9. Safety and Efficacy of Physostigmine: A 10-Year Retrospective Review

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Background: Physostigmine is an effective antidote to reverse anti-muscarinic delirium. The safety of physostigmine came into question after case reports of complications in the setting of tricyclic antidepressant poisoning. We designed a retrospective review of patients reported to the California Poison Control System (CPCS) who received physostigmine to determine its safety and efficacy.

Hypothesis: Physostigmine is a safe and effective antidote for the management of anti-muscarinic delirium.

Methods: Retrospective chart review of patients reported to CPCS who received physostigmine to reverse anticholinergic delirium from 2002 – 2012. The CPCS database was queried for all cases where 'physostigmine’ was entered in the treatment field or reported in the case notes. The notes were carefully reviewed to confirm that physostigmine was given; to determine the response to physostigmine; to assess adverse reactions; and remove duplicate cases.

Results: Of a total of 1,422 potential patients, 1,231 were excluded: 794 patients did not receive physostigmine, 292 patients probably did not receive physostigmine (the case notes were unclear), and 145 were duplicate cases. Anticholinergic plants were the most common ingestions (67 [35%]), followed by diphenhydramine (56 [29%]). Of the 191 study patients, 130 (68%) had improvement in or return to normal mental status after physostigmine, and 21 (11%) had normalization of vital signs. Most patients (185 [97%]) had no adverse reactions following physostigmine. Of the 6 patients with adverse reactions following physostigmine administration, 4 (2%) vomited, 1 (0.5%) experienced QTc prolongation, and 1 (0.5%) had a seizure (in the setting of a quetiapine overdose). A single fatality was reported in a patient who was agitated and tachycardic after ingestion of 950 mg of diphenhydramine. There was no response to 0.5 mg physostigmine. More than 6 hours later the patient developed a wide complex tachycardia and subsequent cardiac arrest.

Discussion: This retrospective review found few adverse events associated with physostigmine administration. There was only 1 reported seizure in the setting of a multi-drug ingestion. The one fatality had a cardiac arrest more than 6 hours after physostigmine administration.

Conclusion: In this retrospective case series, physostigmine appeared to be a safe and effective antidote to treat anti-muscarinic delirium.