

## 00051 Identification of Low-risk Chest Pain Patients for Early Discharge in the Emergency Department Using Heart Rate Variability

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**Aims:** We aimed to derive a risk prediction model and an accelerated diagnostic protocol utilizing heart rate variability (HRV) for rapid and objective identification of chest-pain patients with low-risk of major adverse cardiac events (MACE) who are safe for early discharge from the ED.

**Methodology:** The study retrospectively analysed 902 chest-pain patients presenting to Singapore General Hospital ED between 2010 and 2015. The data was divided into a model derivation set (70%) and a validation set (30%). Primary outcome was 30-day MACE. A HRV-based risk prediction model (HRVPM) was derived using backward-stepwise logistic regression. An accelerated diagnostic protocol (HRVPM-ADP) was developed through consideration of troponin results at 0 and 2 hours. Performance of HRVPM-ADP was validated and compared against the HEART, TIMI, and GRACE scores.

**Result:** HRVPM encompasses 6 HRV variables (triangular interpolation of normal-to-normal intervals, total power, very-low/ low/ high-frequency power, approximate entropy) and 3 ECG variables (ST-elevation, ST-depression, Q-wave).

HRVPM has an area under receiver operating characteristic curve (AUC) of 0.862 (95% CI 0.830, 0.894). This is comparable to HEART with an AUC of 0.861 (95% CI 0.832, 0.890). Addition of troponins in HRVPM-ADP improved the AUC to 0.871 (95% CI 0.841, 0.901). HRVPM-ADP identified chest-pain patients safe for early discharge with sensitivity of 100.00% (95% CI 94.42, 100.00) and specificity of 35.78% (95% CI 29.29, 42.82). Comparatively, a low-risk HEART score had a sensitivity of 98.78% (95% CI 93.39, 99.97) and specificity of 24.02% (95% CI 18.33, 30.48).

**Conclusion:** HRVPM is a simple and non-invasive risk-stratification tool, demonstrating comparable performance with HEART without need for blood tests. Incorporating cardiac enzymes, HRVPM-ADP can be incorporated in a workflow to identify chest pain patients who are safe for early discharge, thus reducing hospital time and cost burden, allowing for better patient experience and outcome. We hope to further validate HRVPM-ADP in larger cohorts.