EDITORIAL

# Prognosis After Myocardial Infarction: Should we Still Use the Calculator or Just Measure a Biomarker?

*Pronóstico del infarto: ¿seguimos con la calculadora o basta con un biomarcador?*

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*"Simplicity is the ultimate sophistication"*
Leonardo da Vinci

One of the great challenges of cardiology has been and continues to be to accurately establish the immediate and long-term prognosis of patients with acute coronary syndromes (ACS), particularly in cases of acute myocardial infarction (AMI). This is an imperative question for the patient and family once the hyperacute phase of the first hours of the event is over.

Significant advances in medicine do not occur in a continuous fashion; rather, they follow a step-by-step pattern. Undoubtedly, the incorporation of troponins in the biochemical diagnosis of ACS represents a breakthrough, one of those that mark a milestone. Indeed, this incorporation has forced a redefinition of the diagnosis of AMI. (1,2)

But the advent of high-sensitivity cardiac troponins also allows for an accurate quantitative measurement of myocardial injury size. Thus, one can detect from microscopic infarcts to large ones. As there is a significant correlation between the infarct size and prognosis after AMI, one may feel inclined to use troponin values to predict patients' outcome. (3,4)

Among the multiple risk scores that have been used to measure the prognosis of patients with ACS, the GRACE score and the CRUSADE score are the most widely used tools to estimate risk of ischemic events or bleeding, respectively. (5) These scores include clinical, biochemical and electrocardiographic data, among other variables. The original GRACE score used elevated biomarkers as categorical variables (yes-no). A recent modification has incorporated high-sensitivity cardiac troponin as a quantitative variable, thus improving its prognostic value. (6) The extensive use of these scores makes it possible to compare different populations for statistical, demographic, and scientific purposes.

Could troponin measurement at presentation compete with these well-established scores? An additional problem exists: there are no universal high-sensitivity troponin values. Cardiac troponins I and T have different cut-off values, so it is recommended to use the 99th percentile to differentiate between normal and pathological values. Beyond the controversy regarding the superiority of one over the other, there appear to be negligible disparities in their prognostic significance. (7)

The article published in this issue of the Journal by Kersten et al. (8) proposes a highly innovative solution to this problem: the utilization of a score derived from the troponin value at presentation as multiple of the 99th percentile value to balance the measurements of the various types of troponins. To validate this new score, they compare it with the performance of the GRACE and CRUSADE scores by analyzing ROC curves, using the ReSCAR registry, published in this Journal by Mirza Rivero et al. in 2022, with about 1000 patients from Argentina, and where the present study was a pre-specified analysis. (9)

The results show that the predictive ability is similar to that of traditional scores for non-fatal events, and somewhat lower for fatal in-hospital events and at 1-year follow-up. Interestingly, the area under the ROC curve of 0.79 (95% CI 0.73-0.85) for 1-year mortality of the GRACE score in this study is very similar to the one published by Lucrecia Burgos et al. (0.76, 95% CI 0.70-0.82) from a similar registry of the National Council of Cardiology Residents, CONAREC XVII,(10) which supports the reliability of the data obtained.

A study conducted in Israel by Loutati R et al. with non-ST-segment elevation MI patients demonstrated a clear association between high-sensitivity troponin I quartiles at presentation and mortality at 1 year. (11) Unlike the Argentine study, this study only measured

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troponin I and the selection of the population was more homogeneous, although it supports the same hypothesis.

Which are the clinical values of these findings? In my opinion, a single determination of troponin levels at presentation, which is standard practice in our country and worldwide in all types of hospitals (at least we wish it were so), can be used to estimate the prognosis of patients quite reliably, revaluing the extent of myocardial injury as the main prognostic value in AMI. The addition of the score derived from the troponin value at presentation as multiple of the 99th percentile value is extremely valuable to balance the different types of troponins and standardize its value.

Obviously, the addition of clinical data further improves the predictive ability. These findings underscore the idea that, although troponin is a key biomarker in the evaluation of ACS patients, its interpretation should not be performed in isolation. (12) Integration with other clinical factors, such as those contemplated in GRACE and CRUSADE scores, remains essential for more accurate risk stratification. In this sense, the score based on the 99th percentile troponin value could be considered a complementary tool but should not replace the traditional risk prediction models.

In a time when randomized studies are held in high regard and registries are criticized, this publication serves as a model for obtaining valuable scientific information from a registry. It employs ideas prior to conducting the registry, as recommended by the scientific research methodology.

In fact, this study received the Dr. Raúl Borracci award at the last SAC Congress. The lack of sponsorship for this study, which is common in our environment and rare in other countries, is a credit to the authors and also to the researchers who made its execution possible.

### Conflicts of interest

None declared

(See authors conflicts of interest forms on the website).

### Ethical considerations

Not applicable.

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