



## EDITORIAL COMMENT

# Clinical scores in acute coronary syndrome: When and why should we use them?



## Scores clínicos na síndrome coronária aguda: quando e porque devemos utilizá-los?

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Available online 10 January 2018

Diagnostic labels can be quite opaque regarding prognosis. Under the umbrella of the same medical term, for example non-ST-elevation acute coronary syndrome (NSTEMI-ACS), we bring together patients with a similar pathophysiological condition, but dramatically different probabilities of dying. These prognostic differences influence the aggressiveness of treatments proposed for each patient. Medical scores are helpful tools to predict outcomes and to stratify patients into different levels of risk.<sup>1</sup> In modern cardiovascular medicine, the GRACE, TIMI and CHA<sub>2</sub>DS<sub>2</sub>-VASc scores are used to predict clinical outcome in patients with acute coronary syndrome (ACS) and atrial fibrillation.<sup>2</sup> After they gained wide acceptability in clinical practice, the potential utility of these scores for other clinical purposes has been further explored. For example, CHA<sub>2</sub>DS<sub>2</sub>-VASc is able to predict postoperative atrial fibrillation after cardiac surgery, as well as death or heart failure hospitalization in patients who have undergone cardiac resynchronization therapy.<sup>3,4</sup>

In this issue of the *Journal*, Hammami et al.<sup>5</sup> study the accuracy of the GRACE and TIMI scores for identifying coronary angiographic features (assessed by the SYNTAX score) of patients presenting with NSTEMI-ACS. The authors argue that a tool able to predict coronary anatomy would allow catheterization to be avoided in a subset of patients (those without significant disease) and antithrombotic therapy to be better individualized in others (those who will need emergent surgical myocardial revascularization). GRACE and TIMI scores correlated with the SYNTAX score and predicted the presence of significant obstructive coronary artery disease (CAD), with areas under the curve (AUC) of 0.639 and 0.599, respectively. A GRACE score of 120 and a TIMI score of 2 had a sensitivity of 57% and 76%, and a specificity of 62% and 48%, respectively, for significant obstructive CAD. The scores did not predict the presence of severe CAD.

These interesting findings prompt several considerations. First, patients who were not catheterized were not analyzed, which means that the scores were not studied in patients who clinically were deemed by the attending cardiologist not to benefit from coronary invasive angiography. More importantly, there was a high proportion (31%) of ACS patients without significant obstructive disease. Together, these features may adversely impact the internal and

DOI of original article:

<http://dx.doi.org/10.1016/j.repc.2017.05.012>

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<https://doi.org/10.1016/j.repc.2017.12.003>

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external validity of the study's conclusions. Second, correlation between these scores was to be expected, as TIMI and GRACE include variables (such as age) that drive coronary atherosclerotic disease, and the severity of CAD influences clinical variables included in both scores (such as troponin levels and electrocardiogram changes). However, correlation does not tell us about the discriminative ability of these scores to identify differences in coronary anatomy; it only shows the strength of the linear association between GRACE (or TIMI) and SYNTAX values at the population level. At an individual level, it is not uncommon in clinical practice to see patients with a low GRACE or TIMI score and severe CAD. Conversely, patients with a single left main stenosis can have a low SYNTAX score and clinical characteristics that will increase both GRACE and TIMI scores. Third, the AUC evaluates how well a tool separates individuals into two classes (such as non-significant vs. significant CAD, mild vs. severe CAD), ranging from 0.5 (no discriminative ability) to 1 (perfect discrimination). In addition to being sensitive to the spectrum of disease severity in the studied cohort, the interpretation of the AUC of any diagnostic score should take into account the clinical consequences of misclassifying patients, given that no score will be perfect. The benefits of percutaneous coronary revascularization have been consistently demonstrated even in the frailest patients with ACS.<sup>6,7</sup> Looking at the reported AUC, sensitivity and specificity, we would be more cautious than the authors, who concluded these scores were "accurate for predicting obstructive CAD".<sup>5</sup> Instead, these measures suggest that the discriminative ability of the TIMI and GRACE scores are statistically better than a random tool, but in the context of NSTEMI-ACS it is clinically unacceptable given the number of patients who would be denied a treatment with proven benefit for their prognosis.

Physicians have the duty to predict the clinical course of the ailments they diagnose. This prophetic art has been improved by the adoption of scores, which are tools developed to enhance clinical judgment. We should however

not forget that predictive tools never completely eliminate uncertainty. Reflecting on the clinical cost of that inescapable uncertainty will help us to discern when to take advantage of scores.

## Conflicts of interest

The authors have no conflicts of interest to declare.

## References

1. Chew DP, Junbo G, Parsonage W, et al. Perceived risk of ischemic and bleeding events in acute coronary syndromes. *Circ Cardiovasc Qual Outcomes*. 2013;6:299–308.
2. Timoteo AT, Papoila AL, Lopes JP, et al. Is it possible to simplify risk stratification scores for patients with ST-segment elevation myocardial infarction undergoing primary angioplasty? *Rev Port Cardiol*. 2013;32:967–73.
3. Paoletti Perini A, Bartolini S, Pieragnoli P, et al. CHADS2 and CHA2DS2-VASc scores to predict morbidity and mortality in heart failure patients candidates to cardiac resynchronization therapy. *Europace*. 2014;16:71–80.
4. Peguero JG, Issa O, Podesta C, et al. Usefulness of the CHA2DS2VASc score to predict postoperative stroke in patients having cardiac surgery independent of atrial fibrillation. *Am J Cardiol*. 2015;115:758–62.
5. Hammami R. Accuracy of the TIMI and GRACE scores in predicting coronary disease in patients with non-ST-elevation acute coronary syndrome. *Rev Port Cardiol*. 2017, <http://dx.doi.org/10.1016/j.repc.05.012>
6. Mehta SR, Cannon CP, Fox KA, et al. Routine vs selective invasive strategies in patients with acute coronary syndromes: a collaborative meta-analysis of randomized trials. *JAMA*. 2005;293:2908–17.
7. Tegn N, Abdelnoor M, Aaberge L, et al. Invasive versus conservative strategy in patients aged 80 years or older with non-ST-elevation myocardial infarction or unstable angina pectoris (After Eighty study): an open-label randomised controlled trial. *Lancet*. 2016;387:1057–65.