ToxTalks:

A Bulletin for Healthcare Professionals Who Manage Poisoned Patients

In Partnership with the UVA Division of Medical Toxicology – Department of Emergency Medicine

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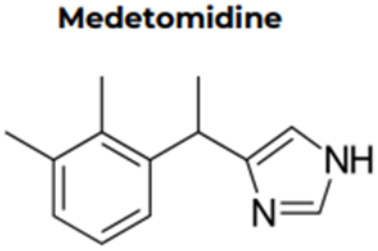
Medetomidine

What is Medetomidine?

Medetomidine is veterinary sedative medication that has increasingly been identified as an adulterant in drugs of abuse such as fentanyl and cocaine. It has been detected in the drug supply in the United States since 2022. Medetomidine is a racemic mixture of the two isomers dexmedetomidine and levomedetomidine. Dexmedetomidine is the active enantiomer and is approved for use in humans for sedation.



Pharmacology

Medetomidine is an alpha 2 adrenergic receptor agonist like xylazine (another veterinary medication found in the opioid supply), clonidine, and guanfacine. The alpha 2 receptor is responsible for negative feedback of norepinephrine release. When activated, the alpha 2 receptor decreases release of norepinephrine from the presynaptic neuron. The alpha 2 receptor therefore generally has inhibitory effects, including CNS depression, vasodilation, and bradycardia. Both medetomidine and dexmedetomidine are administered intravenously. When found as an adulterant in drugs of abuse, it may also be administered via oral ingestion and inhalation. Medetomidine is approximately 200 times more potent than xylazine.

Clinical Effects

Medetomidine, by way of alpha 2 agonism, can cause sedation, bradycardia, and hypotension. Because it is being found as an adulterant in illicit substances of abuse, clinical effects of medetomidine are most often encountered as an exacerbation of effects of drugs it is combined with. For example, in cases use of opioids such as fentanyl that are adulterated with medetomidine, the presence of medetomidine can add to the sedation caused by the fentanyl making the treatment of overdose of this combination particularly difficult.

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Management

Clinically, medetomidine is most commonly encountered as an adulterant used in combination with opioids or other substances of abuse. If a clinician suspects overdose with an opioid, reversal with naloxone is indicated for respiratory depression. The presence of medetomidine or other alpha 2 agonists may create a situation in which the opioid overdose does not appear to be completely reversed, as sedation and bradycardia and hypotension may still be present. Intubation may be necessary if sedation is profound enough to have persistent respiratory depression refractory to naloxone. In the case of hypotension refractory to IV fluids, vasopressors can be used with the goal of improving blood pressure. An alpha 2 antagonist, atipamezole, is used to reverse clinical effects in animals, but it is not approved for use in humans.

Summary

Medetomidine is an increasingly being detected as an adulterant in drugs of abuse, with fentanyl being the most common. It is an alpha 2 agonist similar to xylazine and clonidine. In overdose, it can cause sedation, bradycardia, and hypotension and can exacerbate sedation and respiratory depression in combination with opioids. If medetomidine is suspected, attention should be made to reversing opioid overdose if concomitant, and treating supportively with management of airway, breathing, and circulation with intubation and vasopressors in severe cases.

References available upon request