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Selected Topics: Toxicology

XYLAZINE EXPOSURES REPORTED TO TEXAS POISON CENTERS

Mathias B. Forrester, BS

Epidemiology and Disease Surveillance Unit, Department of State Health Services, Austin, Texas
Corresponding Address: Mathias B. Forrester, BS, Epidemiology and Disease Surveillance Unit, Texas Department of State Health Services, 1100 West 49th Street, Austin, TX 78756

☐ **Abstract—Background: Xylazine is a sedative, analgesic, anesthetic, and central muscle relaxant approved for animals but not humans. Although xylazine is an emerging drug of abuse, there are limited data on potentially adverse exposures to the drug. Objectives: The intent of this study was to describe potentially adverse xylazine exposures reported to a large poison center system. Methods: All xylazine exposures reported to Texas poison centers between 2000 and 2014 were included. The distribution of cases by select variables was determined. Results: Of 76 total cases, 93% of the patients were ≥20 years of age, and 54% were male. Fifty-one percent of the exposures occurred by injection, 28% by ingestion, 16% were dermal, 14% were ocular, and 3% by inhalation. Sixty-four percent of the exposures were unintentional, 32% were intentional, and 1% each was related to malicious use and adverse reaction. Sixty-seven percent of the patients were already at or en route to a health care facility when the poison center was contacted, 21% were managed on-site, and 9% were referred to a health care facility. The most common clinical effects were drowsiness or lethargy (47%), bradycardia (20%), hypotension (11%), hypertension (9%), puncture or wound (8%), and slurred speech (8%). Conclusion: Xylazine exposures tended to involve patients who were adult males, exposures were typically unintentional; and most often occurred by injection. Most of the patients were already at or en route to a health care facility when a poison center was contacted. The most frequently reported adverse effects were cardiovascular or neurologic in nature.** © **2016 Elsevier Inc. All rights reserved.**

☐ **Keywords—poison center; veterinary drug; xylazine**

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The Department of State Health Services institutional review board considers this analysis exempt from ethical review.

INTRODUCTION

Xylazine is a partial alpha-2 adrenergic receptor agonist with characteristics similar to phenothiazines and clonidine (1,2). It acts as a sedative, analgesic, anesthetic, and central muscle relaxant (3). Xylazine is not approved by the United States (US) Food and Drug Administration (FDA) for human use in the United States, but is approved for use in dogs, cats, horses, and other large mammals (3). It is typically administered by injection. Xylazine is an emerging drug of abuse. It has been reported as an adulterant of heroin and may be used with other drugs, such as cocaine (3–8).

There is limited information on the effects of xylazine in humans. A study that reviewed the literature from 1966 to 2013 found 43 reported cases of human exposure (3). These included accidental and intentional exposures to the drug. Adverse effects reported with the human exposures to xylazine in this review included central nervous system depression, hypotension, bradycardia, tachycardia, respiratory depression, miosis, hyperglycemia, and hypothermia (3). Deaths of people who have used xylazine have been reported (4,9). No antidote exists; treatment recommendations include supportive care (3).

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A limitation of the published review is that it included xylazine exposures from a number of different data sources (3). The objective of this study was to describe potentially adverse exposures to xylazine in humans reported to a single data source.

METHODS

This retrospective descriptive study used data collected by the Texas Poison Center Network (TPCN). The TPCN is a system of six poison centers that together service the entire state, a current population of over 26 million. All poison centers in the TPCN use a common electronic database to collect information on all calls in a consistent manner. The data variables and allowable codes in this database were standardized by the American Association of Poison Control Centers (AAPCC) (10).

All xylazine exposures reported to the TPCN between 2000 and 2014 were reviewed. Patients who were not followed to a final medical outcome were included. The distribution of patients was determined for a variety of demographic and clinical factors, including year of report, urbanization status of caller county, patient age and sex, exposure route, circumstances of (i.e., reason for) exposure, exposure site, presence of additional substances, management site, final medical outcome, and most commonly reported adverse clinical effects and treatments. Because the presence of additional substances might affect the management or outcome of a patient, the distribution by management site, final medical outcome, and reported adverse clinical effects and treatments was determined for total cases and for those without additional reported substances.

For urbanization status, the 254 Texas counties were grouped into categories of rural or urban based on US Office of Management and Budget definitions of metropolitan (i.e., urban) and nonmetropolitan (i.e., rural). The rate per 1,000,000 population was calculated using the 2010 US Census as the denominator.

The medical outcome or severity of an exposure was assigned by the poison center staff and was based on the observed or anticipated adverse clinical effects. Medical outcome was classified according to the following criteria: no effect (i.e., no symptoms caused by exposure), minor effect (i.e., some minimally troublesome symptoms), moderate effect (i.e., more pronounced, prolonged symptoms), major effect (i.e., symptoms that are life-threatening or cause significant disability or disfigurement), and death. A portion of exposures were not followed to a final medical outcome because of resource constraints or the inability to obtain subsequent information on the patient. In these instances, the poison center staff recorded the expected outcome of the exposure. These expected outcomes are grouped into the following categories: not followed but judged as nontoxic exposure (i.e., symptoms not expected), not followed but minimal symptoms possible (i.e., no more than minor symptoms possible), and unable to follow but judged as a potentially toxic exposure. Another medical outcome category was unrelated effect where the exposure was probably not responsible for the symptoms. The analysis of medical outcome was performed for these specific outcomes and grouping the outcomes into those known or expected to not be serious (i.e., no effect, minor effect, not followed and judged nontoxic, and not followed and judged minimal effects) and those known or expected to be serious (i.e., moderate effect, major effect, death, and unable to follow and potentially toxic).

The Texas Department of State Health Services institutional review board considered this analysis exempt from ethical review.

RESULTS

Between 2000 and 2014, there were 76 xylazine exposures reported to the TPCN. Twenty-eight (36.8%) of the exposures involved other substances. The most frequently reported other substances were ketamine (n = 9), tiletamine and zolazepam in combination (n = 5), alcohol (n = 3), detomidine (n = 3), butorphanol (n = 2), cocaine (n = 2), and pentobarbital and phenytoin in combination (n = 2). Heroin was not reported in any xylazine exposure.

The annual number of cases ranged from 1 to 10, without any annual trend. Twenty-two cases were reported from rural counties for a rate of 7.2 per 1 million people and 53 from urban counties for a rate of 2.4 per 1 million people; the caller county was unknown for one case. Three (3.9%) of the patients were 11 to 19 years of age, 71 (93.4%) were ≥20 years of age, and two (2.6%) were of unknown age. The exact age in years was known for 56 of the cases; the mean age of these cases was 37 years (range 11–77 years). Forty-one (53.9%) of the patients were male, 33 (43.4%) were female, and two (2.6%) were of unknown sex.

The exposure route was 39 (51.3%) by injection, 21 (27.6%) by ingestion, 12 (15.8%) by dermal route, 11 (14.5%) by ocular route, 2 (2.6%) by inhalation, and 2 (2.6%) by unknown route; 9 (11.8%) of the exposures involved multiple routes. Forty-nine (64.5%) of the exposures were unintentional, of which 17 (22.4%) were occupational-related and 10 (13.2%) were misuse of the drug; 24 (31.6%) of the exposures were intentional, of which 12 (15.8%) were suspected attempted suicide and 10 (13.2%) were abuse of the drug; 1 (1.3%) of the exposures involved malicious use of the drug; 1 (1.3%) of the exposures was an adverse reaction; and