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Editorial

Risk stratification in heart failure. A new score for risk assessment in ambulatory patients with chronic heart failure

Estratificación de riesgo en insuficiencia cardiaca crónica. Una nueva puntuación en pacientes ambulatorios con insuficiencia cardiaca

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The prognosis of patients with heart failure (HF) is challenging to establish. Some patients can be free from hospitalization for long periods, whereas others have an unstable clinical course with frequent HF decompensations and poor prognosis. Thus, it is essential to identify patients at high risk of having a worse prognosis so a closer follow-up and therapy optimization can be implemented. Several risk scores in ambulatory HF patients have been published.[1] The most used scores are the SHFM score (Seattle Heart Failure Model), the MAGGIC-HF risk score (Meta-Analysis Global Group in Chronic Heart Failure), the PREDICT-HF score (PARADIGM Risk of Events and Death in the Contemporary Treatment of Heart Failure), and the BCN-Bio-HF risk calculator (Barcelona Bio-Heart Failure). The SHFM score[2] calculates the projected survival at baseline and 1, 2, or 5 years after interventions (either medical treatment or devices implantation) for patients with HF. The SHFM score was the first score to be published in 2006 and it was updated in 2013. It includes more than 20 variables, from clinical data, the New York Heart Association (NHYA) functional class, medical treatments, to laboratory findings. Therefore, filling this score is rather time-consuming. The MAGGIC-HF risk score,[3] published in 2013, includes 13 independent variables: NHYA functional class, left ventricular ejection fraction, the creatinine value, and treatments such as beta-blockers, angiotensin-converting enzyme inhibitors, and angiotensin II receptor blockers. However, it does not include biomarkers or current disease-modifying prognosis pharmacological treatments. The PREDICT-HF score[4] was developed using data from the PARADIGM-HF trial. It has multiple medical items, laboratory data (including biomarkers), and the treatment with angiotensin receptor–neprilysin inhibitors (ARNIs). Finally, the BCN-Bio-HF risk calculator[5] includes disease prognostic modifying treatments, cardiac devices (such as cardiac resynchronization therapy or implantable cardioverter-defibrillators) as well as 3 biomarkers (N-terminal pro-B-type natriuretic peptide (NT-proBNP), high-sensitivity troponin T, and interleukin-1 receptor-like-1). A recent study by Codina et al.[1] compares these 4 risk scores to conclude that no one shows a clear superiority over the others.

The main limitation with all these predictive scores is that they are time-consuming to calculate and that physicians might not have all the data needed to calculate them. In this

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context, we have read with great interest the paper by Barge-Caballero et al.,[6] proposing a 5-item score to assess risk in ambulatory patients with chronic HF. This model is based on the IC-BERG project, a questionnaire addressed to 150 clinical cardiologists about patients with HF and reduced ejection fraction. This questionnaire identified 5 items (4 clinical factors and 1 biomarker) that may assess the stability of patients with HF.

To evaluate any risk score, it is worth analyzing the population from which a score was derived. The new risk model that Barge-Caballero et al.[6] propose is based on a retrospective study of 1909 patients included from 2010 to 2019 in a specific HF facility at their hospital. This cohort included relatively young patients with a mean age of 63.3 years, most of them were male, with few comorbidities and 73.6% had reduced ejection fraction. It is noteworthy that only 9% of patients received treatment with ARNI, and the use of sodium-glucose transport protein 2 (SGLT2) inhibitors was not documented. However, treatment with SLGT2 inhibitors was not approved for HF indication during the study period, and ARNI was approved with this indication in October 2017.

One of the strengths of this new risk score is its simplicity. It is based on 5 items, 4 of them clinical (NYHA class III-IV, signs of congestion, admission due to HF decompensation in the previous year, daily dose $\geq$ 40 mg furosemide or equivalent) and 1 biomarker (NT-proBNP $\geq$ 1000 pg/mL). This data was collected at the first visit. The endpoint was a composite event of death or admission due to HF, overall mortality, and cardiovascular mortality. Patients who required treatment at the emergency room and those treated at the cardiology day hospital were not included as events. The study showed that the presence of just 1 of these 5 items was associated with an increase in the hazard ratio (HR) of 1.47 (95% confidence interval [95%CI], 1–2.15). Not surprisingly, the higher the number of items, the higher the risk of admission or death. Adjusted HR for the combined endpoint death or admission due to HF was 7.73 (95%CI, 5.21–11.45) when all 5 items were present. NYHA functional class III or IV (adjusted HR, 1.95; 95%CI, 1.66–2.3), congestion signs (adjusted HR, 1.5; 95%CI, 1.26–1.59), and NT-proBNP levels (adjusted HR, 1.55; 95%CI, 1.28–1.86) were the 3 items with higher HRs associated with death or HF admission. This score was useful even when biomarkers were not available.

Which variables are more frequent in all risk scores? Functional class assessed by the NYHA is the only variable included in all the risk scores described previously. Physician-rated NYHA class has prognostic implications,[7] but it is not a foolproof discriminator of functional impairment across the broad spectrum of HF.[8] Hence, in some instances, objective tests need to be considered to unmask advanced functional class in elder or comorbid HF patients who often adapt their usual physical activity.[9] The use of furosemide is only included in the SHFM[2] and the BCN-Bio-HF risk calculator.[5] However, diuretic resistance and the need to use high doses of furosemide are associated with a worse clinical outcome.[10] Since the dose of furosemide is an easy variable to identify, it should always be considered. Hospitalization due to HF decompensation in the previous year is associated with a higher risk of subsequent hospitalization and higher mortality risk.[11] The BCN-Bio-HF risk calculator is the only score to include this variable.[5] The PREDICT-HF score also takes into account a prior hospitalization, although it does not limit it to the previous year.[4] The elevation of natriuretic peptides is associated with a worse prognosis.[12] Only the BCN-Bio-HF risk calculator and PREDICT-HF score include natriuretic peptides. Interestingly, both scores have NT-proBNP as a continuous variable instead of a dichotomous variable.[4,5] Although using a continuous variable might be associated with better predictive ability, a simple cut-off variable might be more clinically relevant as it is easier to use and remember. Finally, none of the most used risk scores (ie, the SHFM score, the MAGGIC-HF risk score, the PREDICT-HF score, and the BCN-Bio-HF risk calculator) include congestion variables.[1] Persistent congestion is a known prognostic factor for death, HF readmission, and even response to HF disease-modifying drugs.[13] The physical examination continues to be an essential tool to detect congestion signs. However, readily available imaging techniques can be very useful for adding sensitivity and specificity to physical examination.[10,14] In the setting of chronic heart failure, lung ultrasound is a non-invasive, safe, and easy-to-use technique appropriate to guide treatment and stratify prognosis.[15]

It is worth mentioning that the risk scores assess prognosis at a 1-time point, but the risk scores are not usually repeated every visit. However, as HF progresses, there might be changes in NYHA class, modification of the diuretic dosage, admission due to decompensation, congestion, or an increase in levels of NT-proBNP that modify the score. Therefore, it is crucial to reassess risk periodically to identify patients at the highest risk.

There are some limitations to the classification presented by Barge-Caballero et al.[6] First, it was based on a retrospective cohort. Second, the population included does not necessarily represent the majority of patients with HF.[11] Therefore, it will be interesting to know if this risk classification is also helpful in patients with HF and preserved ejection fraction, older age, and more comorbidities such as chronic kidney disease or anemia.

In summary, the risk score proposed by Barge-Caballero et al.[6] is a simple and powerful prognostic model to identify patients at the highest risk. Considering the parameters needed to calculate the risk score, it can be easily and quickly used at every clinical encounter.

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Authors' contributions

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Conflicts of interest

S. Valdivieso-More reports honoraria for lectures from Ferrer and support for attending meeting from Novartis and Rovi. L.C. Belarte-Tornero reports grants, honoraria for lectures and support for attending meeting from Novartis. N. Farré Reports reports grants, honoraria for lectures and support for attending meeting from Novartis, Rovi, Bayer, and Pfizer.

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