

A valuable tool in predicting poor outcome due to sepsis in pediatric intensive care unit: Tpeak-end / QT ratio

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Objective: To assess the feasibility of 12-lead electrocardiographic measures such as P wave dispersion (PWd), QT interval, QT dispersion (QTd), Tpeak-end interval (Tp-e), Tp-e/QT and Tp-e/QTc ratio in predicting poor outcome in patients diagnosed with sepsis in pediatric intensive care unit (PICU).

Methods: Measurements and Main Results: The study included 102 consecutive patients were enrolled into the study based upon diagnoses of systemic inflammatory response syndrome (SIRS), sepsis, severe sepsis, and septic shock. The control group consisted of 103 age- and sex-matched healthy children. Patients' demographic features, capillary refill time, C-reactive protein, procalcitonin, lactate values at the time of diagnosis were obtained from the hospital records. PWd, QT interval, QTd, QTcd, Tp-e interval, Tp-e/QT, Tp-e/QTc ratios were calculated in 12-lead-standart electrocardiogram at a speed of 25 mm/sec and an amplitude of 1 mV/cm.

Results: We found that PWd and QTd were higher in the study group ($p < 0.001$). Tp-e interval, Tp-e/QT, Tp-e/QTc ratios were also significantly higher in septic patients compared to the controls ($p < 0.001$, $p < 0.001$, and $p = 0.003$ respectively). We found that of the 102 patients, 9 (8.8%) were diagnosed with SIRS, 35 with sepsis (34.3%), 39 with severe sepsis (38.2%), 19 with septic shock (18.6%). These subgroups were compared in terms of ECG characteristics and we found no statistical differences between them. During the follow-up period 60 (58.8%) patients were cured but 42 (41.2%) had died. Deceased children had statistically significant higher Tp-e/QT, Tp-e/QTc ratios than the survivors. In multivariate logistic regression analysis only Tp-e/QT ratio were found to be independent predictors of mortality ($p = 0.016$, OR: 2.12; 95% CI:1.31-3.98).

Conclusion: This study demonstrated that the ECG measurements can predict the poor outcome in patients with sepsis. The Tp-e/QT ratio may be valuable tool in predicting mortality for patients with sepsis in the PICU.