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Reliability of the CARE rule and the HEART score to rule out an acute coronary syndrome in non-traumatic chest pain patients

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Abstract
In patients consulting in the Emergency Department for chest pain, a HEART score ≤ 3 has been shown to rule out an acute coronary syndrome (ACS) with a low risk of major adverse cardiac event (MACE) occurrence. A negative CARE rule (≤ 1) that stands for the first four elements of the HEART score may have similar rule-out reliability without troponin assay requirement. We aim to prospectively assess the performance of the CARE rule and of the HEART score to predict MACE in a chest pain population. Prospective two-center non-interventional study. Patients admitted to the ED for non-traumatic chest pain were included, and followed-up at 6 weeks. The main study endpoint was the 6-week rate of MACE (myocardial infarction, coronary angioplasty, coronary bypass, and sudden unexplained death). 641 patients were included, of whom 9.5% presented a MACE at 6 weeks. The CARE rule was negative for 31.2% of patients, and none presented a MACE during follow-up [0, 95% confidence interval: (0.0–1.9)]. The HEART score was ≤ 3 for 63.0% of patients, and none presented a MACE during follow-up [0% (0.0–0.9)]. With an incidence below 2% in the negative group, the CARE rule seemed able to safely rule out a MACE without any biological test for one-third of patients with chest pain and the HEART score for another third with a single troponin assay.

Keywords Chest pain · Major adverse cardiac event · Acute coronary syndrome · Risk assessment

Introduction

Background and Importance

Chest pain is a common and difficult condition in Emergency Medicine, along with the fear of failing to diagnose acute coronary syndrome (ACS). The ACS prevalence is estimated between 10 and 15% among chest pain patients, and its mortality up to 25% at 1 year [1, 2]. After ruling out an ST-segment elevation myocardial infarction (STEMI) on a first electrocardiogram (ECG), the emergency physician must make sure not to overlook a non ST-segment elevation (NSTEMI) mainly based on a troponin assay, possibly repeated [3, 4]. This reliable exclusion method has two significant limitations. First, it leads to performance of a troponin assay for many patients not suffering from ACS (85–90%). Second, with the introduction of ultrasensitive troponins, this assay has lost some of its specificity in relation with ACS [5–8]. Patients with a high troponin level require further investigations to distinguish ACS or myocardial injuries not related to ACS (false positive), increasing ED length of stay and hospitalization rate, putting the patient at risk of iatrogenic disorder [9, 10]. Aware of this risk of excessive investigation, emergency physicians, based on their implicit judgement, will sometimes decide to not utilize any troponin assay in case of very low probability of ACS chest pain. Several authors

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