

CARDIOLOGY/ORIGINAL RESEARCH

Multicenter Evaluation of a 0-Hour/1-Hour Algorithm in the Diagnosis of Myocardial Infarction With High-Sensitivity Cardiac Troponin T

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Study objective: We aim to prospectively validate the diagnostic accuracy of the recently developed 0-h/1-h algorithm, using high-sensitivity cardiac troponin T (hs-cTnT) for the early rule-out and rule-in of acute myocardial infarction.

Methods: We enrolled patients presenting with suspected acute myocardial infarction and recent (<6 hours) onset of symptoms to the emergency department in a global multicenter diagnostic study. Hs-cTnT (Roche Diagnostics) and sensitive cardiac troponin I (Siemens Healthcare) were measured at presentation and after 1 hour, 2 hours, and 4 to 14 hours in a central laboratory. Patient triage according to the predefined hs-cTnT 0-hour/1-hour algorithm (hs-cTnT below 12 ng/L and Δ 1 hour below 3 ng/L to rule out; hs-cTnT at least 52 ng/L or Δ 1 hour at least 5 ng/L to rule in; remaining patients to the "observational zone") was compared against a centrally adjudicated final diagnosis by 2 independent cardiologists (reference standard). The final diagnosis was based on all available information, including coronary angiography and echocardiography results, follow-up data, and serial measurements of sensitive cardiac troponin I, whereas adjudicators remained blinded to hs-cTnT.

Results: Among 1,282 patients enrolled, acute myocardial infarction was the final diagnosis for 213 (16.6%) patients. Applying the hs-cTnT 0-hour/1-hour algorithm, 612 (48%) patients were classified as rule-out, 404 (31.5%) were

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Model	Covariates/ Predictor	AUC	Individual CI	P Value
Reference model	T0, T1, Δ	0.947	0.929-0.965	
Univariate	T0	0.905	0.881-0.929	<.001
competitor	T1	0.933	0.913-0.952	.04
models	T2	0.947	0.930-0.963	.997
Multivariate	T0, T1, Δ, age,	0.948	0.931-0.966	.79
competitor	sex, previous			
models	AMI, eGFR <60			
	T0, T2, Δ	0.959	0.945-0.973	.28
	T0, T1, T2, Δs	0.956	0.941-0.971	.28

eGFR, Estimated glomerular filtration rate.

Results showed that the reference model performed superior to univariate models with hs-TnT values at T0 or T1 only. This supports combining T0 and T1 values (as done in the **TRAPID-AMI/APACE** algorithm).

The multivariate model including T0 and T2 values had accuracy comparable to that of the reference model.

REFERENCE

1. DeLong ER, DeLong DM, Clarke-Pearson DL. Comparing the areas under two or more correlated receiver operating characteristic curves: a nonparametric approach. *Biometrics*. 1998;44:837-845.

Table E3. Numbers (and percentages) of cardiac and noncardiac death cases, per 0-hour/1-hour algorithm class.

	Cardiac Death (%)	Noncardiac Death (%)	Death (%)
Within 7 days/N(available)=1,272			
Ruled out	1 (0.1)	0	1 (0.1)
Ruled in	1 (0.5)	0	1 (0.5)
Observational zone	0	1 (0.4)	1 (0.4)
Total	2 (0.2)	1 (0.1)	3 (0.2)
Within 30 days/N(available)=1,271			
Ruled out	1 (0.1)	0	1 (0.1)
Ruled in	4 (2.2)	1 (0.5)	5 (2.7)
Observational zone	0	2 (0.7)	2 (0.7)
Total	5 (0.4)	3 (0.2)	8 (0.6)
Within 3 mo/N(available)=1,264			
Ruled out	1 (0.1)	1 (0.1)	2 (0.3)
Ruled in	4 (2.2)	4 (2.2)	8 (4.4)
Observational zone	1 (0.4)	7 (2.5)	8 (2.8)
Total	6 (0.5)	12 (0.9)	18 (1.4)
Within 1 y/N(available)=1,082			
Ruled out	1 (0.1)	4 (0.6)	5 (0.7)
Ruled in	7 (4.3)	8 (4.9)	15 (9.3)
Observational zone	7 (2.8)	17 (6.9)	24 (9.7)
Total	15 (1.4)	29 (2.7)	44 (4.1)