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24. Characteristics and Treatments of Patients with ECG Findings Significant for QRS Widening

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Background: Many xenobiotics may cause QRS prolongation on the ECG which can result in significant morbidity and mortality. The objective of this study is to describe the characteristics and treatment of single exposure cases of QRS prolongation in the ToxIC registry.

Hypothesis: QRS prolongation is associated with multiple different agents and significant morbidity.

Methods: Using the ToxIC Registry, cases with QRS prolongation greater than 120 ms were selected from January 1–September 1, 2014. Cases were limited to single substance exposures.

Results: Thirty-six cases were abstracted. Ages were in years: 13–18 (4); 19–65 (26); 66–89 (5); and unknown (1). Fifteen were female; 21 were male. There was one death of an unknown ingestion. The drugs reported were (number of cases are in parentheses): amitriptyline (9), beta-blocker (1); bupropion (2); carisoprodol (1); crack cocaine (1); desipramine (1); dextromethorphan (1); digoxin (1); diphenhydramine (5); ethanol (4); flecainide (1); heroin (2); imipramine (1); mirtazapine (1); propofol (1); propranolol (1); quetiapine (1); unknown (1); and venlafaxine (1). Cardiovascular signs described were: tachycardia (9), hypotension (10), bradycardia (3), QTc prolongation (15), ventricular dysrhythmias (3), and greater than first-degree block (4). Significant neurological signs included: coma/CNS depression (20), seizures (8), agitation (5), and delirium/toxic psychosis (4). Key treatments were as follows: sodium bicarbonate (21), lipid (5), calcium (2), benzodiazepines (11), vasopressors (6), beta-blockers (2), anticonvulsants (1), THAM (1), and hypertonic saline (1). Additional therapies included: CPR (2), ECMO (1), hemodialysis (1), and transcutaneous pacing (1).

Discussion: A large percentage of cases represented were cyclic antidepressants and drugs less known to cause QRS prolongation. QRS prolongation was associated with coma (55.5 %) and seizures (22.2 %). Treatment involved sodium bicarbonate in 58.3 % and lipid in 13.9 % of cases. THAM and hypertonic saline were used in one case. Limitations include unreported co-ingestants and limited availability of confirmatory laboratory testing.

Conclusions: QRS prolongation is associated with multiple different medications and with significant cardiovascular and neurological toxicity. Sodium bicarbonate was used in only just over half the cases. Currently, there are no accepted criteria for its use. Future studies should be aimed at validated criteria for bicarbonate treatment of QRS prolongation.