Original Article

Machine Learning Triage for Chest Pain in the Emergency Department: A Retrospective Validation Study

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Abstract

Background: Risk stratification of chest pain in the emergency department relies on clinical scores with limited specificity.
Methods: We validated a gradient-boosting model in 4,812 visits and compared it with the HEART score.
Results: The model achieved an area under the curve of 0.91 compared with 0.82 for the HEART score.
Conclusion: A machine learning model may improve chest pain triage. (Fictional data for template demonstration.)

Keywords: chest pain; machine learning; emergency department; triage

Introduction

Chest pain accounts for a large share of emergency visits.[1] Existing scores are safe but often lead to unnecessary admissions.[2,3]

Methods

We retrospectively analyzed adult visits for chest pain between 2022 and 2024. The primary outcome was a major adverse cardiac event within 30 days.[4]

Results

The model outperformed the HEART score (Fig. 1; Table 1).

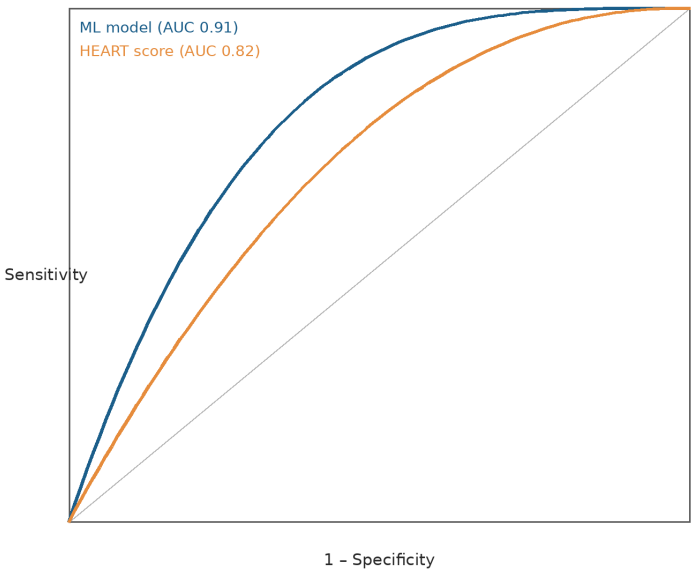


Fig. 1. Receiver operating characteristic curves of the machine learning model and the HEART score.

Table 1. Diagnostic performance for 30-day major adverse cardiac events

Model	AUC (95% CI)	Sensitivity	Specificity
Machine learning model	0.91 (0.89–0.93)	96.2%	71.4%
HEART score	0.82 (0.79–0.85)	95.8%	48.9%

AUC: area under the curve; CI: confidence interval.

Discussion

Machine learning models should be validated prospectively before clinical use.[5]

References

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