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ORIGINAL ARTICLE

Applicability of the Zwolle risk score for safe early discharge after primary percutaneous coronary intervention in ST-segment elevation myocardial infarction

António Tralhão*, António Miguel Ferreira, Sérgio Madeira, Miguel Borges Santos, Mariana Castro, Ingrid Rosário, Marisa Trabulo, Carlos Aguiar, Jorge Ferreira, Manuel Sousa Almeida, Miguel Mendes

Hospital de Santa Cruz, Western Lisbon Hospital Centre, Department of Cardiology, Carnaxide, Portugal

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KEYWORDS
ST-segment elevation myocardial infarction;
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Early discharge

Abstract
Introduction and Aim: The optimal length of stay for patients with uncomplicated ST-segment elevation myocardial infarction (STEMI) treated with primary percutaneous coronary intervention (PPCI) is still undetermined. The Zwolle risk score (ZRS) is a simple tool designed to identify patients who can be safely discharged within 72 hours. The purpose of this study was to assess the applicability and performance of the ZRS in our population.
Methods: We studied 276 consecutive patients (mean age 62±14 years, 75% male, 20% Killip class >1) admitted over a two-year period for STEMI and treated with PPCI. ZRS, length of stay, 30-day mortality and readmission were obtained for all patients. Low risk was defined as ZRS ≤3.
Results: The median ZRS was 3 (interquartile range [IQR] 1–4), with 171 patients (62%) being classified as low risk. Thirty-day mortality was 4.7% (13 patients). Compared to other patients, low-risk patients had shorter length of stay (median 5.0 [IQR 4–7] vs. 7.0 [5–13] days, p<0.001), and lower 30-day mortality (0 vs. 12.4%, p<0.001), yielding a negative predictive value of 100% (95% CI 97.0–100%) for the proposed cutoff. The ZRS showed excellent discriminative power (C-statistic: 0.937, 95% CI 0.906–0.968, p<0.001), and good calibration against the original cohort.
Conclusions: The ZRS appears to perform well in identifying low-risk STEMI patients who could be safely discharged within 72 hours of admission. Using the ZRS in our population could result in a more rational use of in-patient resources.

* Corresponding author.
E-mail address: atralhao@gmail.com (A. Tralhão).

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PALAVRAS-CHAVE
Enfarte agudo do miocárdio com supradesnivelamento de ST;
Intervenção coronária percutânea primária;
Score de Zwolle;
Alta precoce

Avaliação da segurança da alta precoce após enfarte agudo do miocárdio com supradesnivelamento do segmento ST submetido a intervenção coronária percutânea primária: o *Score* de Zwolle

Resumo
Introdução e objectivos: A duração ótima de internamento após enfarte agudo do miocárdio com supradesnivelamento do segmento ST (EAMCST) não complicado, submetido a intervenção coronária percutânea primária (ICPP), permanece por determinar. O *Score* de Zwolle (SZ) é um instrumento simples, desenhado para identificar os doentes candidatos a alta precoce (<72h) segura. Este estudo pretendeu avaliar a aplicabilidade do SZ na nossa população.
Métodos: Analisámos 276 doentes consecutivos (idade média 62±14 anos, 75% homens, 20% em classe de Killip>1) com EAMCST submetidos a ICPP durante um período de dois anos. Foram obtidos os SZ, duração de internamento, mortalidade e readmissão aos 30 dias. Foi definido baixo risco como SZ ≤3.
Resultados: A mediana do SZ foi de 3 [distância interquartil (IQR) 1-4] e 171 doentes (62%) foram classificados como de baixo risco. A mortalidade aos 30 dias foi de 4,7% (13 doentes). Em comparação com os restantes, os doentes de baixo risco tiveram menor duração de internamento [mediana 5,0 (IQR 4-7) *versus* 7,0 (IQR 5-13) dias, p<0,001] e menor mortalidade (0 *versus* 12,4%, p<0,001), resultando num valor preditivo negativo de 100% (IC95% 97,0-100%) para o *cut-off* proposto. O ZS mostrou excelente poder descriminativo (estatística-C: 0,937, IC95% 0,906-0,968, p<0,001) e boa calibração quando comparado com o coorte original.
Conclusões: O SZ parece capaz de identificar com precisão os doentes com EAMCST de baixo risco que podem ter alta segura 72h após a admissão. O uso do SZ na nossa população poderá resultar numa utilização mais racional dos recursos hospitalares.

Introduction

ST-segment elevation myocardial infarction (STEMI) is one the most frequent presentations of acute coronary syndromes. Despite significant reductions in morbidity and mortality due to optimization of reperfusion strategies, some issues are still poorly defined in the current guidelines.[1,2] One of the least studied aspects is the optimal length of stay (LOS) for patients with uncomplicated STEMI. Current practice adopts 5–7 days for monitoring of complications, but this is largely empirical.[3,4] A need to better define the appropriate LOS has been recognized by European and American cardiovascular societies, which suggest the use of prognostic tools to accurately identify low-risk patients who can be safely discharged within 72 hours.[1,2,5,6] The Zwolle risk score (ZRS) is a simple six-item score (age ≥60, time to reperfusion >4 hours, anterior infarct, TIMI flow post angioplasty, three-vessel disease, Killip class; Appendix 1) that showed promising results in a pivotal study.[7] Using the ZRS could potentially improve patient throughput and reduce healthcare costs,[5,7] but any failure to identify patients who will suffer from early complications could have dire consequences and legal implications. The adoption of a targeted early discharge policy should therefore always be preceded by validation in the specific population in which it will be used. We sought to validate the ZRS in our population of STEMI patients and to identify variables associated with increased LOS.

Methods

We conducted an observational retrospective study of all patients with STEMI referred to our center for primary percutaneous coronary intervention (PPCI) between January 2011 and December 2012 (n=278). Of these, two died during the index procedure and were excluded from the analysis, yielding a population of 276 patients admitted to the cardiac intensive care unit. The ZRS was calculated for each patient.[7] In this score, each variable is given points for a minimum score of 0 and a maximum of 16 (Appendix 1). Low risk was defined as ZRS ≤3, as in the original study.[7] In the subset of low-risk patients, clinical data were additionally scanned for variables that could influence LOS. LOS was defined as the time (in days) from first balloon inflation to time of hospital discharge. The primary endpoint was 30-day mortality. The secondary endpoint was death or readmission within 30 days of discharge. Mortality and readmissions up to 30 days after discharge were obtained for all patients by reviewing medical charts, supplemented by telephone interview whenever necessary. Informed consent for inclusion in a prospective registry was obtained from all patients.

The statistical analysis was performed using SPSS version 21.0 (IBM Corp., Armonk, NY, USA) and MedCalc 6.0 (MedCalc Software, Ostend, Belgium). Differences between groups were tested using the t test and one-way analysis of variance and the K test for medians for continuous variables with a normal and non-normal distribution, respectively. Categorical variables were compared using Fisher's exact