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218. Predicting adverse cardiovascular events in bupropion overdose

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Background: Bupropion cardiotoxicity is an infrequent but severe consequence of overdose, leading to shock and dysrhythmias. This rarity and the possibility of delayed toxicity present challenges for clinicians attempting to predict adverse cardiovascular events (ACVE) in bupropion overdose. Previous research has identified predictors of ACVE in drug overdose in general using information available to clinicians on initial emergency department presentation, but predicting ACVE in bupropion overdose has not been well-studied.

Methods: We conducted a secondary analysis of prospectively collected data via the Toxicology Investigators Consortium (ToxIC) from April 2015 through July 2018. We included patients 18 years or older with suspected acute or acute-on-chronic toxicologic exposures to bupropion. We excluded patients with documentation that signs and symptoms were unlikely related to exposure and those with missing data. The primary outcome was ACVE, a composite outcome of the following: ventricular dysrhythmia, vasopressor use, treatment with cardiopulmonary resuscitation, or elevated troponin > 99th percentile. Secondary outcomes included individual ACVE components, altered mental status, seizures, and ICU admission. Candidate predictors included demographic variables, ingestion circumstances, corrected QT interval (QTc) on initial electrocardiogram, and initial serum bicarbonate concentration. Variables with the highest association with ACVE on univariate analysis were included in a multivariable logistic regression model with ACVE as the dependent variable. We also tested a model previously found to predict ACVE in drug overdose in general using prior cardiac history, initial QTc prolongation, and low initial serum bicarbonate. Optimal cutoffs for ordinal variables were performed using receiver operator characteristic (ROC) curves. A prediction tool was created using the presence of any predictor variables, and test characteristics were calculated.

Results: Out of 364 patients screened, 7 were excluded, leaving 357 included for final analysis. The median age was 33 years, and 56.0% were female. Thirty-three (9.2%) patients developed ACVE. Increased number of unique exposures, initial QTc 500 milliseconds, and initial serum bicarbonate < 20 milliequivalents per liter (mEq/L)—cutoffs determined a priori—demonstrated the strongest association with ACVE on univariate analysis and were included in the model. Number of unique exposures (OR 1.50, 95% CI 1.17—1.92) and initial serum bicarbonate < 20 mEq/L (OR 4.76, 95% CI 2.11—10.76) independently predicted ACVE. The decision rule created using the presence of either three unique exposures or initial serum bicarbonate < 20 mEq/L was 53.7% specific with 96.1% negative predictive value (NPV). The presence of both risk factors was 95.7% specific with 92.5% NPV. Applying the previous model predicting ACVE in drug overdose in general, only serum bicarbonate < 20 mEq/L was predictive ofACVE (OR 4.27, 95% CI 1.91—9.46). Increased number of unique ingestions, initial QTc 00 milliseconds,

and initial serum bicarbonate < 20 mEq/L were also associated with vasopressor use, seizures, and intubation on univariate analysis.

Conclusion: Previously derived prediction tools for ACVE in drug overdose can be modified and applied to suspected bupropion overdose with reliable specificity and negative predictive value. The combination of poly-ingestion and low serum bicarbonate predicts ACVE in bupropion overdose.