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180. Comparing beta blocker ingestions: a review of the Toxicology Investigators Consortium database

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Background: Beta antagonists represent a widely used class of medications. Overdose can result in hypotension, bradycardia, cardiac conduction delays and cardiac arrest. It is currently unclear which beta antagonist overdoses result in the highest morbidity and mortality. We sought to compare clinical features and treatments used in single-agent beta antagonist overdoses.

Methods: We queried the Toxicology Investigators Consortium (ToxIC) Database from January 2010 to June 2022 for all single agent beta–blocker ingestions in adults and children. Statistics are descriptive.

Results: There were a total of 512 single-agent beta–blocker ingestions identified. The five most common agents were used for comparison and included metoprolol (n . 187), propranolol (n . 147), carvedilol (n . 58), atenolol (n . 34), and labetalol (n. 32). Hypotension (SBP < 80) was most common with labetalol(37.5%), followed by carvedilol (36%), atenolol (35%) metoprolol (28%), and propranolol (26%). Bradycardia (P < 50) was most common in atenolol ingestion (50%) followed by propranolol (42%). Labetalol was least likely to cause bradycardia (16%). Hypoglycemia (10%) and seizure (5%) were most common in propranolol ingestion, but seen in only 1.3% and 0.3%, respectively, of all other beta antagonist agents analyzed. Aggregate ingestion data revealed intravenous fluids were the most common therapy administered (34%), followed by glucagon (29%) and vasopressors (14%). Vasopressors were most commonly used in labetalol ingestions (22%) and least commonly administered in atenolol ingestions (8.8%). Lipid administration was highest in propranolol ingestions (9%). Only 2.4% of all ingestions required CPR, and there were very low fatality rates in the dataset (1.3%). Beta blocker toxicity is a complex condition and requires toxicologists to consider a number of treatment options. Although receptor selectivity may be lost in overdose, our data demonstrate differences in treatments selected and/or required for various beta antagonist overdoses. Consistent with previous reports, propranolol ingestions are most likely to result in seizures and hypoglycemia compared to other agents. Overall, despite treatment differences between agents, mortality was relatively low.

Conclusion: Our data from the ToxIC registry are consistent with previous literature on beta antagonist ingestions and indicate a relatively low overall mortality rate. Propranolol was more likely to result in seizures and hypoglycemia compared to other agents. Further studies may be warranted to identify specific treatment regimens based on agent ingested.