Medetomidine

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Background

Medetomidine, a potent sedative-analgesic, has been found to be a contributing factor in a recent wave of overdoses across the U.S. **Medetomidine is an α_2-adrenoreceptor agonist often used in veterinary medicine as a sedative and anesthetic for small and large animals**[1]. It is known for producing sedation and pain-relieving effects that last longer in duration compared to similar drugs like clonidine and xylazine[1]. Medetomidine is a synthetically manufactured mixture of dexmedetomidine and levomedetomidine, with dexmedetomidine being the active component[2]. Dexmedetomidine was FDA approved in 1996 as a sedative for animals and approved for use in humans in 1999[3]. Dexmedetomidine (Precedex) may be administered to patients in surgical and intensive care settings, while other forms of medetomidine are typically reserved only for veterinary use[2].

Although the rate of fatal overdoses in the U.S. declined from 2022 to 2023, the recent influx of overdoses being reported can be attributed to a changing drug supply[2]. Researchers mention that one of the dangers associated with medetomidine is that there are currently no supplies that can be used to test for its presence among other substances, unlike with fentanyl and xylazine[2]. The source of medetomidine infiltration is also unknown. Researchers are unclear whether the drug is being illegally diverted from medications intended for use in hospitals, or from veterinary supplies[2]. To combat this, **it**

is crucial to spread awareness and education surrounding emerging threats infiltrating the illicit drug supply and practice harm reduction.

Mechanism

Medetomidine is a specific and selective α2-adrenoreceptor agonist3. Its actions in the brain and spinal cord inhibit the firing of neurons **causing its analgesia, sedation and hypotensive effects[3]**. Medetomidine is in the same drug class as xylazine; however, its potency is 200 times greater[4].

For dexmedetomidine use in clinical settings, it is often administered intravenously in a two-part infusion, with the initial loading dose being administered over a period of 10 minutes and the second over the course of several hours[4]. In the case of a dexmedetomidine overdose or toxicity, it is unclear whether the speed of injection compounds side effects[3]. Other routes of administration include intranasally and sublingually[3].

Effects

Medetomidine, like other α2-agonists, can cause negative side effects when taken at high doses, with some of the cardiovascular effects being the most concerning. **Side effects associated with medetomidine sedation include bradycardia, bradyarrhythmia, initial hypertension followed by prolonged hypotension, and reduced cardiac output[1].** Additional side effects include dry mouth, hypothermia, spontaneous muscle contractions, and respiratory depression[2].

There is limited research on long-term side effects of medetomidine use in humans. According to the Philadelphia Department of Public Health, **it is unclear whether prolonged medetomidine use can cause skin ulcers as seen with xylazine[4].**

Treatment

According to The Center for Forensic Science Research and Education, **most cases of medetomidine overdose involved fentanyl and xylazine[2]**. Medetomidine is not an opioid and does not respond to naloxone, however it is still recommended to administer naloxone in the case of a suspected medetomidine overdose as it is often combined with opioids[2]. Medetomidine can cause prolonged sedation, so in the event of an overdose, it is recommended to perform rescue breathing and place the individual in recovery position[3].

Since most medetomidine overdoses involve opioids, treatment following a medetomidine overdose should include treating symptoms of opioid withdrawal[4]. The recommendation for management of opioid withdrawal is MOUD (medications for opioid use disorder)[4].

Resources

Cases of medetomidine overdose are being reported in states including Pennsylvania, Missouri, Colorado and others[5], emphasizing the need for increased education and awareness. To learn about other emerging adulterants, visit the MATTERS website at https://mattersnetwork.org/edu/other-drugs/. Information on naloxone and where to access it can also be found at https://mattersnetwork.org/naloxone/.

References

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