




Practice Perspectives

Xylazine: An Emerging Cause of Death in Correctional Institutions

Marie Lasater, MSN RN F-ABMDI ¹

Received: August 16, 2023

Accepted: Oct 31, 2023

© Lasater, 2023,  This is an Open Access article distributed under the terms of the Creative Commons-Attribution-Noncommercial-Share Alike License 4.0 International (<http://creativecommons.org/licenses/by-nc-sa/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly attributed, not used for commercial purposes, and, if transformed, the resulting work is redistributed under the same or similar license to this one.

Corresponding author: Marie Lasater
P.O. Box 894,
Licking MO 65542
Email baltimore192@gmail.com

Affiliations: 1- Coroner, Texas County Missouri,, Houston Missouri

Abstract

The unregulated veterinary drug xylazine is emerging as a cause of death in State Correctional facilities. Unlike the drug fentanyl, there is no antidote. The origins and toxicity of the drug are discussed and illustrated with a case study of an offender death due to xylazine mixed with fentanyl. There are precautions that prison officials can take, and correctional nurses that encounter users will be informed and better able to assess offenders for possible xylazine use due to physical signs on examination.

Keywords: xylazine, death in custody, drug overdose

Xylazine: An Emerging Cause of Death in Correctional Institutions

Xylazine, (trade name Rompun®) known on the street as “tranq,” is making its mark on a rural Missouri county, showing up in the local maximum-security prison resulting in two offender deaths within six months in 2022. Unlike fentanyl, which is identified and treated emergently with Narcan®, xylazine has no approved antidote for humans. It is NOT a federally controlled substance (McAward, 2021), but is regulated under the Federal Food, Drug and Cosmetic Act (FDA) and is approved by the FDA under NADA # 047-956.

Introduction

Xylazine is an analogue of the common drug clonidine hydrochloride used to treat hypertension but is only authorized for veterinary use due to its potentially lethal side effects that include bradycardia and profound hypotension. It is an α_2 -adrenergic agonist that acts via stimulation of central α_2 -receptors (Greene & Thurmon, 1988). Early clinical studies confirmed

its' effects on the central nervous system. Today xylazine is only approved in the United States for use in dogs, cats, horses and various deer species as a sedative, analgesic and muscle relaxer. (Greene & Thurmon, 1988; Ruiz-Colón et al., 2014).

The illicit human use of xylazine first became apparent in Puerto Rico in the year 2000. Its use was associated with a high number of inmate deaths at the Guerrero Correctional Institution in Aguadilla, Puerto Rico, from 2002 to 2008 (Torruella, 2011). The Drug Enforcement Agency (DEA) Joint Intelligence report on Xylazine states “The emergence of xylazine across the United States appears to be following the same path as fentanyl, beginning with white powder heroin markets in the Northeast before spreading to the South, and then working its way into drug markets westward. Philadelphia has been extremely hard hit by xylazine. Philadelphia health officials say the drug was first detected in that city in 2006. The number of fatal overdoses in Philadelphia involving xylazine have increased every year: from 15 in 2015 to 434 in 2021, according to the Philadelphia Department of Public Health (Rotuno-Johnson, 2023).

This rising pattern of fatal overdoses indicates that use of xylazine as an adulterant will likely continue to increase and to be commonly encountered in the illicit fentanyl supply. Xylazine use throughout the United States may also follow the pattern seen in Puerto Rico and emerge as a drug of abuse on its own in the future, although it is unlikely to replace fentanyl or other opioids among illicit drug users. (Drug Enforcement Administration, 2022)

Commercial Availability

Despite being a medication approved only for use in certain animals, xylazine is relatively easy to purchase, and is available online on several veterinary medicine sites. The current price is \$26.95 for 100 mg but requires a prescription from a veterinarian (Valley Vet Supply, 2023). It can also be purchased directly from the veterinary office, a process commonly used by farriers, who purchase the drug to calm some horses to enable shoeing.

Toxicity in Humans

In most cases, xylazine is mixed with another drug, frequently fentanyl, making the pharmacokinetics of xylazine largely unknown. While naloxone reverses the effects of fentanyl, death can still occur with fatal overdose cases seen with xylazine levels from trace to 16 ng/ml (Silva-Torres, L. et al., 2014). There is no “safe” dose of xylazine in humans.

Xylazine can be administered orally, by inhalation, injection in vein, muscle or subcutaneously, with intravenous injection the most common route. (Ayub, S, et al., 2023). In animal studies, effects are usually seen within 15 minutes after administration, with sedative effect lasting 1 – 4 hours. The drug diffuses readily throughout the body, penetrating the blood-brain barrier, 70% of the dose is eliminated in the urine, making it useful in detecting xylazine intoxication. Due to rapid metabolism, xylazine decreases fairly rapidly to undetectable levels, so procurement of toxicological specimens as soon as possible is recommended. (Friedman, J. et al., 2022).

Antidotes

Although there is no approved antidote to xylazine in humans, the drug has been effectively counteracted in veterinary practice. The natural herb yohimbine, a α_2 adrenergic antagonist, has been shown to reverse the antihypertensive effects of xylazine in dogs and elephants.

XYLAZINE DEATHS

The drug atipamezole is another α 2-antagonist used to reverse the effects of xylazine, and while this has been tested in humans in Phase I trials, it is not an approved medical treatment for xylazine overdose (McAward, 2021). Consequently, to date all overdose deaths in offenders where xylazine is found are fatal.

Appearance of Xylazine Users

As xylazine is commonly injected and mixed with other drugs, particularly fentanyl, the symptoms of pinpoint pupils, physical deterioration, dependence and track marks will be evident. In addition, chronic xylazine users develop serious non-healing infected skin ulcers due to skin oxygen deficit following hypotension, bradycardia and respiratory depression secondary to use of the drug. The ulcers are not generally due to injection trauma. As illustrated in the case study that follows, the ulcers may ooze pus and have a characteristic odor. In severe cases, amputations must be performed on the affected extremities (Torruella, 2011).

Case study

A 42-year-old male offender at a local State Correctional Facility was found unresponsive at 12:45 am. CPR was initiated, and he was brought to medical ER at the facility, 4 doses of Narcan® were administered without effect. EMS arrived and took over CPR and ACLS without response. The code was called by the physician at 0125. Autopsy was completed and toxicology was positive for xylazine at 16 ng/ml, fentanyl at 6.8 ng/ml, norfentanyl 0.44 ng/ml. and 4-ANPP (an inert ingredient added to some batches of fentanyl). Of note, decedent presented to medical at the correctional facility two weeks prior to his death with complaint of "pus bumps" on his skin, a known side effect of xylazine use. A biopsy was scheduled, but not completed prior to his death (Alexander et al., 2022; Kariisa et al., 2021).

Conclusion

Xylazine is an emerging drug contributing to fatalities in correctional institutions with no antidote approved for human use. Personnel in correctional medical facilities should therefore be aware of the potential presence of xylazine. Markers of xylazine use include very distinct odorous pustular lesions that can be found anywhere on the body due to the ability of the drug to rob the skin of oxygen. Currently there is no field test for xylazine, but it is readily detected in blood or urine in expanded testing completed by forensic laboratories.

References

- Alexander, R. S., Canver, B. R., Sue, K. L., & Morford, K. L. (2022). Xylazine and overdoses: trends, concerns, and recommendations. *American Journal of Public Health, 112*(8), 1212-1216.
- Ayub, S., Parnia, S, Poddar, K, Bachu, A., Sullivan, A., Khan, A., Ahmed, S., Jain, L. (2023) Xylazine in the Opioid Epidemic: A Systematic Review of Case Reports and Clinical Implications. *Cureus*. Mar. 29;15(3).
- Britannica. (2023). Retrieved 15th March from <https://www.britannica.com/topic/bayer>
- Drug Enforcement Administration. (2022). The Growing Threat of Xylazine and Its Mixture with Illicit Drugs.

XYLAZINE DEATHS

- Friedman J, Montero F, Bourgois P, et al. Xylazine spreads across the US: A growing component of the increasingly synthetic and polysubstance overdose crisis. *Drug and Alcohol Dependence*. 2022 Apr 1;233:109380.
- Greene, S., & Thurmon, J. (1988). Xylazine—a review of its pharmacology and use in veterinary medicine. *Journal of veterinary pharmacology and therapeutics*, 11(4), 295-313.
- Kariisa, M., Patel, P., Smith, H., & Biting, J. (2021). Notes from the field: xylazine detection and involvement in drug overdose deaths—United States, 2019. *Morbidity and Mortality Weekly Report*, 70(37), 1300.
- McAward, A. (2021). “Xylazine, an Emerging Adulterant.” *Tactical and Law Enforcement Medicine, American College of Emergency Physicians*. Retrieved March from <https://www.acep.org/talem/newsroom/oct-2021/xylazine-an-emerging-adulterant>
- Rotuno-Johnson, M. (2023). “Xylazine Threat in PA: Feds Issue Warning over Fentanyl Mixture.” Patch. Retrieved 25th March from patch.com/pennsylvania/across-pa/xylazine
- Ruiz-Colón, K., Chavez-Arias, C., Díaz-Alcalá, J. E., & Martínez, M. A. (2014). Xylazine intoxication in humans and its importance as an emerging adulterant in abused drugs: a comprehensive review of the literature. *Forensic Science International*, 240, 1-8.
- Silva-Torres, L., Velez, C., Alvarez, L., Zayas, B. (2014). Xylazine as a drug of abuse and its effects on the generation of reactive species and DNA damage on human umbilical vein epithelial cells. *Journal of Toxicology*, 2014-429609.
- Torruella, R. A. (2011). Xylazine (veterinary sedative) use in Puerto Rico. *Substance Abuse Treatment, Prevention, and Policy*, 6, 1-4.
- Valley Vet Supply. (2023). *Xylazine HCL for Horses*. www.valleyvet.com/ct_detail.html?pgguid=07EE8074-D07C-47C2-A4B4-710F4EAB3F18&q=xylazine.