

Results: In total, 65 patients were followed for a median of 13.7 (Q1-Q3 6.7-18.9) months. Mean age was 79.2 (SD 10.8) years and 56.9% were female. The mean left ventricular ejection fraction was 50.38 ± 19.07 %.

Variables associated with an increased risk for early rehospitalization were RDW (hazards ratio [HR] 1.35; 95% confidence interval [CI] 1.16-1.58), anemia (HR 3.81; 95% CI 1.29-11.28), and anemia with iron deficiency (HR 3.50; 95% CI 1.30-9.38). Increased risk for early mortality was associated with RDW (HR 1.83; 95% CI 1.29-2.59), EPO (HR 1.38; 95% CI 1.04-1.82), absolute iron deficiency (HR 7.22; 95% CI 1.50-34.81), and anemia with iron deficiency (HR 4.48; 95% CI 1.26-15.88). Variables associated with an increased risk for end of follow-up mortality were RDW (HR 1.31; 95% CI 1.12-1.54) and EPO (HR 1.29; 95% CI 1.11-1.49).

Conclusions: Anemia and RDW correlated with higher risk for early rehospitalization.

Absolute iron deficiency, RDW and EPO and were associated with higher risk for early mortality.

RDW and EPO were associated with higher risk for end of follow-up mortality.

Our findings may provide insight into HF prognosis and may raise the interest in some neglected hematological parameters.

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Can Gal-3 and ST2 biomarkers be prognosticators in heart failure?- disclosures from the REFERENCE study

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Background: The vast data addressing emerging cardiac fibrosis markers as adjunctive to conventional clinical risk factors and natriuretic peptides dosing, led the American College of Cardiology/ American Heart Association to grant Galectin-3 (Gal-3) and Suppression of Tumorigenicity 2 (ST2) evaluation a class II recommendation for heart failure (HF) prognosis, in 2013. However, in Europe this endorsement is not valid.

Purpose: To study the association of Gal-3 and ST2 with early (defined as the period of 90 days post-discharge) rehospitalization and overall mortality, and end of follow-up overall mortality in HF patients.

Additionally, aminoterminal B-type natriuretic peptide (NT-proBNP) was considered to test if a multi-marker strategy could yield supplementary information.

Methods: Gal-3, ST2 and NT-proBNP were assessed in patients hospitalized with acute decompensated HF in class III or IV of NYHA.

Univariate Cox proportional hazard model was used to assess the relationship between variables and outcomes.

Since there are no standardized cut-offs for Gal-3 and ST2, the multiclass Area Under the Curve Receiver-Operator Characteristic (AUCROC) as defined by Hand and Till was used to evaluate the overall performance of each biomarker as a predictor of the outcomes.

Results: We followed 65 patients for a median of 13.7 (Q1-Q3 6.7-18.9) months. Mean age was 79.2 (SD 10.8) years and 56.9% were female. The mean left ventricular ejection fraction was 50.38 ± 19.07 %.

Gal-3 correlated with early rehospitalization (HR: 9.886, 95% CI: 2.027-48.214, P-value=0.005), early death (HR: 13.731, 95% CI: 1.650-114.276, P value=0.015) and end of follow-up mortality (HR: 4.492, 95% CI: 1.594-12.656, P-value=0.004).

The association of elevated NT-proBNP determinations with Gal-3 further increased the risk for the mentioned outcomes (HR: 11.985, 95% CI: 1.962-73.218, P value=0.007), (HR: 18.837, 95% CI: 2.193-161.811, P-value=0.007) and (HR: 78.025, 95% CI: 7.592-801.926, P-value<0.001), respectively.

A correlation between ST2 and end of follow-up mortality was acknowledged (HR: 4.846, 95% CI: 1.396-16.825, P-value=0.013). The risk increased if elevated NT-proBNP values were also considered (HR: 5.953, 95% CI: 1.683-21.055, P-value=0.006).

Conclusion: Elevated Gal-3 concentrations correlated with early rehospitalization, early mortality and end of follow-up mortality; whereas ST2 prognosticated end of follow-up mortality.

Collective analysis with elevated NT-proBNP values further increased the outcomes' risk.

These results corroborate the conjecture that promising novel biomarkers Gal-3 and ST2 could be valuable for HF risk stratification.

We highlight that a multi-marker strategy added information, as a synergism between myocardial fibrosis biomarkers and the myocardial stretch peptide was observed.

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Impact of a heart failure clinic on morbidity, mortality and quality of life

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Introduction: Chronic heart failure (CHF) is a syndrome with high morbidity and mortality rates, having a tremendous impact on patient's quality of life (QoL) and on the entire health system. HF Clinics intend to cope with the complexity of the clinical management of these patients (pts), aiming to improve outcomes and QoL.

Purpose: To evaluate the impact on morbidity, mortality and quality of life of a HF Clinic, with a proximity model including a systematic and multidisciplinary approach.

Methods: Analysis of the pts prospectively followed at a HF Clinic (n = 152), including the QoL indicators (Kansas City Cardiomyopathy Questionnaire – KCCQ and European HF Self-care Behavior Scale - EHFSBS), emergency department (ER) visits, HF hospitalizations and all-cause mortality and comparing the last indicator with the previous rate before the creation of the Clinic.

Results: After 6 months of follow-up (FU), 10% of pts improved the KCCQ score and 90% remained at the highest scores and 78% improved in the EHFSBS. Comparing the first trimester with the last one (in a period of 9 months), there was a reduction of ER visits due to HF decompensation from 23.5% to 8.7% and of HF hospitalization rate from 53% to 12.5%. After 9 months of FU, the all-cause mortality rate dropped from 18.1% to 7%.

Conclusions: The implementation of a HF Clinic have a significant impact regarding both the QoL of the pts and the ER visits/hospitalizations and mortality rates, due to a proximity model with a systematic and multidisciplinary approach.

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Age at death in heart failure: relationship with etiology, sex, and cause of death

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Background: Mortality in heart failure (HF) remains high despite the improvement in survival achieved thanks to better HF management. The relation between etiology of HF, sex, cause of death and age at death is incompletely characterized.

Objective: To assess differences in age at death according to sex, etiology of HF and cause of death in ambulatory patients managed in a multidisciplinary HF Unit.

Methods: Consecutive patients with HF from different etiologies admitted at the Unit from August 2001 to October 2019 were considered for the study. Causes of death were classified as unknown, HF (refractory/progressive), sudden death (SD), acute myocardial infarction (AMI), stroke, cardiovascular procedure, other cardiovascular and non-cardiovascular.

Results: Out of 2588 patients attended at the Unit (age 66.5 ± 12.8 years, 70.7% men, 47.2% from ischemic etiology, LVEF $35.8\% \pm 14.4$, NYHA class II 65.2% II and III 26.4%), 1318 deaths were recorded during a median follow-up of 3.7 years (Q1-Q3, 1.5-7.3). Median time to death from HF onset was 6.1 years (Q1-Q3, 3.1-10.9). Age at death varied upon cause of death ($p < 0.001$): unknown (N=87) 73.4 ± 12.6 years; HF (N=368) 77.4 ± 8.9 ; SD (N=167) 72.3 ± 11.4 ; AMI (N=62) 73.6 ± 11.1 ; stroke (N=25) 76.7 ± 10.8 ; cardiovascular procedure 67.8 ± 10.3 ; other cardiovascular (N=72); 76.0 ± 10.0 ; non-cardiovascular (N=479) 76.9 ± 9.6 . Among non-cardiovascular deaths, youngest age at death was found in cancer deaths (N=153) 74.0 ± 9.4 and oldest in declivity deaths (N=60) 83.6 ± 7.7 . Age at death was also affected by HF etiology ($p < 0.001$): ischemic (N=783) 75.9 ± 9.2 ; dilated cardiomyopathy (N=123) 74.6 ± 11.1 ; hypertensive (N=136) 79.8 ± 9.1 ; alcohol-derived cardiomyopathy (N=46) 66.0 ± 11.3 ; toxic-drug cardiomyopathy (N=30) 67.0 ± 12.3 ; valvular disease (N=148) 78.2 ± 9.8 ; other (N=80) 75.6 ± 12.3 . Women died older than men: 78.3 ± 10.0 vs. 74.8 ± 10.1 respectively ($p < 0.001$); this was observed in all causes of death and in most HF etiologies (but not for alcohol and valvular HF).

Conclusions: Death occurred at a median of 6 years in a HF ambulatory cohort from multiple etiologies. Age at death was influenced by HF etiology, sex and the cause of death itself.

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Mortality trends in an ambulatory multidisciplinary heart failure unit: 2001 to 2019

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Background: Mortality in heart failure (HF) remains challenging despite improvement in outcomes proved in clinical trials in HF with reduced ejection fraction.

Objective: To assess mortality trends at 1, 3 and 5 years from 2001 to 2019 in a real-life cohort of HF outpatients from different aetiologies.