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ORIGINAL ARTICLE

Mortality and cardiovascular morbidity within 30 days of discharge following acute coronary syndrome in a contemporary European cohort of patients: How can early risk prediction be improved? The six-month GRACE risk score

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KEYWORDS
GRACE risk score;
30-day events;
Mortality;
Reinfarction;
Heart failure;
Stroke

Abstract
Objectives: Given the increasing focus on early mortality and readmission rates among patients with acute coronary syndrome (ACS), this study was designed to evaluate the accuracy of the GRACE risk score for identifying patients at high risk of 30-day post-discharge mortality and cardiovascular readmission.
Methods: This was a retrospective study carried out in a single center with 4229 ACS patients discharged between 2004 and 2010. The study endpoint was the combination of 30-day post-discharge mortality and readmission due to reinfarction, heart failure or stroke.
Results: One hundred and fourteen patients had 30-day events: 0.7% mortality, 1% reinfarction, 1.3% heart failure, and 0.2% stroke. After multivariate analysis, the six-month GRACE risk score was associated with an increased risk of 30-day events (HR 1.03, 95% CI 1.02–1.04; p<0.001), demonstrating good discrimination (C-statistic: 0.79±0.02) and optimal fit (Hosmer–Lemeshow p=0.83). The sensitivity and specificity were adequate (78.1% and 63.3%, respectively), and negative predictive value was excellent (99.1%). In separate analyses for each event of interest (all-cause mortality, reinfarction, heart failure and stroke), assessment of the six-month GRACE risk score also demonstrated good discrimination and fit, as well as adequate predictive values.

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Conclusions: The six-month GRACE risk score is a useful tool to predict 30-day post-discharge death and early cardiovascular readmission. Clinicians may find it simple to use with the online and mobile app score calculator and applicable to clinical daily practice.

PALAVRAS-CHAVE
Score de risco GRACE;
Eventos aos 30 dias;
Mortalidade;
Reenfarte;
Insuficiência cardíaca;
Acidente vascular cerebral

Mortalidade e morbilidade cardiovascular nos primeiros 30 dias após uma síndrome coronária aguda num coorte contemporâneo europeu de doentes: como podemos melhorar a predição precoce de risco? O *score* de risco GRACE aos seis meses

Resumo
Objetivos: Tendo em conta a importância crescente das taxas de mortalidade e readmissão precoce nos doentes com síndrome coronária aguda (SCA), realizámos este estudo que pretende avaliar a precisão do *score* de risco GRACE na identificação dos doentes com risco elevado de readmissão e mortalidade cardiovascular no primeiro mês após a alta.
Método: Estudo retrospetivo efetuado num único centro com 4229 doentes com SCA com alta entre 2004-2010. Objetivo primário foi a combinação de mortalidade e readmissão por reenfarte, insuficiência cardíaca ou acidente vascular cerebral aos 30 dias após a alta.
Resultados: Cento e catorze doentes tiveram eventos aos 30 dias: mortalidade 2,7%; reenfarte 1%; insuficiência cardíaca 1,3%; e acidente vascular cerebral 0,2%. Após uma análise multivariada, o *score* de risco GRACE aos seis meses esteve associado com um maior risco de eventos aos 30 dias (HR 1,03, IC 95% 1,02-1,04, p<0,001), demonstrando uma boa discriminação (C-statistics: 0,79±0,02) com uma calibração ótima (HL p: 0,83). A sensibilidade e especificidade foram adequadas (78,1-63,3%, respetivamente), com um valor preditivo negativo excelente (99,1%). Numa análise separada de cada um dos eventos em causa (mortalidade por todas as causas, reenfarte, insuficiência cardíaca ou acidente vascular cerebral), a avaliação do *score* de risco GRACE aos seis meses mostrou também uma boa discriminação e calibração, assim como valores preditivos adequados.
Conclusões: O *score* de risco GRACE aos seis meses é um instrumento útil na predição da morte e das readmissões precoces cardiovasculares aos 30 dias. Os médicos podem recorrer facilmente a este *score* (*app* móvel, *online*) e aplicá-lo na prática clínica diária.

Introduction

Acute coronary syndrome (ACS) is a high-risk condition and a common cause of hospital admission around the world. Hospitalization for ACS and its early aftermath define a period of vulnerability, during which clinical deterioration leads to readmission. Since readmission after an ACS is common, expensive, and varies across hospitals, suggesting preventable events, national health systems have identified readmission as an opportunity to improve quality of care and reduce costs.[1] In this context, the transition of care from the inpatient to the outpatient setting is currently seen as an opportunity to prevent readmission.[2]

To improve efficiency, the highest intensity interventions should target the patients who are most likely to benefit.[3] Against this background, the purposes of this study were to determine the significant predictors of 30-day mortality and early cardiovascular morbidity following discharge after an ACS, and to evaluate the utility of the Global Registry of Acute Coronary Events (GRACE) risk score in this setting.

Methods

Data sources and samples

This was a retrospective study in which demographic, clinical, and angiographic data, as well as data on management and in-hospital complications, had been prospectively collected and recorded in an electronic database. Subjects were all patients with a diagnosis of ACS admitted consecutively to our hospital between January 2004 and June 2010. The initial cohort consisted of 4645 patients, of whom 274 died during the in-hospital phase. Of the 4371 discharged patients, those in whom ACS was triggered in the context of surgery, sepsis, trauma, or cocaine consumption (n=41), and those missing data for any variable of the GRACE risk score (n=67), were excluded. Of the remaining 4263 patients, one-month follow-up was completed in 99.2% (34 patients without follow-up data). Thus, the final cohort was composed of 4229 patients. The study complies with the Declaration of Helsinki, and was approved by the Clinical Research Ethics Committee of our hospital.