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ORIGINAL ARTICLE

Accuracy of the TIMI and GRACE scores in predicting coronary disease in patients with non-ST-elevation acute coronary syndrome

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Abstract
Introduction: The GRACE and TIMI scores have been well validated for assessment of prognosis in non-ST-elevation acute coronary syndrome (NSTE-ACS). However, their value in predicting coronary artery disease (CAD) has been little studied. We aimed to assess the relationship between these scores and the extent of coronary disease.
Methods: We analyzed 238 consecutive patients admitted for NSTE-ACS and undergoing a coronary angiogram during hospitalization. The severity of CAD was assessed using the SYNTAX score. Obstructive CAD was defined as ≥50% stenosis in the left main or ≥70% stenosis in other vessels. Severe CAD was defined as a SYNTAX score >32. The Pearson test was used to assess the correlation between scores.
Results: The SYNTAX score was higher in patients at high risk (GRACE score: p<0.001 and TIMI score: p=0.001). Moreover, there was a significant positive correlation between the GRACE and SYNTAX scores (r=0.23, p<0.001) as well as between TIMI and SYNTAX (r=0.2, p=0.002). Both clinical scores can predict obstructive CAD moderately well (area under the curve [AUC] for GRACE score: 0.599, p=0.015; TIMI score: AUC 0.639, p=0.001) but not severe disease. A GRACE score of 120 and a TIMI score of 2 were predictive of obstructive CAD with, respectively, a sensitivity of 57% and 75.7% and a specificity of 61.8% and 47.9%.
Conclusion: The GRACE and TIMI scores correlate moderately with the extent of coronary disease assessed by the SYNTAX score. They can predict obstructive CAD but not severe disease.
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Rigor dos *scores* de TIMI e GRACE na previsão da doença coronária em doentes com síndrome coronária aguda sem elevação do segmento-ST

Resumo

Objetivos: Os *scores* GRACE e TIMI foram convenientemente validados na avaliação do prognóstico de síndrome coronária aguda sem elevação do segmento-ST (NSTE-ACS). No entanto, o seu valor na previsão de doença coronária (DC) está mal estudado. O nosso objetivo é avaliar a relação entre esses *scores* e a extensão da doença coronária.

Métodos: Foram consecutivamente avaliados 238 doentes admitidos para NSTE-ACS e submetidos a angiografia coronária durante o internamento. A gravidade da DC foi avaliada durante o *score* Syntax. Definimos DC obstrutiva quando a obstrução da DC é $\geq$ 50% no tronco comum e $\geq$ 70% nos outros vasos. Uma DC grave é definida por um *score* syntax >32. O teste Pearson foi usado para avaliar a correlação entre os *scores*.

Resultados: O valor do *score* Syntax foi superior nos doentes de alto risco (escore GRACE: p<0,001 e o *score* TIMI: p=0,001). Além disso, houve uma correlação significativa positiva entre os *scores* GRACE e Syntax (r=0,23, p<0,001), assim como entre os *scores* TIMI e Syntax (r=0,2, p=0,002). Ambos os *scores* clínicos podem de certo modo prever DC obstrutiva (*score* GRACE: AUC=0,599 (p=0,015); *score* TIMI: AUC=0,639 (p=0,001), mas não uma doença grave. Um *score* GRACE=120 e um *score* TIMI=2 foram fatores preditores da DC obstrutiva com uma sensibilidade de 57% e de 75,7% respetivamente e uma especificidade de 61,8% e de 47,9%.

Conclusão: Os *scores* GRACE e TIMI estão ligeiramente correlacionados com a extensão da doença coronária avaliada pelo *score* Syntax. Podem prever uma DC obstrutiva, mas não uma doença grave.

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Introduction

Given the wide spectrum of risk for death and recurrent events among patients with non-ST-elevation acute coronary syndrome (NSTE-ACS), risk stratification has become the cornerstone of management of this entity. American and European clinical guidelines recommend the use of the Global Registry for Acute Coronary Events (GRACE) or the Thrombolysis in Myocardial Infarction (TIMI) risk scores for risk assessment[1–3]; however, these scores are not intended to predict the extent and severity of coronary artery disease (CAD). Assessing the coronary anatomy before performing coronary angiography may change the therapeutic decision, including the timing and intensity of interventions, and could even avoid an invasive strategy in patients in whom no obstructive coronary disease is predicted; conversely, if the scores could better identify patients with extensive disease (SYNTAX score >32), it would be possible to avoid the administration of aggressive antiplatelet therapy that would increase the risk of bleeding in the event of emergent surgery. Few studies have analyzed the correlation between prognostic risk scores and coronary anatomy, and their results were disparate. A large number of scoring systems and laboratory parameters are used in this context in clinical practice. The SYNTAX score is a system for determining the extent and severity of CAD but has seldom been used for this purpose.[4] Therefore, we sought to determine the accuracy of the GRACE and TIMI scores in predicting angiographic data in patients admitted with NSTE-ACS and to analyze the correlation of clinical risk scores with the angiographic extent and severity of CAD as assessed by the SYNTAX score.

Methods

We included all patients admitted to our department between January 2014 and December 2014 with a diagnosis of NSTE-ACS. NSTE-ACS was defined as acute chest pain without persistent ST-segment elevation. Electrocardiogram (ECG) changes could include transient ST-segment elevation, persistent or transient ST-segment depression, T-wave inversion, flat T waves or T-wave pseudo-normalization, or the ECG could be normal. The level of conventional troponin could be positive, with a dynamic rise or fall (non-ST-elevation myocardial infarction), or normal (unstable angina).

We excluded patients with ST-elevation myocardial infarction, new left bundle branch block on the ECG, and chest pain of proven non-ischemic etiology (such as takotsubo syndrome or myocarditis), after coronary angiography and magnetic resonance imaging.

Since we aimed to investigate the relationship between clinical risk scores and the extent of native vessel disease, and the SYNTAX score was originally developed for native CAD, we also excluded patients with prior surgical or percutaneous revascularization.

Although this was a retrospective study, for each patient the original GRACE and TIMI scores at admission were recalculated based on their medical records.[3] The tertiles of risk categories used were: for in-hospital mortality, low risk for GRACE score $\leq$108, intermediate risk for GRACE score between 109 and 140, and high risk for GRACE score $\geq$141. For the TIMI score, the risk is considered low for TIMI score $\leq$3, intermediate for TIMI score <5 and high for TIMI score $\geq$5.