Letter by Petretta and Cuocolo Regarding Article, “Four-Variable Risk Model in Men and Women With Heart Failure”

To the Editor:

Chyu et al. demonstrated that a simple risk model assessing 4 variables (B-type natriuretic peptide, peak oxygen consumption, New York Heart Association classification, and angiotensin-converting enzyme inhibitor/angiotensin receptor blocker use) is capable to provide prognostic information in both men and women with advanced heart failure. Using derivation and validation cohorts, they derived and validated a sex-neutral risk model composed of these 4 variables. The model had significant risk discrimination in the total cohort (c-index, 0.786), women (c-index, 0.796), and men (c-index, 0.791) and performed better than the Seattle Heart Failure Model and Heart Failure Survival Score.

We think that further information should be given to a reader interested in using or validating the proposed risk model. Survival at any time \( t \) based on the assigned risk scores was estimated using the following equation: 
\[
\hat{S}(t) = e^{-\lambda t} = e^{-(0.00221 \times \text{score})} 
\]
It seems that the hazard rate \( \lambda \) value 0.00221 was derived by a parametric exponential fitting of survival data in the validation cohort (i.e., exponentiating the \( \beta \)-coefficient of the constant of the model). However, the article does not give any information about it. It should be also considered that Chyu et al.1 evaluated 2 coprimary end points: (1) all-cause mortality, and (2) the combined end point of death, urgent transplant, and ventricular assist device implantation. Therefore, the values to be used in the event-free survival formula are probably different, but only 0.00221 is reported. Also, the hazard rates used for the sex-stratified analysis were not reported. In addition, it is unclear which value of \( \lambda \) was used to predict survival when the performance of the proposed model was validated comparing the discrimination abilities with that of the Seattle Heart Failure Model and Heart Failure Survival Score: 0.00221 or the value reported in the original Seattle Heart Failure Model study (i.e., \( \lambda = 0.0405 \))? In the study of Aaronson et al.,1 the Heart Failure Survival Score was calculated for each patient as the absolute value of the sum of the products of the identified prognostic variables and their computed coefficients using Cox analysis while no parametric model was evaluated.

Furthermore, no consistent method of assessing New York Heart Association class is in use, and the interoperator study on class II and class III patients gave a result little better than chance.3 Its value is, therefore, doubtful. Recently, Alba et al.4 identified 20 different risk models developed for patients with heart failure. Therefore, models that are updated based on changes in the patient’s condition could potentially be more useful in decision making. In this view, Maisel et al. recently demonstrated that in patients with acute clinical heart failure decompensation, B-type natriuretic peptide changes correspond to larger changes in risk, both upward and downward.

Disclosures

None.

References

Letter by Petretta and Cuocolo Regarding Article, "Four-Variable Risk Model in Men and Women With Heart Failure"
Mario Petretta and Alberto Cuocolo

Circ Heart Fail. 2014;7:380
doi: 10.1161/CIRCHEARTFAILURE.114.001157

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circheartfailure.ahajournals.org/content/7/2/380

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Circulation: Heart Failure can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Circulation: Heart Failure is online at:
http://circheartfailure.ahajournals.org//subscriptions/