

## **Pediatric Anticholinergic Toxidrome and Treatment with Physostigmine**

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### **Background and Hypothesis:**

Physostigmine is the antidote to anticholinergic poisoning. Widely used in the 1970s, 2 cases published in 1980 associated use of physostigmine with significant adverse cardiotoxic events. This caused widespread opposition to the use of physostigmine. More recently, the safety profile has been re-examined, and it has been shown to have a more favorable safety profile than was previously believed. Current literature focuses on adult populations, and the available pediatric data does not comprehensively evaluate treatment plans for anticholinergic toxicity in pediatrics. We sought to establish the prevalence of pediatric anticholinergic toxicity as well as determine the prevalence of exposure types associated with physostigmine administration. We then looked at the difference in outcomes, including mortality, for those treated with physostigmine versus those treated with benzodiazepines.

### **Project Methods:**

We retrospectively analyzed data from the National Poison Data System (NPDS), a database collected from poison centers nationwide. We queried for all poison center exposure cases for ages 2-18 to selected anticholinergic agents or any cases that received physostigmine from January 1, 2013 – December 31, 2017.

### **Results:**

The NPDS had a total of 109,833 patients exposed to one of the selected anticholinergic agents or plants. Only 0.27% of cases were treated with physostigmine (n=298), versus 3.3% that were treated with benzodiazepines (n=3626). The most prevalent exposure was diphenhydramine. The most likely pediatric patients to be treated with physostigmine are those that are adolescents, exposed to diphenhydramine, or ingested the substance intentionally with suspected suicidal intent.

### **Conclusion and Potential Impact:**

Despite a good safety profile and superior efficacy to benzodiazepines, physostigmine is still under-utilized by physicians to treat patients with an anticholinergic toxidrome. Further study can also be carried out on the potential of physostigmine to reduce resource utilization in treating the anticholinergic toxidrome.