Evidence-Based Therapy and Its Association With Workforce Detachment After First Hospitalization for Heart Failure

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ABSTRACT

OBJECTIVES This study investigated the association between the use of evidence-based medicine (EBM) for heart failure (HF) and risk of workforce detachment.

BACKGROUND The ability to work can be a marker of functional capacity and quality of life.

METHODS We examined a nationwide cohort of patients in the workforce 1 year after first hospitalization for HF. EBM was defined as treatment with β-blockers and renin angiotensin system inhibitors. The fraction of target dose (0-1) for each drug was calculated. The sum of the fractions gave each patient a score between 0 and 2. Patients were stratified into 4 groups according to this score: group 4 score = 2 (target dose of both drugs); group 3 score <2 to >1; group 2 score ≤1 to >0.5; and group 1 score ≤0.5. The risk of subsequent workforce detachment was estimated in cause specific Cox regression models.

RESULTS One year after first HF hospitalization, 10,185 patients were part of the workforce, and 7,561 (74%) were in treatment with at least 1 of the components of EBM. During a median follow-up of 727 days, 2,698 individuals (36%) became detached from the workforce. Patients receiving more EBM had a significantly lower risk of workforce detachment compared with those receiving less EBM (group 4 hazard ratio [HR]: 0.87; 95% confidence interval [CI]: 0.77 to 0.98; group 3 HR: 0.85; 95% CI: 0.77 to 0.94; and group 2 HR 0.92; 95% CI: 0.83 to 1.02), all compared to group 1.

CONCLUSIONS Patients in the workforce 1 year after first HF hospitalization and treated with target or near-target doses of EBM were associated with a significantly lower risk of subsequent workforce detachment. (J Am Coll Cardiol HF 2017;■:■–■) © 2017 by the American College of Cardiology Foundation.

Heart failure (HF) is a condition associated with considerable mortality and morbidity as well as reduced quality of life (1–3). The advances in HF-specific device and pharmacological therapy have significantly improved life expectancy in patients with HF (4,5). This has led to an increased focus on factors in the everyday life of patients, including the ability to work. Renin-angiotensin system inhibitors (RASi) and β-blockers, in this study referred to as evidence-based medicine (EBM), are cornerstones in treatment of HF. HF guidelines include specific recommendations on up-titration to "target doses" which are considered "optimal medical therapy"(6,7). Information about the effectiveness of other doses, lower or higher, is scarce. It is well established that a significant proportion of people with HF do not receive EBM and, even if they do, many do not receive guideline-recommended target doses (8–10).

The benefits of drugs and devices are usually evaluated on the basis of clinical outcomes such as mortality and hospitalization. Although these are undoubtedly important, they do not reflect the whole burden of HF on the individual, his or her family and care-givers, or on society. A patients' ability to work reflects both the direct and indirect consequences and costs of HF. Beyond having a financial impact, employment status affects a patient's self-esteem and quality of life; it can also affect an individual's mental and physical well-being and potentially that of a spouse and other family members (11,12). Thus, use of EBM and its relation to employment status in patients with HF may provide additional information on the broader benefits of these drugs in younger patients living with HF.

In this nationwide study, we set out to assess the relationship between use of EBM and workforce detachment (i.e., sickness leave, early retirement, or any other economic support from the state due to reduced working capability). We hypothesized that lower use of EBM would be associated with a higher risk of workforce detachment in HF patients.

METHODS

DATA SOURCES. All residents in Denmark have a unique personal identification number. By use of this number, Danish administrative and health registries can be linked at an individual level (13). For the present study, we linked Danish registries which include information on hospitalizations, out-patient visits, all prescribed medications, education level, and death with information on whether the patients received any kind of public welfare payments (14,15).

STUDY POPULATION AND BASELINE VARIABLES. We studied patients with a first hospitalization for HF in the period between 1997 and 2014. Patients were included if they were between 18 and 60 years of age at time of first HF hospitalization and part of the workforce (i.e., employed or available for work 1 year after first HF hospitalization). Thus, baseline was set to 1 year after first HF hospitalization. Workforce status was determined by evaluation of a 5-week period 1 year after discharge from first HF hospitalization. This evaluation method of work status has previously been described in detail (16). All residents in Denmark can receive state-funded support. We classified patients who were not on paid sickness leave, had not taken early retirement, or who were receiving any support due to reduced working capability as able to work. Patients in the workforce 1 year

after first HF hospitalization were grouped according to level of treatment with β-blockers and RASi at baseline by use of the following scheme: For each patient and each drug, the fraction of the target dose (0-1) was calculated (Online Table 1). Subsequently, the sum of the fractions was calculated for each patient. This gave each patient a score between 0 and 2. According to this number, patients were stratified into 4 groups: group 4 score = 2 (target dose of both drugs); group 3 score <2 to >1; group 2 score ≤1 to >0.5; and group 1 score ≤0.5 (Online Figure 1). The following sensitivity analyses were performed. 1) An underlying assumption of our calculations is that β-blockers and RASi carry the same weight. To assess this, we compared patients in target dose of RASi and reduced dose of β-blockers with patients in target dose of β-blockers and reduced dose of RASi. 2) Patients might have been down-titrated from target dose already during the first year or have had fluctuations in drug treatment. To assess the latter, we did an analysis where patients were grouped according to highest achieved dose of EBM within the first year rather than dose achieved at 1-year follow-up. 3) In addition to the main analysis, we created a propensity score-matched population. The propensity score was estimated as each patient's probability of receiving low doses of EBM (group 1 and 2) or high doses (group 3 and 4) by multivariable logistic regression analysis conditional on the following baseline covariates: age, sex, educational level, calendar time, use of diuretic agents and MRA and comorbidities (i.e., ischemic heart disease, atrial fibrillation, chronic kidney disease, chronic obstructive pulmonary disease [COPD], diabetes, hypertension, stroke, and cancer).

Patients were followed for up to 4 years after first HF hospitalization. Thus, during the study period, no patients were old enough to receive ordinary retirement pension, which individuals in Denmark are eligible for from 65 years of age. History of comorbidities in the form of cancer, chronic kidney disease, COPD, diabetes, stroke, ischemic heart disease, atrial fibrillation, and hypertension was identified by a primary or secondary discharge diagnosis in relation to any hospitalization in the previous 10 years. Patients with diabetes mellitus were additionally identified by at least 1 filled prescription for glucose-lowering drugs up to 180 days before 1 year after first HF hospitalization. Besides RASi and β-blockers, we also assessed the use of mineralocorticoid receptor antagonists (MRAs) and loop diuretic agents, but the doses of these drugs were not included in the EBM score.

OUTCOME MEASURES. Patients alive and in the workforce 1 year after first hospitalization for HF were