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Don't Sweat the Small Stuff: Galantamine Toxicity in Polysubstance Overdose

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Background

Galantamine is an alkaloid substance used in the treatment of moderate to severe Alzheimer's disease. It is a reversible and competitive acetylcholinesterase inhibitor that acts centrally as well as peripherally. Reports of toxicity are rare.

Hypothesis

In a complicated polysubstance overdose, galantamine can cause significant cholinergic toxicity.

Methods

This is a retrospective single case report utilizing both prehospital and hospital records. A previously healthy 23-year-old man was found unresponsive in his bathtub. He was a known heroin user. He was given 4 mg naloxone intravenously, causing agitation, and was intubated for airway protection. On clinical examination, the patient was found to be in sinus tachycardia with a heart rate of 120 beats per minute and a temperature of 38.5 degrees Celsius. He was profoundly diaphoretic with copious airway secretions necessitating frequent suctioning. He had miosis on clinical examination.

Results

Urine gas chromatography/mass spectrometry revealed galantamine, in addition to cocaine metabolites, fentanyl, codeine, oxycodone, quinine, and diphenhydramine. His course was complicated by compartment syndrome necessitating fasciotomy, and renal failure requiring hemodialysis. After a prolonged intensive care stay, he was discharged home with home health care.

Discussion

Our patient had no preexisting medical conditions that would have accounted for the galantamine that was found. On it's own, galantamine toxicity would be expected to cause excess muscarinic agonism due to increased synaptic acetylcholine. His presentation was complicated by the presence of cocaine, and possible naloxone-induced opioid withdrawal. However, the dramatic demonstration of respiratory secretions and diaphoresis suggest a cholinergic toxidrome. Sinus tachycardia could have been due to catecholamine activity from cocaine and/or opioid withdrawal, however preganglionic sympathetic stimulation by acetylcholinesterase inhibition, overcoming postganglionic parasympathetic effects, may have also contributed to or accounted for tachycardia. It is unclear whether galantamine was a coingestant or an adulterant in this case. This is the first reported case of galantamine toxicity coinciding with opioid overdose.

Conclusion

The patient's clinical presentation was multifactorial, however, given the degree of diaphoresis and respiratory secretion, cholinergic toxicity was a likely contributing factor.