



## EDITORIAL COMMENT

# Risk stratification after acute coronary syndromes: Scores, scores and yet another score



## Estratificação de risco após síndromes coronárias agudas. *Scores, scores e mais (um) score*

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Identification of high-risk patients soon after an acute coronary syndrome (ACS) event has been a challenge for clinicians in the past two or three decades. Numerous studies have clearly demonstrated that more intensive, even aggressive, management of these patients results in significantly better outcomes, in particular in the reduction of major adverse cardiac events.

Both ST-elevation myocardial infarction (STEMI) and non-STEMI (NSTEMI) patients have been the subject of risk stratification studies and a number of risk scores have been proposed. Some of these scores were tested in populations of clinical trials (of which the TIMI scores<sup>1,2</sup> are the best known), but others (such as the GRACE score<sup>3,4</sup>) were derived from large registries, with the obvious advantages of reflecting real-life patients, including older and sicker patients.

### Identifying high-risk patients

ACS risk scores aim to identify high-risk patients who should be managed with the best available care, in the shortest

possible timeframe. This is in contrast with, for example, the CHA<sub>2</sub>DS<sub>2</sub>-VASc score<sup>5</sup> for non-valvular atrial fibrillation, which aims to identify very low-risk patients who do not need to be anticoagulated, since the risk of cerebral or peripheral embolism is minimal.

Early referral of these high-risk ACS patients to reference centers with percutaneous coronary intervention (PCI) capabilities and cardiac intensive care units has been shown to result in better short- and long-term outcomes.

Risk stratification can be particularly useful to identify high-risk NSTEMI patients who should be referred for more intensive management at an earlier stage of their ACS episode.

### Low-risk patients should be properly treated too

A word of caution for the management of patients stratified as low-risk on presentation shortly after an ACS episode, who should also be referred for the best care possible, particularly those presenting with STEMI. Emergency response services should be ready to provide immediate referral to a PCI center, provided it is available in the timeframe defined by the ACS and PCI guidelines.<sup>6,7</sup>

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## Do we need yet another score?

All existing risk stratification scores have their strengths and weaknesses. The TIMI scores have been used for some time now but they were derived from clinical trials and their application to real-world patients has been the subject of debate.

The robust GRACE score<sup>3,4</sup> has the advantage of being based on a large registry, but the disadvantage of including variables that are not available on admission (such as some laboratory results), meaning that it is not applicable for immediate stratification after presentation in the pre-hospital or emergency room environments.

A more immediately applicable score was proposed in 2013 by Huynh et al.<sup>8</sup> based on a Canadian population registry. The Canada Acute Coronary Syndrome (C-ACS) risk score is a simple-to-use score with only four variables (age, Killip class, systolic blood pressure and heart rate) that the investigators have shown enables rapid identification of high-risk patients with ACS, even before biological markers can be obtained.

The question then arises: if we already have good and reliable scores for ACS risk stratification, why would we want yet another score?

The main reason is concern about the applicability of scores derived from populations from North America (US and Canada) to European ACS patients. There are a number of reasons to question this extrapolation. There are relevant epidemiological, genetic, environmental and cultural differences as well as differences in organizational aspects of healthcare systems. Also, ACS management differs considerably between countries on opposite sides of the ocean.

To resolve this question, in this issue of the *Journal* Timóteo et al.<sup>9</sup> propose a new score derived from the Portuguese Registry on Acute Coronary Syndromes (ProACS), a multicenter nationwide ACS registry. It is a prospective, continuous, and observational registry that includes more than 40 000 patients from 33 participating cardiology departments in Portugal.

Thus, this study has the advantage of being based on a large, continuous, national ACS registry, that likely reflects local real-world practice. The validation (both internal and external) was well designed, the score's performance was similar when comparing patients with STEMI and NSTEMI, and its predictive ability was only slightly lower than that of the robust GRACE risk score. The external validation of the score has been previously published in this journal.<sup>10</sup>

## Creating a new ACS risk score? Keep it simple

Having learned the lessons of the C-ACS score, Timóteo et al. designed the ProACS score to be simple to use and without the need for laboratory results.

Simplicity is a key factor for widespread applicability of a risk score. As the authors mention in the discussion, the need to wait for laboratory results has led to the underuse of the GRACE score in daily clinical practice.

The proposed ProACS score can be easily calculated with clinical variables only, and has nonetheless showed good discriminatory ability in the identification of high-risk ACS patients (both STEMI and NSTEMI).

## Could we make it even simpler?

As mentioned above, one of the major advantages of the C-ACS score is its simplicity, as it has only four variables to consider, 1 point for each variable and clear cut-off values (age  $\geq 75$  years, Killip class  $>1$ , systolic blood pressure  $<100$  mm Hg, and heart rate  $>100$  beats/min). Huynh et al.<sup>8</sup> could justifiably point out in their conclusions "Because this risk score is simple and easy to memorize and calculate, it can be rapidly applied by health care professionals without advanced medical training."

The ProACS score is also simple to calculate, but the cut-off values for some of the variables are not so easy to memorize. We may wonder if the score's discriminatory value would decrease significantly if more straightforward numbers were used as cut-offs, e.g. 70 (or 75) instead of 72 years for age and/or 115 mmHg instead of 116 mmHg for systolic blood pressure.

The exact transposition of the multivariate statistical analysis is understandable, but sometimes some loss of discriminatory value (as long as it is only marginal) can be compensated by more user-friendly cut-off variables.

That being said, the authors of the ProACS score are to be congratulated for their work, which deserves the attention of other investigators in this research area. Validation of their proposed score by other groups in other European countries would be most welcome.

## Conflicts of interest

The author has no conflicts of interest to declare.

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