Prediction of neurally mediated syncope based on heart rate and pulse arrival time

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Background: We previously presented a novel approach based on body-worn sensors to predict neurally mediated syncope (NMS). The aim of the present study was to prospectively validate this syncope warning system during head-up tilt table testing.

Methods and Results: Simultaneous heart rate (HR) and pulse wave changes in 19 consecutive syncope patients undergoing 70° head-up tilt table testing, generated a syncope risk score that triggered a syncope prediction alarm. The pulse arrival time (PAT) was defined as the time between the R-peak in the electrocardiogram and the onset of the pulse wave in the photoplethysmogram. With a syncope prediction alarm based on HR and PAT, all syncopes were detected. No false alarm was generated in patients with negative HUT. The mean duration between the syncope prediction alarm and the occurrence of syncope was 97±48s.

Conclusions: Predicting NMS is feasible based on continuous heart rate and pulse arrival time analysis. This approach might improve NMS management.

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