61. Abuse and intentional misuse of promethazine reported to U.S. Poison Centers: 2000–2012

M E Tsay[2], G L Procopio[1], B D Anderson[2], W Klein-Schwartz[2]

[1]*Johns Hopkins Hospital, Department of Pharmacy, Baltimore MD USA;* [2]*Maryland Poison Center, Baltimore MD USA*

Background: Promethazine is commonly used for allergic reactions, motion-sickness, and as an antiemetic. Abuse and misuse have been documented in the U.S. and internationally.
Objective: To investigate promethazine abuse and misuse in the U.S.
Methods: A retrospective review was conducted of promethazine cases coded as abuse or intentional misuse reported to the National Poison Data System from 2000 to 2012. Data were stratified by product type, promethazine alone (PA) or in a co-formulation (PC), and evaluated for demographics, clinical effects, treatments, management site, and medical outcomes. Multi-substance exposures were excluded.
Results: There were 365 single product abuse or misuse exposures documented between 2000 and 2012, of which 101 were PA and 264 were PC cases. Over the 13 year timeframe, the annual exposure rate per 100,000 population to PA and PC doubled. Exposures were most prevalent among teen-agers and adults in their twenties, accounting for 62.4% of PA cases and 54.9% of PC cases. Clinical effects due to PA and PC respectively included drowsiness (43.6%, 53.4%), tachycardia (7.9%, 20.8%), agitation (12.9%, 12.9%), confusion (12.9%, 11.4%), slurred speech (11.9%, 10.2%), hallucinations (6.9%, 9.9%), dizziness (6.9%, 7.2%), hypertension (5.0%, 7.2%), vomiting (5.9%, 4.2%), and ataxia (4.0%, 4.2%). Common treatments administered for PA and PC exposures included IV fluids (22.8%, 23.1%), activated charcoal (10.9%, 11.0%), benzodiazepines (7.9%, 6.1%), and naloxone (1.0%, 6.8%). The most frequently reported management site for PA and PC exposures was the emergency department (38.6%, 56.1%), followed by non-health care facility (33.7%, 14.8%), intensive care unit (7.9%, 11.0%), general medical floor (6.9%, 7.2%), and psychiatric unit (2.0%, 4.2%). Patients refused treatment or left against medical advice in 10.9% of the PA group and 6.4% of the PC group. The majority of exposures to PA (57.4%) and PC (53.8%) led to minor clinical effects. PA exposures resulted in no effects (21.8%), moderate effects (18.8%), and major effects (2.0%). PC exposures led to no effects (12.9%), moderate effects (31.4%), and major effects (1.9%).
Conclusions: Abuse or intentional misuse of promethazine most frequently resulted in minor clinical effects and with management in the ED or a non-health care facility. Abuse or misuse of PC had more serious consequences with a higher frequency of moderate outcomes and treatment at a health care facility. The differences in effects are most likely attributed to toxicity associated with the co-formulant as opposed to promethazine alone.
Keywords: Abuse, Drug of abuse, National Poison Data System

62. Retrospective evaluation of quetiapine abuse reported to the national poison data system

L Klein, S Bangh, J B Cole

Hennepin Regional Poison Center, Minneapolis MN USA

Background: Quetiapine is an atypical antipsychotic FDA approved for use in schizophrenia and bipolar disorder. The medication is also commonly prescribed for generalized anxiety disorder and major depression. Case reports and poison center experience suggest there is a significant potential for abuse for this widely prescribed medication, but there is scant literature describing the potential burden of this phenomenon. Our goal was to conduct a large retrospective cohort study characterizing demographic and clinical data regarding intentional abuse of quetiapine, utilizing the National Poison Data System (NPDS).
Methods: A 10-year retrospective analysis of the NPDS was conducted, selecting single-substance quetiapine exposures coded as intentional abuse. Demographic and epidemiological data were collected, as well as data on clinical effect and therapies on cases with known outcomes.
Results: There were 2134 cases of quetiapine exposures coded as intentional abuse. Of these cases 1451 had known outcomes, including major (n = 24, 1.1%, 95%CI 0.7–1.5), moderate (363, 17%, 15.4–18.6), minor (760, 35.6%, 33.6–37.6), no effect (303, 14.2%, 12.7–15.7) and death by indirect report (1, 0.04%, -0.04–0.12). Route of exposure included ingestion (2004, 93.9%, 92.9–94.9), inhalation (120, 5.6%, 4.6–6.6), and parenteral (16, 0.7%, 0.4–1.0). Notable dispositions included critical care admission (220, 10.3%, 9.0–11.6), non-critical care admission (137, 6.4%, 5.3–7.4), and psychiatric admission (152, 7.1%, 6.0–8.2). Of cases with known outcomes, the most common clinical effects included drowsiness/lethargy (792, 54.6%, 52.0–57.2), tachycardia (334, 23.0%, 20.8–25.2), slurred speech (114, 7.9%, 6.5–9.3), hypotension (81, 5.6%, 4.4–6.8), and agitated/irritable (79, 5.4%, 4.2–6.6). The most common therapies included IV fluids (368, 25.3%, 23.0–27.5), charcoal (218, 15.0%, 13.1–16.8), and benzodiazepines (47, 3.2%, 2.3–4.1). Other notable therapies included intubation (20, 1.4%, 0.8–2.0). Other notable clinical effects included respiratory depression (14, 1.0%, 0.5–1.5), seizures (13, 0.9%, 0.4–1.4), ECG change (10, 0.7%, 0.3–1.1), conduction disturbance (17, 1.2%, 0.6–1.8), hallucinations/delusions (24, 1.7%, 1.0–2.4), and dystonia (8, 0.6%, 0.2–1). There were no cases of vasopressor or physostigmine use.
Conclusions: Based on NPDS data, quetiapine abuse appears to be a very common phenomenon. While the majority of these exposures lead to minor or no effects, a clinically significant number resulted in moderate or major effects. Clinicians should be aware of the abuse potential of quetiapine as well as the severity of clinical effects that may occur.
Keywords: Antipsychotic, Abuse, National Poison Data System

63. The change in perceived risk associated with marijuana use in the United States from 2002 to 2012

J Okaneku, D Vearrier, M I Greenberg

Drexel University College of Medicine, Philadelphia PA USA

Background: Over the last decade there has been considerable public debate over legalization of medical and recreational marijuana, increasing use of marijuana among residents of the United States, and increasing depictions of marijuana use on television and in the movies. We sought to determine whether there has been a change in the perceived risk associated with marijuana use over that same period of time.

Methods: The National Survey on Drug Use and Health (NSDUH) is a questionnaire administered to a multistage probability sample of residents of the United States. For the purposes of this study, risk perception was defined as the response to: "How much do people risk harming themselves physically and in other ways when they smoke marijuana once a month [occasional use]/once or twice a week [regular use]?" Respondents to the NSDUH 2002–2012 surveys were asked to classify the risk as "no risk", "slight risk", "moderate risk", or "great risk". We performed regression analysis to determine whether a temporal trend existed for the perceived risk of marijuana use, while controlling for age and gender. Secondary analyses included regression analysis and Mann-Whitney U test to determine whether age or gender, respectively, were associated with marijuana use risk perception. All analyses were performed using SPSS version 20 (IBM, Somers, NY, USA).
Results: A total of 614,579 respondents were identified. From 2002–2012 the percent of respondents who characterized regular marijuana use as being associated with "great risk" decreased from 51.3% to 40.3%, while the percent who characterized it as being associated with "no risk" increased from 5.7% to 11.7%. The percent of respondents who characterized occasional use as "great risk" decreased from 38.2% to 30.7%, while the percent who characterized it as "no risk" increased from 10% to 16.3%. There was a significant negative temporal trend in the perceived risk for both occasional and regular use of marijuana from 2002 to 2012 after controlling for age and gender ($p < 0.001$ for both). Increasing age was significantly associated with increased perceived risk for both occasional and regular marijuana use ($p < 0.001$). Males have a significantly lower perceived risk for both occasional and regular marijuana use as compared to females ($p < 0.001$).
Conclusions: Over the 10-year study period, there was a significant decrease in the perceived risk associated with occasional and regular marijuana use. Younger age and male gender were also associated with decreased perceived risk.
Keywords: Marijuana, Epidemiology, Drug of abuse

64. Thrombotic microangiopathy due to intravenous oxymorphone er abuse with variable findings on kidney biopsy

J D King[1], H P Cathro[1], A Bali[1], R Arora[1], J S Cain[2], S Swaminathan[1], N P Charlton[1]

[1]*University of Virginia, Charlottesville VA USA;* [2]*Valley Nephrology Associates, Roanoke VA USA*

Background: Intravenous (IV) abuse of the tamper-resistant formulation of extended-release (TR-ER) oxymorphone has been associated with thrombotic microangiopathy (TMA) and kidney failure based on clinical findings. Currently, only three reported cases document kidney biopsy findings. The cause and pathophysiology of TMA in these patients is currently unknown. This is a review of two cases with TR-ER oxymorphone-induced TMA with concurrent kidney biopsies.
Case reports: A 52 year-old man with Hepatitis C presented with nausea and vomiting; he was found to have acute kidney injury, anemia with schistocytes on blood smear, and thrombocytopenia. He admitted to repeated IV abuse of TR-ER oxymorphone, and was started on hemodialysis. A subsequent kidney biopsy revealed findings of acute arterial damage consistent with malignant hypertension and focal segmental glomerulosclerosis (FSGS). He was treated with plasma exchange with no improvement in kidney function, and discharged on hemodialysis.

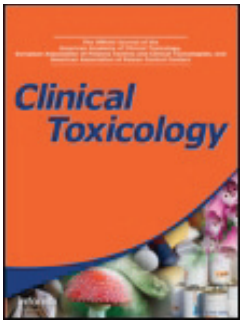
A 23 year-old male with a history of IV abuse of TR-ER oxymorphone presented with fatigue and dyspnea; he was found to have anemia with schistocytes on blood smear, thrombocytopenia, and acute kidney injury. He had had an episode of pancytopenia with schistocytosis one month previously, which improved with corticosteroids. A kidney biopsy revealed acute changes of TMA. He was treated with IV immunoglobulin without improvement, and discharged on hemodialysis. During both presentations, parvovirus B19 viremia was found, but immunohistochemical staining for parvovirus B19 on the kidney biopsy was negative.
Discussion: Two cases of TMA based on clinical and laboratory parameters associated with intravenous abuse of TR-ER oxymorphone are described, but with very different findings on kidney biopsy. One case demonstrated classic findings of TMA, similar to that reported previously; the other case demonstrated findings that did not reveal TMA-induced kidney damage, despite clinical evidence of TMA. While parvovirus B19 has been associated with TMA, given the negative staining on biopsy, its role in our case is unclear. FSGS has been associated with many causes, such as infection, IV drug abuse, medications, idiopathic causes, and others. It is not certain whether the FSGS in our case is a manifestation of IV TR-ER oxymorphone-related kidney damage, or whether it is related to other causes.
Conclusions: IV abuse of TR-ER oxymorphone is associated with TMA. Questions remain as to whether other factors, such as viral infection or other types of kidney damage caused by IV TR-ER oxymorphone, may play a role in the kidney failure affecting some patients who abuse this drug intravenously.
Keywords: Opioid, Renal toxicity, Hemolysis

65. Extreme hyperglycemia, hyperlactemia, and myocardial ischemia from clenbuterol use by a body builder

J Masur[1], S P Mayer[3], M Mink[1], A R des Ordons[2], F M Garlich[1]

[1]*Poison and Drug Information Service, Calgary AB Canada;* [2]*Department of Critical Care Medicine, University of Calgary, AB Canada;* [3]*Department of Emergency Medicine, University of Calgary, AB Canada*

Background: Clenbuterol is a beta-2 adrenergic agonist abused by bodybuilders for its lipolytic, anabolic, and sympathomimetic properties. Acute clenbuterol toxicity results in numerous adverse cardiovascular and metabolic effects. We report a case of severe hyperglycemia, hyperlactemia, and myocardial ischemia resulting from clenbuterol ingestion.
Case Report: A 41-year-old male bodybuilder with a history of anabolic steroid and ephedrine use reportedly ingested clenbuterol 80 mcg at the gym. Within minutes he developed palpitations, flushing, tremors, chest pain, tinnitus, and malaise. He presented to the Emergency Department 3 hours post-ingestion, where he was found to be flushed and diaphoretic with emesis and ankle clonus. Initial vitals: HR 122/min, BP 127/94 mmHg, RR 25/min, T 37.4°C. Multiple laboratory abnormalities included potassium 2.6 mEq/L and Cr 2.5 mg/dL on arrival, peak glucose 575 mg/dL, peak lactate 13.0 mEq/L, and peak high-sensitivity troponin 575 ng/L (normal



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