The Thrombolysis In Myocardial Infarction risk index predicted in-hospital mortality in non–ST-segment elevation myocardial infarction

Wiviott SD, Morrow DA, Frederick PD, Antman EM, Braunwald E. **Application of the Thrombolysis In Myocardial Infarction risk index in non-ST-segment elevation myocardial infarction: evaluation of patients in the National Registry of Myocardial Infarction.** J Am Coll Cardiol. 2006;47:1553-8.

Clinical impact ratings: Hospitalists ★★★★★★☆ Cardiology ★★★★★☆☆

QUESTION

In patients with non–ST-segment elevation myocardial infarction (NSTEMI), how well does the Thrombolysis In Myocardial Infarction risk index (TRI) predict in-hospital mortality?

METHODS

Design: Analysis of the National Registry of Myocardial Infarction database (April 1998 to October 2002).

Setting: > 1500 hospitals in the United States.

Patients: 337 192 patients with NSTEMI (without new left bundle-branch block or STEMI) and a heart rate between 50 and 150 beats/min (mean age 72 y, 55% men).

Description of prediction guide: The TRI was derived from 12 353 patients with STEMI and was calculated using the equation: TRI = heart rate × (age ÷ 10)^2 ÷ systolic pressure (TRI values began with 0, and 10-point intervals were used). The TRI categorized patients into 3 risk groups: high risk = score > 60, intermediate risk = score 30 to 60, and low risk = score 0 to 29.

Outcomes: In-hospital mortality.

MAIN RESULTS

The TRI had good discriminative capacity to predict in-hospital mortality in patients with NSTEMI (*c* statistic = 0.73). Overall mortality in patients with NSTEMI (10.9%) was higher than that in patients registered in the same database with STEMI treated with reperfusion therapy (6.6%), but lower than that in patients with STEMI not treated with reperfusion therapy (18.7%). Rates of in-hospital mortality by TRI scores are in the Table.

CONCLUSION

The Thrombolysis In Myocardial Infarction risk index derived from patients with ST-segment elevation myocardial infarction (STEMI) predicted in-hospital mortality in patients with non–STEMI.

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In-hospital mortality in non–ST-segment elevation myocardial infarction by Thrombolysis In Myocardial Infarction risk index (TRI score)*

TRI score	Percentage of patients	In-hospital mortality	+LR (95% CI)
0 to < 10	3.2	1.0%	0.08 (0.07 to 0.10)
10 to < 20	19.2	2.2%	0.18 (0.18 to 0.19)
20 to < 30	23.1	6.0%	0.52 (0.51 to 0.54)
30 to < 40	20.5	10.7%	0.98 (0.96 to 1.01)
40 to < 50	14.7	15.1%	1.46 (1.43 to 1.49)
50 to < 60	8.9	19.2%	1.95 (1.90 to 2.01)
60 to < 70	4.9	24.0%	2.59 (2.51 to 2.68)
70 to < 80	2.6	27.4%	3.10 (2.96 to 3.25)
≥ 80	2.9	34.4%	4.31 (4.14 to 4.49)

*Percentage of patients and in-hospital mortality provided by author; +LR and CI defined in Glossary and calculated from percentage of patients and in-hospital mortality.

COMMENTARY

Risk prediction rules are useful to clinicians if they: 1) have been validated in unselected patients rather than clinical trial participants in whom rules are often derived with overestimated values; 2) require a small number of readily accessible and reliable clinical variables; 3) can be easily calculated and applied at the bedside; 4) present reasonable predictive accuracy; and 5) have been shown to enhance quality of decision making and patient outcomes by identifying higher-risk patients to whom therapeutic interventions can be aggressively targeted. The study by Wiviott and colleagues showed that the TRI seemed to satisfy the first 4 of these criteria in predicting in-hospital mortality in patients with MI, although its predictive accuracy was lower for NSTEMI patients (*c* statistic = 0.73) than for STEMI patients (*c* statistic = 0.79) and was highest for STEMI patients receiving reperfusion therapy (*c* statistic = 0.81) (1). Whether the rule is as useful as other recently validated rules for predicting longer-term mortality in patients who urvive to discharge (2) remains to be determined. Satisfying the fifth criteria is the next challenge.

Studies showing underuse of effective therapies in high-risk patients (3) suggest the need for simple tools that help clinicians identify patients who have the most to gain from these therapies. Costly and potentially harmful treatments, including antithrombotic agents and percutaneous coronary intervention, are being used in patients with NSTEMI. Thus, a controlled trial in which routine use of the TRI is compared with usual decision making in decreasing risk-intervention mismatch and patient harm is warranted.

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References

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