00237 Sepsis Mortality Prediction Using Heart Rate Variability

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Aims: The Singapore Emergency Department Sepsis (SEDS) model incorporates novel heart rate variability (HRV) parameters to predict 30-day in-hospital mortality (IHM) in patients presenting with suspected sepsis. Patients in the initial study were selected based on the SIRS criteria, and its predictive performance was superior to qSOFA, NEWS and MEWS. Following the publication of Sepsis-3, SIRS is no longer recommended for diagnosing sepsis. We aimed to validate SEDS using broader criteria to see if the model could be improved (SEDS2).

Methodology: Patients aged ≥ 18 presenting with suspected infection (blood cultures performed and antibiotics administered) were included. HRV variables were computed using routine triage ECG segments. The primary outcome was 30-day IHM, and the secondary outcome was a composite of intubation, ICU admission and 30-day IHM. We used multivariate logistic regression to derive the independent predictors, and performed receiver operating characteristic analyses to compare its performance with SEDS and other clinical scores.

Result: Of 152 patients included, 32 (21.1%) met the primary outcome (IHM). Four independent predictors were obtained, which included two vital signs - systolic blood pressure and respiratory rate, and two HRV parameters - mean heart rate and DFA α2. SEDS2 (AUROC 0.80, 95% CI 0.71 – 0.89) outperformed SEDS (AUROC 0.76, 95% CI 0.66 – 0.85), qSOFA (AUROC 0.72, 95% CI 0.62 – 0.82), NEWS (AUROC 0.72, 95% CI 0.61 – 0.82) and MEWS (AUROC 0.66, 95% CI 0.54 – 0.78). Similar results were obtained for the secondary outcome. At the optimal cut-off, the sensitivity and specificity of SEDS2 were 0.72 and 0.68 for the primary outcome, and 0.76 and 0.81 for the secondary outcome respectively.

Conclusion: SEDS2 outperformed SEDS and other clinical scores, while reducing the number of variables from the previous model. Further work on SEDS2 will be required to validate and utilize it as a functional clinical tool.