Need to Know: CJEM *Journal Club*

Outcome of applying the European Society of Cardiology (ESC) 0/1-hour algorithm in patients with suspected myocardial infarction

Geneviève Gravel, MD[*]; Alain Miclette, MD, MBA[*]; Roxane Beaumont-Boileau, MD[*]; Julie Côté-Leclerc, MD[*]; Marcel Émond, MD, MSc[*†‡§]

Abstract link: http://www.onlinejacc.org/content/74/4/483.abstract
Full citation: Twerenbold R, Costabel JP, Nestleberger T, et al. Outcome of applying the ESC 0/1-hour algorithm in patients with suspected myocardial infarction. *J Am Coll Cardiol* 2019;74(4):483–94.
Article type: Diagnosis
Ratings: Methods – 3/5 Usefulness – 4/5

INTRODUCTION

Background

The European Society of Cardiology (ESC) recommends the 0/1-hour troponin dosage algorithm for rapid triage of patients with chest pain and suspected non-ST segment elevation myocardial infarction (MI).

Objectives

To determine safety, performance, and applicability of the 0/1-hour troponin triage algorithm when routinely applied in the emergency room

METHODS

Design

Prospective cohort study

Setting

Two university centres in Switzerland and Argentina

Subjects

Adult patients presenting with chest pain suggestive of MI; exclusion if STEMI diagnosis

Intervention

Standard assessment with history and physical examination plus determination of hs-cTnT at presentation and 1 hour after initial medical encounter. Management of patients was left to the discretion of the attending clinicians who were blinded to the study's outcomes.

Outcomes

Primary outcomes were triage performance when using the algorithm and 30-day rate of major adverse clinical events (MACE): cardiovascular death and MI. Secondary outcomes were feasibility and adherence to the triage algorithm and impact on emergency department (ED) resources use and length of stay.

MAIN RESULTS

The ESC 0/1-hour algorithm triaged 62% of patients towards "rule-out" category with a 0 h troponin T < 5 ng/L or a 0 h < 12 ng/L and 1 h change < 3 ng/L. In the "rule-out" group, 88% of patients underwent

From the [*]Faculté de médecine, Département de médicine familiale et de médicine d'urgence, Université Laval, Québec, QC; [†]CHU de Québec – Université Laval, Québec, QC; [‡]Centre de recherche sur les soins et les services de première ligne de l'Université Laval (CERSSPL-UL), Québec, QC; and the [§]Centre d'excellence sur le vieillissement de Québec, Québec, QC.

Correspondence to: Dr. Marcel Émond, CHU de Québec – Hôpital de l'Enfant-Jésus, 1401, 18e rue, H-608, Québec, QC G1J 1Z4; Email: marcelemond1@me.com

 CJEM 2020;22(3):299–300 DOI 10.1017/cem.2020.17

outpatient management with a 0,1% occurrence of 30-day MACE. The remaining patients (12%) were treated as inpatients without justification provided, and 28% of these patients underwent revascularization therapy with 0,2% of 30-day MACE. The overall 30-day MACE in the "rule-out" category was 0,2% and does not include revascularization therapy. The algorithm was strictly adhered in 94% of patients' encounters with an average time between the blood draws of 65 minutes. The median time to discharge from the ED or transfer to a hospital ward was 2 hrs, 30 min.

APPRAISAL

Strengths

- Patient-oriented outcomes.
- Strong internal validity due to high adherence to algorithm.
- A complete patient follow-up for 30-day MACE – no lost to follow-up.

Limitations

- Data collection performed in EDs where 0–1 h protocol is already a standard of care and clinicians' awareness of the goal of the study sets a potential Hawthorne effect.
- Level and specialty of the clinicians performing the evaluation are unknown.
- Potential selection bias: recruitment method is unknown.
- Current algorithm cutoffs are only applicable to hs-cTnT assay (Elecsys 2010 high-sensitivity troponin T) not available in all EDs.
- No standardization of the "rule-out" patient cohort ED or post-ED management. Decision criteria to admit patients and to investigate as outpatients were not described. Early access to stratification testing and revascularization could have led to lower rates of 30-day MACE in this group.
- Revascularization was not considered as a primary outcome or an MACE. Interestingly, in the "rule-out" cohort, 4.4% of patients underwent revascularization following their ED visit.

CONTEXT

This study builds on the emerging literature showing the capacity of high-sensitivity troponin assays and short interval blood draws to reduce MI diagnosis delays and therefore allows for a more rapid initiation of adequate therapy. The ESC 0/1 hour algorithm appears to be safe and to effectively decrease time to ED discharge with a 30-day MACE rate of 0.1% in the outpatient cohort of 1,619 patients. Furthermore, a recent study showed the 0/1 hour TnT protocol to be non-inferior to the standardized 0/3 hours hs-cTnT protocol.[1]

BOTTOM LINE

The ESC 0/1 h hs-cTnT algorithm allows for safe early discrimination of patients presenting to the ED with chest pain and suspected NSTEMI in the presented cohort.[2] Nevertheless, 4.4% of patients in the "rule-out" low-risk group underwent revascularization procedure, which was not considered an MACE in this study. Moreover, this algorithm is not applicable to early presenters (< 3 hrs), patient with ongoing pain, or known renal insufficiency. Further studies acknowledging the safety with the different types of troponin assay are required for general applicability.[3]

Keywords: Cardiac disease, emergency medicine, evidence-based medicine

Competing interests: None declared.

REFERENCES

1. Chew DP, Lambrakis K, Blyth A, et al. A randomized trial of a 1-hour troponin T protocol in suspected acute coronary syndromes: the rapid assessment of possible acute coronary syndrome in the emergency department with high-sensitivity troponin T study (RAPID-TnT). *Circulation* 2019;140 (19):1543–56.
2. Roffi M, Patrono C, Collet JP, et al. 2015 ESC guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation: Task force for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation of the European Society of Cardiology (ESC). *Eur Heart J* 2016;37 (3):267–315.
3. Levy PD, Mahler SA. Evaluating suspected acute MI in the emergency department: what is and what should never be. *J Am Coll Cardiol* 2019;74(4):495–7.

https://doi.org/10.1017/cem.2020.17 Published online by Cambridge University Press