**Supplementary Table 1: Definition and methods used to document and quantify multimorbidity in patients with heart failure**

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| **Comorbidity**  | **Data source and determination** | **Definition / deficit threshold**  |
| Anemia  | Full blood examination during hospital admission | Serum hemoglobin level <120 (women) / <130 g/l (men) (1) |
| Atrial and ventricular arrhythmias | Review of medical notes with plus review of prescribed pharmacotherapy at discharge. If high clinical suspicion of undiagnosed arrhythmia - 12-lead ECG, inpatient telemetry or extended ECG Holter monitoring | Confirmation of AF, other atrial arrhythmias, 2nd or 3rd degree heart block, ventricular fibrillation or ventricular tachycardia with prescription of anti-arrhythmic therapy or pacemaker/defibrillator device (2) |
| Cognitive impairment/dementia | Assessed via Montreal Cognitive Assessment (MoCA) tool prior to hospital discharge by trained personnel | Documented diagnosis of dementia or MoCA score <26 out of a maximal possible score of 30 (3) |
| Depression and anxiety | Assessed via questionnaire (4) prior to hospital discharge by trained personnel plus review of medical notes and prescribed pharmacotherapy at discharge. If positive, apply more comprehensive tool (e.g. HADS) (5) | Positive response to depressive symptoms and/or confirmed diagnosis (with active anti-depressive/ anxiolytic) of depression or anxiety |
| Diabetes and metabolic disorders | Review of medical notes and prescribed pharmacotherapy at discharge. Calculation of body mass index (BMI). If high clinical suspicion of underlying diabetes HbA1c and/or glucose tolerance tests | Documented diagnosis of type 2 diabetes or obesity BMI >30kg/m2 plus dyslipidemia and/or hypertension (metabolic syndrome) |
| Musculoskeletal disorders | Review of medical notes and prescribed pharmacotherapy at discharge. Frailty test with hand-grip manometer, gait speed, six-minute walk test, and Short Physical Performance Battery including static balance, gait speed and getting in and out of a chair (6) | Documented diagnosis of arthritis, osteoporosis, gout or any other musculoskeletal condition requiring active therapy (e.g. anti-inflammatory or analgesia) |
| Renal impairment  | Electrolytes and renal function obtained during hospital admission | Estimated glomerular filtration rate < 60 mL/min/1.73m2 (7) |
| Respiratory disease | Review of medical notes and prescribed pharmacotherapy at discharge. If high clinical suspicion of underlying respiratory disease - formal lung function tests | Lung function confirmation of chronic airways limitation, asthma and/or other chronic pulmonary condition requiring active treatment (8) |
| Thyroid disease | Review of medical notes and prescribed pharmacotherapy at discharge. If high clinical suspicion of, or historical lack of screening, perform thyroid function tests (including thyroid stimulating hormone levels) at hospital admission | Documented hyper/hypothyroidism according to national standards with associated anti-thyroid or thyroxine replacement therapy (9) |
| Sleep disorders | Review of medical notes and prescribed sleep support device. If high clinical suspicion of sleep disordered breathing perform formal sleep studies. Use of a screening questionnaire in hospital to identify those with sleep-disordered breathing (10) | Documented diagnosis of obstructive or central sleep disordered breathing |

AF = atrial fibrillation; ECG = electrocardiogram; HADS = hospital anxiety and depression scale; HbA1c = haemoglobin a1c;

**References**

1. Pasricha SR, Flecknoe-Brown SC, Allen KJ et al. Diagnosis and management of iron deficiency anaemia: a clinical update. Med J Aust 2010;193:525-32.

2. Gregoratos G, Cheitlin MD, Conill A et al. ACC/AHA guidelines for implantation of cardiac pacemakers and antiarrhythmia devices: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Pacemaker Implantation). J Am Coll Cardiol 1998;31:1175-209.

3. Nasreddine ZS, Phillips NA, Bedirian V et al. The Montreal Cognitive Assessment, MoCA: a brief screening tool for mild cognitive impairment. J Am Geriatr Soc 2005;53:695-9.

4. Arroll B, Khin N, Kerse N. Screening for depression in primary care with two verbally asked questions: cross sectional study. BMJ 2003;327:1144-6.

5. Rutledge T, Reis VA, Linke SE, Greenberg BH, Mills PJ. Depression in heart failure a meta-analytic review of prevalence, intervention effects, and associations with clinical outcomes. J Am Coll Cardiol 2006;48:1527-37.

6. Gary R. Evaluation of frailty in older adults with cardiovascular disease: incorporating physical performance measures. J Cardiovasc Nurs 2012;27:120-31.

7. Johnson DW, Jones GR, Mathew TH et al. Chronic kidney disease and automatic reporting of estimated glomerular filtration rate: new developments and revised recommendations. Med J Aust 2012;197:224-5.

8. Celli BR, MacNee W, Force AET. Standards for the diagnosis and treatment of patients with COPD: a summary of the ATS/ERS position paper. Eur Respir J 2004;23:932-46.

9. Gerdes AM, Iervasi G. Thyroid replacement therapy and heart failure. Circulation 2010;122:385-93.

10. Sharma S, Mather P, Efird JT et al. Photoplethysmographic Signal to Screen Sleep-Disordered Breathing in Hospitalized Heart Failure Patients: Feasibility of a Prospective Clinical Pathway. JACC Heart Fail 2015;3:725-31.