



ORIGINAL ARTICLE

Validation of two US risk scores for percutaneous coronary intervention in a single-center Portuguese population of patients with acute coronary syndrome



Ana T. Timóteo^{a,*}, André V. Monteiro^a, Guilherme Portugal^a, Pedro Teixeira^a,
Helena Aidos^{b,c}, Maria L. Ferreira^a, Rui C. Ferreira^a

^a Cardiology Department, Santa Marta Hospital, Centro Hospitalar de Lisboa Central, Lisbon, Portugal

^b Minalytics, Advanced Solutions for Data Mining and Analytics, Lisbon, Portugal

^c Instituto de Telecomunicações, Instituto Superior Técnico, Lisbon, Portugal

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KEYWORDS

Risk stratification;
Scores;
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Abstract

Introduction: New scores have been developed and validated in the US for in-hospital mortality risk stratification in patients undergoing coronary angioplasty: the National Cardiovascular Data Registry (NCDR) risk score and the Mayo Clinic Risk Score (MCRS). We sought to validate these scores in a European population with acute coronary syndrome (ACS) and to compare their predictive accuracy with that of the GRACE risk score.

Methods: In a single-center ACS registry of patients undergoing coronary angioplasty, we used the area under the receiver operating characteristic curve (AUC), a graphical representation of observed vs. expected mortality, and net reclassification improvement (NRI)/integrated discrimination improvement (IDI) analysis to compare the scores.

Results: A total of 2148 consecutive patients were included, mean age 63 years (SD 13), 74% male and 71% with ST-segment elevation ACS. In-hospital mortality was 4.5%. The GRACE score showed the best AUC (0.94, 95% CI 0.91–0.96) compared with NCDR (0.87, 95% CI 0.83–0.91, $p=0.0003$) and MCRS (0.85, 95% CI 0.81–0.90, $p=0.0003$). In model calibration analysis, GRACE showed the best predictive power. With GRACE, patients were more often correctly classified than with MCRS (NRI 78.7, 95% CI 59.6–97.7; IDI 0.136, 95% CI 0.073–0.199) or NCDR (NRI 79.2, 95% CI 60.2–98.2; IDI 0.148, 95% CI 0.087–0.209).

Conclusion: The NCDR and Mayo Clinic risk scores are useful for risk stratification of in-hospital mortality in a European population of patients with ACS undergoing coronary angioplasty. However, the GRACE score is still to be preferred.

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* Corresponding author.

E-mail address: ana.timoteo@yahoo.com (A.T. Timóteo).

PALAVRAS-CHAVE

Estratificação de risco;
Scores;
Síndromes coronárias agudas;
Angioplastia coronária

Validação de dois scores de risco americanos para a intervenção coronária percutânea num estudo unicêntrico da população portuguesa para doentes com síndrome coronária aguda

Resumo

Introdução: Foram validados novos scores nos EU para estratificação de risco de mortalidade hospitalar em doentes submetidos a angioplastia coronária: da *National Cardiovascular Data Registry* (NCDR) e da Mayo Clinic (MC). Procurámos validar estes scores numa população Europeia com Síndrome Coronária Aguda (SCA) e comparar a sua acuidade preditiva com o score de GRACE.

Métodos: Registo de SCA de um único centro de doentes submetidos a angioplastia coronária. Utilizaram-se as curvas *Receiver Operating Characteristics* (ROC) e a *Area Under Curve* (AUC), a mortalidade observada e esperada e a análise do *Net Reclassification Index* (NRI)/*Integrated Discrimination Improvement* (IDI).

Resultados: Foram incluídos 2148 doentes consecutivos. Idade média de 63 (DP 13) anos, 74% do sexo masculino e 71% com SCA com elevação ST. A mortalidade hospitalar foi de 4,5%. O score GRACE foi o que mostrou melhor AUC (0,94, IC 95% 0,91 – 0,96) comparativamente com o NCDR (0,87, IC 95% 0,83 – 0,91, p=0,0003) e o MC (0,85, IC 95% 0,81 – 0,90, p=0,0003). Na análise da calibração, o GRACE mostrou o melhor poder preditivo. Com o score GRACE, os doentes foram mais corretamente classificados comparativamente com o da Mayo Clinic (NRI 78,7, IC 95% 59,6 – 97,7; IDI 0,136, IC 95% 0,073 – 0,199) e NCDR (NRI 79,2, IC 95% 60,2 – 98,2; IDI 0,148, IC 95% 0,087 – 0,209).

Conclusão: Os scores NCDR e MC são úteis na estratificação de risco para mortalidade hospitalar numa população europeia de doentes com SCA submetidos a angioplastia coronária. Contudo, o score GRACE continua a ser o ideal.

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Introduction

Risk stratification is essential in the management of acute coronary syndromes (ACS), particularly in non-ST-elevation ACS. ACS patients are a heterogeneous group of patients in terms of risk, which has important implications for management strategies. Early risk stratification is therefore essential.

The Global Registry of Acute Coronary Events (GRACE) score is the most widely used risk score due to its high predictive accuracy.¹ Two groups in the US have developed more recent risk scores for stratification of patients undergoing coronary angioplasty, including patients with ACS.^{2,3}

We sought to validate these US risk scores in a European population of patients with ACS and to compare their predictive accuracy with that of the classical GRACE risk score.

Methods

All consecutive adult patients (aged ≥ 18 years) included in a single-center registry on ACS between January 1, 2005 and October 31, 2013 were eligible. This is a continuous, prospective and observational registry. Inclusion criteria were a history of chest pain at rest or other symptoms suggestive of an ACS within 24 hours before admission associated with new or presumed new ECG changes (significant ST-T wave changes or left bundle branch block) and/or dynamic changes in levels of biomarkers of myocardial necrosis. ST-elevation myocardial infarction (STEMI) was

defined as persistent (>20 minutes) ST-segment elevation. All other cases were considered non-ST-elevation ACS.

Data were recorded in a database that included demographic, clinical and patient management characteristics, as well as hospital outcome. Hypertension, diabetes and hyperlipidemia were defined as either previously known or on specific therapy. Patients were classified as smokers if they had smoked during the previous six months and were self-reported.

Decisions regarding patient management strategy, including referral for coronary angiography and myocardial revascularization, either by percutaneous coronary intervention (PCI) or by coronary artery bypass grafting (CABG), were left to the discretion of the attending physician. Only patients undergoing PCI were eligible for the present study.

For each patient a score was retrospectively assigned according to the National Cardiovascular Data Registry (NCDR) risk score, the Mayo Clinic risk score (MCRS) and the Global Registry of Acute Coronary Events (GRACE) risk score.¹⁻³

The primary endpoint was all-cause mortality during the index hospitalization.

Other outcomes were also recorded in the study population: stroke/transient ischemic attack (TIA) and major bleeding. Stroke/TIA was defined as the presence of new neurological symptoms with signs of ischemia or bleeding on computed tomography or magnetic resonance imaging. Major bleeding was defined according to the Global Use of Strategies to Open Occluded Coronary Arteries (GUSTO) criteria as intracranial bleeding or

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