The burden and pattern of comorbidities and its relation to mortality in frail vs non-frail patients with chronic heart failure

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Funding Acknowledgement: Type of funding sources: None.

Background: Frailty is common in patients with chronic heart failure (CHF). Frail patients are at high risk of poor clinical outcomes which might be attributable to the presence of multiple comorbidities. The impact of comorbidities on mortality in frail patients with CHF is not well described.

Aim: To compare the burden and patterns of comorbidities in frail vs non-frail patients with CHF and their impact on mortality.

Methods: We studied consecutive patients attending a routine follow-up visit to a HF clinic. Frailty was assessed using the Clinical Frailty Scale (CFS); those with CFS >4 were classified as frail. Patients were classified into 6 comorbidity groups including: metabolic (obesity, diabetes); respiratory; renal; cancer; neuropsychiatric (depression, dementia); and degenerative (falls, arthritis, fragility fractures). We investigated the relation between frailty, comorbidity groups and all-cause mortality in patients with CHF.

Results: Amongst 467 patients with CHF [67% male, median (IQR) age 76 (69–82) years, NTproBNP 1156 (469–2463) ng/L], 291 patients had HF with reduced ejection fraction (HFrEF, LVEF <40%), and 176 had HF with preserved ejection fraction (HFpEF, LVEF ≥40%). Frailty was more common in HFpEF vs HFrEF (51 vs 40%). 64% of patients had >4 comorbidities (36% 5–6, 21% 7–9 and 7% >9 comorbidities).

Frail patients were more likely to have multiple comorbidities than non-frail patients (85% vs 48% with >4 comorbidities, p<0.001). The number of comorbidities increased with worsening frailty severity (Figure 1). Those with HFrEF were more likely to suffer from cancer, whereas those with HFpEF were more likely to have neuropsychiatric, metabolic and degenerative comorbidities.

During a median follow up of 554 days, 82 (18%) patients died. Increasing number of comorbidities was associated with increasing mortality. (Figure 2) Patients who were frail with >4 comorbidities had a 6-fold increased risk of mortality compared to those who were neither frail nor had multiple comorbidities [HR (95% CI) 6.6 (3.2–13.9), p<0.001]. In a model adjusted for age, sex, logNTproBNP and NYHA class, amongst comorbidity groups, the presence of renal and neuropsychiatric comorbidities were independent predictors of higher mortality.

Conclusion: Frail patients with CHF have a high comorbidity burden. The co-existence of frailty and multiple comorbidities predisposes to higher risk of mortality. Future studies should investigate whether treatment focusing on comorbidities improve outcomes.

Figure 1: Number of comorbidities vs frailty severity, p<0.001.

Figure 2: Kaplan Meier Curve showing the relation between number of comorbidities and all-cause mortality.