

Comparison of GRACE, HEART and TIMI score

in predicting ACS in acute chest pain patients



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Background: Cardiac risk scores have been developed to improve risk stratification of acute coronary syndrome (ACS) in patients presenting with chest pain at ED

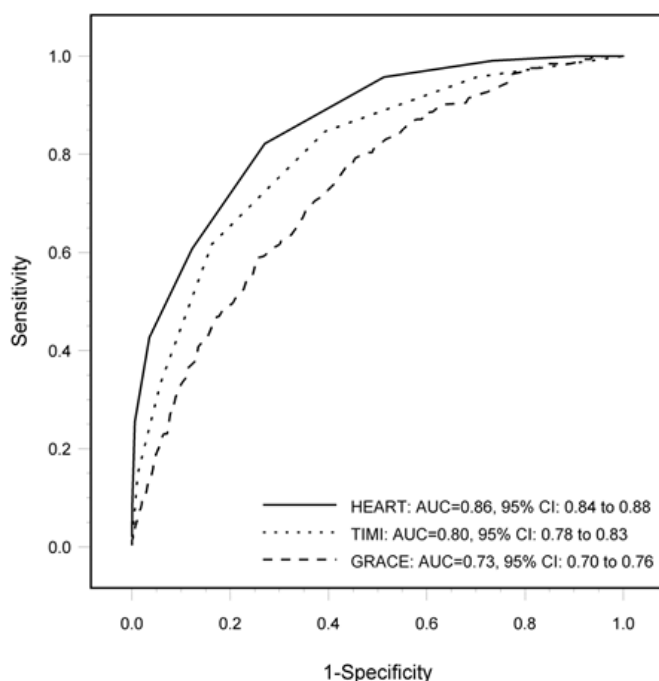
Aim: Comparing performance of GRACE, HEART and TIMI scores in predicting ACS

Methods:

- ✓ **Design:** Stepped wedge cluster randomized trial: 1,827 usual care; 1,821 HEART care
- ✓ **Setting:** 9 Dutch hospitals, differing in size, patients, academic/non-academic
- ✓ **Patients:** Chest pain patients at the ED in the HEART care group
- ✓ **Risk score:** HEART score calculated at ED, GRACE and TIMI score retrospectively
- ✓ **Primary outcomes:** major adverse cardiac events (MACE) within 6 weeks
- ✓ We assessed 2 different scenarios, with fixed safety level of 95% or 98% sensitivity

Results:

- ✓ **Study population:**
 - ❖ 1,821 patients in HEART care period, of which 1,748 (96%) patients with risk scores calculated and follow-up
 - ❖ 54% male, mean age 62
 - ❖ MACE incidence 19%
- ✓ **AUCs:**
 - ❖ GRACE: 0.73 (95% CI: 0.70-0.76)
 - ❖ HEART: 0.86 (95% CI: 0.84-0.88)
 - ❖ TIMI: 0.80 (95% CI: 0.78-0.83)



Scenario 1: sensitivity at least 95%	GRACE score	HEART score	TIMI score
Corresponding cut-off for "low risk"	≤73 points	≤3 points	0 points
Number of patients classified "low risk" / total number of patients	340/1,748 (19.5%)	707/1,748 (40.5%)	430/1,748 (24.6%)
Percentage of MACE in "low risk" group	4.1% (14/340)	1.8% (13/707)	1.9% (8/430)
MACE, of which AMI	5	3	0
MACE, of which death	0	1	0
Negative predictive value (NPV)	0.96	0.98	0.97
Scenario 2: sensitivity at least 98%	GRACE score	HEART score	TIMI score
Corresponding cut-off for "low risk"	≤67 points	≤2 points	-
Number of patients classified "low risk" / total number of patients	243/1,748 (13.9%)	381/1,748 (21.8%)	-
Percentage of MACE in "low risk" group	2.5% (6/243)	0.8% (3/381)	-
MACE, of which AMI	1	1	-
MACE, of which death	0	0	-
Negative predictive value (NPV)	0.98	0.99	-

Conclusion: At same fixed level of safety (e.g. at least 95% or 98% sensitivity), HEART score outperformed GRACE and TIMI score in discriminating between patients with and without ACS, and identified the largest group of low-risk patients