

RESEARCH GROUP: REGISTRY OF ACUTE CORONARY SYNDROMES AND HEART FAILURE

## DOES GRACE SCORE INCREMENT PROGNOSTIC ASSESSMENT AFTER ANGIOGRAPHY IN ACUTE CORONARY SYNDROMES?

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### Abstract

**Rational:** The GRACE Score assessed at admission predicts mortality in patients with non-ST elevation acute coronary syndromes (ACS). However, once coronary anatomy is assessed, it is not known whether this score increments prognostic assessment. **Objective:** To test the hypothesis that the GRACE Score adds prognostic value to coronary anatomy in patients with ACS. **Methods:** Prospective cohort, including patients with ACS who underwent coronary angiography while

admitted to the hospital. Anatomical extension of coronary disease was characterized by the Duke Jeopardy score (DJS) and the number diseased artery (NDA). The primary end-point was the composite of death, non-fatal MI or refractory unstable angina. **Results:** 112 patients enrolled, aged  $70 \pm 12$ , 14% incidence of cardiovascular events. C-statistics for GRACE was 0.68 (95%CI=0.53-0.84), for DJS was 0.78 (95%CI=0.67-0.9) and for NDA was 0.74 (95%CI=0.61-0.88). Logistic regression analysis demonstrated independent predictive value of GRACE in relation to anatomical information. However, when this Score was added to DJS or NDA, no improving in C-statistic was observed: DJS-GRACE had a C-statistics of 0.78 (95%CI=0.64-0.92) and NDA-GRACE of 0.76 (95%CI=0.60-0.92). **Conclusion:** The GRACE score does not add prognostic value to angiographic data in patients with ACS.

**Keywords:** Acute coronary syndromes; angiography; prognostic; Grace score

## INTRODUCTION

The GRACE Score assessed at admission predicts mortality in patients with non-ST elevation acute coronary syndromes (ACS).<sup>(1)</sup> However, once coronary anatomy is assessed,<sup>(2,3,4)</sup> it is not known whether this score increments prognostic assessment. Our aim is to test the hypothesis that adding the GRACE Score to angiographic data improves prognostic assessment in patients with SCA.

## METHODS

### Study population

Consecutive patients admitted to the coronary care unit of Portuguese Hospital due to unstable angina (UA) or NSTEMI between August 2007 and September 2009 were considered candidates for the study. The inclusion criteria were defined as rest onset of typical chest discomfort in the prior 48 hours, absence of a ST-segment elevation, coronary angiography during admission and at least one of the following objective criteria: (1) positive serum marker of myocardial necrosis, defined as cTnT  $> 0.030 \mu\text{g/L}$  or hs-cTnI  $> 0.034 \mu\text{g/L}$ , which correspond to the values above the 99th percentile a healthy reference population and with total imprecision of 10%; (2) electrocardiographic ischemic changes consisting of transient ST-segment depression ( $\geq 0.05\text{mV}$ ) or T wave inversion ( $\geq 0.1 \text{ mV}$ ); (3) previous documentation of coronary artery disease, defined as a definitive history of myocardial infarction or coronary obstruction  $\geq 50\%$  at angiography. Patients with previous coronary artery bypass graft surgery were excluded from the sample because it would be impossible to calculate the DJS. Once criteria for entering the study were fulfilled, patients provided written informed consent. The study protocol conforms with ethical guidelines of 1975 Declaration of Helsinki as reflected in *a priori* approval by the Institution's human research ethics committee.

## Variables definition

GRACE was calculated by clinical and laboratory data for each individual patient. Anatomical extension of coronary disease was characterized by the Duke Jeopardy score (DJS) and the number diseased artery (NDA).<sup>(2,3,4)</sup>

## Clinical End-points

Individuals were followed during hospitalization in order to identify recurrent cardiovascular events, which were adjudicated by investigators, independent of physician impression. As a primary end-point, major cardiovascular events during hospitalization were defined as the composite of death, nonfatal acute myocardial infarction or refractory unstable angina. Myocardial infarction as an outcome endpoint was defined as either a new Q-wave or troponin elevation during hospitalization despite normal values during the first 24 hours. For patients with infarction at admission, a new peak of mass CK-MB (> 50% the previous value and above the normal value) was required for diagnosis of reinfarction. Refractory angina during hospitalization was defined as recurrent chest pain at least twice, despite nitrates and anti-angina therapy ensuring controlled oxygen consumption.

## RESULTS

One hundred and twelve patients was enrolled, with mean age of  $71 \pm 12$ , 51% of males, Killip class > 1 was encountered in 11% of patients, 32% of patients had 3 vessel disease. GRACE's and EDJ's median was 115 (IQI 91-141) and 4 (IQI 0-7.5), respectively. Other characteristics are depicted on Table 1.

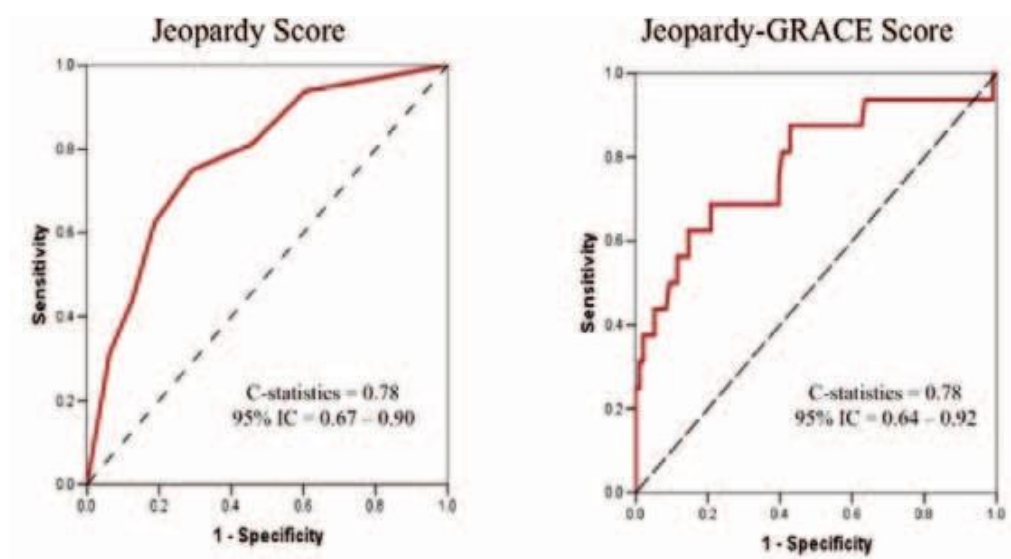
Table 1 – Baseline Characteristics

Sample Size	112
Age (years)	$70 \pm 12$
Males	57 (51%)
Diabetes	35 (31%)
ST-segment Depression	17 (15%)
Positive Troponin	70 (63%)
Serum Creatinine (mg/dL)	$1.24 \pm 1.04$
Systolic Blood Pressure (mmHg)	$152 \pm 33$
Heart Rate (bpm)	$79 \pm 22$
Killip Class > 1	12 (11%)
LV Ejection Fraction < 45%	12/101 (12%)
3-Vessel or Left Main Disease	36 (32%)

GRACE Score	115 (91 – 141)
TIMI-Risk Score	3 (2 – 4)
<b>In-hospital Treatment</b>	
Aspirin	110 (98%)
Clopidogrel	106 (95%)
Bloqueador da GP IIb/IIIa	6 (5.3%)
Heparins	103 (92%)
Statin Therapy	106 (95%)
Coronary Angioplasty	33 (29%)
Surgical Revascularization	15 (13%)

Incidence of cardiovascular events in the hospital was 14%. C-statistics for GRACE was 0.68 (95%CI=0.53-0.84), DJS was 0.78 (95%CI=0.67-0.9) and NAD was 0.74 (CI=0.61-0.88). Logistic regression analysis demonstrated independent predictive value of GRACE, after adjustment for EDJ (OR = 1.02; 95% CI=1.01-1.03; P=0.043) and NAD (OR = 1.02; 95%CI=1.01-1.03, P=0.025). However, when this score was added to DJS or NDA, no improving in c-statistic was observed: DJS-GRACE had a c-statistics of 0.78 (95%CI=0.64-0.92) and NAD-GRACE of 0.76 (95%CI=0.60-0.92) – Figure 1.

Figure 1: ROC curves of Jeopardy Score before and after addition of GRACE data.



## DISCUSSION

In the present study, we demonstrated that GRACE has an independent predictive value in relation to coronary anatomy. However, it was not enough to increment prognostic assessment once angiography is performed. This data indicates that GRACE information should not modify risk impression obtained from anatomical

extension of coronary disease. This paper is unique since our revision of literature did not identify similar work. Limitation of the study is related to the sample size, what we expect supply by continuing the research.

## CONCLUSION

In hospitalized patients with NSTEMI undergoing invasive strategy, the prognostic information of the GRACE score adds no value to the angiographic data in predicting recurrent events.

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