Progressive EKG changes in children at risk for sudden unexpected death in epilepsy
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Introduction:
Sudden unexpected death (SUDEP) is a significant cause of mortality in epilepsy. Lack of seizure control and history of status epilepticus (SE) are known risk factors. Although cardiac pathology may contribute to SUDEP, temporal evolution of the cardiac changes is unknown. Here we sought to investigate whether cardiac alterations develop over time in children with epilepsy who may be at risk for SUDEP.

Methods:
Children admitted to the pediatric intensive care unit for seizures or SE were prospectively identified over 3 years. They were included if there was at least 1 EKG study in the electronic medical record and no pre-existing cardiac conditions. The primary outcomes were the presence of QRS axis deviation, altered PR, QRS and QTc intervals, ST segment and T wave changes, or arrhythmias. We performed Student t test for continuous variables; Fisher exact or χ2 for categorical variables; and logistic regression analysis to identify factors associated with EKG alterations.

Results:
244 children met the study criteria. 88 children had no history of epilepsy (control, 216 EKGs), 156 children had epilepsy (503 EKGs). Compared with controls, the epilepsy group was more likely to have abnormal EKG (1.4 [1.02-1.94], OR [95% CI], p < 0.05) and had more arrhythmias (PVC: 0.47% vs. 1.64%, junctional: 0% vs. 1.02%, heart block: 0% vs. 0.41%, control vs. epilepsy, p < 0.05). Within the epilepsy group, abnormal EKG studies occurred at an older age as compared with normal EKGs (66.6 ± 4.0 vs. 97.4 ± 5.0 months, normal vs. abnormal EKG, p < 0.01). In the control group no differences in age were observed (56.1 ± 5.8 vs. 54.2 ± 6.4 months, normal vs. abnormal EKG). Logistic regression revealed that age was independently associated with abnormal EKG only in the epilepsy group (p < 0.01).

Conclusions:
Our findings suggest that altered cardiac EP and arrhythmias may develop over time in this vulnerable epileptic cohort. Therefore, cardiac surveillance in a select group of children with epilepsy may be warranted.