

Patterns in continuous pulse oximetry data prior to pulseless electrical activity arrest in the general care setting

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J Clin Monit Comput. 2020;10.

Abstract

The study objective was to understand if features derived from continuous pulse oximetry data can provide advanced warning of pulseless electrical activity arrest in the general care inpatient setting. Retrospective analysis of SpO₂ and pulse rate data derived from continuous pulse oximetry was performed for pulseless electrical activity (n = 38) and control (n = 42) patient cohorts. Measures of central tendency and variation over time intervals ranging from 1 min to 1 h were used for inter- and intra-group comparisons. Logistic regression was applied to understand ability of features to predict pulseless electrical activity in future time intervals. Overall, the pulseless electrical activity arrest group tended to have lower mean SpO₂ and higher mean pulse rate values than the control group. SpO₂ and pulse rate variability was higher in the pulseless electrical activity arrest cohort. Changes in variability were observed beginning several hours prior to the rescue event. Up to 20 min before rescue events, pulse rate features were significantly different from feature values for the preceding 30-min interval (> 10% difference in mean, > 46% difference in range). Similar results were found for SpO₂ features 10 min before the event (> 4% difference in mean, > 60% difference in range). There is a significant difference in SpO₂ and pulse rate features derived from continuous pulse oximetry between pulseless electrical activity and control groups. Integration of automated feature calculation and clinician notification into clinical monitoring and information systems may increase patient safety by supporting early detection of such events.