: Public grant(s) – EU funding. Main funding source(s): European Union’s Horizon 2020 research and innovation programme

Background: Older individuals with atrial fibrillation (AF) often present with multiple comorbidities that might challenge their clinical management and worsen the prognosis. Identifying homogenous groups of individuals within similar patterns of comorbidities and health trajectories could potentially facilitate a better integrated care targeting patient-centred needs in AF management.

Purpose: To characterize the comorbidity patterns and to explore their prognostic value in health outcomes among older adults with AF.

Methods: We used population-wide registry data from the Swedish National Patient Register and identified individuals ≥65 years old by 1 January 2017 with AF diagnosis during the period 1 January 2012 - 1 January 2017. Chronic diseases were grouped into 60 clinically relevant disease categories coded by the International Classification of Diseases 10th revision. We performed latent class analysis (LCA) to identify homogeneous groups of AF patients with similar underlying comorbidity patterns. Two measures, disease exclusivity ≥25% and an observed/expected ratio ≥2, were applied to determine the overexpressed diseases in each class. Cox regression models (adjusted by age, sex, education, income, civil status, polypharmacy, vitamin K antagonists, direct oral anticoagulants, antiplatelets, and antiarrhythmics) were fitted to investigate the association between comorbidity patterns and clinical outcomes including two-year risk of all-cause and cardiovascular (CV) mortality, stroke, major bleedings, all-cause and CV hospitalization.

Results: A total of 203,042 AF individuals (mean age 79.6 [7.9] years, 45% female) were included. Seven classes were identified based on the optimal output of LCA (Figure 1), i.e., unspecified pattern (39.3%), metabolic disease (12.3%), complex comorbidity (11.7%), neuropsychiatric disease (11.0%), CV disease (10.6%), musculoskeletal disease (9.0%) and eye disease (6.2%). Compared with patients showing an unspecified comorbidity pattern, patients with complex comorbidity had the highest increased risk of all-cause mortality (hazard ratio, HR 2.02, 95% confidence, 95% CI 1.96-2.08), CV mortality (HR 2.31, 95% CI 2.20-2.41), all-cause hospitalization (HR 2.45, 95% CI 2.34-2.56), CV hospitalization (HR 2.68, 95% CI 2.60-2.77), and bleedings (HR 1.55, 95% CI 1.50-1.61); patients within the neuropsychiatric disease pattern had the highest increased risk of stroke (HR 1.44, 95% CI 1.30-1.59); and patients within the neuropsychiatric disease pattern had reduced risk of all-cause and CV mortality (HR 0.70, 95% CI 0.66-0.74; HR 0.67, 95% CI 0.62-0.74, respectively) and increased risk of all-cause and CV hospitalization (HR 1.37, 95% CI 1.34-1.41; HR 1.19, 95% CI 1.14-1.25, respectively).

Conclusions: The characterization of comorbidity patterns may help to improve clinical outcomes by targeting patient-centred needs among multimorbid older patients with AF.
Figure 1. Bubble plots of seven classes of comorbidity patterns