

Current Awareness in Clinical Toxicology

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CURRENT AWARENESS PAPERS OF THE MONTH

2016 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 34th Annual Report

Gummin DD, Mowry JB, Spyker DA, Brooks DE, Fraser MO, Banner W. Clin Toxicol 2017; 55: 1072-252.

Introduction

This is the 34th Annual Report of the American Association of Poison Control Centers' (AAPCC) National Poison Data System (NPDS). As of 1 January 2016, 55 of the nation's poison centers (PCs) uploaded case data automatically to NPDS. The upload interval was 9.50 [7.33, 14.6] (median [25%, 75%]) min, facilitating a near real-time national exposure and information database and surveillance system.

Methods

We analyzed the case data tabulating specific indices from NPDS. The methodology was similar to that of previous years. Where changes were introduced, the differences are identified. Cases with medical outcomes of death were evaluated by a team of medical and clinical toxicologist reviewers using an ordinal scale of 1–6 to assess the Relative Contribution to Fatality (RCF) of the exposure.

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Results

In 2016, 2,710,042 closed encounters were logged by NPDS: 2,159,032 human exposures, 54,019 animal exposures, 490,215 information cases, 6687 human confirmed non-exposures, and 89 animal confirmed non-exposures. US PCs also made 2,718,022 follow-up calls in 2016. Total encounters showed a 2.94% decline from 2015, while health care facility (HCF) human exposure cases increased by 3.63% from 2015. All information calls decreased by 12.5% but HCF information calls increased 0.454%, and while medication identification requests (Drug ID) decreased 29.6%, human exposure cases were essentially flat, decreasing by 0.431%. Human exposures with less serious outcomes have decreased 2.59% per year since 2008 while those with more serious outcomes (moderate, major or death) have increased by 4.39% per year since 2000. The top five substance classes most frequently involved in all human exposures were analgesics (11.2%), household cleaning substances (7.54%), cosmetics/personal care products (7.20%), sedatives/hypnotics/antipsychotics (5.84%), and antidepressants (4.74%). As a class, sedative/hypnotics/antipsychotics exposures increased most rapidly, by 10.7% per year (2088 cases/year), over the last 15 years for cases showing more serious outcomes. The top five most common exposures in children age 5 years or less were cosmetics/personal care products (13.3%), household cleaning substances (11.1%), analgesics (9.21%), foreign bodies/toys/miscellaneous (6.48%), and topical preparations (5.07%). Drug identification requests comprised 28.1% of all information calls. NPDS documented 1977 human exposures resulting in death; 1492 (75.5%) of these were judged as related (RCF of 1 – undoubtedly responsible, 2 – probably responsible, or 3 – contributory).

Conclusions

These data support the continued value of PC expertise and need for specialized medical toxicology information to manage more serious exposures, despite a decrease in cases involving less serious exposures. Unintentional and intentional exposures continue to be a significant cause of morbidity and mortality in the US. The near real-time, always current status of NPDS represents a national public health resource for collecting and monitoring US exposure cases and information calls. The continuing mission of NPDS is to provide a nationwide infrastructure for surveillance for all types of exposures (e.g. foreign body, infectious, venomous, chemical agent, or commercial product), and the identification and tracking of significant public health events. NPDS is a model system for the real-time surveillance of national and global public health.

Full text available from: <http://dx.doi.org/10.1080/15563650.2017.1388087>

Fewer adverse effects with a modified two-bag acetylcysteine protocol in paracetamol overdose

McNulty R, Lim JME, Chandru P, Gunja N. Clin Toxicol 2017; online early: doi: 10.1080/15563650.2017.1408812:

Objective

Acetylcysteine (NAC), an effective antidote for paracetamol poisoning, is commonly associated with adverse reactions. This has been postulated to be related to the rapid initial infusion rate (150 mg/kg over 1 h) of the traditional three-bag protocol. We hypothesized that a slower rate would result in fewer adverse reactions. Our institution in Western Sydney moved to a modified two-bag protocol in February 2015 – first bag: 200 mg/kg over 4 h (50 mg/kg/h) and second bag: (100 mg/kg over 16 h).

Methods

Data was extracted from our database on paracetamol overdoses treated with NAC from August 2010 to September 2016. We compared adverse reactions in patients receiving the modified two-bag protocol with a historical control (traditional three-bag regimen with initial bolus of 150 mg/kg/h).

Results

Over the study period 1011 paracetamol poisonings presented to our toxicology service, of which 476 required NAC (three-bag = 313, two-bag = 163). Demographic characteristics of the two groups were similar. Fewer anaphylactoid reactions (itch, rash, and swelling) occurred using the two-bag regimen (14% versus 5%, $p = .002$), a relative reduction of 66%. Similarly, there were fewer prescriptions of anti-allergy medications in the two-bag group (11% versus 4%, $p = .01$). There was no difference in incidence of hepatotoxicity.

Conclusions

Adverse reactions to NAC were less common with the two-bag regimen. These results add to the accumulating evidence that reducing the initial NAC infusion rate reduces the risk of adverse reactions.

Full text available from: <https://doi.org/10.1080/15563650.2017.1408812>

Exposures to automatic dishwashing rinse aids reported to the United Kingdom National Poisons Information Service 2008–2016

Day RC, Bradberry SM, Sandilands EA, Thomas SHL, Thompson JP, Vale A. Clin Toxicol 2017; online early: doi: 10.1080/15563650.2017.1393083:

Objective

To determine the toxicity of rinse aids which are used as drying aids to remove water from crockery.

Methods

Enquiries to the UK National Poisons Information Service (NPIS) were analysed retrospectively for the period January 2008 to December 2016.

Results

There were 855 enquiries relating to 828 patients; children aged 5 years or less accounted for 91.1%. Most exposures occurred from ingestion *alone* ($n = 778$, 94.0%), but 26 involved ingestion and other routes: 21 with skin contact, 3 with eye contact, and two with both skin and eye contact. There were a further 24 cases of eye contact *alone* ($n = 20$, 2.4%) or skin contact *alone* ($n = 3$, 0.4%) and a single case of inhalation *alone*. The World Health Organisation/International Programme on Chemical Safety/European Commission/European Association of Poison Centres and Clinical Toxicologists (WHO/IPCS/EC/EAPCCT) Poisoning severity score [PSS] was known in 824 of the 828 exposures: 425 of 824 (51.6%) patients did not develop clinical features, 381 (46.2%) had a PSS of 1 (minor toxicity), 15 (1.8%) developed moderate (PSS 2) and 3 (0.4%) severe (PSS 3) toxicity. Vomiting was the most common feature, occurring in over a third of all ingestions ($n = 286$, 35.8%), followed by coughing ($n = 73$, 9.1%). A higher proportion of adults than children developed clinical features (72.7% of 33 vs 46.0% of 767, $p = .0026$), although vomiting occurred significantly more frequently amongst children ($p = .0315$). Of the 25 eye contact cases, eye pain ($n = 8$) and/or eye irritation ($n = 8$) were reported, with or without abnormal vision ($n = 7$); there were two cases of corneal abrasion. Dermal contact rarely produced features; only 4 of 26 patients reported symptoms including skin rash or burning or numbness at the contact site.

Conclusions

Severe clinical features were uncommon following rinse aid exposure; vomiting was the most frequently reported symptom following ingestion.

Full text available from: <http://dx.doi.org/10.1080/15563650.2017.1393083>

Trends in carisoprodol abuse and misuse after regulatory scheduling: a retrospective review of California poison control calls from 2008 to 2015

Sun C, Hollenbach KA, Cantrell FL. Clin Toxicol 2017; online early: doi: 10.1080/15563650.2017.1414950:

Background

In January 2012, carisoprodol was classified as a Schedule IV substance under the controlled substances act from a previously non-controlled, non-scheduled classification. Carisoprodol is marketed as a skeletal muscle relaxant and is commonly cited for its abuse potential.

Objectives

We aimed to compare volume of calls involving carisoprodol abuse or misuse to a statewide poison control system before and after the scheduling change.

Methods

Data were extracted from poison control calls coded as "misuse/abuse" involving carisoprodol from four years before (2008 to 2011) and four years after (2012 to 2015) the scheduling change. The volume of calls from pre- and post-scheduling change was compared after adjusting for yearly California census data.

Results

The number of calls related to carisoprodol abuse or misuse was significantly decreased in the four years following the change compared to the four years before.

Conclusion

Scheduling of carisoprodol was temporally related to decreased exposures as reported to California Poison Control Centers. Governmental regulation may impact a drug's potential for abuse.

Full text available from: <https://doi.org/10.1080/15563650.2017.1414950>

Is naloxone the best antidote to reverse tramadol-induced neuro-respiratory toxicity in overdose? An experimental investigation in the rat

Lagard C, Malissin I, Indja W, Risede P, Chevillard L, Mégarbane B. Clin Toxicol 2017; online early: doi: 10.1080/15563650.2017.1401080:

Context

Since the banning of dextropropoxyphene from the market, overdoses, and fatalities attributed to tramadol, a WHO step-2 opioid analgesic, have increased markedly. Tramadol overdose results not only in central nervous system (CNS) depression attributed to its opioid properties but also in seizures, possibly related to non-opioidergic pathways, thus questioning the efficiency of naloxone to reverse tramadol-induced CNS toxicity.

Objective

To investigate the most efficient antidote to reverse tramadol-induced seizures and respiratory depression in overdose.

Materials and methods

Sprague-Dawley rats overdosed with 75 mg/kg intraperitoneal (IP) tramadol were randomized into four groups to receive solvent (control group), diazepam (1.77 mg/kg IP), naloxone (2 mg/kg intravenous bolus followed by 4 mg/kg/h infusion), and diazepam/naloxone combination. Sedation depth, temperature, number of seizures, and intensity, whole-body plethysmography parameters and electroencephalography activity were measured.

Results

Naloxone reversed tramadol-induced respiratory depression ($p < .05$) but significantly increased seizures ($p < .01$) and prolonged their occurrence time. Diazepam abolished seizures but significantly deepened rat sedation ($p < .05$) without improving ventilation. Diazepam/naloxone combination completely abolished seizures, significantly improved rat ventilation by reducing inspiratory time ($p < .05$) but did not worsen sedation. None of these treatments significantly modified rat temperature.

Conclusions

Diazepam/naloxone combination is the most efficient antidote to reverse tramadol-induced CNS toxicity in the rat.

Full text available from: <http://dx.doi.org/10.1080/15563650.2017.1401080>

Independent validation of the ICU requirement score in a cohort of acutely poisoned adults

Böll R, Romanek K, Schmoll S, Stich R, Ott A, Stenzel J, Geith S, Eyer F, Rabe C. Clin Toxicol 2017; online early: doi: 10.1080/15563650.2017.1401635:

Objective

To independently validate the predictive value of the intensive care requirement score (IRS) in unselected poisoned patients. DESIGN: Retrospective chart review.

Patients and methods

Five hundred and seventeen out of 585 admissions for acute intoxications could be analyzed. Eleven were excluded for a condition already requiring intensive care unit (ICU) support at admission (e.g., preclinical intubation). A further 57 admissions were excluded due to missing data. The IRS was calculated using a point-scoring system including age, Glasgow Coma Scale, heart rate, type of intoxication, and preexisting conditions. It was then compared to a composite endpoint indicating an ICU requirement (death in hospital, vasopressors, need for ventilation). The endpoint and the point-scoring system were identical to the original publication of the score.

Results and conclusion

Twenty-three out of 517 patients had a complicated clinical course as defined by meeting the endpoint definition. Twenty-one out of 23 complicated courses had a positive IRS (defined as greater or equal 6 points), as compared to 255/494 patients with an uncomplicated clinical course ($p < .001$, Fisher's exact test). One patient (with a positive IRS) died. The negative predictive value of the IRS was 0.99 (95% CI: 0.97–1), the sensitivity was 0.91 and the specificity 0.48. In conclusion, the IRS is significantly linked to outcome. While a negative IRS virtually excludes the need for ICU care, a positive IRS has a

positive predictive value too low to be used for risk stratification. The IRS could also be applied to unselected admissions of poisoned patients.

Full text available from: <http://dx.doi.org/10.1080/15563650.2017.1401635>

Trends in types of calls managed by U.S. poison centers 2000–2015

Anderson BD, Seung H, Klein-Schwartz W. Clin Toxicol 2017; online early: doi: 10.1080/15563650.2017.1410170:

Aim

The number of cases reported to poison centers has decreased since 2008 but there is evidence that the complexity of calls is increasing.

Objectives

The objectives are to evaluate national poison center data for trends in reason and how these changes effect management site, medical outcomes, and poison center workload.

Methods

Data regarding reason, age, management site, and medical outcome were extracted from annual reports of the National Poison Data System from 2000 to 2015. The proportion of cases by year were determined for unintentional and intentional exposures. Analysis of data from a single poison center from 2005 to 2015 compared the number of interactions between poison center staff and callers for unintentional versus intentional reasons.

Results

Trend analyses found that from 2000 to 2015 the percent of unintentional cases decreased (from 85.9 to 78.4%, $p < .0001$) and the percent of intentional cases increased (from 11.3 to 17.6%, $p < .0001$). Age distribution changed with a decrease in children <13 years of age and increase in adolescents and adults. In these latter two age groups, the proportion due to intentional exposure increased while unintentional declined. The distribution of management sites changed over the 16-year period, with a decrease in non-HCF cases and significant increase in percent of cases treated in a HCF. The frequencies of moderate effect, major effect, and death were significantly higher for intentional exposures than for unintentional exposures. Analysis of data entry notes from a single center showed that the mean number of notes per unintentional case (1.61 ± 0.08) was significantly different from the mean number of notes per intentional case (9.23 ± 0.68) ($p < .0001$).

Discussion

Poison centers are managing more intentional exposures and fewer unintentional exposures. Intentional exposures require more poison center staff expertise and time.

Conclusion

Looking only at poison center total call volume may not be an adequate method to gauge productivity.

Full text available from: <http://dx.doi.org/10.1080/15563650.2017.1410170>

Calls to Poison Centers for hookah smoking exposures

Retzky SS, Spiller HA, Callahan-Lyon P. Clin Toxicol 2017; online early: doi: 10.1080/15563650.2017.1400556:

Over the past decade, smoking behaviors have changed in the US. Hookah or waterpipe smoking is increasing, especially among youth and young adults. Social media sites describe

the "hookah high" or "buzz", which may be related to nicotine, carbon monoxide, or other inhalants in hookah smoke. Most important is the risk of carbon monoxide poisoning. Case reports include a high number of victims presenting with loss of consciousness from either syncope or seizures. Anaphylaxis and a very rare respiratory hypersensitivity reaction, acute eosinophilic pneumonia, have also been reported from hookah smoking in previously healthy young adults. This article provides background information on hookah smoking, describes hookah-induced acute injuries that could precipitate poison center calls, and offers suggestions for exposure characterization.

Full text available from: <http://dx.doi.org/10.1080/15563650.2017.1400556>

Biological effects of metal degradation in hip arthroplasties

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Continuous positive airway pressure: an early intervention to prevent phosgene-induced acute lung injury

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Abstract and full text available from: <http://dx.doi.org/10.1016/j.toxlet.2017.11.001>

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Price ME, Whitmore CL, Tattersall JEH, Green AC, Rice H. Toxicol Lett 2017; online early: doi: 10.1016/j.toxlet.2017.11.006:

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Long-term health effects of chemical warfare agents on children following a single heavy exposure

Talabani JM, Ali A, Kadir AM, Rashid R, Samin F, Greenwood D, Hay AWM. Hum Exp Toxicol 2017; online early: doi: 10.1177/0960327117734620:

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TOXICOLOGY

General

Anon.

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CHEMICAL WARFARE, BIOLOGICAL WARFARE AND RIOT CONTROL AGENTS

Chemical warfare

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