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### **13. The Use of Physostigmine by Toxicologists in Anticholinergic Toxicity**

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Background: The anticholinergic toxidrome is well described and relatively common, seen over 350 times by toxicologists reporting to the ACMT Toxicology Investigators Consortium (ToxIC) registry in 2012. Administration of physostigmine is generally regarded as the antidote to anticholinergic toxicity. While physicians without toxicology training may be reticent to use physostigmine due to their unfamiliarity, we would expect that trained toxicologists would be relatively liberal in its use. Research question: How often is physostigmine administered to patients with anticholinergic toxicity that are evaluated by a toxicologist?

Methods: We retrospectively analyzed data in the ToxIC registry, representing data from medical toxicologists in multiple institutions nationwide, searching for patients who exhibited an anticholinergic toxidrome, determining what treatment(s) they received, and classifying the treatments as physostigmine, benzodiazepines, physostigmine and benzodiazepines, antipsychotics, or no definitive treatment.

Results: Three hundred fifty-two patients were seen by toxicologists for anticholinergic toxidromes in 2012, of which 113 (32.1 %) were given benzodiazepines alone, 46 (13.1 %) were given physostigmine alone, 32 (9.1 %) received both physostigmine and benzodiazepines, 12 (3.4 %) were given antipsychotics, and 149 (42.3 %) were given no definitive treatment. Of the patients who received physostigmine alone or in combination, five (6.4 %) required intubation and one (1.3 %) developed rhabdomyolysis. Of those who received benzodiazepines alone or in combination, 17 (11.7 %) required intubation and 4 (2.8 %) developed rhabdomyolysis. Of those who did not receive physostigmine, 25 (9.1 %) required intubation and 8 (2.9 %) developed rhabdomyolysis. Those who received physostigmine had a lower rate of intubation (6.4 vs 9.1 %) and rhabdomyolysis (1.3 vs 2.9 %) than those who did not, but the differences were not significant (OR, 0.68; 95 % CI, 0.25–1.84 (p=0.45) and OR, 0.56 95 % CI, 0.07–4.53 (p=0.59), respectively).

Discussion: These data suggest that patients with anticholinergic toxicity are more likely to receive benzodiazepines than physostigmine (32.1 vs 13.1 %) as monotherapy, and a significant number of these patients did not receive treatment for their toxidrome. The use of physostigmine was not correlated with intubation rates or rhabdomyolysis though numbers were small.

Conclusion: We find it interesting that physostigmine was infrequently used as treatment by toxicologists, given its recommendation for use in anticholinergic toxicity.