ToxTidbits

Maryland Poison Center
UNIVERSITY OF MARYLAND SCHOOL OF PHARMACY

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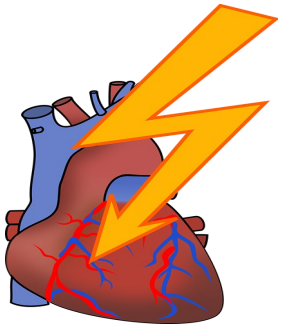
The Maryland Poison Center's Monthly Update: News, Advances, Information

Class I Antiarrhythmics



The Maryland Poison Center was consulted about a 4 year old male who presented to the emergency department with persistent junctional reciprocating tachycardia after ingestion of up to 2,000 mg of his own flecainide. On arrival, he was hypotensive and in a wide complex tachycardia on EKG. He was cardioverted 3 times, which resulted in transient stabilization of heart rhythm, but with a return to ventricular tachycardia. Eventually he stabilized after multiple doses of sodium bicarbonate. EKG showed a QRS of 158 msec and a QTc of 700 msec. He continued to have recurrent arrhythmias for greater than 24 hours after his ingestion, but recovered completely by 30 hours post ingestion.

I trained in the post CAST-1/2 and AFFIRM era, when we learned "rate control good, rhythm control bad." When it comes to overdoses, the mantra is more appropriately "rate control bad, rhythm control bad." Class I antiarrhythmics are incredibly toxic in overdose. These drugs include disopyramide, quinidine, procainamide, mexiletine, lidocaine, flecainide, and propafenone. All of them are sodium channel blockers, but are subdivided into class Ia, Ib, and Ic based on their rate of interaction with the sodium channel. Toxicity is dose dependent, but significant toxicity has been reported with inadvertent double doses of flecainide (*Am J Emerg Med 2012;30:2095.e1-2).* We've also been consulted regarding patients with double-doses of propafenone that resulted in brief bradycardia and hypotension. Overdoses of antiarrhythmics are infrequent; in 2016, poison centers were called about 1205 single substance antiarrhythmic exposures. Of those, 43 were intentional, 19 resulted in major effects and 5 deaths were reported.

Reported symptoms of mild toxicity include nausea, vomiting, diarrhea, drowsiness, and anticholinergic effects. Severe toxicity is primarily related to sodium channel blockade. Clinical effects include seizures, hypotension, bradycardia, arrhythmias, and coma. Objective signs of sodium channel blockade include a prolonged QRS of > 100 ms and a tall terminal R wave in lead aVR. The drugs might also prolong the QTc, increasing the risk of Torsade de Pointes.

Treatment consists of activated charcoal if presenting early, blood pressure support with IV fluids and vasopressors, and benzodiazepines for seizures. Atropine can be used for bradycardia. Treatment for sodium channel blockade is sodium bicarbonate. The recommended dose is 1-2 mEq/kg given rapidly over 1-2 minutes, but multiple case reports suggest that with flecainide, the dose should start at 2 mEq/kg. With flecainide, alkalinization of the urine secondary to serum alkalinization with sodium bicarbonate increases the half-life and may prolong the duration of toxicity. Most of the class Ia antiarrhythmics are fat soluble molecules and case reports are published with the use of intravenous lipid emulsion as a therapy in patients with cardiac instability refractory to other treatments. In spite of multiple case reports attributing survival to intravenous lipid emulsion therapy, the evidence is lacking that it improves outcomes. Extracorporeal membrane oxygen might be of benefit in class Ia antiarrhythmic overdose. (*Am J Emerg Med 2015;33:1840.e3-5; Clin Med 2015;15:301-3).*

Did you know?

Lipid emulsion may clog extracorporeal membrane oxygen machines.

Extracorporeal membrane oxygen (ECMO) is becoming more popular in the toxicology world as an assist device in patients with significant cardiac instability due to drug overdoses. In some cases, intravenous lipid emulsion (ILE) and ECMO are both being used to "rescue" these patients. There is some evidence that the combined use of ILE and ECMO may be associated with fat emulsion deposition in the ECMO circuit and increased blood clot formation. Until we have more studies and experience utilizing both treatments, some recommend that ILE and ECMO should not be used concurrently, or that the total dose of lipids should be kept to less than 10 mL/kg. *(Clin Toxicol 2015:53:145-50; Intensive Care Med 2016;42:1806-7).*

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