

## 01. The Frequency of Seizures After Exposure in Cases with QRS Interval Prolongation

Alexa Camarena-Michel, Christopher Hoyte, On Behalf of the ToxIC Investigators Consortium (ToxIC)  
*Denver Health Residency in Emergency Medicine, Denver, CO, USA.*

**Background:** Various toxicological exposures cause both prolongation of the QRS interval in addition to seizures. However, it is unclear which substances are most likely to result in the development of seizures in association with QRS interval prolongation. The purpose of this study was to determine the frequency of exposures causing prolongation of the QRS interval also resulting in seizures, using the Toxicology Investigators Consortium (ToxIC) registry.

**Research Question:** Does exposure to agents causing prolongation of the QRS interval increase likelihood of seizures?

**Methods:** This is a retrospective review of prospectively collected registry data. All cases between December 31, 2013 and January 1, 2017 leading to QRS prolongation (defined as a QRS > 120 milliseconds) were extracted from the ToxIC database. From this dataset, the data was distilled to include exposures causing seizure activity. Using this data, the most common agents causing seizure were identified. The data also included age, gender, clinical symptoms and primary toxic exposures, which was then reviewed and statistically analyzed.

**Results:** There were 397 cases of QRS prolongation identified. The mean age was 32.4 years (range < 2–89 years) and 216 (54.4%) were male. Of the 397 cases that had exposures causing QRS prolongation, 77 (19.4%) of these cases were accompanied by a seizure. Of these 77, the three most common exposures that resulted in seizures were bupropion ( $N = 15$ , 19.5%), amitriptyline ( $N = 11$ , 14.3%) and diphenhydramine ( $N = 8$ , 10.4%). In cases of QRS prolongation 65.2% bupropion, 30.8% diphenhydramine and 15.9% amitriptyline exposures resulted in seizures. There were 29 deaths in the cohort.

**Discussion:** While both ventricular conduction and neuronal excitability are directly related to voltage-gated sodium channel dysfunction, it is unknown which substances cause the highest proportion of seizure in association with QRS prolongation. This study identified bupropion, diphenhydramine and

amitriptyline use resulting in QRS prolongation as the most common agents associated with seizures. Interestingly, bupropion exposures causing QRS prolongation resulted in seizures 65.2% of the time.

**Conclusion:** Although it appears that there were numerous instances of seizures in exposures that also caused QRS prolongation, additional studies need to be performed to evaluate causality.