1. Investigation of the Poisoned Patient - History Taking and Physical Examination

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Background: Assessment of an acutely poisoned patient involves the taking of an appropriate history, assessment of the vital signs, level of consciousness, a physical examination, and requesting appropriate toxicological and non-toxicological investigations. Diagnosis is based on the history, circumstantial evidence, a cluster of symptoms and signs, on the results of biochemi- cal and toxicological analyses and ECG or X-ray abnormalities. Poisoning should be suspected in all cases of alteration, severe, and unexpected illness and in any patient who presents with multisystemic involvement. History: In many cases, it is not diffi- cult to make the correct diagnosis because a history of drug overdose or exposure to the toxic agent is pro- vided by the patient, family members, witnesses or emergency services staff. If the patient is unable to provide accurate information (very young, con- scious, demented) circumstantial evidence may be of considerable diagnostic value. Toxidromes in the mouth or on the skin has been swallowed. The patient’s medical or psychiatric history, current med- ical and toxicological analyses and ECG or X-ray abnormalities, where the result might alter management - lith- ium, salicylate, iron, methanol, ethylene glycol. Tests where knowing the concentration may be the only clue: paracetamol (acetaminophen)Tests suggested by clinical circumstances: drug concentra- tions, where the result might alter management - lithi- um, salicylate, iron, methanol, ethylene glycol. Tests where knowing the concentration usually does not alter management: opioids (give naloxone); tricyclics (give support); benzodiazepines (give support, fluma- zenil). Drug screening may be helpful for several clinical syndromes: alopecia; cardiac arrhythmia or inf- arction in younger patients; respiratory arrest; aggression; confusion; reduced neurolability; unconsciousness; unexpected death. Functional tests can be useful, e.g. pro- cothrombin time in patients who have taken coumarins; cholinesterases in patients who have taken organophos- phorous compounds.

Conclusion: Careful choice of tests can substantially improve the diagnosis and management of poisoning, and the cost-effective uti- lization of the laboratory.

2. The Principles of Blood Tests in Adult Toxicology

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Objective: To explain the purpose and value of blood tests in adult toxicology. Method: The possible rea- sons for undertaking blood tests are considered with regard to diagnosis and management of poisoning in adults. Results and discussion: Blood tests should only be done with a clear purpose in mind, and once requested, the results should be found and acted upon. Some simple biochemical tests can be helpful in making a diagnosis of poisoning and guiding treatment, and it is reasonable to check them in all patients where poison- ing is possible: urea, creatinine, sodium, potassium, chloride, (venous) bicarbonate, glucose. Abnormal results in these measurements can suggest what fur- ther testing will be appropriate. Functional tests, such as prothrombin time in patients who have taken cou- marins, may be essential to the satisfactory manage- ment of some overdoses. Some toxicological tests need to be carried out as they may give the only clue to diagnosis. Testing for paracetamol (acetami- nophen) is the most frequent example of a test whose omission in the investigation of an unconscious or un- communicative patient, can be disastrous. Other toxicological tests will be needed to diagnose toxic causes for clinical syndromes, which may be any- thing from sudden unconsciousness to chronic peripheral neuropathy. The diagnostic tests can be tailored to the clinical syndrome. The diagnosis of the cause of death is a particular challenge, and results can be seriously misleading. Drugs with nar- row therapeutic ranges, e.g. lithium and digoxin, are good examples of poisons where measurement of serum concentration can be very helpful in manage- ment. Others include iron (with total iron binding capacity), ethylene glycol and methanol; and anti- epileptic agents in patients with epilepsy. Sensible tests: urea, electrolytes, and creatinine; venous bicar- bonate; glucose, ANION GAP = (cSODIUM + cPOTAS- SIIUM) - [cBCARBONATE + cCHLORIDE] Essential tests, where knowing the concentration may be the only clue: paracetamol (acetaminophen)Tests suggested by clinical circumstances: drug concentra- tions, where the result might alter management - lithi- um, salicylate, iron, methanol, ethylene glycol. Tests where knowing the concentration usually does not alter management: opioids (give naloxone); tricyclics (give support); benzodiazepines (give support, fluma- zenil). Drug screening may be helpful for several clinical syndromes: alopecia; cardiac arrhythmia or inf- arction in younger patients; respiratory arrest; aggression; confusion; reduced neurolability; unconsciousness; unexpected death. Functional tests can be useful, e.g. pro- cothrombin time in patients who have taken coumarins; cholinesterases in patients who have taken organophos- phorous compounds. Conclusion: Careful choice of tests can substantially improve the diagnosis and management of poisoning, and the cost-effective uti- lization of the laboratory.

3. Investigation of the Poisoned Patient: Place of Cardiovascular Monitoring

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Objective: Drug-induced hypotension is a common feature in acute poisonings, related to various mecha- nisms.1 Circulatory failure represents a life-threatening complication requiring close monitoring of the patient’s hemodynamic conditions in intensive care (ICU). Despite significant improvement in critical care, drug- induced cardiovascular failure remains a leading cause of death.2 Cardio-toxicants include not only the car- diovascular drugs but also various other toxicants like anticoagulants, H1-antihistaminic agents, meperid- ine, chloroquine, cocaine, organophosphates, cyanide, and plants.3 The objective is to discuss the role and indications for the different available tools and tech- niques for cardiovascular monitoring in acute poisoning. Methods: Review of PubMed-referenced studies. Results: Physiology rules teach us that vas- cular perfusion pressure is determined by three factors: the stroke volume, the heart rate, and the systemic vas- cular resistance. Any alteration in one of these factors immediately results in a compensation by the two others, unless some degree of drug-induced failure of these mech- anisms occurs leading to hypotension. Shock is defined as 1) systolic blood pressure <90 mmHg or decrease in usual systolic blood pressure >40 mmHg or mean blood pres- sure <65 mmHg, 2) unresponsive to fluids, 3) with at least one sign of organ hyperperfusion. While blood pressure and heart rate only describes “mircocirculation”, circula- tory failure results from the inability of circulation to meet the metabolic cell demand, expressed as impairment of “microcirculation”. Alteration in microcirculation is usu- ally evidenced by the occurrence of symptoms or signs including dizziness, loss of consciousness, collapse, chest pain, or skin discoloration. Consequently, repeated assess- ment of changes in mental status and urine output as well as chemical tests including plasma lactate, serum creati- nine, and liver enzymes, is mandatory to guide adequate treatments. Determination of hypotension mechanism is mandatory to improve patient management. Providing preload parameters is useful to optimize fluids. Measure- ment of cardiac index is essential to distinguish between cardiogenic (<2.5 L/min/m²) and peripheral failure (>3.5 L/min/m²). Heart failure mainly results from decreased systolic myocardial contractility.3 However, other mecha- nisms may also be implicated, including diastolic dysfunc- tion, alteration in heart contraction geometry, myocarditis or acute coronary syndrome. For instance, overdoses with calcium-channel blockers, beta-blockers, and membrane- stabilizing agents may result in myocardial negative mo- tropic effects as well as arterial dilatation. Besides invas- ive blood pressure (using an arterial catheter) and electrocardiogram monitoring, circulation conditions can be assessed using a large number of bedside devices. Especially, echocardiography coupled with Doppler flow shows a direct visualization of the heart contractility and aspects (ventri- cle dilatation, myocardium thickness, valve diseases); however, it remains operator-dependent.4 Right heart cath- eterization, traditionally performed by all intensivists, allows the thermodilution-based measurement of cardiac output as well as the simultaneous determination of arte- rial and mixed venous blood gases providing insights on
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5. Correlation Between Arterial and Venous Lactates and Blood Gases in Acute Poisonings Treated with Extracorporeal Life Support for Refractory Cardiac Failure or Arrest


Objectives: Extracorporeal life support (ECLS) has been proposed as an alternative rescue method to treat patients suffering from cardiac failure or arrest if not responding to conventional treatment and cardiopulmonary resuscitation. Our aims were: 1) to study the correlations between arterial and venous lactates and blood gases in these poisoned associations with extremely poor cardiovascular conditions and 2) to assess their respective predictive values regarding survival at 24h in case of cardiac arrest and ICU discharge at day 28.


6. A Systematic Review of the Use of Intravenous Lipid Therapy in the Management of Poisoned Patients

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Introduction: Intravenous lipid therapy (ILE) in the context of this summary refers to the parenteral administration of a lipid-containing emulsion in an attempt to ameliorate the adverse effects of drug or chemical toxicity. The rationale for ILE derives from data generated four decades ago which suggested a pharmacokinetic interaction between lipoprotein and an administered lipid emulsion. The potential therapeutic utility of a lipid-chemical interaction was first reported in 1998, by Gyu Weinberg, an anesthesiologist from the University of Michigan, who modelled a combination of mepivacaine and bupivacaine-induced cardiac arrest.1 In the Weinberg model rats were attempted to be resuscitated from cardiac arrest with ephedrine or ILE, the latter by the administration of a 30% lipid emulsion. Intravenous lipid therapy was associated with an approximately 50% increase in the survival rate. Discussion: Nineteen additional animal studies have been identified by the author as fully published in the English language literature, eleven of which were published in 2008–9. These studies are comprised of 7 on bupivacaine, 4 on beta-receptor antagonists, 3 on cyclic antidepressants, 3 on verapamil and 1 each on thiopentone, paraxon, and asphyxia. A number of different animal species have been used in these studies: rats in 10, canines in 2, pigs in 2, rabbits in 5, and one in the mouse. Sixteen of these twenty controlled experimental studies showed often very dramatic beneficial effects of ILE, including those with the end point of resuscitation from full cardiac arrest. Other endpoints in which therapeutic efficacy has been demonstrated are coronary perfusion pressure, blood pressure, heart rate and QRS duration. In comparative studies between ILE and other lipid emulsions, ILE is the most consistently effective in animal models in the last two years there has been a growing number of anecdotal reports in humans. To date the author has identified 15 published English-language case reports, 11 of which were published in 2008 and 2009. These have documented successful, and at times remarkably impressive, resuscitations including several cases of apparent dramatic reversal of prolonged cardiac arrest with a lack of subsequent neurological deficits. Reports from the human literature have involved local anesthetics, 7 with bupivacaine alone, 1 with a combination of mepivacaine and bupivacaine, and 1 with ropivacaine. The other cases have involved each of an overdose of bupivacaine and Seroquel, verapamil, verapamil and atenolol, atenolol alone, and haloperidol. There has also been a case report of a dog with moxidectin toxicity successfully treated by ILE. To date there have been no major adverse effects of ILE reported. However, ILE appears to be less effective in animal models when high doses of epinephrine are administered. Conclusions: Based on a critical analysis of the literature it is evident that there is clear and unambiguous evidence of the efficacy of ILE in animal models. In contrast, “real world” experience with poisoned humans is completely anecdotal and, undoubtedly, suffers from the publication bias.

7. Incidence of Adverse Cardiovascular Events Following Drug Overdose: A Pilot Study Manin AF, Nelson LS, Stimmel B, Vlahov D, Hoffman RS. Division of Medical Toxicology, Mt. Sinai School of Medicine, New York; 2Department of Emergency Medicine, NYU School of Medicine, New York; 3New York City Poison Center, New York; 4Division of Cardiology, Mt. Sinai School of Medicine, New York; 5New York Academy of Medicine, New York, US

Objective: Drug overdose is a leading cause of cardiac arrest in victims under 45 years of age, and is the second leading cause of injury related fatality in the US. Risk factors for adverse cardiovascular events (ACVE) include older age (ED) patients with a history of [Acute] (ACE) or a history of ILE (ED) patients with a history of ACE have previously been described, but the incidence of ACVE following hospitalization for acute drug overdose is unknown. This pilot study characterized the incidence of ACVE following hospitalization for acute drug overdose in patients presenting to the ED. Methods: This pilot, prospective cohort study enrolled consecutive adult ED patients with a history of drug (medication and illicit) overdose in one urban, tertiary care hospital over 12 months (2007–08). Subjects were prospectively followed to hospital discharge with data that included electronic medical records, ED paper records and inpatient telemetry monitoring (if any). In-hospital ACVE were defined as the occurrence of 21 of the following: myocardial injury (troponin > 0.09 ng/mL), shock (hypotension requiring vasopressors), ventricular dysrhythmia (VT, VF, orTd), and cardiac arrest (loss of pulses requiring CPR). Descriptive statistics and 95% confidence intervals were calculated. The study results are reported as the percentage of patient-days. The percentage of patient-days with each of the following was computed: patients with an adverse cardiovascular event, percentage of patients with an adverse cardiovascular event by exposure group. Results: There were 459 eligible ED patients with suspected drug overdose. One hundred and eighty-six patients were excluded (61 chronic toxicity, 50 children aged <18, 49 non-drug overdose, 13 alternate diagnosis, 6 death/inhospitalization, 5 insufficient data, 1 anaphylaxis), leaving 273 subjects included for analysis (mean age 40.3, 63% male, 1.8% mortality). During the study period, 83 (43%) of 191 patient-days were recorded: 12 (4%) myocardial injury, 3 (1%) shock, 2 (1%) dysrhythmia, and 3 (1%) cardiac arrest. The overall incidence of ACVE was 5.9% (95 CI 3.1–8.6%). In the ILE+ group, 75% of drug overdose cases were treated with the most frequent exposures being opioids (7 total, 4 methadone, benzodiazepines (7), and cocaine (5). Conclusion: Based on this pilot study, ACVE may occur in up to 8.6% of adult patients with acute drug overdose. Implications for the evaluation and triage of ED patients with acute drug overdose are in process. The results of this pilot study are being used to design a larger, prospective study to further evaluate the incidence of ACVE in adult drug overdose patients.

8. What is the Evidence for Added Benefit from Hemoperfusion? Pro Eyer F, Zilker T. Department of Toxicology, Klinikum rechts der Isar, Technical University of Munich, Munich, Germany

Objective: To review the potential benefits and the evidence for charcoal hemoperfusion (CHP) in the treatment of intoxicated patients. Methods: Review of the international literature. General considerations: The optimal method of extracorporeal elimination of xenobiotics is often a matter of debate. Due to the lack of well-designed clinical trials we are left with circumstantial evidence as to whether extra- corporeal drug removal is beneficial and if so, by what method. However, most clinicians would agree that in the case of ongoing toxicity in a life-threatening poiso- ning, the faster one removes a toxin, the less chance of toxicity. Beside removal of toxins, CHP provides a potential tool for enhanced drug elimination. Results: During recent years, there was an increased report of use of HD and a decrease in the use of ILE in poisoning patients. Particularly in severe poisoning, it is mostly linked to an increase in overdoses with lithium and toxic alcohols, the latter to the infrequency of intoxications with theophylline and phenytoin, both classical candidates for CHP. Like HD, CHP is most effective for toxins that have a small volume of distribu- tion. Unlike HD, it also can effectively remove toxins that are bound to plasma proteins or with a higher molecular weight. Commonly cited side effects of CHP, like thrombocytopenia and hypocalcemia are less fre- quent since the introduction of biocompatible mem- branes and are often self-limiting. Generally accepted drugs amenable to CHP removal are agents (I) such as phenobarbital (I), carbamazepine (II), theophylline (III) and phenytoin (IV). Furthermore, valproate (V), paracetamol (VI) and amatoxins (VII) are also toxins that could be effec- tively removed by CHP. (I) Long acting barbiturates (Vd=0.5 L/kg; Pb=0.5): As barbiturates bind readily to AC, they are promising to be effectively eliminated by CHP. Half-life during HP is about 3.2 hrs compared to 27 hrs during HD. The elimination half-life is about 10% of the fold compared to HD.2 There are a number of case reports and series which describe dramatic improve- ments of clinical condition (e.g. time to wake up, time to extubation) in intoxicated animals. Effective dose from 65–100% with the use of CHP. Conclusion: CHP remains an important, but secondary method of treatment in individual, life threatening cases. Toxin-specific bio- kinematics of the poison is mandatory for being effec- tively eliminated. CHP can never be substituted for excellent supportive care or specific antidotal treat- ments. It is unlikely that we will ever see a controlled study in the future to definitely evaluate the effectiveness of CHP in an evidence-based fashion. References: 1. Holubek W, Hoffman R, Goldfarb J, et al. Use of hemodialysis and charcoal hemoperfu- sion in poisoned patients. Kidney Int 2008; 74:1327–34. 2. Palmer B. Effectiveness of hemodialysis in the extracorporeal therapy of phenobarbitol overdose. Am J Emerg Med 1995; 13:340–4. 3. Okuyama O, et al. Carbamazepine poisoning managed with hemodialysis and hemoperfusion in three adoles- cents. Nephrology 2007; 12:33–4. 4. Shannon MW. Comparative efficacy of hemodialysis and hemoperfu- sion in severe theophylline intoxication. Acad Emerg Med 1997; 4:674–8. 5. Eyer F, Felsenhauer N, Pfab R, et al. Treatment of severe intravenous phenytoin over- dose with hemodialysis and hemoperfusion. Med Sci Monit 2008; 14:CS145–8. 6. Thanacoody RH. Extracorporeal elimination in acute valproic acid poisoning. Clin Toxicol 2009; 47:609–16. 7. Hampson EC, Pond SM, Mann JI. Is haemoperfusion an effective means to prevent death in paracetamol poisoning. A retrospective review of 42 patients. Med Toxicol Adverse Drug Exp 1988; 3:64–71.

9. Diethyle Glycol Poisoning: from Metabolism to Treatment McMartin KI, Department of Pharmacology, Toxicology & Neuroscience, LSU Health Sciences Center, Shreveport, Louisiana, US

Background: Consumer exposure to diethyle glycol (DEG) is widespread because it is commonly used in commercial solvents and automotive prod- ucts. DEG has recently gained international notoriety because of numerous highly-fatal poisoning epidem- ics of renal failure that resulted from its mistaken inclusion as a food solvent. The widespread publicity about these mass poisonings, there is virtu- ally nothing known about the mechanism of its toxic- ity. More importantly, hemodialysis seems to be the only approach used to manage the intoxication. Hepatic Autopsy of human cases has shown severe renal cor- tical necrosis, with a milder hepatic pathology. Studies on animals including rats, rabbits and dogs have shown a similar toxicity, with acute renal failure being the predominant feature. At low doses of DEG in animals, unchanged DEG is the major product in the urine, with 2-hydroxyethoxyacetic acid (HEAA)
being the primary metabolite. In addition, in human case studies involving nearly 100 individuals, no oxalate has been detected in the urine, nor have kidney sections contained oxalate crystals. As such, DEG is primarily metabolized by alcohol dehydrogenase (ADH) to hydroxethoxyacetaldehyde, which is then rapidly converted to HEAA. HEAA could be further oxidized to diglycolate (DGA), although this has not been shown in vivo. A few clinical studies have suggested that DEG itself may be toxic (because of neurologic sequelae), but the prevailing view is that DEG produces toxicity because of its metabolism. However, no studies have related the appearance of HEAA or any other metabolite in the blood or target tissue with the resulting toxicity in tissues. Ongoing studies in animals have been designed to examine the metabolism and mechanism of toxicity of DEG in order to aid in the development of improved clinical treatments. Methods: Male rats were placed in one of four treatment groups including: water, low dose DEG (2 g/kg), high dose DEG (10 g/kg), or high dose DEG + fomepizole (to inhibit ADH). Blood and urine samples were collected up to 48 h to assess development of toxicity and metabolite accumulation. Results: Rats treated with high dose DEG developed metabolic acidosis, moderate to severe renal toxicity and mild liver damage. No signs of any toxicity were observed in the DEG + fomepizole-treated group throughout the time course. Histopathologic studies on kidneys revealed that DEG induced a proximal tubular necrosis that was still blocked by treatment with fomepizole. Metabolic studies confirmed that urinary excretion of unchanged DEG accounted for >50% of the DEG doses (about 95% of the dose when given with fomepizole). Urinary excretion of HEAA and DGA represented 25–35% and 1% of the dose, respectively. Fomepizole completely blocked DEG metabolism since no HEAA or DGA was excreted in the urine of these rats. Urinary HEAA excretion correlated with the metabolic acidosis and was associated with the degree of renal toxicity. These results demonstrate that HEAA was the major acidic metabolite in urine after toxic doses of DEG and suggest that HEAA may be responsible for the target organ toxicity of DEG. However, when normal human proximal tubule cells were treated with DEG (up to 100 mM), HEAA or DGA (both at up to 25 mM) for 6 h, cell death was not observed. Instead, toxicity to these cells did increase with a 48 h exposure to both HEAA and DGA in a dose-dependent manner. Conclusion: These results demonstrate for the first time that a metabolite(s) of DEG, rather than DEG itself, is responsible for its toxicity and that fomepizole, a treatment DEG-exposed patients received, may block its metabolism. HEAA appears to be the toxic metabolite of DEG, but determination of the plasma and kidney tissue metabolite levels are needed to confirm that its accumulation relates to the development of DEG toxicity. Interestingly, toxicity of DEG metabolites on human kidney cells in culture is observed only with prolonged exposure. Studies on the mechanism by which HEAA produces toxicity will be useful for designing alternative treatments in cases where metabolic inhibition is not possible.

10. The Relative Toxicities of Glycols

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Objective: Diethylene glycol (DEG), and other glycol ethers (OGE) are in numerous products responsible for exposures reported to poison centers. “Glycol” is often a source of considerable confusion as manufacturers’ labels often do not specify which glycol is in a formulation. As a result lay persons and medical personnel often wonder if these products are as dangerous as ethylene glycol (EG). This was an observational study comparing the relative risk (RR) of a serious outcome for each type of glycol exposure. Methods: We reviewed 1947 exposures to DEG, OGE, and EG reported to a statewide poison control network from 2000 to 2007. Inclusion criteria were patients with any type of oral exposure and a known outcome without co-exposure. The percentage of patients who received 4MP, hemodialysis (HD), or with acidosis was determined. Results: The current criteria for dialysis are the presence of severe metabolic acidosis, electrolyte imbalances unresponsive to conventional therapy, renal failure, or deteriorating vital signs despite intensive supportive care. For methanol poisonings, additional criteria are the presence of visual impairment or a plasma methanol concentration >0.5 g/L. In EG poisonings, initial serum glycolic acid concentration (>10 mmol/L) appears to be a good indicator for hemodialysis; however, it is not readily available in most hospitals. Hemodialysis is unnecessary, regardless of EG level, if glycolic acid is ≤8 mmol/L in patients receiving antidote. When dialysis is indicated, continuous antidote infusion should be provided to compensate for its elimination. The traditional end-point of dialysis is a plasma concentration of the toxic alcohol <0.2 g/L, with resolution of acid-base disturbances and the osmolar gap. Continuous extracorporeal removal techniques including hemofiltration and hemodiafiltration are only indicated in case of cardiovascular impairment that may compromise conventional hemodialysis performance. Real removal techniques are invasive with significant risks of adverse effects. They are not universally available and difficult to use in case of epidemic alcohol poisonings. Moreover, if avoided by early fomepizole administration, admission to the intensive care unit may be limited to a relatively brief (24 h) period of observation. Therefore, we believe that it is worthwhile to confirm that fomepizole may obviate hemodialysis under certain conditions. While comparing fomepizole with ethanol ≥ hemodialysis would be of interest, such a study has not been done and is unlikely to be done. The risks, costs and inconvenience of prolonged hospitalization if fomepizole alone is used, must be weighed against those of hemodialysis, if ethanol is preferred. Conclusion: When recommending fomepizole as an effective and safe first-line antidote for EG and methanol intoxications, the need for hemodialysis may be obviated in selected patients. While antidotal therapy without hemodialysis appears to be efficacious in a number of cases of uncomplicated poisonings, further experience is needed to clearly define the indications for associated hemodialysis. References: 1. Brent J. Fomepizole for ethylene glycol and methanol poisoning. N Engl J Med 2009; 360:2216-23. 2. Brent J, McMartin K, Phillips S, et al. Fomepizole for the treatment of ethylene glycol poisoning. Methylyprazole for

Table 1. RR of clinical outcomes for DEG and GE exposures compared to EG

<table>
<thead>
<tr>
<th>N = total number of cases</th>
<th>No - minor effects [95% confidence interval (CI)]</th>
<th>Moderate - severe effect including death [95% CI]</th>
<th>Acidity (%)</th>
<th>Received 4MP (%)</th>
<th>Received HD (%)</th>
<th>Most Common Causative Agent</th>
</tr>
</thead>
<tbody>
<tr>
<td>EG (N = 835)</td>
<td>77%</td>
<td>23%</td>
<td>116 (14%)</td>
<td>244 (29%)</td>
<td>113 (14%)</td>
<td>Antifreeze</td>
</tr>
<tr>
<td>RR-1</td>
<td></td>
<td></td>
<td>116 (14%)</td>
<td>244 (29%)</td>
<td>113 (14%)</td>
<td></td>
</tr>
<tr>
<td>DEG (N = 267)</td>
<td>93%</td>
<td>7%</td>
<td>9 (3%)</td>
<td>28 (10%)</td>
<td>3 (1%)</td>
<td>Brake Fluid</td>
</tr>
<tr>
<td>RR-1.2 (1.03–1.39)</td>
<td></td>
<td></td>
<td>9 (3%)</td>
<td>28 (10%)</td>
<td>3 (1%)</td>
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<tr>
<td>RR-0.33 (0.20–0.52)</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>OGE (N = 845)</td>
<td>2%</td>
<td></td>
<td>2 (0.2%)</td>
<td>7 (0.8%)</td>
<td>0 (0.0%)</td>
<td>Household Cleaning Products</td>
</tr>
<tr>
<td>RR-1.27 (1.15–1.41)</td>
<td></td>
<td></td>
<td>2 (0.2%)</td>
<td>7 (0.8%)</td>
<td>0 (0.0%)</td>
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<tr>
<td>RR-0.08 (0.05–0.14)</td>
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12. Challenges to Medical Systems by Terrorism with Chemical Warfare Agents

Thierrmann H, Aurbach N, Nord F, Kehe K, Zilker T.


Madsen JM, Greenberg M.

Objective: To be useful in disaster planning and response, an information resource must provide information that is authoritative, easy to apply, and sufficiently detailed to allow for application to a wide range of scenarios. It needs to provide information that applies to the preparation, response, and mitigation phases of chemical incidents. It also needs to be user-friendly in the sense that it can be accessed and understood by health-care providers and public safety agencies. In the planning and response details into a format that is easy for clinicians and planners to navigate both before and during a chemical emergency. Method: The first 14 chapters of the “Emergency Department” and “Department of Health and Human Services and the National Library of Medicine, examined the currently available Radiological Event Medical Management (REMM) module as a starting point for the development of a companion program, Chemical Hazards Emergency Medical Management (CHEMM). The basic organization of REMM was preserved, but the overall approach is being modified so that basic toxicological principles guide the organization and presentation of material. Results: The existing REMM provides a rich source of information to help educate users to approach chemical events from a toxicological perspective and incorporate easy-to-navigate but comprehensive tools that enable focused assessments of the type of chemical event, the nature of the agents involved, casualty presentation, probability–based estimation of likely agents based on casualty signs and symptoms, and prehospital management of patients, including special populations. Most importantly, CHEMM has been designed to be easily navigable by clinicians and nonclinicians both before and during a chemical emergency. CHEMM is poised to become a standard toxicological resource for chemical emergencies, including inadvertent releases and also terrorist events. References: 1. Bader JL, Nienhauer J, Chang F, et al. Radiation Event Medical Management (REMM): website guidance for health care providers. Prehosp Emerg Care 2008; 12:1–11. 2. Coleman CN, Hedin JL, Eldred M, et al. Medical response to a radiologic/nuclear event: integrated plan from the Office of the Assistant Secretary for Preparedness and Response, Department of Health and Human Services. Ann Emerg Med 2009; 53:213–22.

14. Hazmat Disasters - Prevention, Planning, Training

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Introduction: Industrial disasters with extensive damage to human health and the environment resulting from accidental specific explosions and releases of large amounts of hazardous chemicals have frequently occurred in the last 80 years. The Seveso (Italy, 1976, dioxin) and Bhopal (India, 1984, methylamine) disasters were industrial accidents that caused major human error, equipment failure, facility or transportation related factors very often are at the origin of the events. Discussion: EPIDEMIOLOGY Chemical incidents are surprisingly rare, but the estimated number of all incidents in the world ranges from 100,000 to 500,000 per year, with 10 to 15 major Hazmat disasters. HAZMAT RISK ASSESSMENT AND RISK MODELS A considerable part of any chemical disaster plan involves the survey of the area with the identification of hazardous chemical sites and transport routes, hazardous products and their chemical properties (concentration, physical state, vapor pressure, flammability and toxicity), evaluation of possible incident scenarios (risk assessment) and an estimation of the health and environmental impact of those events. CHEMM is a software programme for scenario modelling use many inputs (substance, weather, topography) to predict and display the geographical extent of a hazardous atmosphere and its evolution. For flammable substances, the aerial impacts of fires, explosions and domino effects can be calculated as a function of thermal and overpressure levels. HAZMAT DISASTER PLANNING Planning is fundamental for an effective response to a chemical incident. From the national to local levels, government and public authorities, resident population, of the emergency services (fire fighters, police, civil protection), environment agencies and local chemical industries need to set up the procedures necessary to ensure the effective response of any chemical incident. The public health sector (emergency medical services [EMS], hospitals, poison centers) must be fully involved and actively participate in the planning and preparedness components of the event and its implementation. This multi-disciplinary approach to a Hazmat disaster plan is the best way of achieving the necessary tasks that greatly enhance the resulting planning and its IMPLEMENTATION. The poison centers must plan for chemical disasters and be prepared to provide detailed information about the toxic effects of the substance and
Abstracts

15. Poison Center Data: Complete or Completely Inaccurate? How to Improve Accuracy in Data Reporting

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South Texas Poison Center, San Antonio, Texas, US

Objective: Poison center chart data are analyzed for a variety of purposes. These include real-time event surveillance, poisoning demographics, severity of exposure, procedures and treatments recommended and/or used and their efficacy, and outcomes. Call-takers document using code numbers for substances, check-off boxes, dropdown menus, and radio buttons have been placed on the chart.

We sought to increase call-taker accuracy in recording poison center data using a newly created continuous quality improvement (CQI) method. Methods: We retrospectively analyzed each call center’s human exposure case records created during nineteen consecutive months. One hundred charts from each month were randomly selected to review for errors in four areas: exposure reason, route of exposure, clinical effects, and treatments/thelapieties. An error was identified for exposure reason and route if the selected code did not match the narrative. Similarly, if a clinical effect or treatment/thelrapy was mentioned in the chart and the corresponding box was not checked, an error was recorded. Call-takers received periodic feedback of coding and documentation errors to encourage improvement.


17. The Feasibility of Multicentre Data Collection on Poisoning in Europe, using Paraguay as an Example

Kupferschmidt H1, Rato F2, Esteban M3, Neou P4, 1Swiss Toxicological Information Centre, Zurich, Switzerland; 2Centro de Información de Emergencias Médicas, Lisbon, Portugal; 3Servicio de Información Toxicológica, Instituto Nacional de Toxicología y Ciencias Forenses, Madrid, Spain; 4Poison Information Center, Children’s Hospital P&A, Athens, Greece

Objective: Paraguay has been used as herbicide worldwide since 1962. The aim of this study was to collect adverse health incident data to a common standard in Europe, using paraguay as model substance. Methods: Poisons centre-based prospective multicentre cohort studies from countries where paraguay was marketed during 2006–2008. In the first months of 2006 data were collected in a retrospective pilot study. Patient and exposure characteristics were recorded, then in 2007 a new form was introduced to improve the capture of exposure data. Results: The final form was used in 419 cases (from Greece 97, Spain 93, Portugal 84, United Kingdom 60, France 38, Italy 17, Belgium 6, Germany 12, Netherlands 8, Slovakia 3, Cyprus 1). The percentage of cases with complete data fields is shown in Table 1. The highest rate of reporting had the route of exposure with information present in
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19. Naltrexone-Induced Severe Opioid Withdrawal Treated with Intravenous Fentanyl Infusion

Macovei R.1,2 Danescu L.1 Caragea G.2 Ionica M.2

1ICU II Toxicology, Emergency Clinical Hospital, Bucharest, Romania
2Army Center of Medical Research, Bucharest, Romania

Objective: Naltrexone-induced opioid withdrawal can be prolonged and severe. No approach to treat ment has been evaluated and there is a paucity of data related to treatment. We present 2 cases to demonstrate one effective approach to treating naltrexone-induced opioid withdrawal.

Case report 1: A 62 year old woman with opioid dependence presented to the hospital in opioid withdrawal 3 hours after ingesting naltrexone 50 mg prescribed by her dermatologist for itching related to a skin disorder. She had no improvement of her nausea, vomiting, diarrhea, severe body and joint pain, and yawning after receiving 200 mg of intravenous fentanyl, 2 mg hydromorphone, and 1 mg lorazepam. She was placed on an intravenous infusion of fentanyl, titrated to her withdrawal symptoms. In the ICU, her fentanyl infusion was as high as 175 mcg/hour. She was closely monitored for respiratory depression and rigid chest syndrome and the infusion was titrated off approximately 36 hours after ingestion. Case 2: A 54 year old man on opioids for cancer-related pain presented to the ED with constipation for 7 days and diffuse abdominal pain. He was treated with IV fluids and admitted to the hospital after a CT scan and laboratories did not reveal the etiology of his pain. While on the inpatient service, a trial of oral naloxone was initiated to relieve his constipation. Mistakenly, he was treated with naltrexone and developed severe opioid withdrawal. There was no response to a total of 30 mg intravenous morphine. The patient was moved to the ICU and started on an intravenous fentanyl infusion. The infusion was as high as 100 mcg/hr and he was closely monitored for respiratory depression and rigid chest syndrome. The infusion was continued approximately 24 hours after the ingestion. Conclusion: Naltrexone is an opioid antagonist with a high affinity for the mu receptor. Fentanyl is a synthetic opioid with approximately 100 times more potency than morphine. Its short duration of action makes it ideal for intravenous titration. Intravenous fentanyl infusion is a safe and effective method to treat naltrexone induced opioid withdrawal. High doses may be required and therefore a closely monitored setting recommended.

20. Venlafaxine-Induced Rhabdomyolysis Macovei R.1 Danescu L.1 Caragea G.2 Ionica M.2

1ICU II Toxicology, Emergency Clinical Hospital, Bucharest, Romania
2Army Center of Medical Research, Bucharest, Romania

Objective: Venlafaxine, an antidepressant drug, inhib its CNS serotonin and norepinephrine neuronal uptake. In overdose, venlafaxine has been reported to cause rhabdomyolysis. Case report: A 46 year old man with a history of bipolar depression was admitted following suicidal ingestion of 100 tablets (1 tablet = 75 mg; total dose = 7.5 g) of venlafaxine twelve hours before hospital presentation. There was no history of seizures. Findings on admission included Reid II coma, fixed equal mydriasis, muscular hypotonia, bradyp noea, hyperventilation, hypertension (BP=140/80 mmHg), tachycardia (130 b/min), fever (39 °C) and dark coloured urine. Pulmonary radiography revealed aspiration pneumonia. Initial normal laboratory findings were myoglobin > 1000 ng/mL, CK 6452 U/L (normal range 313–618 U/L).

Conclusion: Venlafaxine poisoning can present normoinsulinemic hypoglycemia lasting 40 hours. The pathogenic mechanism is unclear, but inappropriately serotonin increased release of insulin up to normal levels, insulin sensitizing effects and enhanced cellular glucose entry in serotonin syndrome could be considered. In venlafaxine poisoning immediate glucose measurement is essential and prolonged hypoglycemia can be expected.

Table 1. Completeness of Case Report Forms (overall and by centre) (percentage values).

<table>
<thead>
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<th>Data field</th>
<th>% complete</th>
<th>lowest</th>
<th>highest</th>
</tr>
</thead>
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<td>Route of exposure</td>
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<td>91.7%</td>
<td>100%</td>
</tr>
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<td>Sex</td>
<td>98.3%</td>
<td>85.7%</td>
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<td>Likelihood of exposure</td>
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</tbody>
</table>

*only if analyses were done

**information deliberately withheld by the Madrid Poisons Centre

89.8% of CRFs; the lowest value for a single centre was 91.7%. Poor reporting rates (<80%) had age (in years), the description of the circumstances of exposure, final outcome, and the ingested paraquat dose or concentration exposed to. The lack of this information was due to difficulties in obtaining it from the caller, or to the failure of getting follow-up information. Only 17.8% of initial notifications of a case in the 2007–2008 period were within 3 days after the call as stipulated by the study protocol.

Conclusion: It is feasible to prospectively collect data from different poisons centres using predefined criteria. Poisons centres have difficulties in collecting information of circumstances of exposure, age of the patient, and medical follow-up. Most cases were reported after a delay.

18. Normoinsulinemic Hypoglycemia in Venlafaxine Poisoning

Brvar M.1, Grenc D.1, Kozelj G.1, Mozina M.1

1Poison Control Centre, University Medical Centre, Ljubljana; 2Institute of Forensic Medicine, School of Medicine, University of Ljubljana, Slovenia

Objective: Venlafaxine, a structurally novel antidepressant, is a potent combined neuronal serotonin and noradrenaline reuptake inhibitor and weak inhibitor of dopamine reuptake. Venlafaxine poisoning may result in serotonin syndrome, coma, seizures, rhabdomyolysis, myoglobinuria, and renal and liver failure. There is only one report of hypoglycemia after venlafaxine overdose that was explained by an increased endogenous insulin level. In this case we present prolonged hypoglycemia in venlafaxine poisoning with normal insulin levels. Case report: A 42-year-old woman with depression ingested 9,000 mg of venlafaxine in a suicide attempt. On arrival at the ED 4 hours after ingestion she was somnolent and had mydriasis, tremor, tachypnea 36.5 °C; pulse 130/minute and blood pressure 115/60 mmHg. Gastric lavage was performed and activated charcoal was given, immediately after which she had a grand-mal seizure. Gut decontamination with polyethylene glycol was performed. The initial serum glucose level was 2.6 mmol/L and potassium 3.2 mmol/L; all other laboratory results were within normal limits. A continuous infusion of 10% glucose with potassium was started at 250 mL/h. Intermittent hypoglycemia 1.8 mmol/L with neurological signs was recorded 7 times during subsequent hospitalization, the last episode being detected 40 hours after venlafaxine ingestion. Serum creatine kinase increased to 82 μkat/L and myoglobin to 531 μkat/L, but renal function remained unaffected. A toxicological analysis of serum by LC-MS/MS revealed 14.7 μg/mL of venlafaxine, twelve hours after ingestion (therapeutic range 0.07–0.27 μg/L). Afterwards serum venlafaxine concentration decreased with a prolonged half-life of 15 hours (at 5 hour therapeutic doses). No ethanol or other medications were found. The subsequent insulin measurement and a 37.7% glucose tolerance test was normal as well.

Conclusion: Venlafaxine poisoning can present normoinsulinemic hypoglycemia lasting 40 hours. The pathogenic mechanism is unclear, but inappropriately serotonin increased release of insulin up to normal levels, insulin sensitizing effects and enhanced cellular glucose entry in serotonin syndrome could be considered. In venlafaxine poisoning immediate glucose measurement is essential and prolonged hypoglycemia can be expected.

98.4% of CRFs; the lowest value for a single centre was 91.7%. Poor reporting rates (<80%) had age (in years), the description of the circumstances of exposure, final outcome, and the ingested paraquat dose or concentration exposed to. The lack of this information was due to difficulties in obtaining it from the caller, or to the failure of getting follow-up information. Only 17.8% of initial notifications of a case in the 2007–2008 period were within 3 days after the call as stipulated by the study protocol.

Conclusion: It is feasible to prospectively collect data from different poisons centres using predefined criteria. Poisons centres have difficulties in collecting information of circumstances of exposure, age of the patient, and medical follow-up. Most cases were reported after a delay.
stopped on the 4th day. Sinus bradycardia persisted till the 6th day and QTc-interval normalized on the 9th day. Toxicological analysis by GC/MS confirmed metha- done and ibogaine on arrival. Ibogaine was detected in the patient’s blood at 9 days. Structural heart disease was excluded by echocardiography, coronaryography and MRI. Genetic long QT-interval syndromes were excluded. On discharge Holter monitoring and electro- physiology study were normal. Conclusion: Ibogaine prolongs QT-interval and causes VF/VT that might be provoked by vagal manoeuvres such as miction or defeca- tion. The serum and urine levels of ibogaine poisoning as it additionally lengthens QT- interval. In ibogaine poisoning patients should be moni- tored, vagal manoeuvres prevented and lidocaine con- sidered for tachyarrhythmias.

22. Zopiclone-Induced Acute Respiratory Distress Syndrome

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Background: Acute respiratory distress syndrome (ARDS) results from diffuse lung injury and the inflammatory process. The mechanism remains unclear. Few antidepressants or antipodpressants had been reported to induce ARDS in overdose. Zopiclone is a zopiclone derivative antipsy- chotic for insomnia with few side-effects. Here, we report a case of zopiclone overdose complicated with ARDS and successfully treated with extracorporeal membrane oxygenation (ECMO).

Case report: A 44-year- old woman was intoxicated with 3000 mg of zopiclone and 1000 mg of trazodone. She received endotracheal tube insertion with mechanical ventilation due to respiratory failure on day 2 in a local hospital. She presented to our emergency unit with ARDS on day 3. She received ECMO therapy due to hypoxia despite of 100% oxygen therapy on day 4. She was successfully weaned from ECMO 8 days later and discharged in a stable condition after 21 days of hospitalization. Conclusion: ARDS has been described in a few cases of tricyclic antidepressant or selective serotonin reuptake inhibitor overdose. Endothelial and/or epithelial cell damage and increased permeability of the alveolar/capillary barrier have been suggested to be the probable mechanism. High dose zopiclone intoxication might also induce acute lung injury and needs aggressive management.

23. Enhanced Elimination in Sustained-release Potassium Chloride Poisoning - A Case Series

Gunja M,1,2 NSW Poisons Information Centre, Sydney, Australia

Objective: to describe the management of three epi- sodes of sustained-release potassium chloride (KCl) poisoning presenting in an adult and a child involving haemolysis and whole bowel irrigation. Case series: Case 1: episode 1 - 42 year old woman presented within 90 minutes of ingesting forty tablets of Slow-K (Novartis, potassium chloride 600 mg; K+ 8 mEq). She received endotracheal tube insertion with mechanical ventilation due to respiratory failure on day 2 in a local hospital. She presented to our emergency unit with ARDS on day 3. She received ECMO therapy due to hypoxia despite of 100% oxygen therapy on day 4. She was successfully weaned from ECMO 8 days later and discharged in a stable condition after 21 days of hospitalization. Conclusion: ARDS has been described in a few cases of tricyclic antidepressant or selective serotonin reuptake inhibitor overdose. Endothelial and/or epithelial cell damage and increased permeability of the alveolar/capillary barrier have been suggested to be the probable mechanism. High dose zopiclone intoxication might also induce acute lung injury and needs aggressive management.

24. A Study of Outcomes of Steroid Therapy in Severe Acetic Acid Poisoning Patients

Bruns KM,1 Baygozina OK,1 Mjachkova LP,1 Novikova OV,1 Chekmarev AV,2 Yentus VA.2
1The Ural State Medical Academy, Ekaterinburg; 2Centre for Hyperbionics, Epidemiology of Sverdlov Region, Ekaterinburg, Russia

Background: Acute respiratory distress syndrome (ARDS) is a severe form of acute lung injury. The definition of ARDS is still widely spread in Russia both in accidental and suicidal cases. The average level of morbidity for the last 8 years in Sverdlov region was 13.9 per 100,000 people with the mortality rate of 1.23 per 100,000. The aim of this study was to define the influence of steroid therapy on the mortality rate and frequency of strictures. Methods: Case notes of patients admitted to the Sverdlovsk Regional Toxicological Centre during January 2006 - March 2009 were reviewed. Signifi- cance of differences was estimated with t and z test.

Results: There were no significant differences were found in the second one. The difference was not significant (z=1.2, p=0.23). Kidney failure occurring hemodialysis developed in 17 patients of the first group (35.3% of them died), and in 23 patients of the second group (73.9% of them died). There was significant difference (z=2.12, p=0.034) between the mortality rate of the first and second group patients who developed kidney failure. Esoph- ageal or pyloric strictures developed during the first month in 30.4% surviving patients of the first group and in 35.5% of the second one. The difference was not statistically significant. Conclusion: Long term steroid therapy in severe acetic acid poisoning can increase the mortality rate but does not decrease the development of strictures.

25. Fluoxetine and 3,4-Methylenedioxymethamphetamine- amine Induced Serotonin Syndrome Responsive to Propofol Therapy

Webreath K.1 Boyer EW.2
1Division of Medical Toxicology, University of Massachu- setts Medical Center, Worcester, MA, US

Objective: To describe propofol treatment for severe sero- tonin syndrome. Case report: A 27 year old female pre- sented with agitation, seizure, and altered mental status 1 week after taking a single 40 mg dose of fluoxetine (MDMA) and two 20 mg fluoxetine tablets. Vital signs were rectal temp 102 F, heart rate 201 bpm, respiratory rate 32 bpm, blood pressure 128/67 mm Hg. Physical exam was significant for diaphoresis, dilated unreactive pupils (8 mm), diffuse rigidity, spontaneous clenches, pig-pony-like eye movements, and depressed mental status. The patient maintaned between 45–50 mg/kg for 6 hours while awaiting transport to a facility that had cyproheptadine. During this time her heart rate decreased to 100 bpm and her rigidity improved signifi- cantly. Cimetidine and lorazepam were administered to inhibit MDMA, but were not metabolized by CYP2D6, are both associated with sero- tonin syndrome individually.1 Tradition treatment of serotonin syndrome includes benzodiazepines for mild cases; cerebral CT was negative; no diagnosis stud- ies have demonstrated anxiolytic properties of propo- fol;2,3 this may be mediated by 5-HT1 antagonists and an effective treatment for patients at centers that do not carry cyproheptadine. References: 1. Boyer EW, Shott S. The serotonin syndrome: a general overview. J Clin Psychiatry 2005; 66(suppl 4): 108–12. 2. Brusin KM,1 Baygozina OK,1 Mjachkova LP,1 Novikova OV,1 Chekmarev AV,2 Yentus VA.2 3. Matsuo M, Ayuse T, Oi K, et al. Propofol for serotonin syndrome. Anesthesiology 2004; 100:973–7. 4. Landois F, Aimard L, Boyer EW. Acute serotonin syndrome in dextromethorphan abuse: an effective treatment with propofol therapy. Ped Emer Care 2007; 23:829–31. 5. Borgeat A, Wilder-Smith OH, Suter PM. The nonhyp- notic applications of propofol. Anesthesiology 1994; 80:642–56.

26. A case of Severe Ethylene glycol Poisoning: Late Though Successfully Treated

Osti D,1 Rinaldi S,1 Bortolazzi S,1 Petrinà S,1 Ferri E,1 Petrolini V,2 Avato FM,2 Brunaldi V,2 Zoppolari R.1
1Department of Anaesthesi and Intensive Care, S. Anna Hospital, Ferrara; 2Institute of Legal Medicine, Ferrara University, Ferrara; ‘Poison Control Centre and National Toxicology Information Centre, IRCCS Magueri Foundation, Pavia, Italy

Objective: We describe a case of severe ethylene glycol (EG) poisoning treated with fomepizole and hemodialysis. Methods: A 13-year-old unconscious man with a previous history of alcoholism was found in his car. At the local hospital admission oral intubation and mechanical ventilation were performed and fomepizole was administered. The patient was transfered to the reference-hospital ICU. Initial laboratory data revealed pH = 6.71, pCO2 = 26.6 mmHg, HCO3 = 4.5 mmol/L, BE = −32.4 mmol/L, anion gap = 37 mg/dL, osmolal gap = 21 mg/dL; K+ = 6.6 mEq/L; ethanol 0.12 g/L; NaHCO3 450 mEq = 200 mEq were administered. Suspected EG poisoning was confirmed by EG blood level (131.5 mg- dl). Fomepizole 15 mg/kg was immediately administrat- ed and CVVHDF was performed. During the follow- ing three days fomepizole 10 mg/kg were administered every 24 hours. CVVHF was performed every day during the following 6 days. On day 4, EG plasma level was <4 mg/dL and fomepizole administration was stopped; on day 5 the patient was extubated: he showed no neuro- logical signs; no altered mental status or electrolyte imbalances and EG=1.5 mg/dL. The patient finally con- fessed he had ingested antifreeze (about 200 mL containing EG 95%) and spirits in a suicide-attempt. Renal failure worsened, requiring dialysis. On day 6 he was discharged from hospital. On day 7 the patient presented pneumonia and pro- longed his ICU stay. On day 16 he was transferred to a nephrology ward. On day 30 he was discharged home. The patient was not affected by pharmacology or serotonin syndrome. Conclusion: Despite the fact that the patient’s clinical condition was severe and his ICU admission was delayed, aggressive treatment with...
28. Acute Intoxication with Valproic acid, Treated epine resistant alcohol withdrawal.

Objective: Valproic acid resistant alcohol withdrawal can respond to barbiturates like benzodiazepines. A symptomatic toxidrome that did not respond to benzodiazepines.

Case report: A two year old boy weighing 14.4 kilograms, in good health, taking no medications, was found with an open bottle of 50 mg lisdexamfetamine dimesylate. Initial examination showed a significant level of consciousness, agitation, tremor, tachycardia, and agitation returned but resolved after a third dose of pentobarbital 14.4 mg. Further medications were needed, and the child was discharged in good health after a period of observation. lisdexamfetamine dimesylate in a child resulted in a symptomatic toxidrome that did not respond to benzodiazepines. Pentobarbital immediately terminated the toxidrome. Symptomamtic toxidromes resistant to benzodiazepines may respond to barbiturates like benzodiazepines resistant alcohol withdrawal.

She gradually deteriorated. After 8 hours of observation she was comatose, developed metabolic acidosis and hypotension. It was associated with increase in valproic acid level to 313.99 microgram/mL. There were no other expected abnormalities, particularly thrombocytopenia or laboratory features of liver injury. Platelets count was 508,000/μl/microliter. Given the clinical deterioration, high valproate concentration, and lack of thrombocytopenia we decide to combine haemodialysis with haemoperfusion on charcoal column, performed simultaneously in series. Blood samples were taken during the procedure before dialyser, between dialyser and column, and after column. Extraction ratio on dialyser diminished from 0.386 to 0.350, whereas extraction ratio on column decreased from 0.756 to 0.719 after 4 hours when the procedure was ended. Extraction ratio for total process decreased from 0.850 after 1 hour to 0.427 at the end of procedure. During elimination, significant clinical recovery was noted, associated with decrease in xenobiotic concentration in blood to 168 micrograms/mL, with half time of elimination of 2.2 hours after extracorporeal elimination. The patient did not develop any significant complication during the procedure or after it. Rebound increase of valproic acid level was also absent. Conclusion: Addition of haemodialysis and haemoperfusion increase significantly the effectiveness of extracorporeal elimination of valproic acid and to be relatively safe in patients with severe intoxication.

29. Seizures in Acute Poisoning in Children - 5 Year Study

Objective: To study the prevalence of an acute life-threatening situation: seizures, in acute poisoning in children. Methods: We made a retrospective study of acute poisoning cases admitted to a pediatric poisoning department during a five year period. The following criteria were taken into consideration: etiology of poisoning, type of poisoning, age, severity of poisoning. Results: 3687 patients with acute poisoning were admitted to our department between November 1st 2004 and October 30th 2009. Seizures were noted in 47 patients representing 1.25% out of the total number of poisonings. The acute poisonings resulting in seizures were the following: chloramphenicol inhibiting 75%, phenobarbital (local anaesthetic used in stomatology which contains in 10 mL: lidocaine 2 g, menthol 2 g, phenol 2 g) 14 cases, carbamone (CO) 7 patients, pyridoxine 3 cases, isoniazid 3 cases. The antiepileptic drugs used were carbamazepine, phenobarbital, and ethosuximide. In every patient, mild to moderate anticonvulsant therapy was given, including benzodiazepines and phenobarbital. Despite aggressive supportive treatment, the patient’s condition deteriorated over the next six hours with increasing confusion, agitation, tremor, tachycardia (170 b./min.), and hypotension (80/40 mmHg). The child’s condition was critical. She was in deep coma, had muscle hypotonia, hyporeflexia and seizure activity. Blood pressure was 70/35 mmHg, pulse rate 146 bpm. Blood analyses showed mild metabolic acidosis with pH 7.25 and BE -8.5 mEq/L, decreased levels of potassium to 3.1 mmol/L, sodium to 129 mmol/L, calcium to 0.8 mmol/L, increase in lactate levels by 1.5 times, AST by two. Depakine concentration in blood was 131.99 microgram/mL. The treatment included forced diuresis and infusion of hydroxyethyl starch 6% solution. To intensify detoxification continuous veno-venous hemodialfiltration was performed simultaneously in series by the system for extracorporeal blood purification with the volume of hemacorad at 47 mL. The speed of hemoperfusion was 50 mL/min. After 5 hours of hemodiafiltration the child’s condition improved to level improved to somnolence with no signs of seizures activity. Blood pressure registered at 85/50 mmHg, pulse rate 129 bpm, acid-base and electrolyte balances were normal. Blood gases: pH 7.42, pCO₂ 37 mmHg, bicarbonate 24 mmol/L, levels of potassium 3.9 mmol/L, sodium 138.5 mmol/L, calcium 1.2 mL/L. Depakine concentration in blood plasma after hemodiafiltration decreased to 37 microgram/mL. The patient regained consciousness, her eyes after her name was called. Conclusion: A small volume of hemacorad and slow speed of hemoperfusion makes possible the use of hemodiafiltration in children of an early age. The case presented in this report suggests that CVVHDF is an effective method of therapy in severe poisoning by valproic acid.

30. A Case of Successful Therapy in Acute Valproic Acid Poisoning in a Child Using Hemodiafiltration

Objective: To report a case of successful therapy in acute valproic acid poisoning in a child using hemodiafiltration.


31. Continuous Venovenous Hemodiafiltration in Acute Theophylline Overdose - A Case Report

Objective: To assess the efficacy of continuous venovenous hemodiafiltration (CVVHDF) in chronic theophylline overdose.

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The purpose of the study was to assess the incidence of aspiration pneumonitis (AP) and its association with gag reflex and Glasgow Coma Score (GCS). Methods: In a retrospective analysis study after prospective data collection, 155 poisoned patients with GCS ≤ 12 were evaluated. An assessment of GCS and the quality of gag reflex were made on arrival and recorded. Intubation status before gastrointestinal decontamination was noted. All patients were subsequently followed for development of AP. Results: The incidence of AP was 15.5%, with significant variance among patients with respect to the gag reflex, GCS, and the performance of intubation. A logistic regression model for predicting AP contained the following predictors: GCS (odds ratio [OR], 0.43; 95% confidence interval [CI], 0.30–0.62), intubation (OR, 0.07; 95% CI, 0.01–0.49), organophosphate ingestion (OR, 1.39; 95% CI, 0.96–2.01), and gastric evacuation (OR, 9.49; 95% CI, 0.94–9.51). In patients with reduced gag reflex, variations in GCS were associated with AP (OR, 0.43; 95% CI, 0.20–0.9), whereas in patients with absent gag reflex, age was the most important predictor of AP (OR, 2.67; 95% CI, 0.99–7.22). Conclusion: A reduced GCS and a nonintubated trachea are associated with an increased incidence of AP.

33. Survey of the Role of the Clinical Laboratory in Seventeen Frequent Overdoses
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Objective: To evaluate physicians’ views on the role of laboratory tests in the management of frequently encountered overdoses. Methods: A 20-item questionnaire was distributed to the attendees of clinical toxicology courses directed to physicians working in emergency medicine and primary care. Ninety-five questionnaires were completed. This communication focuses on one item of this questionnaire: “Indicate the three tests that you consider fundamental for the clinical care of the following 17 frequent overdoses”. Results: Respondents stated that the tests they found most valuable for each case were the following (Table 1). Physicians, in our setting, have the perception that the laboratory’s primary role in the care of overdose patients is providing non-specific tests. When asked about overdoses caused by a substance/drug that the laboratory can quantify, respondents did not state the specific test in first place with importance in any of the poisonings. In the case of lithium, its quantification was placed in second order of frequency, whereas for paracetamol and salicylates, levels were put into third place. In poisonings involving drugs frequently abused where urine identification is available, (opiates, cocaine, benzodiazepines, amphetamines and gamma-hydroxybutyrate) the first answer was toxicological screening except for cocaine, where troponin I was considered more valuable. Conclusion: One of the most interesting conclusions of this part of the survey is that after making a clinical diagnosis, physicians are more concerned with tests that reveal information about the state of target organs rather than levels of toxic substances. References: 1. Desel H. Need for Laboratory Investigation Support in Poisoning and Treatment of Poisonings - Results of a EAPCCCT Membership Survey (abs). Clin Toxicol 2009; 47:441–442.

Table 1. Most valuable laboratory tests

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34. Molecular Identification of Leptota brunneoincarnata: Application to the Clinical Setting
Itrurralde MJ,1 Ballesteros S,2 Marin Serra J,1 Martin MI,1
1Servicio Biología, Instituto Nacional Toxicología y Ciencias Forenses, Madrid; 2Servicio Información Toxicológica, Instituto Nacional Toxicología y Ciencias Forenses, Madrid; 3Servicio de Pediatría, Hospital Dr Pexet, Valencia; 4Real Jardín Botánico, CSIC, Madrid, Spain
Objective: Amatoxin poisoning is ascribed to 35 amatoxin containing species belonging to the genera Amanita, Galerina and Leptota. The high degree of polymorphisms within the ITS nrDNA region has been used in the identification of fungal species and separation of species, as well as to establish the limits between very closely related taxa. This is the first description of the application of the study of the regions ITS-1 and ITS-2 to the resolution of a mushroom poisoning caused by Leptota brunneoincarnata. Methods: Methodology identified the mushroom of specimens observed in the meal was made by botanical classification with macromorphological and microscopic characteristics. ITS-1 and ITS-2 were amplified in the same reaction tube, and the sequence was submitted to the GenBank database. Conclusion: The samples were identified as Leptota brunneoincarnata var. castaneiflava, a species of the genus Leptota and at the species level. The sample was collected from the Valencian Community and was identified as Amanita phalloides. The sample was thus identified as Amanita phalloides.
37. Reliability of Different Methods Useful in Emergency Services for PH Measurement of Potentially Caustic Solutions
Giammarelli G, Vecchio S, Bigi S, Rognoni A, Acerbi D, Rada E, Locatelli C, Manzo L. Pavia Poison Control Centre and National Toxicology Information Centre, IRCCS Maugeri Foundation and University of Pavia, Pavia, Italy.

Objective: Precise and rapid pH determination of unknown potentially caustic solutions could be very useful in Emergency Departments (EDs). However, the reliability of some methods available in EDs, such as paper strips, cannot be guaranteed. The aim of this study was to evaluate the reliability of different methods for pH-measurement in emergency setting.

Methods: Four different methods for pH detection were analyzed: laboratory pH-meter, urine pH-strips 5 to 9, pH-strips 0 to 14 and pH-strips 1 to 11. Cautions tested were chosen from among those most involved either in accidental and intentional exposures in Pavia Poison Centre experience. Methods were blind tested by four operators: one chemist and three senior toxicologists.

Results: Reliability of pH methods was evaluated on 19 products (2 peroxides, 4 hypochlorites, 3 strong acids, 8 strong alcohols and 3 alcoholic detergents). No significant differences in pH detection were registered among operators. pH-meter was able to provide the same pH data to those declared in the product SDS. pH-strips 0–14 and 1 to 11 were useful in the measurement of pH real value of 11.5. Urine pH-strips showed pH 5 for strong acids (instead of pH-meter real values of 0–2) and pH 9 for strong alcohols (instead of pH-meter real values of 10–11). Moreover, erroneous values (pH from 6.5 to 8) were detected for hypochlorites (pH-meter real value 11.5). Conclusions: At present, pH strips 0–14 and 1–11, when available in EDs, correctly detect strong acids (pH < 2), strong alcohols (pH > 10) and peroxides, but not hypochlorites. Erroneous hypochlorite pH evaluations may be due to the whitening effects of chlorine on colorimetric strips. In case of detection of a pH ranging from 2 to 10 with colorimetric strips, a further detection with a pH-meter should be performed if hypochlorites cannot be excluded.

15. Hospital laboratories where ED attendances assays (range 0–8) and 4/15 assays (range 0–10) respectively. Group A and B carried out a median number of 3/15 toxicological investigations. Paracetamol was the most widely available assay (74.4%, n = 29) and the assays vide any toxicological analyses. Nationally, 15 hospital laboratories provided the full complement of the definitive quantity of analyses performed.

36. The Availability of Toxicological Analyses Relating to the Management of the Poisoned Patient in Ireland
Cassidy N, Herbert JX, Tracey JA.

National Poisons Information Centre, Dublin, Ireland.

Objective: To investigate the availability in Ireland of 15 quantitative laboratory analyses, specifically relating to the management of the poisoned patient. Not all hospital laboratories perform a full complement of toxicological investigations. Although there are international guidelines on toxicological analyses in the provision of poison, there are no national guidelines in Ireland and the availability of specific quantitative toxicology analyses has not been previously investigated here.

Methods: A questionnaire relating to the availability of 15 quantitative analyses (carbamazepine, carbamylmethylglucosin, digoxin, ethanol, ethylene glycol, iron, lithium, methaemoglobin, methanol, paracetamol, paraquat, phenobarbitone, salicylate, theophylline, and valproic acid) was compiled and distributed electronically to all 39 acute hospital laboratories in Ireland. Respondents were asked which quantitative analyses were available and if they were provided on-call (outside of normal working hours). Data was collected from November-2008-February 2009 inclusive. National statistics for each hospital in Ireland and ED attendances in 2008 were obtained. Hospitals were sorted into groups according to their number of ED attendances: (A) <20,000 (n = 9 hospitals), (B) 20,000–40,000 (n = 7), (D) 40,000–50,000 (n = 7), (E) >50,000 (n = 5). The median number of assays provided for each hospital group was calculated. Results: The response rate was 100%, allowing complete national data to be ascertained. Only 3 hospitals did not provide any toxicological analyses performed.

Conclusion: To the management of the poisoned patient. Not all hospital laboratories perform a full complement of toxicological investigations. Although there are international guidelines on toxicological analyses in the provision of poison, there are no national guidelines in Ireland and the availability of specific quantitative toxicology analyses has not been previously investigated here.

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Historically associated with barbiturate overdose, coma blisters have also been colloquially referred to as ‘barb burns’. We present a patient who suffered a prolonged coma after quetiapine overdose and was noted to have skin lesions including bullae and blistering. In comparing the mechanism of tissue injury to other types of pressure injury such as decubitus ulcers we discuss the role that pressure injury and subsequent impairment in tissue oxygenation plays versus specific drug effects such as endothelial disruption and microvascular thrombus formation in the evolution of this type of injury. 

Case report: A 27-year-old man was transferred to our tertiary care center with the history of ingesting 7200 mg of quetiapine in a suicide attempt. He had been found comatose, having ingested the quetiapine up to 35 hours prior to being discovered. He was a agitated, tachycardic and febrile on arrival and complained of diffuse myalgias and weakness. The patient was noted to have multiple vesicles on his right arm and a firm, erythematous plaque and bullae on his right thigh. Laboratory abnormalities included an elevated CK at 33,000. The patient’s course was complicated by bacteremias and cellulitis, associated with ruptured bullae, of his right hip. With treatment of his infection, wound care, and therapy for rhabdomyolysis the patient improved and was ultimately discharged to self-care. Conclusion: Sequelae related to prolonged immobility of any cause may include injury to muscle, vascular, microvascular and cutaneous structures. Coma blisters differ from pressure ulcers in many ways and cannot be graded by direct pressure injury as well as specific drug effect. Appropriate attention to coma blisters and related injuries will decrease morbidity and mortality related to drug overdose.

41. Remarkable Dissociation Between Phenobarbital Serum Levels and Clinical Presentation in a Suicidal Attempt
Madureira PM, De Capitani EM, Bucaretchi F, Prado CC, Lanaro R, Costa JL. 
Campinas Poison Control Centre, State University of Campinas, Campinas, Brazil

Objective: To report a clinical case where a very high serum level of phenobarbital did not lead to any expected neurological effects. Case report: A 38 year old lady was brought to the ER with a history of having ingested 20 phenobarbital (100 mg each) pills 45 minutes earlier, with a total dose of 2 grams of metoclopramide in a suicidal attempt. At admission she presented sleepy and immobile. She was noted to have ruptured bullae on his right hip and arm, and a firm erythematous plaque on his right thigh. Laboratory abnormalities included an elevated CK at 33,000. The patient’s course was complicated by bacteremias and cellulitis, associated with ruptured bullae of the right hip. With treatment of the infection, wound care, and therapy for rhabdomyolysis the patient improved and was ultimately discharged to self-care.

Conclusion: Sequelae related to prolonged immobility of any cause may include injury to muscle, vascular, microvascular and cutaneous structures. Coma blisters differ from pressure ulcers in many ways and cannot be graded by direct pressure injury as well as specific drug effect. Appropriate attention to coma blisters and related injuries will decrease morbidity and mortality related to drug overdose.

42. Intra-Arterial Infusions in the Treatment of Skin Exposures to Hydrofluoric Acid
Madsen JM, Curtis JA.
Department of Emergency Medicine, Drexel University College of Medicine, Philadelphia, PA, US

Objective: Hydrofluoric acid is often confused with hydrochloric (muriatic) acid but exhibits different local and systemic effects, and a high index of suspicion for fluoride exposure is important in burn cases. Treatment of burns from hydrofluoric acid is still controversial and problematic. A 16 year-old worker was exposed at work to a brick-cleaning solution. Despite immediate and copious rinsing of his affected dominant hand (the right hand), pain developed within four to five minutes of exposure and persisted throughout the rest of the day and the night. The patient, his wife, and a coworker engaged in cleaning the solution all reported that the cleanser was muriatic acid (hydrochloric acid), but further investigation established that it was in fact hydrofluoric acid. Local pain was unresponsive to topical application of calcium-glucanate gel, and an interscalene block was performed on the right brachial plexus, an arterial line was placed into the right radial artery, and calcium gluconate was administered both intra-arterially (using a four-hour infusion) and via injection through the skin into the affected tissues. After the nerve block had worn off, the pain in the patient’s right hand returned and increased, and a new four-hour intra-arterial infusion was begun. However, adequate flow into the artery was not maintained, and the infusion had to be terminated. The patient did not exhibit systemic effects from fluoride, was free of pain the following day, and was discharged. Conclusion: Intra-arterial therapy for hydrogen-fluoride exposures has both promise and also problems, and an appreciation of the need for both is necessary before deciding upon this route of administration. References: 1. Lim TM, Tsai CC, Lin SD, et al. Continuous intraarterial infusion therapy in hydrofluoric acid burns. J Occup Environ Med 2000; 42:892-7.

43. Beneficial Effects of ‘Home Therapies’ on the Pharmacokinetics of Paracetamol poisoning - a Human Simulated Overdose Study
Hoeberg LCG, Madsen KR, Groenlykke TB.
1. The Danish Poisons Information Centre/Department of Anaesthesia, Bispebjerg University Hospital, Copenhagen, Denmark; 4. Department of Clinical Pharmacology, Bispebjerg University Hospital, Copenhagen, Denmark

Objective: To assess whether raw eggs or a fluid bolus, given orally ten minutes after paracetamol ingestion, significantly affected the maximum serum-paracetamol concentration compared to water. Methods: Fifty healthy volunteers, although such high levels have never been seen so far, and for so long a period of time, without any major CNS depression. References: 1. Butler TC, Malaffee C, Waddell WJ. Phenobarbital: studies of elimination, accumulation, tolerance, and dosage schedules. J Pharmacol Exp Ther 1954; 111:425–35.

#Results are shown in Table 1.

Table 1. Serum levels of phenobarbital by two methods

<table>
<thead>
<tr>
<th>Time after ingestion (hours)</th>
<th>Immunoassay (pg/mL)</th>
<th>LC/MS* (pg/mL)</th>
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<td>24</td>
<td>136.45</td>
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*Liquid chromatography/mass spectrometry

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<th>Study Day</th>
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<th>AUC_0,∞ (min*umol/L)</th>
<th>C_max (umol/L)</th>
<th>Elimination half-life (min)</th>
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<td>153</td>
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<td>[31–182]</td>
<td>54913–150627</td>
<td>283</td>
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<tr>
<td>Egg</td>
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<td>71653</td>
<td>189.5</td>
<td>[121–322]</td>
</tr>
</tbody>
</table>

*Significant difference compared to control, P < 0.05
$Significant difference compared to water, P < 0.05

Clinical Toxicology downloaded from informahealthcare.com by University of Zuerich on 05/02/10
tricyclic screen was negative. While seizures and sodium channel blockade are recognized complications of DPH toxicity, we were unable to find reported cases of SE from DPH overdose. Examination of the patient’s presentation was similar to a tricyclic overdose and management required aggressive control of her seizures, sodium bicarbonate therapy, and recognizing that prolonged use of tricyclics can cause a complex tachycardia. Conclusion: A patient with a DPH overdose may present with SE. Management should focus on antidotal therapy with sodium bicarbonate, cardioversion, neurosurgical consultation, and supportive neurologic management with appropriate anticonvulsants and airway protection if clinically indicated. Reference: 1. Sharma AN, Hasdell AH, Chang EK, et al. Diphenhydramine-induced wide complex dysrhythmia responds to treatment with sodium bicarbonate. Am J Emerg Med 2003; 21:212–215.

45. Emergency Department Management of Unintentional Pediatric Ingestions of Psychiatric Medications

Fiesseler FW, 1 Hung Q, 1 Troncoso A, 1 Shih R, 1, 2 Riggs RL, 3 Books H.
1 Morristown Memorial Hospital, Morristown, NJ; 2UMDNJ Robert Wood Johnson Medical School, New Brunswick, NJ, US

Introduction: Pediatric ingestions though rare, can be life-threatening. Little data is available regarding treatment and outcomes of a pediatric patient who unintentionally ingests psychiatric medications. Objective: To determine the emergency department (ED) course of pediatric patients who unintentionally ingest psychiatric medications. Methods: Design: A multi-center retrospective cohort study. Setting: 20 New Jersey and New York EDs in urban, suburban and rural areas from January 2007 to September 2009. Subjects: Consecutive patients 0–8 years of age with the ICD-9 primary diagnosis of “poisoning antide pressants” were included in the study. Exclusion criteria were specific data points. This study was approved by the hospital Institutional Review Board (IRB). Results: The database contained 44 patients age 0–8 years with an ICD-9 diagnosis of “poisoning antidepressants.” Charts were available for 38. Eleven were excluded for non-psychiatric medication ingestions, leaving 27 for evaluation. Ten patients were admitted, two transferred and the remaining discharged. Mean age was 2.6 years. Males comprised 55% (n = 15). Poison control was contacted in eighty-one percent. The most common classes of medications were: SSRI (n = 3/3), antipsychotic unspecified (n = 15) of which 50% were admitted. EKGs were documented in 70% of patients and 47% additionally recorded QTc; all were normal. One patient had a documented cardiac arrhythmia, bradycardia (antidepressant) which occurred prior to ED arrival. Six patients received charcoal and 2 had gastric lavage performed, of which one was discharged. No “boucle back” visits occurred for any discharged patients and 74% reported participating hospitals. Conclusion: In our study, it was rare for pediatric patients, who unintentionally ingest psychiatric medications, to have cardiac abnormalities and none decompenated while in the ED.

46. Are Pediatric Patients who are Severely Affected by Carbon Monoxide Poisoning Receiving Hyperbaric Oxygen Therapy?

Fiesseler FW, 1 Hung Q, 1 Troncoso A, 1 Shih R, 1, 2 Riggs RL, 3 Books H.
1 Morristown Memorial Hospital, Morristown, NJ; 2UMDNJ Robert Wood Johnson Medical School, New Brunswick, NJ, NJ; 3NPJES, New Jersey’s Poison Control Center, Newark, NJ, US

Introduction: Carbon monoxide (CO) can lead to devastating end organ effects. Limited data is available regarding pediatric patients presenting to the ED with “severe” CO exposure and the utility of hyperbaric oxygen therapy (HBO). Objective: To determine if the inclusion of CO analysis in a CO poisoned patient exposed to CO requires HBO. Methods: Design: Multi-center retrospective cohort study. Setting: 23 NJ/NY EDs. Subjects: Consecutive patients (age 0–21 yrs) with the ICD-9 diagnosis of “toxic effects CO” from Jan 2000 to Sept 2006. A standard manual chart review was performed. We “a priori” defined “severe” intoxication as: syncope, altered mental status, dizziness/seizures, cardiac arrest or a CO level (COHb) >20%. Statistics: Mann-Whitney with a preset alpha of 0.05. Results: “Toxic effects of CO” was diagnosed in 380 pediatric patients. 362 charts were available for analysis, (49.3% (135/277) met inclusion criteria). Of the patients (n=277) CO levels were measured in 230 (82.7%). The median CO level was 13.8 and 17.7 years overall and in HBO groups, respectively. Four patients required transfer for treatment. Norm baric O2 was utilized in 75%. The most common source of exposure (43%) was home CO alarm triggered. Eighty-six percent of the patients were ultimately discharged. Conclusion: Treatment of the sickest pediatric patients is variable with only a minority receiving HBO.

47. The Tell-Tale Heart

Ricci G, 1 Zannoni M, 2 Perfetti P, 2 Caroselli C, 2 Codogni R, 2 Bonelli E, 2 Rocca GP. 3
1 Toxicology Unit, Azienda Ospedaliera, Verona; 2Emergency Department, Azienda Ospedaliera, Verona, Italy

Objective: To describe an uncommon side effect of quetiapine abuse in a 45 year old woman who consumed 13 tablets of quetiapine for suicidal purpose. Case report: A 45 year old woman, guest of a private clinic, was severely af fected by quetiapine overdose when taken an hour before. She consumed 13 tablets of quetiapine 100 mg. On arrival, the patient was quiet, alert and cooperative, GCS was 14, the heart and respiratory rate were normal. Cardiac auscultation revealed hyperreflexivity at the level of the aortic arch. Fluorescein angiography demonstrated a hyperreflectivity in the inferior right fovea, perhaps a century-old textbook that described incorrect cite a century-old textbook that described incorrect cite a century-old textbook that described incorrect cite a century-old textbook that described incorrect cite a century-old textbook that described incorrect cite a century-old textbook that described. Only two reviews list “yellow vision” as result of volatile alkyl nitrates, both of which incorrectly cite a century-old textbook that described inconsistent subjective color vision changes in patients ingesting amyl nitrite. We report a case of acute red to yellow color perception that lasted over one month following isobutyl nitrite use. Case report: A 26 year-old man reported that for two days red light sources appeared yellow with halos following use of isobutyl nitrite. He could still distinguish red and yellow pigments. He denied medications or other abused substances, and noted mildly decreased visual acuity in his right eye at baseline, but denied other medical history. Ocular coherence tomography revealed hyperreflectivity at the level of the choroid. Reported complications have predominantly infectious etiologies. We describe a case of acute lidocaine poisoning secondary to scrotal infusion. Case report: A 50 year-old man presented to the emergency department (ED) with confusion after a near-syncope event. Two hours prior to arrival he had injected 80 mL of undiluted 2% viscous lidocaine (16 mg/kg) into his scrotum, and felt a "burning sensation", followed by unsteadiness and headache. The patient reported that he regularly and safely performed such infusions with aqueous lidocaine in attempts to reduce the discomfort associated with the subsequent scrotal infusions. He reported no adverse effects to the saline. Vitalsigns were normal. He was somnolent and disoriented, but gradually improved during the first hour, and later recalled feeling “drunk”. As his mental status improved his BP increased from normal to his mildly hypertensive baseline. Examination noted mild generalized cyanosis and an enlarged scrotum (diameter ~20 cm) with multiple punctate scars on the scrotum and glans penis. ECG revealed sinus rhythm, normal intervals, LVW without echocardiogram. In conclusion we have detailed the use of cardiac-specific drugs, but only with sodium bicarbonate.

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50. A Case of Life-threatening Rectal Administration of Moist Snuff (Snus)

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1Department of Anesthesiology, Sahlgrenska University Hospital, Gothenburg; 2Department of Anesthesiology, Varnamo Hospital, Varnamo, Sweden

Introduction: Oral use of moist snuff (“snus”[sic]) is common among young males in Sweden, especially among extraverted males. At least 23% of Swedish men use moist snuff on a regular basis. In excessive doses, nicotine may cause agitation and in rare cases unconsciousness. However, nicotine uptake is higher in an alkaline medium and thus rectal administration is probably more efficient than buccal administration, due to the higher capillary pH. We here describe a case of nicotine poisoning via excessive rectal self-administration of moist snuff in an attempt to treat a migraine attack. Case report: A previously healthy, 42-year-old gander, arrived at the emergency ward of a local county hospital with symptoms of nausea, dizziness. The patient had suffered a severe migraine attack and intended to treat himself as usual with rectal administration of snus. Due to lack of response, about 75 sachets (sic!) of snus were admini-

51. Anesthetic Veterinary Drug Poisoning After Ingestion of Deer Venison

Bacis G.1, Panzeri C.1 Faroon L.1 Vertemati AM.2 Papa P.1

1Bergamo Poison Control Center, Ospedali Riuniti, Bergamo; 2Toxicology Analytical Laboratory, San Matteo IRCCS Hospital, Pavia, Italy

Objective: Wild deer breeding is used for reintroduction in protected areas like natural parks and private estates. In such areas, deer is carried out using a dart syringe with an anesthetic drug shot with a rifle. Tetramine in association with zolazepam are used in veterinary medicine for that purpose. Tetramine is a NMDA antagonist with disassociative anesthetic effects similar to ketamine while zolazepam is a pyrazolidine- dione structurally related to benzodiazepine. We here report a case of a very unusual toxic effect of veterinary drug intoxication after ingestion of deer venison with laboratory proof. Case report: A family of three, father (a forest service officer), mother, and their 17-year-old son (cooked and ate) the last of four frozen deer venison they had received after a selective hunting. That venison had been eaten before without any problems. After 15 minutes all the patients showed dizziness and nausea. While the adults were standing and talking, the boy showed somnolence, slurred speech, alteration of thinking, confusion, visual hallucinations (on the bed) and amnesia. He arrived at our hospital late in the evening. Analysis for cocaine, amphetamines, and benzodiazepines were normal. On suspicion of meat contaminated with drugs, gas chromatography-mass spectrometry analysis was performed on the patient’s blood and urine specimens and on the few remaining pieces of venison. Tiletamine metabolite and zolazepam were found in the patient’s urine. Zolazepam serum level was 20 ng/mL; no measurable tracheal administration was 5 mg/kg and zolazepam was 2 mg/kg. The following day the boy was discharged in good condition. Conclusion: Human poisoning with veterinary pharmacologic agents was never described before. Patients may present unusual clinical effects and may require extensive toxicological analysis for confirming the suspected exposure. The deer was probably killed or died during the capture immediately after the anesthetic shot and it was dressed instead of being discarded and the boy has eaten the piece of meat into which the dart syringe had been fired.

52. Cocaine Induced Angioedema without Urticaria: A Rare Adverse Reaction of Inhaled Cocaine

Eleftheriou G.1, Butera R.2, Panzeri C.1, Manzo L.2

1Poison Control Center, Ospedali Riuniti, Bergamo; 2Poison Control Center, IRCCS Fondazione Mangiuri and University of Pavia, Italy

Objective: Uvular angioedema (associated or not with IgE-mediated mast cells degranulation) is a rare disorder that occurs in allergic patients. The commonest trigger for airway obstruction is we report a case of acute uvular angioedema secondary to cocaine use, poorly responsive to conventional drug treatment. Case report: A 32-year-old Caucasian male patient (ED) admitted complaining of dysphagia, muffled voice and dyspnea, 30 minutes after cocaine snuffing. He admitted cocaine use at least 2–3 times a month for several years; a similar pattern but without overt uvular uvular swelling was noted one year before. He was taking no medication and had no known drug or food allergy. A diagnosis of uvular angioedema caused by cocaine or its contaminating agents was made. Aurosetrolized adrenaline 1 mg in asso-

References:
1. Bergamo Poison Control Center. Ospedali Riuniti, Bergamo.2 Toxicology Analytical Laboratory, San Matteo IRCCS Hospital, Pavia, Italy.

Objective: To describe acute pulmonary toxicity from inhalation of a hydrocarbon aerosol. Case report: A 45 year old male presented with respiratory distress after a 15 minute inhalational exposure to Meguiar’s Marine Canvas Protectant Aerosol (ingredients: liquefied petroleum gas, ethylene glycol monobutyl ether, isopropyl alcohol) in an enclosed environment. Symptoms of dyspnea, vomiting, diarrhea, near-syncope, chest tightness, and shaking chills began during the last two hours following exposure. On arrival to the Emergency Department his exam was significant for heart rate 140 bpm, blood pressure 116/60 mmHg, respiratory rate 30 breaths per minute, oxygen saturation 94% on room air, clear breath sounds bilaterally in lungs with decreased breath sounds, and tachycardia. Initial chest x-ray showed no infiltrate but within 12 hours there was evidence of a left lower lobe infiltrate.
Iron poisoning leads to systemic organ damage, being potentially lethal. We describe an iron poisoned woman was admitted to the hospital two hours after a massive oral ingestion of iron pills. Serum iron level was 255.5 and 210.5 mg/dL; and intravenous N-acetylcysteine was begun. In the intensive-care unit, the patient was responsive with empty bottles of iron pills.

Case report: A 29 year old man called an ambulance for acute onset of severe chest pain and tightness, and shortness of breath. He was admitted to the hospital with hypotension, tachycardia, and clutched his chest in distress. Vital signs: BP 158/76 mmHg; pulse 148 beats/min; Temp 37.3°C; RR 20/min; SpO2 100% on room air. Physical examination revealed diffuse, bilateral coarse crackles and wheezes in both lungs, a normochromic and normocytic anaemia, with left lower half weakness and diminished 2-point discrimination. His toes developed gangrene, and diminished capillary refill was normal. The chest X-ray was normal. The tachycardia and severe chest pain prompted ordering of a CT scan, to exclude aortic dissection or a pulmonary embolism. Psychoactive drugs were selected. Demographic and poisoning characteristics, and human and veterinary toxicology were reviewed. Despite the existence of standard protocols for management of patients with drug poisoning resulting in a low level of consciousness, and because of varying prevalences of drugs in different countries and also the lack of experience with new drugs, it seems that correction of these protocols according to drug use pattern in each country and for each time course is inevitable. Our aim is to assess the characteristics of patients with drug poisoning resulting in decreased level of consciousness. Methods: In this descriptive cross sectional study 89 patients suffering from decreased level of consciousness due to unknown drug poisoning who were transferred to the Loghman Poison Hospital via the Tehran emergency system in March and April 2008 were consecutively selected. Demographic and poisoning characteristics, past medical history, drug past use history and level of consciousness following primary emergency care were recorded. Results: Seventy (70%) patients were male. The most frequent age range of patients was 20–29 years (35 patients, 39%). Thirty-three (37%) patients had a history of psychological disorders and 48 (54%) patients had substance abuse history. Decreased level of consciousness in 30 (34%) patients was due to poisoning with illegal drugs. Twenty-one (24%) patients had intentional poisoning. In intentional cases tramadol (26%) and methadone tablets (16%) were the commonest causes and in unintentional ones, Iranian kerack (29%) and opium (26%) were selected. Symptoms of N-acetylcysteine and defer oxamine was given in 31 (35%) patients remained unconsciousness. Endotracheal intubation was performed for 12 (15%) patients in place and 15 (17%) patients were transferred to ICU for further investigations. In about one third of these patients not recovering from hypoxia, the above protocol shows that additional therapy might be used. The use of drugs and correction of treatment protocols are necessary. References: 1. Olsson M, Gamberoff MJ, Marcus SC et al. Emergency treatment of young people following illegal drug abuse. Arch Gen Psychiatry. 2005; 62:1122–1128.

58. An Unusual Case of Serotonin Toxicity
Madsen JM, Curtis JA.
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Objective: Many ingested substances can cause serotonin toxicity, but antihistamines have so far not been associated with this condition. We report a case of serotonin toxicity after a massive overdose of antihistamines. Case report: A 22-year-old physical therapist was found unresponsive after consuming empty bottles of (containing doxylamine and diphenhydramine) and of acetaminophen with an odor of alcohol on her breath. She was transported to a local emergency department and admitted to a hospital. Conclusion: The promenent role of opioid and illicit drugs in patients with decreased level of consciousness due to drug poisoning with about one third of these patients not recovering from hypoxia, the above protocol shows that additional therapy might be used. The use of drugs and correction of treatment protocols are necessary. References: 1. Olsson M, Gamberoff MJ, Marcus SC et al. Emergency treatment of young people following illegal drug abuse. Arch Gen Psychiatry. 2005; 62:1122–1128.
quickly performed. Laboratory findings showed normal values. Metabolic acidosis and hypokalemia quickly appeared and were rapidly treated. Seven hours after the ingestion, we observed hypotension, rectal bleeding, hypotension and tachycardia. Laboratory findings revealed increased liver enzymes (AST 220 ALT 70 U/L; peak level AST 6020, ALT 2800 at 32 hours), and D-dimers (56023 mcg/mL); ESR 2.2; hemoglobin 9.6 g/dL. As serum iron concentration was 4636 micrograms/dL, intravenous deferoxamine 10 mg/kg/h for 2 hours was started. Fresh frozen plasma was administered to blood cells were infused together with electrolytic solution and vitamin K. The upper GI endoscopy performed 10 hours after iron ingestion revealed hemorrhagic enteritis and bleeding from the anastomosis. The bleeding stopped. Hence, the administration of iron chelator and a free radical scavenger should be considered in order to prevent free radical secondary damage in iron poisoning.

60. Parachlorobenzene Induced Leukoencephalopathy

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Objective: Although neurotoxicity from chronic parachlorobenzene (PCB) exposure is very rare, myelin toxicity and leukoencephalopathy are reported. Only two published case reports of neurotoxicity quantitatively confirm exposure, both with concentrations of PCB in serum. We report a case of severe leukoencephalopathy confirmed with a PCB concentration. Case report: A 44-year-old man with a history of pica was brought to the ED for 4 weeks of altered mental status following self-induced homelessness and acquired mental illness. At admission he improved, was transferred under psychiatry care facility.

61. Deliberate Selharm by Intravenous Injection of Copper and Cyanide

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62. Cyloxyxilene Induced Subdermal Chemical Burns with Persistent Disability

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Objective: Cyloxyxilene is a weak sympathomimetic amine derivative of cyclohexane that is commonly used in rubber, paint, nylon and pesticide industries. It is a weak alkaline chemical known to have irritant properties.1,2 We present a case of cycloxyxilene induced chemical burns resulting in prolonged functional disability. Case report: A previously healthy, 22-year-old male employed as a chemist was filling a large metal drum using a mixing blender in a local industrial plant and fell into a pool of cycloxyxilene, which had leaked onto the floor from a barrel. His personal protective equipment included a hard hat, eye protection, long-sleeved T-shirt and length rain jacket. He immediately removed contami- nated clothing and began showering within 60 seconds. Emergency personnel continued decontamination for a total of 30 minutes. During transport he experienced moderate respiratory distress along with nausea and two episodes of emesis. These symptoms quickly resolved with supplemental oxygen and an anti-emetic. His total reticulocytes and platelets were normal. Blood cultures for Pseudomonas aeruginosa and Enterococcus faecalis were negative. MRI findings. PDCB leukoencephalopathy remains a diagnosis of exclusion, relying on history, clinical neurotoxicity and MRI findings.

63. Unusual Complication of Suicidal Intoxication with a Combined Hypotensive Drug - A Case Report

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Objective: Drug intoxication can result in several medical complications, however, limb amputation is a rare side effect. Case report: A 45-year-old man who had ingested a “handful” of Tarka (capsules containing 2 mg of trandolapril and 180 mg of vera- pamil) and alcohol with suicidal intent. The patient was found unconscious after 7 hours of sitting in his own car. His left leg was bent at 110 degrees, right leg at 90 degrees, and the trunk was bent forward and lying on the steering wheel. At admission deep coma (GCS 5), hypoxia (hypercapnia 90 mmHg), acute kidney injury and respiratory insufficiency were observed. The skin of both legs was cold and pale, without noticeable tension, and swelling. Laboratory results showed elevated levels of serum creatinine (1.9 mg/dL), creatinine kinase (43868 U/L), D-dimer (6110 ng/mL), and decreased platelet count (60 G/L). USG Doppler examination showed no blood flow bilaterally in the shanks’ arteries. Despite aggressive supportive treatment, and hemody- namic improvement, progression of acute ischemia, no power, sensation and reflexes in either leg were observed. The above knee amputations had to be performed in the next few days. Conclusion: According to the best of our knowledge there are only few reports of limb amputation because of acute poisonings. Most of them had been associated with narcotics and ergotamine intoxication.3,4 The patient’s limb amputa- tion syndrome are supposed to be the main causes of amputation in those cases. In our patient, except for the prolonged sitting with bent legs, the most important factor seemed to be the profound and long lasting hypotension which was responsible for acute ischemia of an extremity, tissue necrosis, and further complications. References: 1. Muskatavorn K, Sutepark S. Ergotism unresponsive to multiple therapeutic modalities, including sodium nitro- prusside, resulting limb loss. Clin Toxicol 2008; 46:157–8. 2. O’Connor G, McMahon G. Complications of heroine abuse. Eur J Emerg Med 2008; 15:104–6.

64. Successful Treatment of a Dinitrophenol Overdose Smits GJP. Emergency Department, Radboud University Medical Centre, Nijmegen, The Netherlands

Background: Dinitrophenol (DNP) was first used in the 1930s as a weight loss agent, but fell out of favor as a result of sudden deaths and cataract development with chronic use.1 DNP is currently used as an insecticide. DNP-induced hypoxia may stem from the uncoupling of the oxidative phosphorylation in mitochondria. Gluconeogenesis, increased anaerobic glycolysis, and lipolysis are the result, resulting in weight loss. Several case reports indicate that DNP ingestion may often cause fatal.2 Severe cases exhibit hyperthermia, seizures, coma, pulmonary oedema, dysrhythmias and renal and hepatic injury. We report a case of severe DNP
poisoning. Case report: A 20 year old female presented 4 hours after ingestion of 600 mg of 2,4-dinitrophenol (DNP). She had bought the DNP illegally from the Internet, was taking 400 mg bd for weight loss. Her regular medication included fluoxetine 60 mg daily.

In the Emergency Department she felt unwell and complained of myalgia. On examination there was generalised cyanosis, profuse diaphoresis, and tachypnoea. Her breathing signs were: Respiratory rate 35 bpm, BP 170/70 mmHg, sinus tachycardia 140/min, GCS 15, tympanic temperature 39.6°C. Biochemistry revealed a respiratory alkalosis (pH 7.47, bicarbonate 20.9 mmol/L) marked rhabdomyolysis (CK of 18,000) and a mild metabolic acidosis (HCO₃⁻ 7.49, bicarbonate 20.9 mmol/L).

The patient was intubated, placed on a cooling mattress. An intravenous dantrolene was administered. The CK rose to 30,000 on day two. On day 5 the CK began to fall to 25,000. A diagnosis of rhabdomyolysis was made. The patient was extubated. No renal or other organ failure resulted, and the patient was discharged well.

Experimental and analytical studies were conducted to confirm or validate these hypotheses. References: 1. Mostin M. Taste disturbances after pine nut ingestion. Eur J Emerg Med 2001; 8:76.

66. Metabolic Acidosis in Acute Poisoning

Beji O,1 Snouda S,2 Mrad A,1 Elghord H,3 Brahami N,1 Kourachi N,1 Thabet H,3 Amamou M.1,2 Intensive Care Unit and Clinical Toxicology Department, Centre d’Assistance Médicale Urgente, Montfleury; 1Emergency and Toxicology Department, Centre Antipoison, Centre d’Assistance Médicale Urgente, Tours, Touraine.

Introduction: Metabolic acidosis in acute poisoning is a common syndrome that is not well studied. In this study we have tried to evaluate the frequency, the mechanisms, the causes, the prognostic factors and the treatment modalities of this abnormality.

Methods: A prospective observational trial during a nine-month period including all the patients hospitalized for an acute poisoning in our intensive care unit. Two groups have been identified: G1: patients who have a pure metabolic acidosis on admission (pH < 7.37; HCO₃⁻ < 22 meq/L and PaCO₂ < 37 mmHg) versus G2; those who have no acid-base abnormalities in the blood gas sample. Results: 241 patients were enrolled. Hypo-basemia was present in 125 patients (51.9%); 60 of them (24.9%) had a concentration of HCO₃⁻ < 20 meq/L and PaCO₂ < 37 mmHg versus G2; those who have no acid-base abnormalities in the blood gas sample.

Table 1. Characteristics of groups G1 and G2

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>G1 N = 47 (19.5%)</th>
<th>G2 N = 56 (23.2%)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>28.2 ± 14</td>
<td>32.2 ± 16</td>
<td>NS</td>
</tr>
<tr>
<td>SAPS II</td>
<td>26.8 ± 13</td>
<td>20.4 ± 13</td>
<td>0.048</td>
</tr>
<tr>
<td>Induction Delay (h)</td>
<td>10 ± 13</td>
<td>5.4 ± 1.2</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Medicaments</td>
<td>19 (40%)</td>
<td>31 (55%)</td>
<td>NS</td>
</tr>
<tr>
<td>Alcohols</td>
<td>9 (19.1%)</td>
<td>1 (1.8%)</td>
<td>0.005</td>
</tr>
<tr>
<td>Organophosphonates</td>
<td>7 (15%)</td>
<td>1 (1.8%)</td>
<td>0.22</td>
</tr>
<tr>
<td>Caustic substances</td>
<td>2 (4.4%)</td>
<td>5 (8.9%)</td>
<td>NS</td>
</tr>
<tr>
<td>Coma (GCS&lt;9)</td>
<td>14 (29.8%)</td>
<td>14 (25%)</td>
<td>NS</td>
</tr>
<tr>
<td>Shock</td>
<td>8 (17%)</td>
<td>2 (3.6%)</td>
<td>0.041</td>
</tr>
<tr>
<td>Seizure</td>
<td>2 (3.6%)</td>
<td>5 (8.9%)</td>
<td>NS</td>
</tr>
<tr>
<td>Hypoxemia</td>
<td>12 (25.5%)</td>
<td>3 (5.4%)</td>
<td>0.004</td>
</tr>
<tr>
<td>Mechanical ventilation</td>
<td>16 (34%)</td>
<td>21 (36%)</td>
<td>NS</td>
</tr>
<tr>
<td>Length of stay (h)</td>
<td>59.5 ± 75</td>
<td>56.2 ± 98</td>
<td>NS</td>
</tr>
<tr>
<td>Dead</td>
<td>3 (6.4%)</td>
<td>1 (1.8%)</td>
<td>NS</td>
</tr>
</tbody>
</table>

Conclusion: Most patients with acute poisoning had metabolic acidosis. The most frequent causes were the ingestion of medicinal and nonmedicinal substances. The long-lasting duration of the dysgeusia (median of 10 days) reflected a toxic residue of pathogenic compounds.

References: 1. Intensive Care Unit and Clinical Toxicology Department, Centre d’Assistance Médicale Urgente, Montfleury; 1Emergency and Toxicology Department, Centre Antipoison, Centre d’Assistance Médicale Urgente, Tours, Touraine.

Discussion: The predominant cause of the disease was the ingestion of pine nuts in France in 2009. A certain number of clinical cases have been documented over a long period of time before onset of symptoms (median of 24 hours), spontaneous healing, great interindividual differences.

67. The Agent Profile: Sixteen Attributes as a Framework for Risk Determination and Response to Agents of Opportunity in Academic Medical Centers

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Objective: Agents of Opportunity are defined as “dual purpose” substances that are safe when used as intended for medical research and patient care, but potentially harmful if used improperly, whether unintentionally or intentionally. AOIs are present in all Academic Medical Centers (AMCs), creating vulnerability. The focus of this research was to identify the most important attributes contributing to AO risk and to produce an Agent Profile for each AO to aid in preparation for an AO event at an AMC. Methods: A literature review was performed to identify existing classification schemes, and risk assessment tools. Attributes were identified in our collaborative review, and classified into the threat, vulnerability, consequence, and availability categories. This process was repeated for each AO. These hypotheses were tested on 200 attributes identified in 3 seminal classification schemes were considered for inclusion. A final attribute list, affirmed by local experts, aided in the creation of the Agent Profile for each AO. Results: Sixteen attributes were identified from the 3 seminal schemes: class, availability, dispersion, exposure/transmission routes, psychological impact, physical state, persistence, latency, prevention of exposure, detection, identification, decontamination of building and people, and available treat-ments. Conclusions: Attributes were identified in 3 classes: threat, vulnerability, and consequences based on the National Infrastructure Protection Plan with the investigators’ addition of Consequence Management. These attributes in this classification scheme are compiled into Agent Profiles for each AO. Discussion: The Agent Profiles are unique in compiling data across all classes of AOIs: biological, chemical, pharmaceutical, and radiological. These profiles can provide assistance in disaster preparedness and response in the pre-event, event, and post-event settings. The Agent Profiles are more encompassing and informative in a wide scale disaster than the traditional Material Safety Data Sheets. Conclusion: The Agent Profile permits an AMC to conduct risk assessments across all classes of AOIs in a comprehensive manner via the sixteen attributes (sub-classes of threat, vulnerability, consequence, and consequence management).
69. Dioxin Contamination of Irish Meat in 2008

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Objective: To describe the discovery of dioxin in Irish pig meat exported to Europe in 2008 and how the source was identified. To analyse the potential hazard to human health of this episode.

Case report: On Saturday 6th December the Irish Government ordered the recall of all Irish pork products because of fears that the meat had been contaminated. The Food Safety Authority had identified a pig with high polychlorinated biphenyls (PCBs) from a sample taken on November 19th. Investigation of the farm the pig had come from found contaminated feed stuff and subsequently several further farms were identified and closed. The RIVM Institute of Food Safety laboratory in the Netherlands identified contaminates in pork products in France, Belgium and Holland as being from the same source. As it was impossible to identify which pork came from the nine contaminated farms all Irish pork products had to be recalled. A Belgian rendering plant stated that they had noticed increased levels of PCBs in September so the recall was backdated to then. The feed mill was identified and heating oil found to be the source of the PCBs.

The European Food Safety Authority (EFSA) was available to help with the crisis and analyse the risk to health. It was estimated that 5–7% of pork products were contaminated and was predicted that the burden would increase by 10% for an Irish consumer who had eaten pork at the highest contaminated level measured (200 pg TEQ/kg) during the 90 days of possible exposure and this represented a low risk to health.

A similar incident in Belgium in 1999 was calculated to have caused an increased body burden for PCBs of 42%. Conclusion: Prompt recall of contaminated pork prevented exposure of the population to dangerous levels of dioxin. Cooperation from EFSA and European laboratories was important in managing the crisis.


70. Serotonin Syndrome Induced Solely by Carisoprodol Overdose

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Objective: A variety of medications have been known to induce serotonin syndrome (SS), with MAOIs or SSRIs most commonly implicated. We report a case of SS after ingestion of carisoprodol alone.

Case report: A 40 year old woman was brought to the ED for altered mental status several hours after the witnessed ingestion of a “handful” of carisoprodol. Fifty-nine tablets of 350 mg carisoprodol were ingested over the preceding 6 days. Other medications included only oxycodeone/acetaminophen, with no evidence suggesting ingestion. On presentation, the patient was confused and nonverbal, exhibiting difficulty moving her extremities. Physical exam revealed tachycardia, mild hypotension, mid-to-late-reactive pupils, and dry skin. Neurological exam was normal except for the anxiety already described.

The patient was not considered to be on monoamine oxidase inhibitors, and this represented a low risk to health. A similar case report of one patient was recently published from the Children’s Hospital at Westmead, Sydney, Australia. This case series describes two cases of serotonin syndrome reactions and summarises adverse reactions reported from oeseltamivir in Australia. Case series: Patient 1 was a previously healthy 4 year-old boy with suspected H1N1 influenza. 09 was prescribed oeseltamivir 48 mg twice daily, the first and only dose was administered at 7 pm. After a few hours of sleep the child awoke unsettled and agitated with visual hallucinations. He was calmed by his mother and eventually fell asleep to wake again at midnight with continued abnormal behaviour, incoherent speech and visual hallucinations. His temperature in the first instance was 38.1°C and the second 36°C. The child continued to visualise stationary objects as moving in the morning. The only medications used for this child were oeseltamivir in regular doses. Patient 2 - A previously healthy 43 year-old man with suspected H1N1 influenza 09 was prescribed oeseltamivir 75 mg twice daily, with the first and only dose taken at 7 pm. After 1.5 hours he was noted by his partner to be behaving unusually with incoherent speech, agitation, confusion and limb twitching. The reaction resolved within 2 hours and the following day the patient had no remaining symptoms at the end of his medicine’s half-life.

71. Immunohistochemical Study Effects of Methamphetamine on Proliferation and Apoptosis of Sperm Germ Cells in Mature Rats

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Introduction: Methamphetamine (MAMP) is a central nervous system stimulant that is abused by teenagers and young adults. MAMP effects on the male reproductive system are not clear. In this experimental study, we evaluated the effects of a single injection of three different doses of MAMP on proliferation and apoptosis in the sperm germ cells of mature rats.

Methods: Four groups of mature rats were injected IP with three doses of a single dose of MAMP (1, 5 or 15 mg/kg) or normal saline. The right and left testes were used for further investigation. The testes and epididymis were separated. Tissue sections were stained with hematoxylin and eosin. Cell proliferation was assessed using the terminal deoxynucleotidyl transferase (TdT)-mediated dUTP nick-end labelling (TUNEL) method and apoptotic index was calculated.

Result: In the control group, more than 95% of spermatogonia were viable, while in the MAMP treated groups this number decreased significantly. The ratio of proliferation to apoptosis decreased significantly in two groups with the highest doses. In the MAMP treated groups, the number of proliferating spermatogonia was not significantly different from the control group. However, the number of apoptotic cells at least doubled in some tubules of these groups. There were significant differences between the lower dose group and the other dose groups. Therefore, the observed differences were relatively dose-dependent. Conclusion: This study revealed that one exposure to MAMP, particularly at a high dose, caused significant reduction in the number of proliferating spermatogonia. On the contrary, the number of apoptotic cells at least doubled in some tubules of these groups. These results suggest that the effects of MAMP on the testis are dose-dependent and may be partially mediated by changes in the cell cycle of spermatogonia.

72. Neuropsychiatric and Other Adverse Reactions to Oeseltamivir (Tamiflu)

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Aust Poison Information Centre, The Children’s Hospital at Westmead, Sydney, Australia

Objective: In 2009, oeseltamivir (Tamiflu, Roche Products Australia) began to be used at unprecedented levels in Australia and worldwide. Neuropsychiatric reactions to oeseltamivir have been reported in the past, predominantly from Japan. This case series describes two cases of neuropsychiatric reactions and summarises adverse reactions reported from oeseltamivir in Australia. Case series: Patient 1 - A previously healthy 4 year-old boy with suspected H1N1 influenza 09 was prescribed oeseltamivir 48 mg twice daily, the first and only dose was administered at 7 pm. After a few hours of sleep the child awoke unsettled and agitated with visual hallucinations. He was calmed by his mother and eventually fell asleep to wake again at midnight with continued abnormal behaviour, incoherent speech and visual hallucinations. His temperature in the first instance was 38.1°C and the second 36°C. The child continued to visualise stationary objects as moving in the morning. The only medications used for this child were oeseltamivir in regular doses. Patient 2 - A previously healthy 43 year-old man with suspected H1N1 influenza 09 was prescribed oeseltamivir 75 mg twice daily, with the first and only dose taken at 7 pm. After 1.5 hours he was noted by his partner to be behaving unusually with incoherent speech, agitation, confusion and limb twitching. The reaction resolved within 2 hours and the following day the patient had no remaining symptoms at the end of his medicine’s half-life.
75. Neuroleptic Malignant Syndrome Variant in a Child on Aripiprazole

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Background: Neuroleptic Malignant Syndrome (NMS) is a condition of altered mental status, fever, muscle rigidity, and dysautonomia that can occur due to decreased dopaminergic activity. We report a case of a child who developed NMS-like manifestations after initiating aripiprazole, an atypical antipsychotic with agonist/antagonist activity at central dopaminergic and serotonergic receptors. Case report: An 8 year old with Attention Deficit Hyperactivity Disorder (ADHD) and bipolar disorder was started on aripiprazole (10 mg qhs). Other routine medications included: clonidine, valproate (discontinued when aripiprazole was started), eprostine, and methylphenidate. After two doses of aripiprazole he developed confusion, ataxia and drooling. He was seen at a hospital and instructed to stop aripiprazole and start benzotropine 0.5 mg daily. Three days after stopping aripiprazole, and despite benzotropine (0.5 mg), the child worsened with unresponsiveness, severe lead pipe rigidity, and urinary incontinence. On examination: body temperature 38.6 °C; hyperpyrexia (101 °F); tachycardia (130–150 bpm), and hyper-tension (SBP 140–170 mmHg). Pupils were 6 mm and minimally reactive. Saliva pooled in his mouth. Bowel sounds were decreased. Neurological examinations were normal; there was no clonus. All four extremities had lead pipe rigidity. With any verbal or tactile stimulation, he developed painful, intermittent, truncal tremor and extremity muscle spasms. CPK was mildly elevated (peak 852 IU/L). Other studies were normal including electrolytes, renal function, glucose, urine drug screen, urinalysis, CT brain, and lumbar puncture. During hospitalization, Tmax was 101 °F. Treatment included lorazepam (5.5 mg IV total) and restarting clonidine. Altered mental status, muscle rigidity, and spasms completely resolved over three days. Conclusion: NMS-like manifestations developed after two doses of aripiprazole. The child had unusual rigidity, mild CPK elevation, and mild hyperthermia. Overall, his clinical course was shorter than expected with NMS. As more children are started on atypical antipsychotic medications, more NMS variants may be seen.

76. Severe Toxicity of a Single Therapeutic Dose of Baclofen in Patients with Impaired Renal Function

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Objective: To describe the occurrence of toxic effects of baclofen after ingestion of single therapeutic doses in adults with renal failure. Methods: Analysis of all cases of oral baclofen adverse drug reactions in adults with confirmed renal impairment reported to a Poisons Information Centre between 1996 and 2008 with written medical feedback and sufficient causality. Results: Three cases fulfilled all inclusion criteria. All patients experienced severe symptoms (Table 1). Discussion: According to the literature the minimum single oral dose of baclofen for severe toxicity in adult patients with normal renal function is 200 mg. Severe toxicity of baclofen has been frequently reported in the literature in patients with impaired kidney function after repeated ingestion of therapeutic doses. Accumulation of baclofen due to diminished renal elimination has been postulated as the main pharmacokinetic mecha-nism.2 Our patients presented with severe toxicity immediately after ingesting the first therapeutic dose (25–50 mg) of baclofen. Concomitant medication was unknown. Conclusion: In our case the patients experienced severe toxicity after a first low oral dose of baclofen. This suggests that not only accumulation, but also other underlying mechanisms may play a role, such as altered pharmacodynamics associated with renal failure or interacting co-medication. Further studies are needed to investigate possible pathophysiologi-cal mechanisms of severe toxicity of baclofen in renal failure and other renal compromised patients.

77. Acute Laryngotracheitis after Accidental Aspiration of Clindamycin

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Objective: Capsular clindamycin is frequently used to prevent infections after dental surgery. The occurrence of esophagitis and esophageal ulcers has been previously described. Recently our poison centre was notified about a case of accidental aspiration of the capsule content with subsequent laryngotracheitis. Our database contains four further cases of adverse events due to aspiration of the content of clindamycin capsules. To our knowledge no comparable cases have been published before. Case report: NY year-old patient was treated with capsular clindamycin (150 mg caps) after dental implantation. One capsule, swallowed with a small amount of water, accidentally opened during ingestion with subsequent aspiration of the capsule content. The patient immediately reported burning throat pain. He progressively developed respiratory distress and had a syncopal episode at admission. Initial laryngoscopy showed acute laryngotracheitis, moderate inflammatory edematous change of mucous membrane between oropharynx and trachea, two subglottal, hemorrhagic lesions and bilateral chilary, whitish plaques in the sinus tonsillaris (100–200 °F), leucocytes 14.2 G/L, C-reactive protein 73 mg/mL. The chest X-ray showed discrete signs of aspiration. Methylprednisolone, clemastine, and amoxicillin / clavulanic acid were administered. Control laryngoscopy after three days of treatment showed persistent slight subglottal swelling and spot-shaped whitish coating and slight supraglottal fibrin coatings. The clinical course was favourable; the patient was discharged asymptomatic at the fifth day. Steroids were discontinued after five days, antibiotics after ten days. A follow-up examination on the 9th day showed restitution ad integrum. Case series: Four similar cases were identified in our database (1995–2009). The symptoms reported were burning pain (2 cases), cough (3), nausea (3), dyspnea (2), aphasis (2) and syncope (1). Conclusion: The accidental opening of clinda-mycin capsules during swallowing can lead to severe laryngotracheitis. Patients should be advised of this hazard. The risk of aspiration may be minimized if the drug...

78. Co-Pranolol Withdrawal - Five Years On Sandlansky EA,1 Crookes D,2 Bateman DN.3 1NPI Edinburgh, Royal Infirmary of Edinburgh, Edinburgh; 2Primary & Community Organisation, NHS Lothian, Edinburgh, UK Objective: Co-pranolol (paracetamol 325 mg and dextropropoxyphene 32.5 mg) was previously one of the most commonly prescribed analgesic agents in the UK. However, following evidence of increased mortality in overdose and a lack of analgesic benefit over other simple analgesics, co-pranolol underwent a phased withdrawal from the UK market in 2005. Similar recommendations have now been implemented across Europe. We previously demonstrated the initial effect of this legislation on Scottish mortality figures and similar results have been shown elsewhere in the UK. We have now extended the study period to assess the longer-term effect of legislation on mortality in Scotland from poisoning with co-pranolol and paracetamol. Methods: Mortality relating to poisoning by single agents in Scotland were obtained from the General Register Office for 2000–08. Deaths due to co-pranolol poisoning alone were recorded, involving multiple agents were excluded. Proportional co-pranolol mortality before and after legislation was compared. Primary care prescribing data was obtained from the Information and Statistics Division of the Scottish Executive Health Department. Results: Following legislation mortality associated with co-pranolol poisoning in Scotland has significantly reduced beyond that which already reported (mean 2000–08 = 78 deaths (2.5%) of total poisoning deaths, 2008, 2 deaths (1%; P < 0.0001). The decline in mortality has been associated with a precipitous fall in co-pranolol prescriptions, with a steady rise in prescriptions for co-codamol and paracetamol. No concomitant rise in mortality from poisoning with these, or any other analgesic agents, was identified. Conclusion: We have demonstrated a reduction in mortality from co-pranolol poisoning following legislation. Despite a steady rise in prescriptions for paracetamol and co-codamol, there is no evidence of increased mortality associated with these agents. We estimate that across the UK more than 300 lives might have been saved following legislation to withdraw co-pranolol.

79. Cholestasis Induced By M-Drol Successfully Treated With Hydroxocobalamin for Presumed Cyanide Toxicity Lugassy DM,1 Weintgart SD,2 Ginsburg BJ,3 Howland MA,1,4 Hoffman RS,1,2 Nelson LS.1,2,4 New York City Poison Control Center, New York; 2New York University Medical School, New York; 3Department of Emergency Medicine, Mount Sinai School of Medicine, New York; 4St. John’s University College of Pharmacy and Allied Health Professions, New York, US Objective: Studies have raised concerns over the effect of hydroxocobalamin on patients with cyanide toxicity caused by nitrite oxide scavenging. We present a case of severe and prolonged hypotension following the use of hydroxocobalamin. Case report: A 50-year-old male was admitted with a cardiac arrest following a building fire, received epinephrine 3 mg, vasopressin 40 units, atropine 2 mg, during successful prehospital resuscitation. In the ED, his vital signs were: BP 100/60 mmHg; HR 118 beats/min; RR 12/min; Temp 36.7°C; O2 saturation 98% on 100% O2. Post-arrest hypothermia protocol was initiated and a 2L NS bolus improved his BP to 166/68 mmHg. Significant laboratory data included: carboxyhemoglobin, 46%; blood lactate, 11.5 mmol/L. Physical exam: no significant trauma or cutaneous burns, but carbonaceous material was present around his mouth and nares. He received hydroxocobalamin 5 g intravenously as empiric therapy for cyanide. Soon after his blood pressure began to rise peaking thirty minutes later at 220/180 mmHg. Despite sedation with fentanyl and propofol, ninety minutes after hydroxocobalamin his blood pressure remained elevated at 185/79 mmHg. A goal of 100 mmHg was achieved within 45 minutes of initiation of a nicardipine infusion, which was required for 16 hours. The patient was declared brain dead and expired on day 10 after care was withdrawn. A serum sample obtained prior to administration of hydroxocobalamin revealed no detectable concentration of cyanide. Conclusion: Hydroxocobalamin is considered a safer alternative to the traditional cyanide antidote kit due to the lack of methemoglobin generation. Hydroxocobalamin causes hypertension in healthy volunteers who are not cyanide poisoned. Although the clinical significance of hypertension in this patient is unclear, his risk of this adverse event was possibly increased because he was not cyanide poisoned. Cautious administration and continued observation of hydroxocobalamin’s clinical use in potential cyanide poisoning victims may help identify rational therapeutic outcomes. References: 1. Uhl W, Nolting, A, Golor, G, et al. Safety of hydroxocobalamin in healthy volunteers in a randomized, placebo-controlled study. Clin Toxicol. 2006;44:17-28.

81. Myocardial Arrest Associated with Pranolol Use in Thyroid Storm Elefteriou G,1 Buters P.2,1 Mantovani L,1 Baci G,1 Manzo L.2 1Poison Control Center, Ospedali Riuniti, Bergamo. 2Poison Control Center, IRCCS Fondazione Maugeri and University of Bergamo, Caro in: Surgery Unit, Ospedali Riuniti, Bergamo, Italy Objective: Thyroid storm is a rare clinical emergency that is fatal when left untreated. Beta-blockers and anti-thyroid medications are the first-line treatment. We report a fatal case due to propranolol use in thyroid storm. Case report: A 39-year-old man presented to the emergency department with a thyroid storm. ECG revealed a paroxysmal atrial fibrillation with a ventricular rate of 214 bpm. Cardiac ultrasound showed a left ventricular ejection fraction (EF) of 35%. The patient was started on propranolol 2 mg i.v. Three hours later, the ECG showed supraventricular tachycardia (110 bpm) and an additional propranolol infusion (5 mg infused at a rate of 0.16 mg/min over 30 minutes) was administered. Because of worsening dyspnea, transtho- racic echocardiogram was repeated and revealed a severe reduction of EF to 15%. Three hours after propranolol infusion, the patient developed cardiorespiratory arrest. Cardiopulmonary resuscitation was unsuccessful. A myocardial infarction was a possible cause. The patient was transferred to the Coronary Unit for extracorporeal cardiovascular support with ECMO. He remained comatose and anuric; subsequently, he developed multiorgan failure and died 5 days later. Conclusion: In hyperthyroid patients, an excess in circulating thyroid hormones may result in an abnormal left ventricular function1 and under stress some of them can develop low-output heart failure. In thyrotoxic patients, left ventricular function fraction decreases after propranolol administration2 and cardiovascular collapse may be a serious complication following beta-blockade in thyroid storm.3 In patients with thyroid storm, early EF assessment3 and monitoring beta-blocker withdrawal2 cardiac output is observed, it might be prudent to consider alternative beta-blockers with shorter half-life like esmolol. References: 1. Dalan R, Lewow M. Cardiovascular collapse associated with thyroid storm. Exp Clin Endocrinol Diabetes 2007; 115:392-6. 2. Forfar JC, Murr AL, Sawers SA, et al. Abnormal left ventricular function in hyperthyroidism: a possible cause of low cardiac output. N Engl J Med 1982; 307:1165–70. 3. Critchley M, Guillford P. An equilibrium radionuclide technique to assess the effect of propranolol on left ventricular function in thyrotoxicosis. Clin Radiol 1980; 31:717-22.
nuclear medicine; gastrointestinal, respiratory, or blood borne pathogens in microbiology and transfusion medicine; spaces; and acids, bases, and other potentially hazardous chemicals and mixtures. Independent dispensing modalities and access sites included HVAC, pneumatic tube, elevator, and water systems; food services; central and cleaning supplies; and pediatrics. In the Security phase, a common security platform and security assess control (engineering) concepts for both agent injection of a mixture of testosterone, methenolone and nandrolone. His initial vital signs were: BP 111/75 mm Hg; HR 100 bpm; RR 31/min; T 98.7°C; SpO2 94% on 15 L O2. The patient received albuterol, dexamethasone, dexamethasone, and BiPAP with improved oxygenation. CT chest demonstrated acute lung injury without evidence of a pulmonary embolus. A broncho-alveolar lavage was normal, and the patient recovered fully within a week. Case 2: A 26-year-old man presented to the hospital with dyspnea for four hours. His symptoms started 30 minutes after injecting a mixture of testosterone, methenolone, and nandrolone. Vitals signs were: BP 125/79 mmHg; HR 130/min; T 98.4°C; RR 28/min; SpO2 90% on room air. He was in moderate respiratory distress, with diffuse rales and wheezing. An arterial blood gas revealed pH 7.41; pCO2 38 mmHg; pO2 105 mmHg; saturation 98%; FiO2 of 40%. Chest radiograph demonstrated diffuse infiltrates bilaterally. The patient was treated with albuterol, methylprednisolone, and BiPAP. Within 48 hours of hospitalization, the patient recovered fully and was discharged home. Conclusion: Two patients developed acute lung injury following intramuscular injection of anabolic steroids. The patient’s hemolytic crisis to the reported contents of the “vitamin infusion,” since neither the full contents nor the method of preparation of this remedy was ever disclosed. Since most properly formulated naturopathic treatments have little active ingredients, the possibilities of improper formulation, nose or lungs were cleared. Inadequate regulation of naturopathic remedies has the potential to induce serious toxicity, especially in genetically predisposed individuals.

85. Recreational Inhalation of Ethyl Chloride Leads to Neurotoxicity


Objective: Ethyl chloride is a colorless, volatile gas sold online and in the specialty stores, with uses ranging from a VCR head cleaning solvent to a topical anesthetic to a recreational drug for inhalation. We report a case of neurotoxicity from ethyl chloride inhalation. Case report: A 45-year-old man with a history of HIV presented to the hospital with persistent axillary and cervical lymphadenopathy. He was observed in moderate respiratory distress, with diffuse rales and wheezing. An arterial blood gas revealed pH 7.41; pCO2 38 mmHg; pO2 105 mmHg; saturation 98%; FiO2 of 40%. Chest radiograph demonstrated diffuse infiltrates bilaterally. The patient was treated with albuterol, methylprednisolone, and BiPAP. Within 48 hours of hospitalization, the patient recovered fully and was discharged home. Conclusion: Two patients developed acute lung injury following intramuscular injection of anabolic steroids. The patient’s hemolytic crisis to the reported contents of the “vitamin infusion,” since neither the full contents nor the method of preparation of this remedy was ever disclosed. Since most properly formulated naturopathic treatments have little active ingredients, the possibilities of improper formulation, dose, dilution and contaminants should be considered. Inadequate regulation of naturopathic remedies has the potential to induce serious toxicity, especially in genetically predisposed individuals.

86. Anabolic Steroid Use Leads to Acute Lung Injury

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Objective: Anabolic steroids are commonly abused by both amateur and professional athletes. We report two cases of acute lung injury associated with intramuscular injection of anabolic steroids. Case series: Case 1: A 26-year-old man presented to the hospital with dyspnea for four hours. His symptoms started 30 minutes after injecting a mixture of testosterone, methenolone, and nandrolone. Vitals signs were: BP 125/79 mmHg; HR 130/min; T 98.7°C; RR 28/min; SpO2 94% on 15 L O2. The patient received albuterol, dexamethasone, dexamethasone, and BiPAP with improved oxygenation. CT chest demonstrated acute lung injury without evidence of a pulmonary embolus. A broncho-alveolar lavage was normal, and the patient recovered fully within a week. Case 2: A 26-year-old man presented to the hospital with dyspnea for four hours. His symptoms started 30 minutes after injecting a mixture of testosterone, methenolone, and nandrolone. Vitals signs were: BP 125/79 mmHg; HR 130/min; T 98.7°C; RR 28/min; SpO2 90% on room air. He was in moderate respiratory distress, with diffuse rales and wheezing. An arterial blood gas revealed pH 7.41; pCO2 38 mmHg; pO2 105 mmHg; saturation 98%; FiO2 of 40%. Chest radiograph demonstrated diffuse infiltrates bilaterally. The patient was treated with albuterol, methylprednisolone, and BiPAP. Within 48 hours of hospitalization, the patient recovered fully and was discharged home. Conclusion: Two patients developed acute lung injury following intramuscular injection of anabolic steroids. The patient’s hemolytic crisis to the reported contents of the “vitamin infusion,” since neither the full contents nor the method of preparation of this remedy was ever disclosed. Since most properly formulated naturopathic treatments have little active ingredients, the possibilities of improper formulation, dose, dilution and contaminants should be considered. Inadequate regulation of naturopathic remedies has the potential to induce serious toxicity, especially in genetically predisposed individuals.
after an alleged overdose with 90 mg of a friend’s risperidone. She was dyspneic and could not speak. Examination was unremarkable except for an acute dystonia of the oromandibular region, true stridor, and sinus tachycardia (HR 150). Neurological examination was normal except for the dystonia. Coagulation, renal and liver function test results were within normal limits. Procycoline was given as an intravenous bolus of 10 mg. The patient described a reduction in the swelling and spasm of her tongue and throat within 30 minutes of treatment. Serum risperidone concentration at the time of presentation was below the limit of detection for the assay and the concentration of the active metabolite, 9-OH risperidone, was 31 µg/L, which is within the normal range of 10–90 µg/L (26). Her heart rate settled following resolution of the dystonia and she was discharged the same day.

Conclusion: This case report confirms that dystonic reactions can occur in some days after an otherwise asymptomatic overdose of risperidone, even in the absence of elevated blood concentrations of the parent drug or its metabolite. Although dystonic reactions are not usually life-threatening, the localisation in this case of the dystonia in the mouth and throat led to severe distress that was treated effectively with procyclidine.

88. Non-Acetaminophen Drug-induced Liver Injury: Reporting Concerns to National Poison Data System

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Objective: To show the profile of non-acetaminophen drug-induced liver injury (DILI). Reports of DILI by herbal drugs, over-the-counter drugs (OTC), and other dietary supplements have been increasing in recent years. In 2008, the National Poison Data System (NPDS) received 15,290 reports of DILI; 3,978 of these were cases of probable DILI in which the identification of the drug was not known. The NPDS contains a large database of cases of DILI, but as many indications of cases are based on patient recall, many cases are underreported.

Methods: We evaluated 2009-2008 NPDS reports of DILI by herbal drugs, over-the-counter drugs, and other dietary supplements. Cases were classified by causative agents. Complete case details were collected to the extent possible. Cases were counted by causative agent, location, and age group.

Results: During 2009-2008, the NPDS received 20,030 reports of probable DILI. Of these, 1,985 (9.9%) were cases of probable DILI in which the causative agent was herbal drugs, over-the-counter medications, and other dietary supplements. The cases included 445 males (22.4%) and 1,540 females (77.6%). The median age was 49 years (range: 1-109 years).

Conclusions: Reports of DILI by herbal drugs, over-the-counter drugs, and other dietary supplements have been increasing in recent years. The NPDS contains a large database of cases of DILI, but as many indications of cases are based on patient recall, many cases are underreported.

89. Paediatric Toxic Injuries Related to Chemical Exposures in the Spanish Toxicosurveillance Program

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Objective: To show the profile of paediatric toxic inci- dents caused by chemicals in the Emergency Depart- ments of Spanish Hospitals, as part of a program carried out by the Toxicology Section of the Spanish Association of Toxicology (AETOX) over a 10-year period. Methods: Cases involving patients under the age of 16 years were selected from the totality of chemical incident cases reported to the Spanish Toxicosurveillance Program (TSP) in order to present their epidemiological and clin- ical profile and compare it with the characteristics of total chemical incidents (6012 cases) from 20 hospitals, and with the total of toxic paediatric cases in the ED of our hospital during the same 10-year period (837 cases).

Results: From among the total chemical cases those under the age of 16 years (n = 1,012) were selected (11%). The proportion of males was 54.8% and females 45.2%. 96% were household accidents. 69% of the cases involved patients aged under 5 years. The main families of chemicals involved in the events were irritant gases (20 cases) caustics (233), solvents (88), dyes (12), and pesticides (62). The main individual agents were: carbon monoxide (173 cases) and domestic bleach (102 cases). There were 5 cases of acute poisoning on the respiratory tract, 4% cutaneous, and 2% ocular. 62% of cases had had some clinical symptoms: 150 neurological, 51 respiritory, 287 digestive, 13 cutaneous and 6 cardiovascular. Some treatments included gastric deconditioning in 88, cutaneous or ocular decondi- tions in 28, antitoxines in 165 (oxygen 148, ethanol 2, atropine 5, vitamin K 4) and symp- tomatics in 302 cases. There were no fatal cases recorded, nor relevant sequelae.

Conclusion: The main differences from the overall chemical cases were related to sex distribution (no difference in the total group), the absence of intentional cases in the paediatric population, and the chemical agents involved - with fewer cases of the most dangerous products, such as hydrochloric acid and methanol in the paediatric popu- lation, and a consequently better prognosis. The main differences within the total paediatric toxic cases were determined by the presence of ethanol and different medicines causing a peak of intentional poisoning in the 13–15 age group.
92. Lyell’s Disease - the Most Severe Adverse Drug Reaction and Difficult to Treat (Case Series)

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Objective: Lyell disease (toxic epidermal necrolysis) is a severe acute skin disorder, described for the first time in 1956 by Alan Lyell. This condition is most often drug induced (NSAIDs, barbiturates, some antibiotics, etc) and is characterized by generalized erythema, confluent macules with subsequent generalized epidermal sloughing, mucous membrane involvement, persistent fevers, positive Nikolsky sign. Although rare (average incidence of toxic epidermal necrolysis is 0.5–1.4 cases per million population per year) this condition has a high prognosis - with estimated mortality rate of 10–70%, depending on the quality of care and the rapidity with which treatment is initiated. The pathophysiology of toxic epidermal necrolysis has not yet been fully elucidated; however, various theories have received wide acceptance.

Toxic epidermal necrolysis is believed to be an immune-related cytotoxic reaction aimed at destroying keratinocytes that express a foreign antigen. Case series: We present a case series of 150 patients with Lyell’s disease treated over the period 1978 - 2008. The age of the patients varied from 18 years to 80 years (29 children, 73 adults and 22 adults). The survival rate observed was 60% throughout the whole period.

Conclusion: Lyell’s disease is a life threatening severe disorder requiring timely diagnosis and appropriate treatment. Special attention is paid to the standard treatment protocol at the Toxicology Clinic, MHATEM “Pirogov” as it is well known that mortality rate is highly dependent on the aggressiveness of the treatment, quality of care and rapidity with which treatment is initiated.

93. Enquiries to the UK National Poisons Information Service Regarding Dextromethorphan Abuse: Clinical Effects and Management

Waring WS,1 Good AM,2 Thompson SHL,2 Waring WS,3 Good AM,1 Good AM,3

Objective: Dextromethorphan is a readily accessible antitussive agent. Recreational abuse has been associated with dissociative effects, and deaths have been reported after ingestion of very large doses.1 This study examined the clinical effects associated with dextromethorphan ingestion in the United Kingdom. Methods: The National Poisons Information Service is commissioned by the Health Protection Agency to provide clinical advice on the management of poisoned patients in the United Kingdom. Enquiries concerning dextromethorphan were examined retrospectively. Results: Data were available between 2004 to 2007. There were data concerning 354 patients with median age 7 years (95% CI 4 to 14 years) of whom 194 were female (55.0%). Cases involved accidental ingestion in 261 (73.9%), deliberate overdose in 87 (24.6%), and adverse effects of therapeutic dose in 5 (1.4%). Median dose was 45 mg (range 3 to 2750 mg). Commonest co-ingested agents were paracetamol in 147 (41.6%), benzodiazepines in 48 (13.3%), and antihistamines in 47 (13.3%). In 50 cases there were no symptoms or signs of toxicity in 257 patients (72.8%). The dose was higher in patients with severe symptoms; 120 mg (IQR 50 to 225 mg) versus 30 mg (IQR 8 to 90 mg), p<0.001 by Mann Whitney test. Dextromethorphan dose was predictive of toxicity; receiver operating characteristic (ROC) curve revealed an AUC of 0.92 (95% CI 0.87 to 0.95) with a cut-off of 45 mg. Specific adverse effects included respiratory depression in 13 (20.7%), diphenhydramine in 3 (7.3%), and other antihistamines in 3 (7.3%).

Conclusion: A universal electronic notification procedure for industry will enable BfR to considerably increase the number of products notified, received, processed and communicated to PCCs. Under risk minimization aspects, a new product identifier (e.g. product identification element) will be exchanged in the new format.

94. Electronic Product Notifications of Industry to BfR: Development of a Uniform Standardized Data Set for Information of the German Poison Control Centers

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Objective: Since 20 January 2009, the CLP Regulation (EC) No. 1272/2008 has been in effect in the EU. Article 45 stipulates compulsory reporting of formulations of products containing health services. Having to collect such information in Germany, BfR is developing a uniform standardized electronic data set for product data supplied by companies on formulations of detergents and cleaning agents has been performed by file transfer in XML format. This procedure was developed by BfR and has been adopted by industry very well. It is currently being refined by BfR to ensure that data on all notifiable products and data reported on a voluntary basis can be transmitted in XML format. After completion and testing of the prototype at BfR in spring 2010, it is envisaged that the procedure will be tested in practice by a major enterprise (Henkel, Düsseldorf). The BfR database is being adapted to the new requirements of the CLP Regulation on e.g. labelling. All important data, including clear identifiers (e.g. product identification element) will be exchanged in the new format.

Results: The 2000–2006 period, a harmonized joint PCC/BfR classification of products at BfR and subsequent communication between the Association of Clinical Toxicology. This system is being adopted by the BfR database: Classification of products at BfR and subsequent communication procedure will facilitate a harmonized evaluation of cases of poisoning. The data acquisition system at BfR and the exchange format are being adapted to the new CLP Regulation and subjected to practical testing. To warrant a secure data transfer, a dedicated portal for receiving formulation data has been established. For clear product identification and reporting to PCCs by means of XML exchange format will facilitate a harmonized evaluation of cases of poisoning.

Conclusion: Since 20 January 2009, the CLP Regulation (EC) No. 1272/2008 has been in effect in the EU. Article 45 stipulates compulsory reporting of formulations of products containing health services. Having to collect such information in Germany, BfR is developing a uniform standardized electronic data set for product data supplied by companies.
97. Severe Mercury-Poisoning of a Child and Involvement of the Whole Family
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1Poisons Information Centre, Erfurt; 2:Hospital Bavaria Zschekchwitz, Kreischa, Germany
Objective: Elemental mercury is well absorbed via inhalation with the risk of damage to the central and peripheral nervous system after chronic exposure. We report a case of mercury-poisoning of a child with severe injury to the peripheral nerves. The involvement of the other family members is documented, as well.
Case report: A 13-year-old boy found a box containing metallic mercury in an old factory and played with it at home for many days in November 2008. During the next few weeks he developed a progressive leg-emplazified frailty, hyporeflexia and paresthesiae of the extremities. In addition, he presented nausea, headache, and psychological signs in terms of mood disorder and alopecia. At first the mercury urine level was not seen in electronemography in February 2009. The initial mercury-level in urine was 360 μg/L. During the DMPS treatment for several months the mercury level in urine was decreased to 14 μg/L, but the severe neurological symptoms persisted nearly unchanged. Within 6 months he was able to write again. One 11-year-old brother with a mercury level in urine of 327 μg/L showed 63% patients (29%) and multiple drug poisoning, was treated with DMPS, as well. Conclusion: The child developed a severe secondary peripheral neuropathy, despite mercury urine levels in the lower toxic range. DMPS-treatment reduced the mercury urine level to a normal range during 10 weeks, but the neurological symptoms improved slowly over several months. Apparently, the storage of the heavy metal in the nervous system was complete at the time of diagnosis and it could not be mobilised sufficiently by the antidote. In contrast to the brothers, there was no increase of the mercury urine level at the beginning of the medication suggesting interindividual differences of mercury storage or metabolism.1 References: 1. Gundacker C, Wittmann J,1 Della Puppa T, 1 Ferruzzi M, 1 Rebutti I, 1 Travaglia Moderna T,1
1Poison Control Centre, A.O. Niguarda Ca’ Grandan, Milan; 2Department of Pharmaceutical Chemistry, University of Pavía; Pavía, Italy
Objective: A review of data collected by the Poison Information Centre, Milano, concerning domestic poisoning cases with Mercury (Hg) 95% 2.80, 5.91). Although serious AEs only occurred in the flumazenil treated group (Relative Risk 4.07, CI 95% 2.19, 7.50). The current evidence does not allow to reliably conclude whether NAC might be beneficial for improving interindividual differences of mercury storage or metabolism.1

99. Do People Use Over-the-Counter Drugs Safely? An Analysis of 409 Cases Of Domestic Medication Errors With Acetaminophen Reported From the Poison Control Centre of Milan, Italy
Moro PA,1 Assisi F,2 Bissoli M,1 Borghini R,1 Davanzo F,1 Delia Puppa T,1 Ferruzzi M,1 Rebuzzi I,1 Travaglia Moderna T,1
1Poison Control Centre, A.O. Niguarda Ca’ Grandan, Milan; 2Department of Pharmaceutical Chemistry, University of Pavía; Pavía, Italy
Objective: A review of data collected by the Poison Information Centre, Milano, concerning domestic poisoning cases with Mercury (Hg) 95% 2.80, 5.91). Although serious AEs only occurred in the flumazenil treated group (Relative Risk 4.07, CI 95% 2.19, 7.50). The current evidence does not allow to reliably conclude whether NAC might be beneficial for improving interindividual differences of mercury storage or metabolism.1

100. Acetaminophen Misuse Among Pediatric Patients Hospitalized With Suspected Benzodiazepine Overdose. A Meta-Analysis
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Objective: The purpose of this meta-analysis is to estimate the risk of adverse events (AE) associated with the use of flumazenil in patients with impaired consciousness due to suspected benzodiazepine overdose. Methods: Randomised controlled studies including patients with benzodiazepine overdose were considered. The primary outcome was serious adverse event (SAE) as defined by the flumazenil treated group (Relative Risk 4.07, CI 95% 2.19, 7.50). The current evidence does not allow to reliably conclude whether NAC might be beneficial for improving interindividual differences of mercury storage or metabolism.1

References:
1. Gundacker C, Wittmann J,1 Della Puppa T, 1 Ferruzzi M, 1 Rebutti I, 1 Travaglia Moderna T,1
1Poison Control Centre, A.O. Niguarda Ca’ Grandan, Milan; 2Department of Pharmaceutical Chemistry, University of Pavía; Pavía, Italy
Objective: A review of data collected by the Poison Information Centre, Milano, concerning domestic poisoning cases with Mercury (Hg) 95% 2.80, 5.91). Although serious AEs only occurred in the flumazenil treated group (Relative Risk 4.07, CI 95% 2.19, 7.50). The current evidence does not allow to reliably conclude whether NAC might be beneficial for improving interindividual differences of mercury storage or metabolism.1

Objective: To study the prevalence of coma due to acute poisoning in children examined in a Pediatric Emergency Department. Methods: We have analyzed all the children who attended the Emergency Department in our hospital during a five year period, taking into consideration the following: consciousness status assessed by doctors, who received a double dose (150 mg) oseltamivir; a 9 year-old child who received a double dose (150 mg) oseltamivir had vomiting in the morning and then vomited again after the dose; a 7 year-old who got 30 mL (12 mg/mL) oseltamivir instead of 5 mL; a 7 year-old who got 20 mL (12 mg/mL) oseltamivir twice and was febrile; and a 5 year-old who received 15 mL instead of 4 mL (12 mg/mL) oseltamivir suspension.
102. Neurotoxicity Due to 3,4-Diaminopyridine Treated Successfully with Lorazepam

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Objective: Previous reports of toxicity due to 3,4-diaminopyridine (DAP) have only described mild paresthesias and abdominal pain. However, no reports of acute overdose exist in the literature. We describe a case of unintentional overdose of 3,4-diaminopyridine presenting with severe abdominal pain, back pain, dia- phoresis and painful ascending paresthesias of all 4 extremities.

Case report: A 57-year-old woman with a past medical history of Lambert Eaton myasthenic syndrome (LEMS) presented to the emergency department with unintentional overdose of DAP just prior to arrival. She had recently been instructed to increase her prescribed dose from 20 mg to 3 times per day, but had taken 20 mg. The patient immediately developed severe abdominal and back pain, diaphoresis, and painful paresthesias of all 4 extremities. Vital signs on arrival were: HR 74 bpm, BP 130/74 mmHg, RR 22 bpm, temperature 36.8 °C, and 100% oxygen saturation on room air. Electrocardiogram revealed a sinus rhythm at 65 bpm with a QTc of 436 ms. Physical examination revealed widespread tenderness in abdomen and thoracolumbar paravertebral musculature. The remaining physical examination was normal. The patient was treated with lorazepam 1 mg intravenously with resolution of all symptoms within 2 minutes. Laboratory values including chemistry, creatinine phosphokinase, and liver function tests were all normal. The patient did not experience any increased weakness, remained asymptomatic for 24 hours and was reintiated on her original medication regimen the following day. Conclusion: DAP has not been approved in the United States for use in LEMS despite multiple studies confirming its efficacy. DAP has been preferred over aminopyridine because of less expected neurotoxicity via blood brain barrier permeability. This case demonstrates that DAP also has a very narrow therapeutic index despite multiple studies confirming its efficacy. Additional research is needed to determine the potential benefit of phenytoin coadministration in preventing seizures in this patient population. This case demonstrates that DAP is not at all different from aminopyridine in the neurotoxicity profile. The absence of anticholinergic side effects in the patient supports the hypothesis that DAP does not impair renal function.

103. Naltrexone Interaction with Opioid Induced Withdrawal Syndrome Follows a Binary Pattern of Severity in Contrast to Post Opioid Overdose

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Objective: Opioid overdose is common.1 Overdose with short half life opioids usually leads to withdrawal symptoms in the day following admission. Naltrexone, an opioid antagonist, can also cause withdrawal symptoms in dependent individuals. The frequency of withdrawal manifestations in opioid naltrexone interaction and post overdose.

Methods: All consenting subjects with opioid naltrexone interaction (N) and a quarter of diamorphine overdose subjects (O) (systematic selection) from November 2008 to April 2009 were studied prospectively, as a part of a wide randomised clinical trial. Ethical approval was obtained from the local ethics committee. N subjects received fluids and diazepam. O cases received fluids and naloxone if needed. Results: 25 N and 21 O subjects were studied. On admission, pain, agitation, sweating, piloerection, muscle cramp, nasal congestion, yawning, tremor, nausea, muscular and bone pain, pupil size and respiratory rate were significantly different (P<0.001 for all). Craving started within the first 24 hours after admission and temperature was not different. Twenty-four hours after exposure insomnia (0.004), nausea (0.032), pupil size (0.006) tremor (0.035) and respiratory rate (0.037) were still significantly different. Other findings were similar. Descriptively, severity of these variables was gradually increasing in the 24 hours in overdosed subjects. Naltrexone cases, however, followed a binary pattern in severity of some of these variables including pain, muscle cramp, sweating, tremor, piloerection, respiratory rate and pupil size in this period. Conclusion: Clinical manifestation of withdrawal symptoms/signs post overdosage and after naltrexone interaction were not parallel and the dominant symptom was pain. Naltrexone induces a binary pattern of increased severity of findings, overdose cases experience constant intensification of symptoms. O and N cases are more different on admission than 24 hours later. Some differences might be due to diazepam administration. References: 1. Hall AI, Logan JE, Toblin RL, et al. Patterns of abuse among unintentional pharmaceutical overdose fatalities. JAMA 2008; 300:2613–20. 2. Singh SM, Sharma B. Uninten- tional rapid opioid detoxication: case report. Psychiatric Danmark 2009; 21:65–7.

104. Causality Assessment For Pediatric Drug Induced Liver Injury Using Poison Center Data

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Objective: United States Poison Centers receive over 1 million calls reporting pediatric exposures each year. Poison center data has been used as a post-marketing signal for adverse medication effects, including liver injury. The purpose of this study was to evaluate the performance of a structured causality assessment using poison center data. Methods: Ten pediatric cases (age <6 years) reported to US Poison Centers which described liver injury and acacetaminophen exposure were selected. Four toxicologists independently reviewed the cases using the RUCAM assessment tool. Affidavit to rate the probability that the drug event was due to acetaminophen was required for the WHO-UMC scale and a gestalt score of 100% chance of being caused by acetaminophen. Clinical and demographic data was collected. Results: A case was defined as all reviewers within 2 points for the overall score. Results: Using the RUCAM system, 3 or 4 reviewers rated 8 cases as possibly related and 2 cases were as probable and 2 were rated as certain by 3 or 4 reviewers. Using the Gestalt scale all cases were rated as at least an 80% chance of being acetaminophen induced. Conclusion: The RUCAM score had fair agreement but appears to understate the probability of causality for identifying pediatric cases of liver injury due to acetaminophen poisoning. The gestalt scale worked well for this small sample but is problematic for larger scale data. Other factors such as age or treatment with Fab remains necessary for better data collection at poison centers nationwide. Alternately, a modified scale could be developed for poison center data.

105. Digoxin Antibody Use in Elderly Patients in Lille Hospital

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Objective: Evolution of elderly patients treated with digoxin antibodies. Methods: A retrospective analy- sis of digitalis poisoning cases occurring in subjects aged more than 70 years and hospitalized in Lille between 2003 to 2008 and treated with digoxin antibody- ses by the Poison centre of Lille. To consider initial and total severity, the criteria used were: - Death by edge of Persson and colleagues.1 Results: 26 patients were hospitalized and treated with Fab. The average age was 81.4 ± 6.7 years (range: 71–97 years). Eighty-one per cent of patients received Fab. One patient was a chronic overdose in 92% and for 8% a suicidal act. Pois-oning occurred mainly at home (92%). All the patients were receiving digoxin treatment for a chronic cardiac disease, and seven had been prescribed Fab prophylactically by a doctor. Half the patients were at home at the time of their initial health care management. Clinical severity was considered as being moderate in 15 patients (57.7%), severe in 10 patients (38.5%) and minor in 1 patient (3.8%). The electrocardiogram showed conduction disturbances in 14 patients, an arrhythmia in 19 patients, and a cardiac block in 17 patients. The average digoxin serum level was 6.64 ± 4.77 mmol/l (4.8–10). The average serum potassium was 4.7 ± 2.6 (4.0–7.2). Naltrexone overdose caused severe abdominal pain, back pain, diaphoresis, and vomited. For the adult cases, two were acute double digoxin poisoning (systematic selection) from November 2008 to April 2008. For pediatric cases, four were acute double digoxin poisoning.

106. High-Fidelity Simulated Toxidromes in Medical Student Education

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Objective: In an effort to familiarize medical students with frequently encountered toxic exposures, a curriculum was designed to simulate a poisoned patient. The simulation required the students to recognize, diagnose and treat the toxic exposure as presented on the MUMS-6367. The medical toxicology curriculum was created for fourth year medical students rotating through the Emergency Department which included a classroom lecture and high-fidelity simulation cases. The simulation was based around the cholinergic, anticholinergic, sympathomi- metic, opioid and ethanol withdrawal toxidromes. Stu- dents were presented with a verbal scenario, and then had to proceed with a history and physical examination of the simulated patient. The students were required to act on the history and physical exam findings, as well as verbalize placement of intravenous access, initiation and dosing of appropriate pharmacotherapy, interpretation of car- diac rhythms, and modify patient management based on a response to the treatments given. The mannequin is also equipped with the ability to simulate changes in
pupil size, presence or absence of diaphoresis, seizures, respond to intravenous access, pharmacotherapy, endotracheal intubation, transdermal pacemaker, and defibrillation. The CPI was defined as the cardiac arrest, heart rate, blood pressure, respiratory rate, pulse oximetry, and temperature on a monitor linked to the mannequin. It was also pre-programmed to respond appropriately to correct interventions. For incorrect interventions, that caused death, a 1 point out of a 10 point scale was presented. Where “1” was uninformative, “3” was informative and “5” was inspirational. Results: Overall, 72 fourth year medical students rotated through our department between the years of 2008 and 2009. The students’ mean rating for this curriculum was 4.4 on a Likert scale. Conclusion: High-fidelity simulation provides an interactive approach to learning clinical toxicology. The medical students rated this as an effective teaching modality.

107. The Utilization of Pre-Hospital Advanced Life Support for Toxic Ingestions

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Objective: Advanced Life Support (“ALS”) is requested frequently for patients with suspected drug overdose or ingestion, but its utility has not been proven. Anecdotally, many of these patients are simply observed pre-hospitaly and in the emergency department (“ED”), so ALS resources may be applied more efficiently with other types of patients. We sought to determine what percent of ALS calls dispatched as drug overdose or toxic ingestion, receive ALS intervention on a five out of a 10 point scale. Methods: We retrospectively reviewed the pre-hospital records of all patients for which ALS was dispatched for “Ingestion/ Poisoning” or “Overdose” over a 30 month period in a suburban, two-tiered EMS system. Prehospital charts and in the emergency department (“ED”), so ALS established prehospitaly. Fourteen per cent (CI:11–17) of patients cancelled on 16% (CI:13–18). 51% (CI:47–55) had an IV access, administration of IV medications, and establishing a definitive airway. Percentages and 95% confidence intervals (“CI”) were calculated to describe the proportion of patients receiving these interventions. Results: Out of over 41,804 paramedic dispatches, 673 (1.6%) were dispatched as “Ingestion/Poisoning” or “Overdose.” Of those patients, ALS was cancelled on 16% (CI:13–18). 51% (CI:47–55) had an IV established prehospitaly. Fourteen per cent (CI:11–17) received another IV on the field. Conclusion: Of all ALS dispatched for “Ingestion” and “Overdose” in our suburban EMS system, the utility of ALS was questionable. A study of whether or not this curriculum improved toxicology. The student can assess the cardiac rhythm, heart sounds, respiratory rate, blood pressure, and other vital signs. The student can also pre-programmed to respond appropriately to correct interventions and clinically decompensate in response to various toxicological scenarios. The student can also simulate the emergency department, school, and workplace. As a result, these hand disinfectants increased 8-fold from July to November. This was followed by a 1.6-fold increase in December. In total, the number of enquiries concerning exposures of disinfectants increased 8-fold from July to November. However, no increase in the incidence of severe poisonings was observed in the period. The amount ingested was typically from a few drops to a month, and too small to be a cause of death. Conclusion: Increased accessibility to alcohol-based hand disinfectants has led to an increase in accidental exposures in children, with the inherent risk of poisoning.


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Objective: Injection drug use has been the major growth route of drug abuse in Iran in the past decade and it has been responsible for the transmission of HIV virus in more than two third of cases.1 The aim of the present study was to determine the prevalence of HIV and hepatitis B in a group of IDU (IV drug users) cadavers and to compare the results to a group of cadavers in the normal population. Methods: In a case-control study the blood samples of the cadavers of 400 randomly chosen IDUs (IV drug users) and 400 other cadavers as control group were checked for HBS antibody and HIV antibodies in the Forensic Medicine Center of Tehran. The prevalence of HIV and HBV infection was compared in the two groups according to their demographic characteristics. Results: The number of HIV and HBV positive cadavers was significantly higher in the IDU (IV drug users) group than the controls (6.25% vs 0.5%, P<0.0001, 27.5% vs 3%, P<0.0001). The risk of being infected by the HIV virus was 27 times higher in IV drug users group and the risk of HBV infection was 12.26 times greater in this group as compared to the control group. The age distribution of IDU (IV drug users) cadavers indicated that most of the exposures (70%) involved persons of drug users cadavers in the reproductive (20–40 years old) age was 80%. Conclusion: The greater prevalence of the HIV and HBV infection especially in the reproductive age of IDUs (IV drug users) indicates that the authorities need to pay more attention to prevention and harm reduction programs. References: 1. Rahimi Movaghar A, Mohammad K, Razaghi EM. Trend of drug abuse situation in Iran: a three decade analysis. Hakim Research Journal 2002; 5:171–82.

110. Evaluation of the Influence of Glutaraldehyde on the Respiratory System on the Basis of Changes in Clara Protein Concentrations in Blood Serum of Medical Staff Employed in Endoscopic Therapies


111. Randomised Comparison Study of Intramuscular Droperidol Versus Midazolam for Violence and Acute Behavioural Disturbance in the Emergency Department - The DORM Study

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Objective: To determine the most effective and safest drug for intramuscular sedation in violent and acute behavioural disturbance. VASIT in the emergency department. Methods: We conducted a blinded randomised, comparison trial of intramuscular sedation for VASIT, comparing droperidol (10 mg), midazolam (10 mg) and droperidol (5 mg) and midazolam (5 mg). Inclusion criteria were patients requiring physical restraint and parenteral sedation. The primary outcomes were duration of the VASIT and time until further sedation using a survival analysis. Secondary outcomes were a reduction in the altered mental status score at 20 minutes, number of and type of injuries to the patient or staff members, functional safety to security and any drug-related adverse effect. Electrocardiograms were obtained in all patients and the QT measured. Results: Of 91 patients included, 33 (36%) in the droperidol/midazolam combination obtained the median duration of the VASIT was 20 minutes (inter-quartile range [IQR];11–37min) for droperidol, 24 minutes (IQR:10–35min) for midazolam and 36 minutes (IQR:15–38min) for the combination (p = 0.91). Additional sedation was required in 11 (33%) droperidol patients, 18 (62%) midazolam patients and 12 (41%) in the combination group (p = 0.068). The hazard ratio for additional sedation in the midazolam versus droperidol group was 2.25 (p = 0.03), and for the combination versus droperidol was 1.29 (not significant). Patient and
112. Risk Factors for Paracetamol (Acetaminophen) Hepatotoxicity

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Introduction: Paracetamol (acetaminophen) is the most frequent drug taken in overdose in the United Kingdom. Hepatotoxicity from paracetamol poisoning remains an important public health issue worldwide. Acetylsalicyclic acid is an inhibitor of cyclooxygenase (COX) including COX-2. Even within a few hours of overdose, with need for treatment determined from the plasma paracetamol concentration and time since ingestion. This method identifies most patients at risk, but a few patients below usual treatment thresholds develop unexplained hepatotoxicity. The reasons for this apparently enhanced individual susceptibility are not fully understood, but there is accumulating evidence that certain clinical factors affect risk of hepatotoxicity after overdose. Methods: Literature review, concentrating on epidemiological studies of human paracetamol poisoning. Hepatic enzyme induction: Metabolism of paracetamol in man may occur via several hepatic isoforms including CYP2E1 and CYP1A2. These enzymes may be induced by drugs or other risk factors. Enzyme inducing drugs increase CYP1A2. These enzymes may be induced by drugs or other risk factors. Enzyme inducing drugs increase CYP1A2. These enzymes may be induced by drugs or other risk factors.

113. No Evidence of Hy’s Law in Patients Treated with Labeled Doses of Acetaminophen in Prospective Clinical Trials

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Objective: In July 2009, US Food and Drug Administration (FDA) issued guidance for industry for the pre- market assessment of potential liver injury with its use, including Hy’s Law criteria: hepatocellular injury (alanine aminotransferase (ALT) or AST, respectively) elevations >3 X upper level of normal (ULN) level in the same sample, total bilirubin >2 X ULN, and lack of other causality for elevated aminotransferases or total bilirubin. We retrospectively analyzed data from McNeil-sponsored, long-term clinical studies with acetaminophen for cases meeting FDA’s definition of Hy’s Law. Methods: McNeil-sponsored prospective, double-blind, randomized, placebo-controlled clinical trials. Results: Studies 24 weeks duration, administering ≥3000 mg/d acetaminophen monotherapy, were included. Data from patients with baseline liver enzyme values >ULN were excluded during the period when McNeil was an account for variability by assay methods, reference ranges, and definition of ULN, the ULN used by each laboratory was determined after weighing the results of 2512 subjects enrolled in 10 studies, 1928 met inclusion requirements and were analyzed per Hy’s Law criteria. Patients, ages 20 to 85 years, received 3000–6000 mg/d of acetaminophen in the form of oral or rectal suppository. Conclusion: No patient in any treatment group met Hy’s Law criteria for hepatotoxicity. While ALT or AST elevations >3 X ULN were observed, these were transient and not accompanied by increases in total bilirubin >2 X ULN or associated with hepatic failure. Conclusion: In prospectively designed, well-controlled studies in patients receiving acetaminophen monotherapy, no patients met Hy’s Law criteria for drug-induced liver injury. Although some patients treated with acetaminophen had low-level ALT elevations, these levels were transient and not accompanied by increases in total bilirubin or associated with hepatic failure. In our experience, patients were unaccompanied by signs or symptoms of liver injury, and as such appear to be clinically insignificant.

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Abstracts
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Abstracts

JW, Leelahavankul A, Aponte A, et al. Liver pro-

115. Investigation of Neurological Toxicity of Poisoning with Alcohol

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Objective: Toxic alcohol poisoning may be compli-
cated by various neurological complications. They are
mainly due to the formation of toxic metabolites. The
objective of this review is to illustrate the different tech-
niques of neurological investigation of these severe neu-
rological disturbances. Results: 1. Methanol poisoning
results in severe metabolic acidosis due to formic acid
accumulation that usually becomes critical after a delay
of several hours. The main neurological findings are an
impaired consciousness evolving to a deep coma, and
to major visual disturbances ranging from blurred vision
to blindness. Methanol-related brain injury involves basal
ganglia, mainly the putamina. These lesions can be
demonstrated by different methods in vivo (MRI) or in
death (liver histology). In vivo, an increase in diffusion
(CT) or magnetic resonance imaging (MRI). The differ-
ent sequences of MRI appear particularly appropriate
to investigate the topology and nature of methanol-
related lesions. Citric acid, NAA, and Lactate are
missing in the fatty component of the tissues, while the T2-
weighted images are enhancing the water component.
The diffusion-weighted imaging is a specific technique for tissue contrast in conditions in which the original sig-
nal intensity is diminished proportionately to the degree
of free-water diffusivity. The initial CT imaging studies
were demonstrated that putaminal necrosis with haemorrhage was present in the majority of cases. MRI stud-
ies have shown that in putaminal lesions exhibiting abnormal hypersignal intensity of the lateral
margins of the nuclei, parenchymal changes can extend
to other regions, such as the thalamus and the sub-
comi-sone, hippocampus, cerebellum.1 There is also
an involvement of the subcortical white matter within
frontal and/or occipital lobes. The diffusion-weighted
sequence will reveal areas of decreased apparent diffu-
sion coefficient (ADC) values in both putamina and in
the white matter. This would reflect cytotoxic cell
swelling. Such abnormalities are not, however, specific for methanol intoxication and may be found in other
intoxication, ocular toxicity is usually biphasic. Early
retinal dysfunction can be diagnosed by electroretinog-
raphy (ERG). Retinal dysfunction is potentially revers-
able and is the rule when found between 12 to 24 hours.
Cerebral changes and blood formate concentrations, with
a threshold value for retinal dysfunction. It may be fol-
lowed after a delay of several hours or days by a toxic
effective necrosuppressive. Visual injury is well investigated by visual evoked potentials. The risk for developing
permanent visual injury is well correlated with the severity
of metabolic acidosis and with the peak value of blood
formate concentration. Ethylene glycol (EG) may induce
by itself a significant central nervous system (CNS)
depression; however, neurotoxicity is mainly related to
the biotransformation of EG into several toxic metabolic
products responsible for severe metabolic acidosis.
In addition to coma due to brain edema, EG poisoning
may be complicated by cranial nerve palsies and severe
axonal damage. The number of cases of EG poisoning has
been investigated either by brain CT or MRI. On CT
images, hypodense areas are seen in the central white
matter, the basal ganglia, thalamus, midbrain and upper
pons. After ethanol intoxication, putaminal cystic necro-
sis can be observed on MR images. Nonspecific white
matter abnormalities were also described. Diethylene
glycol (DEG) has caused epidemic poisoning when it
was substituted in pharmaceutical preparations. It is
effective investigated by electromyography (EMG) and
nerve conduction velocity (NCV) studies. Not all
EMG/NCV studies have shown evidence of nerve
demyelination. An acute axonal neuropathy may pre-
cede the development of a delayed demyelinating
neuropathy. The analysis of the cerebrospinal fluid
(CSF) is probably not helpful, as CSF proteins con-
tent may be normal even in the presence of demyelina-
tion. Conclusion: Toxic alcohol poison-
ing may be complicated by either central or peripheral
neurological abnormalities. The brain injuries should
be preferentially investigated by MRI. However, the
radiological findings are not totally specific for any
alcohol poisoning, and the relationship with the clinical
outcome is usually weak.

116. Acute Cholestatic Liver Injury Caused by Alcohol Contaminated with Polyoxynhexamethyl-
ge neuguineide

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AY,2 Vishnevetsky MK,2 Sentsov VG,2 Novikova
OV,2 Alekseev YB3

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eral Medical-Biological Agency, Moscow; 2 The Ural
State Medical Academy, Ekaterinburg; 3 Irkutsk
State Medical University, Irkutsk; 4 The Far-Eastern
State Medical University, Khabarovsk; 5 Perm, Rus-
sian Federation

Objective: Acute poisoning with the antiseptic liquid,
Extrasept-1, and some other liquids with the same struc-
ture was widespread in 44 regions of Russia in the
second half of 2004. More than 12 thousand patients; the mortality rate was 9.4%. This liq-
uid contained ethanol, diethyl phthalate and polyoxyn-
hexamethyleneguineide (PHMG) with a molecular weight ranging from 1,000 to 3,000 Daltons.
PHMG is a cation-active poly-
meric compound with a molecular weight ranging from
1,000 to 3,000 Daltons. Serum osmolality, Na,
BUN, glucose were measured; serum osmolality was
calculated using the formula: 2Na + BUN/2.8 + glu-
cose/18 for all specimens. The calculated osmolality
was subtracted from the measured osmolality to calcu-
late the OG, and OG was multiplied by 1/10 the MW
to estimate the concentration of the TA. The TA concen-
trations were measured by GC/FID. Results: For all
TA levels, low levels (<50 mg/dL) did not raise the OG
above the normal range. When OGs were ≥ 20 mOsm/
L, the predicted TA level had a similar percentage error
among all alcohol (range 3–36%). For a measured
TA level of 167, the OG predicted a level of 204 (22% error); a measured EG level of 175, OG method predicted 239 (36%); measured ISO levels of
163 and 83, OG predicted 167 and 105, respectively (2
and 28% error); and measured ME levels of 167 and 86,
OG predicted 162 and 89 respectively (both 3% error).
Conclusion: This provides experimental sup-
port that low, but clinically significant TA levels, in the range of 25–100 mg/dL, cause OG values within the
expected normal range (± 10 mOsm/L) and cannot reli-
ably predict TA levels. When OG is very elevated (>20), the OG method can be useful, and has a percent-
age error of 3–36%. Specific analysis of different alco-
holics (DEG, EG) only serum levels >150 mg/dL ele-
vated the OG above the normal range. The OG method
is as accurate for DEG as it is for the other toxic alcohols.

118. Formate Analyses: A Research Tool of Limited Interest, or a Diagnostic Tool in the
Clinical Setting?

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Introduction: Methanol remains one of the most toxic substances according to morbidity and mortality. Spe-
cific and efficient treatments exist, but poor outcome is
related to the often delayed diagnosis and treatment.
Diagnosis is often difficult in these patients who fre-
quently present comatose with a metabolic acidosis of
unknown origin. The clinical tool available is the me-
time analysis (S-methanol) is available only in specialized centers, it is time consuming and seldom available on a 24 hours
basis. Further, the mostly commonly used substitute
(S-methanol) is available only in specialized centers, it is
taken for other medical diagnoses, and the lack of anti-
dotal treatment may often lead to death. The poisonings
often presents as outbreaks (especially in the developing
world), or as single suicide attempts. Specific analysis
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often presents as outbreaks (especially in the developing
world), or as single suicide attempts. Specific analysis
(S-methanol) is available only in specialized centers, it is
time consuming and seldom available on a 24 hours
basis. Further, the mostly commonly used substitute
(S-methanol) is available only in specialized centers, it is
taken for other medical diagnoses, and the lack of anti-
these poisonings are limited. The diagnosis of methanol should hence be based upon more easily available methods that are cheaper and adaptable to analytical equipment already present. S-formate can easily be measured on most of the commonly available spectrophotometers using reagents commercially available. The method is fairly cheap, well tested and has a high specificity and sensitivity. The method itself is simple and was established many years ago,1 being based on an enzymatic reaction with the highly specific enzyme formate dehydrogenase (FDH). By catalyzing the reaction wherein formate is oxidised to CO₂ and water, NAD⁺ is reduced to NADH, a typical spectrophotometric method is used on most commonly available spectrophotometers. The method itself is simple and was established many years ago, being based on an enzymatic reaction with the highly specific enzyme formate dehydrogenase (FDH). By catalyzing the reaction wherein formate is oxidised to CO₂ and water, NAD⁺ is reduced to NADH, a typical spectrophotometric method is used on most commonly available spectrophotometers.

**Conclusion:** S-formate analysis is a highly specific and sensitive method that can be used on most commercially available spectrophotometers. It is cheap, fast and simple, and the greatest obstacle seems to be the lack of knowledge of the method in various centers. It can greatly simplify the diagnostics in the clinical setting, and is also applicable to developing countries. It can greatly simplify the diagnostics in the clinical setting, and is also applicable to developing countries.

**Discussion:** The formate tool is a well known analytical method in basic sciences, whereas its diagnostic use is limited to different research objectives. However, the method is easy to perform, only needs readily available ingredients, and can be used on analytical apparatus available most places. It is cheap and has a high sensitivity and specificity. Further, it is well known that the toxic effect of methanol is due to formate, hence no formate produced - no toxicity. The clinical symptoms appear at a 20-fold level of the upper endogenous formate concentration, which is determined until now in patients showed the clinical benefits of having such a tool available and at hand. By adapting this simple method in clinical practice, a diagnosis can be established within less than half an hour. The main obstacle seems to be the awareness of this simple method in the clinical setting. We have suggested making a kit containing all the necessary ingredients (containing the formate dehydrogenase enzyme, NAD⁺, a calibrator, two controls and a how-to-do list). This will simplify the spread of the method further. Conclusion: S-formate analysis is a highly specific and sensitive method that can be used on most commercially available spectrophotometers. It is cheap, fast and simple, and the greatest obstacle seems to be the lack of knowledge of the method in various centers. It can greatly simplify the diagnostics in the clinical setting, and is also applicable to developing countries.

**References:**


**Table 1.** Percentages of patients lost to follow-up together with main reasons

<table>
<thead>
<tr>
<th>Study</th>
<th>Data collection design</th>
<th>LFU</th>
<th>Main reasons for LFU</th>
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<tbody>
<tr>
<td>XTC</td>
<td>Physician and patient interviewed at a bed-side visit performed by family, caregivers, relatives.</td>
<td>18%</td>
<td>- physician refused to participate: 37%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- patient refused to participate: 18%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- patient left hospital before interview: 37%</td>
</tr>
<tr>
<td>Occupational poisoning</td>
<td>Patient interviewed at work by dedicated researchers.</td>
<td>20%</td>
<td>- LFU was totally due to refusal of patients or companies to participate</td>
</tr>
<tr>
<td>Lamp oil</td>
<td>Physician and patient or caregiver interviewed via a telephone call performed by dedicated researchers.</td>
<td>28%</td>
<td>- physician refused to participate: 14%</td>
</tr>
<tr>
<td>Xylometazoline</td>
<td>Physician interviewed via a telephone call performed by information specialist.</td>
<td>41%</td>
<td>- physician refused to participate: 10–20%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- interview impossible because of inadequate information to contact physician or track patient: 81%</td>
</tr>
<tr>
<td>ADHD medication</td>
<td>Physician interviewed via a telephone call performed by information specialist.</td>
<td>44%</td>
<td>- physician refused to participate: 10%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- interview impossible because of inadequate information to contact physician or track patient: 90%</td>
</tr>
<tr>
<td>Escitalopram</td>
<td>Physician interviewed via a telephone call performed by information specialist.</td>
<td>48%</td>
<td>- physician refused to participate: 12%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- interview not possible because of inadequate information to contact physician or track patient: 81%</td>
</tr>
</tbody>
</table>

120. Observational Studies are Hampered by ‘Lost to Follow-Up’. How to Perform Better?

Wijnands-Kleukers APG,1 de Vries L,2 Meulenbelt J,2 1National Poisons Information Centre, National Institute for Public Health and the Environment, Bilthoven, 2Intensive Care Centre, University Medical Centre, Utrecht, The Netherlands

**Objective:** Observational research is important in clinical toxicology, because there are many ethical and practical reasons why randomized clinical trials are difficult to perform. Our Poisons Information Centre (NPIC) uses observational methods to study dose response relationships, and, for instance, the impact of legislation. The number of patients lost to follow-up (LFU) is a major problem of these kind of studies. Therefore we performed an evaluation on the causes of LFU, with the ultimate goal to reduce the number of LFU. **Methods:** Six prospective case consecutive NPIC studies with different study designs for data collection were analyzed for LFU and compared. LFU is defined as patients that are eligible for the study but for whatever reason are not included, or patients lost to follow-up despite initial inclusion. **Results:** Table 1 presents the percentages of LFU together with the main reasons...
122. Safety Data Sheets Under the New REACH Regulation - More Useful for Poisons Information Centres?
De Groot R,1 Brekelmans PJAM,1 Meulenbelt J,1,2,3 1National Poisons Information Centre, National Institute for Public Health and the Environment, Bilthoven; 2Institute for Risk Assessment Sciences, Utrecht University; 3Division Intensive Care Centre, University Medical Centre, Utrecht, The Netherlands
Objective: The current Safety Data Sheet (SDS) does not provide a detailed product composition. The toxicological information in the current SDS is limited or entirely missing. In order to be able to adequately inform about symptoms and treatment of acute intoxications, Poisons Information Centres (PIC) need detailed product information. Will the new SDS be appropriate for PIC use? Discussion: SDS under REACH Regulation: Improvements in the SDS are expected from the REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) Regulation that incorporated new requirements in Annex II. For registration of substances, the REACH ANNEX specifically states that SDS section 11 is aligned with the Globally Harmonised System (GHS) in 2010 for substances and in 2015 for mixtures. The toxicological information will be further extended. An important shortcoming of the new SDS for PICs is that only dangerous substances above specified concentrations are classified for a particular hazard; more detailed hazard information in the new SDS is useful for PICs but a detailed product composition remains necessary. An important shortcoming of the new SDS for PIC use is that only dangerous substances above specified concentrations are classified for a particular hazard; more detailed hazard information in the new SDS is useful for PICs but a detailed product composition remains necessary. An important shortcoming of the new SDS for PIC use is that only dangerous substances above specified concentrations are classified for a particular hazard; more detailed hazard information in the new SDS is useful for PICs but a detailed product composition remains necessary. An important shortcoming of the new SDS for PIC use is that only dangerous substances above specified concentrations are classified for a particular hazard; more detailed hazard information in the new SDS is useful for PICs but a detailed product composition remains necessary. An important shortcoming of the new SDS for PIC use is that only dangerous substances above specified concentrations are classified for a particular hazard; more detailed hazard information in the new SDS is useful for PICs but a detailed product composition remains necessary. An important shortcoming of the new SDS for PIC use is that only dangerous substances above specified concentrations are classified for a particular hazard; more detailed hazard information in the new SDS is useful for PICs but a detailed product composition remains necessary. An important shortcoming of the new SDS for PIC use is that only dangerous substances above specified concentrations are classified for a particular hazard; more detailed hazard information in the new SDS is useful for PICs but a detailed product composition remains necessary.

123. Ingestion of Button Cell Batteries - Experiences of the Poison Information Centre Berlin. Proposal for a Therapy Guideline
Witchen F, Schommer HG, Acquarone Greiwe D, Binscheck T, De Groot R, Wittchen F 1German Institute of Toxicology, Clinical Toxicology and Poison Information Centre, Berlin, Germany
Objective: Ingestion of button cell batteries is a common cause for contacting us. Nevertheless there is no consistent therapeutic guideline. Therefore it seems to be necessary and important to evaluate our data from 2000–2008 to discuss and develop new strategies in diagnosis and therapy of button cell ingestion. Methods: We collected 1425 cases of button cell ingestions in the years 2000–2008. Mainly affected were children below the age of seven (91%) and 53% (=764) were between 1 and 3 years old. We analysed our data in regard to diagnostics, therapy and clinical outcome. Results: Seven individuals with age 1–12 years were operated (chemical burns, perforation, fistula) are rare and occur only if the button cell battery lodged in the oesophagus. There is no absorptive toxicity. In the monitored period we only had two described in literature, the majority of all ingested button cell batteries pass the GI-tract quickly and generally without complication. Conclusion: The great majority of all cases of button cell ingestion is harmless. Because of the rare but possibly severe complications we use the following approach: 1. All children with assumed ingestion must receive abdominal and thoracic x-ray. 2. If the battery is lodged in the oesophagus it should immediately be removed endoscopically; 3. In all other cases, passing through the gastrointestinal tract should be awaited controlling the stool. Only if symptoms occur or the transit time exceeds 7–10 days further diagnostic is required. References: 1. Litovitz T, Scheinberg BF. Ingestion of cylindrical and button batteries: an analysis of 2382 cases. Pediatrics 1992; 89:747–57.

Abstracts

121. Poisoning Risk Caused by Cleaning Products and Detergents
Dessel H, Wagner R, Göttingen, Göttingen, Germany
Objective: Cleaning product or detergent exposures are frequent causes of poison centres’ (PC) advice. Although product safety has increased tremendously during the last decades there is still concern about poisoning, especially in young children. This study is directed to quantify the poisoning risk for Germany. Methods: All exposures to cleaning products or detergents reported to the authors’ poison centres between 1999 and 2008 were selected from the PC case database. Cases were analysed for groups of agents involved and poisoning severity. An ‘IntoxIndex’ was calculated for all agent groups, by dividing the sum of all moderate, severe or lethal poisonings, by the number of all exposures. Results: Within the study decade 26,268 exposures to cleaning product or detergent were identified corresponding to 10.0% of all exposures.

Table 1. Agents involved and severity

<table>
<thead>
<tr>
<th>severity vs. product group</th>
<th>lethal</th>
<th>severe</th>
<th>mode-rate</th>
<th>minor</th>
<th>no</th>
<th>unknown</th>
<th>sum of expos.</th>
<th>IntoxIndex</th>
</tr>
</thead>
<tbody>
<tr>
<td>lavatory cleaners</td>
<td>3</td>
<td>13</td>
<td>88</td>
<td>860</td>
<td>212</td>
<td>401</td>
<td>3485</td>
<td>2.9%</td>
</tr>
<tr>
<td>drain cleaners</td>
<td>1</td>
<td>21</td>
<td>71</td>
<td>523</td>
<td>18</td>
<td>37</td>
<td>534</td>
<td>17.4%</td>
</tr>
<tr>
<td>oven cleaners</td>
<td>1</td>
<td>7</td>
<td>23</td>
<td>158</td>
<td>254</td>
<td>76</td>
<td>519</td>
<td>6.0%</td>
</tr>
<tr>
<td>all manual dish washing products</td>
<td>1</td>
<td>6</td>
<td>20</td>
<td>868</td>
<td>396</td>
<td>243</td>
<td>5107</td>
<td>0.5%</td>
</tr>
<tr>
<td>all purpose cleaners</td>
<td>1</td>
<td>5</td>
<td>30</td>
<td>604</td>
<td>163</td>
<td>212</td>
<td>2491</td>
<td>1.4%</td>
</tr>
<tr>
<td>automatic dish washing products</td>
<td>1</td>
<td>2</td>
<td>17</td>
<td>379</td>
<td>1675</td>
<td>144</td>
<td>2218</td>
<td>0.9%</td>
</tr>
<tr>
<td>industrial cleaners</td>
<td>–</td>
<td>8</td>
<td>32</td>
<td>118</td>
<td>49</td>
<td>103</td>
<td>310</td>
<td>12.9%</td>
</tr>
<tr>
<td>detergent reducers</td>
<td>–</td>
<td>4</td>
<td>9</td>
<td>320</td>
<td>1688</td>
<td>106</td>
<td>2127</td>
<td>0.6%</td>
</tr>
<tr>
<td>glass cleaners</td>
<td>–</td>
<td>4</td>
<td>25</td>
<td>215</td>
<td>695</td>
<td>81</td>
<td>1020</td>
<td>2.8%</td>
</tr>
<tr>
<td>metal cleaners</td>
<td>–</td>
<td>4</td>
<td>20</td>
<td>109</td>
<td>178</td>
<td>78</td>
<td>387</td>
<td>6.2%</td>
</tr>
<tr>
<td>shoe and leather cleaners</td>
<td>–</td>
<td>3</td>
<td>7</td>
<td>55</td>
<td>153</td>
<td>22</td>
<td>244</td>
<td>4.1%</td>
</tr>
<tr>
<td>front wall and stone cleaners</td>
<td>2</td>
<td>2</td>
<td>12</td>
<td>74</td>
<td>51</td>
<td>52</td>
<td>191</td>
<td>7.3%</td>
</tr>
<tr>
<td>laundry additives</td>
<td>–</td>
<td>2</td>
<td>8</td>
<td>199</td>
<td>616</td>
<td>78</td>
<td>903</td>
<td>1.1%</td>
</tr>
<tr>
<td>paint removers</td>
<td>–</td>
<td>2</td>
<td>8</td>
<td>199</td>
<td>616</td>
<td>78</td>
<td>903</td>
<td>1.1%</td>
</tr>
<tr>
<td>rinse aids for dishwashers</td>
<td>–</td>
<td>1</td>
<td>7</td>
<td>206</td>
<td>594</td>
<td>57</td>
<td>865</td>
<td>0.9%</td>
</tr>
<tr>
<td>furniture care products</td>
<td>–</td>
<td>1</td>
<td>5</td>
<td>73</td>
<td>132</td>
<td>39</td>
<td>250</td>
<td>2.4%</td>
</tr>
<tr>
<td>milking machine cleaners</td>
<td>–</td>
<td>1</td>
<td>18</td>
<td>41</td>
<td>16</td>
<td>33</td>
<td>108</td>
<td>16.7%</td>
</tr>
<tr>
<td>stool removers</td>
<td>–</td>
<td>2</td>
<td>8</td>
<td>199</td>
<td>616</td>
<td>78</td>
<td>903</td>
<td>1.1%</td>
</tr>
<tr>
<td>cleaners not specified</td>
<td>–</td>
<td>12</td>
<td>42</td>
<td>238</td>
<td>278</td>
<td>160</td>
<td>730</td>
<td>7.4%</td>
</tr>
<tr>
<td>other cleaners</td>
<td>–</td>
<td>12</td>
<td>256</td>
<td>697</td>
<td>117</td>
<td>1082</td>
<td>26268</td>
<td>2.1%</td>
</tr>
</tbody>
</table>

124. Mandatory Carbon Monoxide Detectors Do not Appear to Reduce the Incidence of Death from Carbon Monoxide Poisoning
Soghian S,1,2 Prosser JM,3 Mangini AF,4 Stajic M,5 Marker E,1 Prezant D,3 Nelson LS,1,2 Hoffman RS,1,2 1New York City Poison Center, New York; 2New York University School of Medicine, New York; 3Weill Cornell Medical Center, New York; 4Sinai School of Medicine, New York; 5New York City Office of the Chief Medical Examiner, New York; 6Fire Department of New York, New York, US
Objective: Carbon monoxide (CO) poisoning is a leading cause of unintentional poison deaths. In our region, CO detectors became mandatory 11/1/2004. The purpose of this study was to determine if this legislation changed the incidence of deaths reported to the Medical Examiner’s Office (MEO). Methods: The MEO’s toxicology database was searched for all cases with postmortem CO concentrations from 1/1/1996 - 12/31/2008. A CO related death was defined as a COHb > 30% without any other obvious cause of death. Cases were divided into pre and post regulatory periods. The number of deaths pre and post legislation were compared using a Wilcoxon rank sum test. In an attempt to control for historical variation in exposure risk, the annual incidence
of fires for the study period was obtained from the fire department. Results: Although there was a steady decline in CO related deaths during the entire period, the difference pre- and post-legislation was not statistically significant. There were 47 deaths in the pre-regulatory period and 33 deaths in the post-regulatory period (p = 0.46). There was no significant difference in mean number of deaths pre and post-months from 69 to 69 post-months 2 months compared 29 to 69 post-months (t-test p = 0.073). Structural fires decreased from 285,778 pre to 265,935 post regression period (p = 0.073). Conclusions: CO related deaths during the study period possibly because of the overall decrease in structural fires. Mandatory CO detectors did not appear to have affected this trend. Lack of effect on mortality rate may therefore be poor enforcement, inadequate maintenance of devices, intentional suicides, or deaths occurring in unmonitored areas such as empty warehouses, and reporting bias. A previous evaluation of poison center calls suggested that there was a decrease in reported major effects from CO following the legislation. This study is subject to all the limitations of a retrospective review of passively collected data. Notably the data may not reflect the true incidence of CO exposure, as all deaths may not have been reported to the ME. Future work is needed to elucidate the reasons for this trend.

125. Anaphylactoid Reactions to Acetylecysteine After Paracetamol Overdose

Waring WS, Acute Medical Unit, York Hospital, York, UK

Introduction: Acetylecysteine is widely used to minimize the risk of hepatotoxicity after acute paracetamol overdose. This paper reviews the occurrence of acetylecysteine adverse effects, risk factors and the likely underlying mechanism. Anaphylactoid reactions may occur in a high proportion of treated patients, which are variably reported to affect 5–15% of patients in retrospective studies, and 40–50% in prospective studies. Anaphylactoid reactions are characterized by erythema, urticaria, flushing, bronchospasm, wheeze, and hypotension. Around 15–30% of patients develop a diffuse erythematous or urticarial rash, which typically affects the upper trunk, neck and face. The clinical presentation is similar to true anaphylaxis but important differences exist; namely, prior exposure to acetylecysteine is not required, and treatment can normally be reintroduced without provoking a further reaction. Onset is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset. Is typically at 20–60 min after commencing intravenous acetylecysteine, and features subside quickly after onset.

126. Developing a New Administration Regimen for N-acetylcysteine in Paracetamol Overdose Using Pharmacokinetic Simulations

Ishberi G,1,2 Coulter C,3 Kleijnen F,3 Kwan WF,3 Lu B,3 Melmes S,3 Duffull SB.3 School of Pharmacy, University of Otago, Dunedin, New Zealand

Abstracts

Using Pharmacokinetic Simulations

Methods: Studies of the pharmacokinetics of paracetamol and NAC were identified from the literature and used to build deterministic models of the pharmacokinetics of paracetamol and NAC in Microsoft Excel and NONMEM VI. Paracetamol overdoses were simulated at different doses and compared to the paracetamol nomogram. The pharmacokinetics of NAC were simulated for a patient presenting 2 hours after overdose. A potential treatment regimen was then developed by matching the area under the curve for a constant infusion rate of NAC commenced on admission with the two scenarios using the current protocol - 1) commenced when paracetamol concentrations above the nomogram are available; 2) commenced 8 hours post overdose. Results: Comparing simulated paracetamol plasma concentrations time curves to the nomogram showed that the required dose for paracetamol to intersect the nomogram for 4 and 8 hours was 23.9 g and 29.2 g respectively. The immediate commencement of NAC on presentation at a constant infusion rate of 14 mg/kg/hr provided a similar AUC of NAC to the traditional NAC and NONMEM VI. Paracetamol concentrations were monitored in patients with minimal, moderate and severe reactions (see Table 1). Plasma histamine concentrations were significantly higher in patients with moderate and severe reactions than those in the minimal group, although tryptase was not increased in any group.

Table 1. Plasma acetylcysteine concentration determined at baseline and at 0.5, 2, 4 and 20 hours after commencing intravenous administration in patients with no minimal or no paracetamol reaction, moderate, or severe reactions. AUC20 is the area under the time-concentration curve up to 20 hours. Data presented as median (interquartile range)

<table>
<thead>
<tr>
<th>Minimal n = 10</th>
<th>Moderate n = 4</th>
<th>Severe n = 8</th>
<th>Total n = 22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>3 (2–4)</td>
<td>5 (5–5)</td>
<td>5 (3–5)</td>
</tr>
<tr>
<td>0.5 h</td>
<td>94 (78–104)</td>
<td>98 (63–124)</td>
<td>95 (78–115)</td>
</tr>
<tr>
<td>2 h</td>
<td>45 (37–61)</td>
<td>43 (36–51)</td>
<td>40 (34–48)</td>
</tr>
<tr>
<td>4 h</td>
<td>32 (14–41)</td>
<td>31 (26–37)</td>
<td>34 (26–37)</td>
</tr>
<tr>
<td>20 h</td>
<td>16 (15–19)</td>
<td>25 (16–25)</td>
<td>17 (16–21)</td>
</tr>
<tr>
<td>AUC20</td>
<td>58.6 (48.7–68.3)</td>
<td>60.4 (49.4–70.7)</td>
<td>52.0 (43.4–60.0)</td>
</tr>
</tbody>
</table>


127. The Use of N-acetylcysteine in Poisonings Other Than Paracetamol

Karlsson-Stiber C, Swedish Poisons Information Centre, Stockholm, Sweden

Objective: N-acetylcysteine (NAC) has a well established role as the drug of choice in the management of acetaminophen poisoning. Due to its wide range of apparently beneficial effects NAC has also been suggested for a number of other applications. To elucidate the usefulness of NAC in poisonings other than paracetamol poisoning, a survey has been undertaken. Methods: A questionnaire was sent out to all members of the EAPCCT and Medline was searched for relevant literature published 1990–2009. Results: Completed questionnaires were returned from 26 European poison centres, three North American centres, one Australian centre and the Israeli centre. According the survey NAC is currently considered to be useful, or worth trying, in the
Abstracts

128. The Evaluation of Standard Medical Termi-

nology Systems to Describe Symptoms of

Poisoning, An Output of the ASHTII Project


1International Research and Development, Centre for

Poisoning, an Output of the ASHTII Project

2Clinical Toxicology Systems to Describe Symptoms of

Poisoning

Introduction: An Alerting System for Chemical Threats (ASHTII) is currently under development to improve the speed and effectiveness of detection, evaluation and public health response to accidental and deliberate chemical release. This alerting system will deliver an approach allowing different levels of access by the creation of a European Union Poison Centre Forum (EUPC Forum) to enable poison centres to communicate with each other and a Rapid Alert System for Chemical Health Threats (RAS-CHEM) for national public health authorities and health ministries to communicate events that may have a potential public health impact (either nationally, cross-border or internationally). For both facets of the rapid alert system to operate successfully standardised terminology has been recommended for inclusion in both the EUPC Forum and RAS-CHEM, both to describe clinical effects and classify chemical agents. User protocols are also being developed. Conclusion: The range of mechanisms that already exist for reporting chemical health threats in ASHTII project partner EU Member States has been established, and RAS-CHEM is due to undergo extensive testing with ASHTII associates and collaborating partners and external stakeholders. RAS-

CHEM is viewed as a practical and valuable addition to the European Union and the Health Emergency Opera-

tion Facility (HEOF).

130. New Zealand and Australian Emergency

Department Sources of Poisons Information

Fountain J,1 Reith DM2

1National Poisons Centre, University of Otago, Dunedin;

2Dunedin School of Medicine, University of Otago, Dunedin, New Zealand

Objective: The New Zealand National Poisons Centre has developed a comprehensive poisons information data-

base - TOXINZ - utilised by the majority of New Zealand
Clinical Toxicology Downloaded from informahealthcare.com by University of Zuerich on 05/02/10

Table 1. New Zealand and Australian emergency department sources of poisons information

<table>
<thead>
<tr>
<th>Country</th>
<th>Public Telephone</th>
<th>Medical Personnel</th>
<th>Other</th>
<th>Medline</th>
<th>TOXINZ</th>
<th>INZ</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Zealand</td>
<td>29%</td>
<td>6%</td>
<td>45%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Australia</td>
<td>25%</td>
<td>14%</td>
<td>28%</td>
<td>4%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Objective: The Danish Poison Information Centre (DPIC) offers poisoning advice to health professionals and the general public by telephone. Calls are answered by nurse specialists with backup from physicians specialised in occupational and environmental medicine, clinical pharmacology and anaesthesiology. All calls are registered to evaluate the quality and structure of recording-based markers. Methods: The DPIC’s local quality board identified 16 “quality-markers” within the DPIC record using the concept of face-validity. These markers concerned the following areas 1. Identification of the exposure, the exposed person and the caller. 2. Record of toxicological symptoms and vital parameters. 3. Description of event, risk assessment and given advice. 4. Local guidelines for the management of the poisoning in question. Four monitors, two physicians and one pharmacist and one nurse, evaluated a total of 200 DPIC records, 100 drug-intoxications and 100 environmental exposures, randomly chosen from the DPIC database. Results: In thirty-nine cases (19.5%) the exposure (time, amount and/or type of poison) was unclear. In ninety-five (46%) cases toxicological symptoms were not recorded. In thirty-seven cases (23%) the exposure (time, amount and/or type of poison) was unclear. In ninety-five (46%) cases toxicological symptoms were not recorded. Treatment (procedure and dosages) were not recorded in ninety cases (45%). The given advice were ambiguous. In sixty-five cases (32%) no local guidelines existed. Conclusion: The presented audit procedure is a valuable tool to detect shortcomings in the documentation of inquiries to the DPIC. While some are difficult to influence, e.g. limited information of toxic exposure, others, e.g. ambiguous advice, must be areas for a targeted effort, to ensure the necessary quality of toxicological advice and use of data for toxicovigilance.

131. The Use of Record Based Markers to Evaluate the Quality of Documentation of Inquiries to the Danish Poison Information Centre. An Audit Procedure

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1Department of Clinical Pharmacology, Bispebjerg University Hospital, Copenhagen; 2Department of Occupational and Environmental Medicine, Bispebjerg University Hospital, Copenhagen; 3Department of Anaesthesiology, Bispebjerg University Hospital, Copenhagen; 4Danish Poison Information Centre, Bispebjerg University Hospital, Copenhagen, Denmark

Objective: The Danish Poison Information Centre (DPIC) offers poisoning advice to health professionals and the general public by telephone. Calls are answered by nurse specialists with backup from physicians specialised in occupational and environmental medicine, clinical pharmacology and anaesthesiology. All calls are registered to evaluate the quality and structure of recording-based markers. The purpose of the present audit is to evaluate the quality of recording-based markers. Methods: The DPIC’s local quality board identified 16 “quality-markers” within the DPIC record using the concept of face-validity. These markers concerned the following areas 1. Identification of the exposure, the exposed person and the caller. 2. Record of toxicological symptoms and vital parameters. 3. Description of event, risk assessment and given advice. 4. Local guidelines for the management of the poisoning in question. Four monitors, two physicians and one pharmacist and one nurse, evaluated a total of 200 DPIC records, 100 drug-intoxications and 100 environmental exposures, randomly chosen from the DPIC database. Results: In thirty-nine cases (19.5%) the exposure (time, amount and/or type of poison) was unclear. In ninety-five (46%) cases toxicological symptoms were not recorded. In thirty-seven cases (23%) the exposure (time, amount and/or type of poison) was unclear. In ninety-five (46%) cases toxicological symptoms were not recorded. Treatment (procedure and dosages) were not recorded in ninety cases (45%). The given advice were ambiguous. In sixty-five cases (32%) no local guidelines existed. Conclusion: The presented audit procedure is a valuable tool to detect shortcomings in the documentation of inquiries to the DPIC. While some are difficult to influence, e.g. limited information of toxic exposure, others, e.g. ambiguous advice, must be areas for a targeted effort, to ensure the necessary quality of toxicological advice and use of data for toxicovigilance.

132. A Research Program at a Small- to Mid-Sized U.S. Poison Center

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Background: Poison centers perform many functions, among them management of acute poisonings; public and professional education; regional and national toxico-surveillance; and research. The organizational structure and economics of small- to medium-sized poison centers, however, pose challenges to the development of a research program. The New Mexico Poison and Drug Information Center (NMPDIC) is a small- to mid-sized U.S. center, serving a population of 2.5 million and receiving about 45,000 calls per year. Over the past decade, it has had between 1 and 2 medical toxicology full-time equivalents (FTEs), and 1 Diplomate of the American Board of Applied Toxicology (DABAT)-certified managing director, a two-year pharmacy toxicology fellowship (one fellow per year), 10 poison specialist FTEs, and one administrative assistant. The poison specialist job description does not include a research role. Objectives: The purpose of this presentation is to characterize the research program developed at the NMPDIC and the method of overcoming these obstacles.

Research Program: The NMPDIC has developed a research program which consists of funded research, no-direct-cost NPDS database analyses, participation in national research projects, collaboration with researchers in other university departments, and volunteer efforts of poison specialist staff. Research output: Between 2000 and 2009, the NMPDIC has published 49 peer-reviewed, scientific manuscripts, including 22 retrospective case series (16 involving analysis of multi-center or national databases and 6 involving single-institution databases). The NMPDIC has submitted 12 peer-reviewed manuscripts. In addition, there were 45 published scientific abstracts, most presented at national or international scientific meetings. Discussion: Despite limited personnel, protected research time, and financial and other resources, the NMPDIC has been able to create a multifaceted research program which has brought in external research funds and generated academic output including participation in randomized, prospective clinical and chemical research, epidemiologic studies, and retrospective case series and reports. Conclusion: A vigorous, multi-faceted research program can be developed despite limitations of staff, time, and resources.

133. Mercury Enquiries to a National Poisons Information Centre - Poisoning or Exposure?

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Objective: Public awareness of the potential of mercury to cause health problems and its amount of necessary exposure has increased in recent years. As a result of this publicity, members of the public may ascribe unusual neurological symptoms and signs to mercury ‘poisoning’. This study was performed to audit exposures to mercury and resulting toxicity. Methods: All telephone enquiries, over a 57 month period, to the National Poisons Information Centre (NPIC) were retrospectively reviewed. Only calls between 8 am and 10 pm were included in the study. Results: 258 enquiries regarding mercury in all its forms were recorded by the NPIC over the study period. 132 (51.5%) were calls from patients. 115 (44.6%) were from general practitioners and primary care out-of-hours services and 54 (21.0%) were from hospitals. In cases where human exposure occurred (n = 191), 104 (54%) patients were children (≤16 years) and 87 (46%) were adults. Enquiries regarding metallic mercury in mercury thermometers accounted for the majority of calls (n = 185). These included enquiries after accidental mercury ingestion from thermometers (n = 116), information on clean-up procedure after mercury thermometer breakage (n = 59), skin contact after mercury thermometer breakage (n = 6) and inhalation of mercury after mercury thermometer breakage (n = 6). In patients who were exposed after ingestion of mercury from thermometers, 112 reported no symptoms and 4 had reported vomiting. Information on clean-up procedure after mercury thermometer breakage accounted for 12 enquiries. Enquiries about potential toxicity from dental amalgams accounted for 21 calls and exposure to mercury after breakage of Compact Fluorescent Lamps (CFL) bulbs accounted for 6 calls. NPIC received 2 calls about patients with mercury toxicity. One patient was already receiving chelation therapy, and the other was a patient looking for chelation therapy after being diagnosed with mercury toxicity in a private clinic. Conclusions: The majority of enquiries received by the NPIC during the study period were about accidental ingestions of metallic mercury from thermometers in children. This usually occurred when the child bit on the thermometer. Significant exposure to mercury was infrequently encountered.

134. Status and Trend in the Total Top-10 of Inquiries to the Danish Poison Information Center

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Objective: Status and trend in the Top-10 of inquiries to the Danish Poison Information Center (DPIC), a public- and health personnel 24th telephone service. We
investigated if a year-based DPIC Top-10 can provide reliable specific information on poisoning trends, and new and upcoming poisonings in Denmark. Methods: All inquiries to DPIC from health personnel and citizens in Denmark were sorted by whole years (2007 and 2008) and the first nine months in 2009. Only inquiries with a prevalence of at least 5%year were included. The inquiries were divided into 18 main groups, each with 10-20 subgroups. Results: Top-10 of the 18 main groups are presented as per cent of the included number of inquiries. Year 2007: Household products (16%); Chemicals, other (10%); Plants (10%); Pharmaceuticals, other (8%); Anxiolytics (8%); Antidepressants (6%); Drugs of abuse (6%); Antipsychotics (5%); Alcohol (4%); Year 2008: Household products (18%); Plants (10%); Pharmaceuticals, other (7%); Chemicals, other (7%); Antipsychotics (7%); Drugs of abuse (6%); Antidepressants (6%); Anxiolytics (5%); Vitamins (4%). First nine month of 2009: Household products (18%); Plants (15%); Chemicals, other (10%); Weak analgésics (10%); Pharmaceuticals, other (6%); Anxiolytics (5%); Vitamins (5%); Antipsychotics (5%); Antidepressants (5%); Drugs of abuse (4%). In general, drug poisonings account for approximately 40% of the included inquiries and the weak analgésics (paracetamol, NSAID, salicylic acid, etc.) are eight times more frequent than other poisonings. Furthermore, vitamin-containing products entered the Top-10 in 2008, and increases. Conclusion: A specific detailed list, and an organised database and data material, might change patients' patterns. The rise of inquiries concerning vitamin-product occurrences in 2008 and continues rising in 2009. This might be correlated to new palatable, eye-catching, easy access products. The results emphasize the importance of a fine-meshed grid and correct registration in a national poison information center if increase in new specific poisonings is to be noticed. Consequently, this new information to the national public administration and healthcare system can be provided in time to: 1) provide early detection of poisoning trend changes, 2) prevent further escalation in number of a potentially dangerous specific xenobiotic poisoning.

135. Health Care Disparities in Delivering Poison Center Services to Spanish Speakers in Texas

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Objective: Spanish speakers make up the second largest language population group in the United States of America and this ethnically diverse group reside in the states of California and Texas. Use of poison center call services by the Spanish speaking population of Texas is significantly low, but this health care disparity has not been well characterized. To better describe this undertilization, we studied the correlation between calls received from Spanish-speaking callers by the six poison centers (PIC) that comprise the Texas Poison Center Network (TPCN) and the total volume of calls received. Data will be used to help regional poison centers better serve constituent callers whose primary language is Spanish. Methods: Call center data was evaluated from 2001 through 2008 to determine the number of calls received from Spanish speakers by each of Texas’ regional poison centers. All Spanish language calls were examined to determine the degree of correspondence, if any, between the region from where calls originated versus the region at which the calls were handled. Results: Over the eight-year study period, Texas regional poison centers received 2,607,151 calls. Of these, only 29,151 (1.12%) were handled in Spanish, originating from the following centers: Texas Panhandle (671), Central Texas (1,951), North Texas (5,226), West Texas (6,951), and Texas Panhandle (6,951). Of all Spanish-language calls, the South Texas and West Texas Poison Center handled 83.34%. This was shown partly to be due to a larger proportion of these persons living in the regions served by these two centers, as well as calls purposefully transferred to them because they are staffed by bilingual (Spanish/English) call-takers. Conclusion: This evaluation of calls received by Texas poison center demonstrates a major language-based disparity in call center utilization, showing only 1% of calls generated from the Spanish-speaking population. This evaluation fosters the foundation for greater efforts to be used towards educating this community on the services provided by poison centers. To more effectively provide regionalized care to this population, call volume must be reflected in adequate bilingual call-taker staffing in regions with significant populations of Spanish speakers.

136. Anticipating the Forthcoming European Harmonisation: A New Product Notification Procedure

Procedure was Introduced; Lessons Learned

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Objective: To describe a new notification procedure in the Netherlands. Methods: Although obligatory, the notification of dangerous products to the Dutch Poisons Information Centre (PIC) has never been satisfactory. Industry complained both about the required quality of the information and about the required format. In revitalising the product notification process, the Dutch PIC and the REACH Committee realised the importance of a fine-meshed grid and correct registration in a national poison information center if increase in new specific poisonings is to be noticed. Consequently, this new information to the national public administration and healthcare system can be provided in time to: 1) provide early detection of poisoning trend changes, 2) prevent further escalation in number of a potentially dangerous specific xenobiotic poisoning.

137. Study of the Reliability of a Poisoning Severity Score “PSS”: Mexican Poison Control Centre Experience

Achour S,1,2 Rhalem N,1,2,3 Semlali I,1,2,3 Khattabi A,1,2,3 Soulaimanya A1,2 Soulaimanya Bencherchi R1,2

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Objective: To assess the reliability of the poisoning severity score (PSS) through a prospective study in two Toxicology units (toxicological information unit and toxicociguillant unit) of the Moroccan Poison Control Centre (MPCC). Methods: Study of the reliability of PSS involved 200 observations (100 files received from the toxicological information unit and 100 files from the toxicociguillant unit). We included all observations containing information essential for the gradation of PSS, notably the symptomatology and the final outcome of the patient. This study was conducted by 3 operators who are physicians with experience ranging from 2 to 4 years. Each operator was assigned a specific detailed list, and an organised database and data material, might change patients’ patterns. The rise of inquiries concerning vitamin-product occurrences in 2008 and continues rising in 2009. This might be correlated to new palatable, eye-catching, easy access products. The results emphasize the importance of a fine-meshed grid and correct registration in a national poison information center if increase in new specific poisonings is to be noticed. Consequently, this new information to the national public administration and healthcare system can be provided in time to: 1) provide early detection of poisoning trend changes, 2) prevent further escalation in number of a potentially dangerous specific xenobiotic poisoning.

Tweed J,1 Weatherall I2

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Objective: To present a model for organising and rationalising hospital antidote stockholding within regional districts. Methods: Following published guidelines by the British Association of Emergency Medicine on Antidote Availability in Accident and Emergency Departments in June 2006,2 NPIS (Newcastle) undertook a survey of hospital antidote holdings within the north of England. In response to this survey and updated guidelines by the College of Emergency Medicine (CEM) in May 2008,2 the Medicines Information (MI) Service at Leeds Teaching Hospitals NHS Trust surveyed Yorkshire hospitals via the UKMI network of pharmacists. MI Service was contacted for advice regarding the CEM guidelines and recommendations for stock holdings, particularly in relation to rarely used and/or expensive antidotes. A proposal was prepared for consultants by the Yorkshire Chief Pharmacists Group, which suggested specific placement of antidotes around the region enabling access within an acceptable time period and also facilitating shared antidote stockholding. Results: NPIS (Newcastle) received 22 responses from 62 hospitals surveyed (35%). From the Yorkshire region 7 responses from 14 hospitals were received (50%). Following the survey, responses were received from 14 of 16 Yorkshire hospitals (87.5%). Discussions between NPIS (Newcastle) and the MI Service related to the following antidotes: phenolamine, cyanide antidotes, fomepizole,
pralidoxime, viper and other antivenoms, Prussian Blue, DMPS and DMSA. Specific issues considered were transport times from stock holder to patient, quantities to stock and the regional supply sources. The proposal prepared for the Chief Pharmacists Group has been well received and broadly supported, with the suggestion to develop a standard operating procedure to be followed by all Yorkshire hospitals when obtaining an antidote through another hospital within the region. 

Conclusions: Cooperation between hospitals within regional districts and advice from a poisons service can assist rationalisation of antidote stockholding. 


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Objective: To investigate training needs in chemical emerg-encies of Italian emergency medical and nursing staff. Methods: A questionnaire was distributed in 2007–2009 to health emergency personnel employed during 24 toxicology courses all over Italy. The questionnaire, given before the course began, was composed of ten questions aimed to investigate (i) knowledge about diagnosis and antidotal treatment of selected toxidromes; (ii) ability to deal with chemical emergencies, (iii) availability of NBC individual protection devices (DPI) and devices for decontamination, and the ability to use them. Results: Among 504 returned ques-tionnaires, 4 were excluded for incompleteness of data and were included for the evaluation: 356 (72.2%) were filled in by physicians and 144 (28.8%) by nurses. Physicians and nurses enrolled in the survey were working in out-of-hospital Emergency Medical Services (89/500, 17.8%), in hospital Emergency Departments (315/500, 63%), in Intensive Care Units (60/500, 12%) and in other hospital departments (i.e. general medicine, sur-gery) (36/500, 7.2%). 114/144 (80%) of the nurses indicated items regarding antidotes/toxidromes and DPI are reported. The clinical use for amyl nitrite was unknown by 61.2% (306/500) of all the interviewees, by 55.9% of the physicians (177/315) and by 74.3% of the nurses (42/57). 114/144 (80%) of those interviewed gave an incorrect answer about blood-gas-analysis alterations in cyanide poisoning. 85.6% (428/500) of those interviewed had never worn individual protection devices. Conclusions: The data collected reveal a lack of preparedness for major chemical emergencies: this may be related to the rarity of NBC major events and to the rapid turn-over of medical and nursing staff in Italian emergency services. Poison centers may play a key role in continuous and specific training in this area. Acknowledgements: Study carried out with the support of Italian Civil Protection Department.

140. Surrogate Markers for Swine Flu using TOXBASE® - Antivirals, Cough and Cold Preparations

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Objective: To investigate surrogate markers for H1N1 (swine flu). Methods: Enquiries to Poisons Centres in the US have been used to track spread of infectious disease (NPSD report 2008 in press). TOXBASE® is the Internet poisons database used by health professionals in the UK for managing poisoned patients. An increase in enquiries may indicate a corresponding increase in TOXBASE® enquires concerning pharmaceutical products containing "cold" , "flu" , "cough" or "throat" in the product name, paracetamol and ibuprofen. Weekly figures for antiviral preparations were compared with estimated GP consultations/100,000 population for flu and England and Wales for the period 1/2009 to 31/10/2009 were reviewed. Results: Oseltamivir had an average of 1.7 accesses/month and zanamivir P.7/month for the period 1/2006-2009 and thereafter registered 1007 and 7 accesses respectively in the following six months, with peaks of 460 and 36 in July 2009. Cough and cold preparations accessed: mean 727, range 276–1908) showed seasonal variation with peaks (>1000 accesses) in Jan and Mar 2006, Feb and Dec 2007 and Dec 2008, but no peak in July 2009. Ibuprofen showed 75.5% (379/500) of those interviewed had never worn antiviral preparations (mean 727, range 276–1908) showed seasonal variation with peaks (>1000 accesses) in Jan and Mar 2006, Feb and Dec 2007 and Dec 2008, but no peak in July 2009. Ibuprofen showed 7.2% (30/500) of those interviewed had never worn antiviral preparations. 75.8% (379/500) of nurses (114/144) and 58.6% (293/500) of the interviewees [50.28% of physicians (199/356), and 74.3% of nurses (107/144). The French Toxic Exposure Surveillance System: Adaptation to a Business Intelligence System for Toxicovigilance

Guyodo G, Bleine L, Boullent J, Lefebvre B, De Bels F, Garnier R

Poison Control Centre, Paris; 2Poison Control Centre, Marseille; 3IT Service, Lariboisière - Fernand Widal Hospital, Paris; 4Ministry of Health, Paris; 5French Institute for Public Health Surveillance (InVS); 6Saint-Maurice, France

Objective: The French Toxic Exposure Surveillance System (F-TESS) has 2 goals: 1) to help physicians in their daily work; 2) to contribute to toxicovigilance. In contrast cough and cold preparations, paracetamol and ibuprofen containing products did not provide surrogate markers in the UK. References: 1.http://www.hpa.org.uk/HPA/Topics/InfectiousDiseases/InfectionsAz/1242949541993/ accessed 10 Nov 2009.

141. The French Toxic Exposure Surveillance System: Adaptation to a Business Intelligence System for Toxicovigilance

Guyodo G, Bleine L, Boullent J, Lefebvre B, De Bels F, Garnier R

Poison Control Centre, Paris; 2Poison Control Centre, Marseille; 3IT Service, Lariboisière - Fernand Widal Hospital, Paris; 4Ministry of Health, Paris; 5French Institute for Public Health Surveillance (InVS); 6Saint-Maurice, France

Objective: The French Toxic Exposure Surveillance System (F-TESS) has 2 goals: 1) to help physicians in their daily work; 2) to contribute to toxicovigilance. In contrast cough and cold preparations, paracetamol and ibuprofen containing products did not provide surrogate markers in the UK. References: 1.http://www.hpa.org.uk/HPA/Topics/InfectiousDiseases/InfectionsAz/1242949541993/ accessed 10 Nov 2009.

142. How Long Does it Take to Document a Call to a Poison Center? 

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Objective: Electronic written documentation of calls is the standard in all U.S. poison information centers. A retrospective observational study was conducted at an APCC certified regional poison information center to determine the amount of time required to conduct the initial documentation of both exposure and information calls and whether the length of time to perform the documen- tation of exposure calls was influenced by either the ultimate outcome (severity) of the patient or the reason for the exposure. Methods: Daily records of all incoming calls to the Idaho and Nevada Enterprise (WBM Software, Fresno, CA; release 4.3.7, 2009) was utilized by the poison information center to document all exposure calls. The software has an integrated component that tracks all entries. Data from records that were collected from January-September, 2009 that contained no specific patient identifying information (mean and median length of time [minutes] to complete the initial documentation of exposure calls and information calls) were evaluated. Results: Descriptive statistics were utilized to characterize the data. Results: During the study period, 47,041 exposure (32,665) and information (14,376) calls were documented electronically. Exposure calls required more time (mean 4.14 minutes; median 2.10 minutes) than information calls (mean 1.55 minutes; median 0.30 minutes) to complete the initial documentation. The mean time to document all calls initially was 3.40 minutes (median 1.50 minutes). Definitive outcome infor-mation was documented on 7,777 of the records. The means/medians (minutes) were: no effect 4.96/2.80; minor effect 5.81/3.40; major effect 6.60/4.50; major effect 7.68/4.50; fatality 6.80/9.5. Nineteen rea-sons categories were documented among the exposure calls. Examples of those results included: unintentional/general-mean 3.29 minutes (median 1.6 minutes); inten-tional/suicide attempt 5.92 minutes (median 3.95 minutes); adverse effect/death 9.10 minutes (median 4.80). Conclusion: Specialists in poison information are efficient in the initial documentation of calls to a poison center. The length of time to complete the elec-tronic documentation was in direct relationship (longer time associated with greater severity) to the severity of the ultimate outcome. Unintentional (accidental) expo-sures required less time to document the initial note than exposures that were intentional and for adverse drug reaction calls.

143. Identification and Characterization of Surges in Poison Center Call Volume

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Objective: High volume surges in health care demand are rare, unpredictable events, making their impact on health system performance and surge capacity difficult to study. We aimed to explore methods of identifying time periods with surge-like conditions at a US poison center and to determine whether cases during these periods are different from non-surge periods. Methods: Incoming

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call data from a US prison center over twelve consecutive months was collected via a call logger and an electronic case database (Toxicall). Variables indicative of surger-like conditions included in-call duration, number of cases and number of calls per staff member per 30-minute period. Using maximum likelihood estimation, six probability distributions (Exponential, Gamma, Weibull, Chi squared) were evaluated for each variable to determine best fit for identifying unusually high levels of staff call activity. Surge-like periods were defined as higher than 99% of all other 30-minute periods and non-surges as lower than 70% of all other 30-minute periods. Case characteristics and distribution of surger-like and non-surge calls were compared using logistic regression and odds ratios. Results: A total of 65,564 incoming calls occurred over 11,760 hours; on Mondays, Wednesdays and Saturdays, and during the winter months. Conclusion: A method for identifying periods of surger-like activity for poison center incoming calls was demonstrated. This allowed distinction to non-surger-like periods for call characteristics. Staffing patterns, communication, and program capacity can be evaluated using this process in planning for larger call volume surges during disasters.

144. Unexplained Lactic Acidosis and Toxicological Investigations in 11 Poisoned Patients
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Objective: Physicians may call the Poison Centre for advice in the diagnosis and management of critically ill patients with unexplained lactic acidosis. In a short time frame, we were consulted for two such patients, described here. Case 1: A 75-year-old woman was admitted to the medical ICU for abdominal pain and hyperventilation. ECG and routine laboratory tests were within normal limits. Arterial blood gases revealed pH 7.4, PCO2 30 mmHg, PO2 101 mmHg and lactate 4.2 mmol/L. Lactate levels were increased (11 mmol/L, normal range 0.5–1.6 mmol/L). Elevated anion gap of 4.2 mmol/L, ketonuria 2+ to pH 7.4, pCO2 27.4 mmHg, pO2 101.4 mmHg and HCO3 was assessed by a CM (B.H.) into classes: highly toxic (HT), low toxic (LT), edible, but known for adverse reactions in individual cases (EAI), not able to be assessed, and MUT. Two hundred and forty-six cases met the inclusion criteria, 80 cases had mushrooms identified, in 74 a CM was consulted. 15 cases had eaten 8 HT species, 18 cases LT species, 14 cases EAI species, 18 cases had eaten 11 MUT species. From these, 6 cases reported minor symptoms after ingestion of 4 species. Results: In this survey we registered 18 cases in 15 mushroom species with clinical symptoms. Consultations assessing the effects after ingestion of mushrooms with unknown toxicity counselling by certified mycologists can be expected. A cooperative data collection, by multiple PCCs in a shared database will be valuable.

146. Geographic Information System Mapping of Poisoning Cases in North Palestine
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Poison Control Center, Nablis, Palestine

Objective: To utilize the Geographic Information System (GIS) technology to study the different types of poisoning among citizen in Nablus governorate, north Palestine. Methods: All the acute poisonings reported between January 1st - December 31st 2008, were studied taking into consideration: age, gender, residence, etiology, modalities of producing, consciousness status, gastric lavage, antidotes administration, causes of death, and differences regarding the structure of poisoning between the two centres: in Nablus more cases with carbon monoxide (CO) (from individual heating stations) while in Tulkarm more methemoglobinemia is more frequent (nitrates from well water). Gastric lavage was performed more frequently in Tulkarm than in Nablus. More unknown substances were reported in Tulkarm (difficulties in performing toxicology analyses). Conclusion: Even if the structure of acute poisoning is quite similar between the two centres there are many differences due to social and economic conditions in the two regions and administration: the EAPCCT protocol is not applied in Tulkarm. Further investigations should address the clinical course after poisoning.

147. Epidemiology in Acute Poisoning in Children - One Year Comparative Study in Two Pediatric Poisoning Centres
Nitescu VG,1 Iordache C,2 Jitararu C,2 Rosu S,2 Burlea M,2 Babaca D,3 Olteanu I,2 Vasile O2,3 Popescu M,2 Stema C,2 Vivisienco I,1 Ulmecei CE
1Pediatric Poisoning Centre, Emergency Clinical Hospital for Children “Grigore Alexandrescu”, Bucharest;
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3Pediatric Poisoning Centre, Emergency Clinical Hospital for Children “Sfanta Maria”, Iasi;
4Emergency Department, Emergency Clinical Hospital for Children “Sfanta Maria”, Iasi, Romania

Objective: To compare the structure, management and evolution of poisonings in two pediatric poison centres. Methods: We have performed a one year retrospective study in two centres in Bucharest, Romania: Pediatric Poisoning Centre “Grigore Alexandrescu” Hospital Bucharest and Pediatric Poisoning Centre “Sfanta Maria” Hospital Iasi. Results: See Table 1. All the acute poisonings reported between January 1st - December 31st 2008, were studied taking into consideration: age, gender, residence, etiology, modalities of producing, consciousness status, gastric lavage, antidotes administration, causes of death, and differences regarding the structure of poisoning between the two centres: in Bucharest more cases with carbon monoxide (CO) (from individual heating stations) while in Iasi acute methemoglobinemia is more frequent (nitrates from well water). Gastric lavage was performed more frequently in Iasi compared to Bucharest (In Bucharest the EAPCCT protocol for gastro-intestinal decontamination is more strictly applied). A higher percentage of poisonings benefited from antidotes in Bucharest (problems with antidote supplies in Iasi). More unknown substances were reported in Iasi (difficulties in performing toxicology analyses). Conclusion: Even if the structure of acute poisoning is quite similar between the two centres there are many differences due to social and economic conditions in the two regions and administration: the EAPCCT protocol is not applied in Iasi. Further investigations should address the clinical course after poisoning.

Green JL,2 Dart RC.1
1Denver Health Rocky Mountain Poison & Drug Center, University of Colorado, Denver; 2Vanderbilt University Medical Center, Nashville, Tennessee, US

Objective: A US Food and Drug Administration Advisory Committee recently recommended decoupling the paracetamol-opioid ingredients in prescription products. The National Poison Data System (NPDS) was used to compare medical outcome of paracetamol single ingredient exposures to those associated with paracetamol-opioid combination products (hydrocodone, oxycodone, tramadol, propoxyphene or codeine combined with paracetamol). Methods: NPDS was used (2000–2007) for human exposures to at least one single-ingredient paracetamol product or at least one paracetamol-opioid combination product. Results: A total of 468,903 paracetamol exposures were identified: 1,006 (0.2%) reported an outcome of death. Only 11% of deaths were associated with single-ingredient products
and outcome were analysed. The evaluation of severity included delay after intoxication, symptomatology, severity (MPCC).

Objective: Retrospective review of paracetamol poisoning cases seen at the Poisoning Centre from Eastern Europe.

Methods: Data was examined for 115 patients admitted to a Pediatric Poisoning Centre in Bucharest between January 1997 and December 2008. Poisons were identified by poisoning history, examination, reactivity and liver function tests. The severity score was calculated using the Modified Parisian Severity Score. The primary outcome measure was mortality.

Results: Among 15,722 drug poisonings, 22 cases of paracetamol poisoning were identified (0.14%). The mean age was 16.5 years (range: 0.5–85 years). The route of exposure was oral in 15 cases, intravenous in 4 cases, and both in 2 cases. The most common cause of death was liver failure (4 cases). Overall, mortality was 9.09% (2 cases).

Conclusion: Paracetamol poisoning is a rare cause of death in pediatric practice. Early recognition and treatment with N-acetylcysteine are crucial for survival.

151. Integrated Care Pathway for the Management of the Paracetamol Poisoned Patient

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Objective: To develop an integrated care pathway for the management of paracetamol poisoned patients.

Methods: A retrospective review of 115 patients who were admitted to the pediatric poisoning centre between January 1997 and December 2008 was conducted. The severity score was calculated using the Modified Parisian Severity Score. The primary outcome measure was mortality.

Results: Among 15,722 drug poisonings, 22 cases of paracetamol poisoning were identified (0.14%). The mean age was 16.5 years (range: 0.5–85 years). The route of exposure was oral in 15 cases, intravenous in 4 cases, and both in 2 cases. The most common cause of death was liver failure (4 cases). Overall, mortality was 9.09% (2 cases).

Conclusion: Paracetamol poisoning is a rare cause of death in pediatric practice. Early recognition and treatment with N-acetylcysteine are crucial for survival.

Table 1.

<table>
<thead>
<tr>
<th>CENTRE</th>
<th>BUCHAREST</th>
<th>IASI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of poisonings</td>
<td>957</td>
<td>1185</td>
</tr>
<tr>
<td>AGE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–1 year</td>
<td>70 (7.31%)</td>
<td>117 (9.87%)</td>
</tr>
<tr>
<td>1–5 years</td>
<td>356 (33.97%)</td>
<td>381 (32.15%)</td>
</tr>
<tr>
<td>6–10 years</td>
<td>108 (11.26%)</td>
<td>129 (10.88%)</td>
</tr>
<tr>
<td>11–15 years</td>
<td>250 (26.12%)</td>
<td>309 (26.07%)</td>
</tr>
<tr>
<td>16–18 years</td>
<td>173 (18.03%)</td>
<td>249 (21.01%)</td>
</tr>
<tr>
<td>GENDER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>433 (45.24%)</td>
<td>580 (48.94%)</td>
</tr>
<tr>
<td>Female</td>
<td>524 (54.75%)</td>
<td>605 (51.05%)</td>
</tr>
<tr>
<td>RESIDENCE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>580 (60.06%)</td>
<td>503 (42.44%)</td>
</tr>
<tr>
<td>Rural</td>
<td>377 (37.09%)</td>
<td>682 (57.55%)</td>
</tr>
<tr>
<td>GASTRIC LAVAGE</td>
<td>121 (12.64%)</td>
<td>250 (21.09%)</td>
</tr>
<tr>
<td>ANTIDOTES</td>
<td>167 (17.45%)</td>
<td>121 (10.12%)</td>
</tr>
<tr>
<td>SUBSTANCES</td>
<td>525 (54.85%)</td>
<td>681 (57.46%)</td>
</tr>
<tr>
<td>Ethanol</td>
<td>131 (13.68%)</td>
<td>273 (23.03%)</td>
</tr>
<tr>
<td>Caustics</td>
<td>55 (5.74%)</td>
<td>86 (7.25%)</td>
</tr>
<tr>
<td>Hydrocarbons</td>
<td>22 (2.29%)</td>
<td>75 (6.32%)</td>
</tr>
<tr>
<td>Mushrooms</td>
<td>15 (1.56%)</td>
<td>23 (1.94%)</td>
</tr>
<tr>
<td>Pestsicides</td>
<td>40 (4.17%)</td>
<td>27 (2.27%)</td>
</tr>
<tr>
<td>Rodenticides</td>
<td>10 (1.04%)</td>
<td>11 (0.92%)</td>
</tr>
<tr>
<td>Toxic methemoglobinemia</td>
<td>15 (1.56%)</td>
<td>44 (3.71%)</td>
</tr>
<tr>
<td>Carbon monoxide</td>
<td>87 (9.09%)</td>
<td>24 (2.02%)</td>
</tr>
<tr>
<td>Other</td>
<td>143 (14.94%)</td>
<td>41 (3.45%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>7 (0.73%)</td>
<td>77 (6.49%)</td>
</tr>
<tr>
<td>MEDICINES</td>
<td>386 (40.33%)</td>
<td>448 (38.70%)</td>
</tr>
<tr>
<td>Non-toxic</td>
<td>10 (1.04%)</td>
<td>22 (1.85%)</td>
</tr>
<tr>
<td>Bites and stings</td>
<td>36 (3.76%)</td>
<td>34 (2.86%)</td>
</tr>
<tr>
<td>COMA</td>
<td>146 (15.25%)</td>
<td>152 (12.82%)</td>
</tr>
<tr>
<td>DEATHS</td>
<td>2 (0.24%)-Diazinon 2 (0.17% )-methemoglobinemia -nitrites</td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Number (and percentage) of deaths by exposure duration and paracetamol product type

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Acute Exposure</th>
<th>Acute-on-Chronic</th>
<th>Chronic</th>
<th>Unknown</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paracetamol single agent</td>
<td>62 (6)</td>
<td>18 (2)</td>
<td>15 (1)</td>
<td>16 (2)</td>
<td>111 (11)</td>
</tr>
<tr>
<td>Paracetamol-opoid</td>
<td>325 (32)</td>
<td>230 (23)</td>
<td>85 (8)</td>
<td>172 (17)</td>
<td>812 (81)</td>
</tr>
<tr>
<td>Both</td>
<td>30 (3)</td>
<td>16 (2)</td>
<td>30 (3)</td>
<td>7 (&lt;1)</td>
<td>83 (8)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>417 (41)</td>
<td>264 (26)</td>
<td>130 (13)</td>
<td>195 (19)</td>
<td>1006 (100)</td>
</tr>
</tbody>
</table>

References:


151. Integrated Care Pathway for the Management of the Paracetamol Poisoned Patient

Pettie JM, Dow MA, Thanacoody HKR, Sandilands EA, Bateman DN.

Clinical Toxicology Unit, Royal Infirmary of Edinburgh, Edinburgh, UK

Objective: To develop an integrated care pathway for the management of paracetamol poisoned patients.

Methods: Data was examined for 115 patients admitted to a Pediatric Poisoning Centre in Bucharest between January 1997 and December 2008. Poisons were identified by poisoning history, examination, reactivity and liver function tests. The severity score was calculated using the Modified Parisian Severity Score. The primary outcome measure was mortality.

Results: Among 15,722 drug poisonings, 22 cases of paracetamol poisoning were identified (0.14%). The mean age was 16.5 years (range: 0.5–85 years). The route of exposure was oral in 15 cases, intravenous in 4 cases, and both in 2 cases. The most common cause of death was liver failure (4 cases). Overall, mortality was 9.09% (2 cases).

Conclusion: Paracetamol poisoning is a rare cause of death in pediatric practice. Early recognition and treatment with N-acetylcysteine are crucial for survival.

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<td>264 (26)</td>
<td>130 (13)</td>
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<td>1006 (100)</td>
</tr>
</tbody>
</table>

References:

Abstracts

152. Acute Paracetamol Poisonings in the Years 2003–2008 Reported to the Toxicological Information Centre in Bratislava

Plackova S,1 Cagano B,1 Ondriasova E2 Ficekova Z,1 Kresanek J,1 Batora I
1National Toxicological Information Centre, University Hospital Bratislava, Bratislava; 2Department of Pharmacology and Toxicology, Comenius University, Bratislava; 3Department of Occupational Medicine and Toxicology, University Hospital Bratislava, Bratislava, Slovakia

Objective: The National Toxicological Information Centre (NTIC) in Bratislava has frequently been consulted for advice on paracetamol exposures. To obtain more information about paracetamol poisoning in Slovakia, we performed a retrospective analysis of all the telephone calls to our Centre. Methods: All the telephone inquiries involving paracetamol exposure were extracted from our database for the years 2003–2008. The following data were analysed: age, sex, intent of exposure (accidental or suicidal), substances ingested, the clinical severity, type of first aid provided before exposure (accidental or suicidal), substances ingested, professional medical treatment, treatment chosen. Results: The population under review comprised 423 intoxication cases recorded from the medical consultations provided by the NTIC over the telephone and from hospital discharge reports. Paracetamol exposures in females (64%) were more prevalent than those involving males. Intoxications in adults made up 51% of cases, with the majority of cases being suicidal intoxications. In children under the age of 6 accounted for 11% of cases from the population under review. These were accidental intoxications, often caused by exceeding the recommended daily therapeutic amount. Thirty-four per cent of cases were made up of intoxications of patients of the age 6 to 18 years. Suicidal cases (64%) mostly involved the combination of paracetamol with other drugs or with alcohol. Accidental intoxications (22%) were caused by paracetamol alone. Therapeutic medical treatment was carried out in these forms: ingestion of activated charcoal (55% of cases), ingestion of a laxative (25%), gastric lavage (19%), physiological saline infusion (14%), forced diuresis (6%), haemodialysis (2%), and ingestion of hepatoprotective drugs (3%). N-acetylcysteine as a paracetamol antidote was given in 37% of cases. Fifty-one per cent of intoxications were accompanied by mild, transient and spontaneously resolving symptoms (SSS 1). There were no fatal cases (SSS 4). Conclusion: Obligatory reporting of every poisoning to the NTIC including cases of poisoning not resulting in a consultation with the NTIC came into force in October 2006. Previous to this measure we received only 30% of feedback information on poisonings about which we were consulted, which did not enable us to carry out the full analysis of the efficacy of the treatment.

153. Hepatic Injury Incidence Following Opioid with Paracetamol Exposure in Non Suicidal Patients has risen Dramatically

Bond GR,2 Woodward RW,2 Ho M2
1Drug and Poison Information Center and Cincinnati Children’s Hospital Medical Center, Cincinnati, Ohio; 2Department of Pediatrics, University of Cincinnati, Cincinnati, Ohio, US

Objective: To use post-marketing surveillance data from US poison centers, along with US prescription data to explore the incidence of hepatic injury from non-suicidal exposures to therapeutic doses of opioid and paracetamol products over time and with various patterns of exposure. Methods: The AAFCP NPDS database for 2000–2007 involving exposures to one or more opioids (hydrocodone, oxycodone, codeine, tramadol, metha- done, morphine, fentanyl, hydromorphone) along with paracetamol (separately or in combination) were obtained. This dataset was limited to age > = 13 years. The database was sifted for 7 years 2003–2008. The following data were analysed: age, sex, intent of exposure (accidental or suicidal), substances ingested, professional medical treatment, treatment chosen. Results: The population under review comprised 423 intoxication cases recorded from the medical consultations provided by the NTIC over the telephone and from hospital discharge reports. Paracetamol exposures in females (64%) were more prevalent than those involving males. Intoxications in adults made up 51% of cases, with the majority of cases being suicidal intoxications. In children under the age of 6 accounted for 11% of cases from the population under review. These were accidental intoxications, often caused by exceeding the recommended daily therapeutic amount. Thirty-four per cent of cases were made up of intoxications of patients of the age 6 to 18 years. Suicidal cases (64%) mostly involved the combination of paracetamol with other drugs or with alcohol. Accidental intoxications (22%) were caused by paracetamol alone. Therapeutic medical treatment was carried out in these forms: ingestion of activated charcoal (55% of cases), ingestion of a laxative (25%), gastric lavage (19%), physiological saline infusion (14%), forced diuresis (6%), haemodialysis (2%), and ingestion of hepatoprotective drugs (3%). N-acetylcysteine as a paracetamol antidote was given in 37% of cases. Fifty-one per cent of intoxications were accompanied by mild, transient and spontaneously resolving symptoms (SSS 1). There were no fatal cases (SSS 4). Conclusion: Obligatory reporting of every poisoning to the NTIC including cases of poisoning not resulting in a consultation with the NTIC came into force in October 2006. Previous to this measure we received only 30% of feedback information on poisonings about which we were consulted, which did not enable us to carry out the full analysis of the efficacy of the treatment.

154. Confusing Clinical Response to Exceptional Paracetamol Overdose. Report of Two Cases

Parson H, Karlsson-Stieber C, Swedish Poisons Information Centre, Karolinska University Hospital, Stockholm, Sweden

Objective: To describe the clinical course in two patients who had exceptionally high serum paracetamol levels. Case series 1: A 43-year-old man with a history of intravenous drug abuse took 50 g paracetamol 2 – 3 hours before admission to hospital. Gastric decontamination was undertaken on admission. Initial N-acetylcysteine was started and the patient had CNS depression and developed circulatory instability. He was given iv fluids, had a noradrenaline infusion and was put on a ventilator. Initial tests showed a metabolic acidosis with a plasma lactate >15 mmol/L. Continuous hemodialysis was started. The patient was extubated the next morning. N-acetylcysteine 24 hours after admission was 800 μmol/L and after another 24 hours 230 μmol/L. During day 2 there was a gradual clinical deterioration with a relapse of lactic acidosis and CNS depression. The patient gradually developed hepatic failure and finally had abdominal bleeding. Multi-organ failure ensued and the patient expired on the third day after admission. Case 2. A 30-year-old, healthy woman was admitted to hospital deeply unconscious after a serious suicide attempt, verified by a farewell letter. She had a severe and prolonged nausea with vomiting. She had abdominal bleeding. Multi-organ failure ensued and the patient died from intractable cardiac failure during the transplant procedure. Conclusion: A clinical course, including early severe lactic acidosis and CNS depression, is observed in a small number of patients with excessive paracetamol overdose and exceptional serum levels. It has been postulated that the early metabolic disturbances, observed independently of hepatic failure, are related to inhibition of mitochondrial respiration and that extreme paracetamol levels as such may cause CNS depression. These phenomena require further attention.

155. Re-evaluating the Dose of N-Acetylcysteine in Massive Paracetamol Intoxication

Hernández-Sh,1 Mason RJ,1 Howald MA,1.2 Nelson LS,1 Hoffman RS,1,2,3The New York City Poison Control Center, New York; 2New York University School of Medicine, New York; 3St. John’s University School of Pharmacy, New York, USA

Introduction: Although the current N-acetylcysteine (NAC) dose is adequate for most patients with paracetamol (APAP) overdoses, the principles upon which the dose was formulated are speculative. Recent reports of APAP overdose exceeding the NAC dose either in rare cases. We present two cases of APAP ingestion where NAC was dosed below that recommended in this case. Case series: Case 1: A 32-year-old woman ingested APAP with diphenhydramine. Initial [APAP] was 5124 umol/L, with normal LFTs. The 21 hour IV NAC protocol was started and oral NAC at 5097 mg/kg Q6h. Twelve hours later her [APAP] was 5097 μmol/L. Steady state [NAC] ranged 12.5-17.5 μg/mL. The patient developed lactic acidosis, hypotension and died 66h after presentation. Perimortem her [APAP] was 3310 μmol/L, diphenhydramine 3400 mg/mL, LFTs and renal function remained normal, and an INR of 1.8 was attributed to NAC. On autopsy no gross hepatic necrosis was observed and death was nonspecifically attributed to multiderug intoxication. Case 2: A 54-year-old man with normal LFTs and [APAP] of 7507 μmol/L at unknown time, was started on 21 hours of IV NAC. Ten hours later his [APAP] was 4190 μmol/L. At 18 hours the complete IV regimen was restarted and the patient was discharged as above. On day three his [APAP] was finally <66 μmol/L. LFTs peaked day 5 (AST of 3641 IU/L, ALT 7783 IU/L) then declined. Although prognostic indicators remained normal, the patient died from sepsis. On autopsy an unquantified amount of microscopic hepatic necrosis was noted. Conclusion: The NAC regimen is based on assumptions including APAP dose and t½, liver size, and gluthathione stores. In these two cases the APAP dose and toxicokinetics significantly deviated from the assumed parameters, so the NAC dose was increased. We speculate the second patient may have developed hepatotoxicity because the maintenance NAC dose was insufficient to detoxify the NAPOQI generated from an exceedingly high serum [APAP] and the increase in NAC dose was initiated too late. This contrasts with the increased in NAC occurred very early and three days later, despite persistently elevated [APAP], no hepatotoxicity resulted.

156. Paracetamol Overdose and Vomiting

Langford NJ, West Midlands Poisons Unit, City Hospital, Birmingham, UK

Objective: Nausea and vomiting is commonly the only symptom of early paracetamol poisoning. It is unpleas-
ing, as well as investigating the time period over which it develops; whether healthcare staff and patient perceptions correlate; and which pharmacological agents were effective in controlling N&V we conducted a survey on evaluation on patients admitted with acute paracetamol poisoning. *Methods:* All patients between the ages of 16 and 65 suffering from nausea or vomiting associated with a history and laboratory evidence of paracetamol ingestion (either as the sole agent taken or as part of a cocktail of substances ingested) were entered into the study. Patients were observed for signs of nausea and vomiting. Sixteen patients (8 adult and 8 children) completed a 4-point scale recording the severity of the N&V. *Results:* 33 consecutive patients were recorded of whom 28 had taken a single overdose of paracetamol and presented to the hospital within 6 hours of ingestion, whereas 5 patients received cyclizine, though 4 of these required a further dose or alternative anti-emetic (ondansetron). *Conclusion:* Patients with paracetamol poisoning commonly experience N&V in a dose-dependent manner that appears to be worse approximately 6 hours after ingestion. *References:* 1. Scharman EJ. Use of ondansetron and other antiemetics in the management of toxic acetonitrile ingestions. Clin Toxicol 1998; 36:19–25.

157. Paracetamol Orodispersible Tablets: A Risk for Severe Poisoning in Children? Hofer K, Rauber-Lüthy C, Stüer A, Kupferschmidt H, Ceschi A. Swiss Toxicological Information Centre, Zurich, Switzerland. *Objective:* Childhood paracetamol ingestion including the risk of hepatotoxicity remains a significant medical problem. The issue of over the counter medications leading to unintentional ingestions by young children and the important question of whether paracetamol preparations has been studied.1,2 At the beginning of 2002 an over-the-counter oro-dispersible preparation of paracetamol was licensed in our country. The aim of this study was to investigate the risk of single dose ingestion of fast disintegrating paracetamol tablets. *Methods:* Retrospective single-centre analysis of all cases with accidental self intake of solid vs. orodispersible tablets. The ingested amount (precise or maximal dose) of paracetamol was recorded. *Results:* A total of 293 patients were entered in the study. The mean ingested dose was 98.7 mg/kg (range 8.3–1,510 mg/kg, median 100) in group 2. In group 1, 23 patients (12.3%) vs. 4 patients (25%) in group 2 were admitted to hospital for N-acetylcysteine treatment because intake was >200 mg/kg. Statistical analysis showed a tendency toward ingestion of higher doses for the orodispersible tablets compared to the solid tablets. *Conclusion:* Paracetamol as oro-dispersible preparation may be an important risk factor for severe paracetamol poisoning in children, because they can ingest a large number of adult-strength tablets in a short time due to a pleasant taste and the fast melting in the mouth. *References:* 1. Chien C, Marriot J, Ashby K, et al. Unintentional ingestion of over the counter medi- cation in children less than 5 years old. J Paediatr Child Health 2003; 39:264–9. 2. Assargard U, Sbergor G. The successful introduction of child-resistant closures for liquid paracetamol preparations. Safe Sci 1995; 21:87–91.

158. Vaginal Burn Injury Caused by Prolonged Retention of Alkaline Batteries Lonati D,1 Giampreti A,1 Bigi S,1 Vecchio S,1 Cassani C,1 Babbinato L2, Locatelli C1.1 Poison Control Centre and National Toxicology Information Centre, IRCCS Fondazione Policlinico San Matteo and University of Pavia, Pavia, 2Department of Obstetrics and Gynecology, IRCCS Fondazione Policlinico San Matteo and University of Pavia, Pavia, Italy. *Objective:* To evaluate the risk of metal absorption and toxicity in a case of prolonged intra-vaginal retention of alkaline batteries. *Diagnosis:* May be difficult for young girls rarely admit the self insertion.1 *Case report:* A 16-year-old girl was brought by her mother to the gynecology clinic for lower abdominal pain, genital itching and irritation. She revealed that one month earlier her boyfriend inserted two alkaline batteries (type-AAA) into her vagina during sexual intercourse. The gynecological examination revealed a healthy 70 kg girl with normal vital signs, including body temperature. Laboratory data on admission showed leucocytosis (19,500 cells/mm³) with normal haemoglobin concentration (13.5 g/dl) and mild increase of C-reactive protein (1.5 mg/dl). Pelvic examination was performed under anaesthesia because of intense inflammation and pain. Vaginal foreign bod- ies (two cylindrical alkaline batteries) were extracted. These were slightly eroded and not conclusively intact. The vaginal mucosa was brown, haemorrhaged easily, and difficult to evaluate owing to a copious grey vaginal discharge. Cultural examinations of the vaginal discharge were negative for infections. Vescic and rectal fistulas were excluded and vaginal irrigation performed. Antibiotics were administered in addition to vaginal healing tablets. Blood (B) and 24-hour urine (U) samples were col- lected in order to exclude metal toxicity. Cadmium (B = 0.4 mcg/L; U = 0.1 mcg/L), manganese (B = 0.2 mcg/L; U = 0.4 mcg/L), lithium (B = 0.1 mcg/L; U < 100 mcg/L), zinc (B = 154 mcg/dL; U = 248 mcg/dL), lead (B < 0.1 mcg/dL; U = 0.5 mcg/dL) and copper (B = 126 mcg/L; U = 46 mcg/L) were within normal ranges. One month after initial evaluation, healing was complete and no metal levels were increased. Protracted retention of batteries may cause severe local burns1 and metal toxicity. Where battery content leakage is noted metal levels should be evaluated. In this case metal toxic- ity did not develop because vaginal mucosal exposure to metals released by the batteries. References: 1. Dahiya P, Agarwal U, Sang- wani K, et al. Retained intravaginal foreign body: a case report. Arch Gynecol Obstet 2003; 268:323–4. 2. Huppert J, Griffith S, et al. Vaginal burn injury due to alkaline batteries. J Pediatr Adolesc Gynecol 2009; 22:133–6.

159. Heavy Metals Slow Release from Retained Lead Projectiles and Thermometer’s Mercy Giampreti A,1 Lonati D,1 Bigi S,1 Vecchio S,1 Locatelli C,1 Petrolini V,1 Manzo L1, Pelliccioni A2, Pezzola D2. 1Pavia Poison Control Centre and National Toxicology Information Centre, IRCCS Maugeri Foundation and University of Pavia; 2Department of General Surgery, Ospedale di Acquapendente, ASL Viterbo; 3Department of General Surgery, Ospedale Civile di Brescia, Brescia, Italy. *Objective:* To report three cases in which lead (case 1, 2) and thermometer (case 3) fragments were released from retaining tissues without clinical/toxic effects. *Case series:* Case 1: In a shooting accident, a 67-year-old man was hit by 200 pellets in the posterior left lower leg area. He was admitted to hospital with several skin oedema, so fasciotomy with subsequent antibiotic therapy was performed. He was discharged without sequelae 20 days later. During the following year he remained asymptomatic; three-month blood and urine lead levels, gave results 4, 14, 13, 7 mcg/L (“normal” range 0.1–10 mcg/dL) and 19.4, 16.2, 55.6 mcg/L (“normal” range 0.5–3.5 mcg/dL). Case 2: A 43-year-old man was accidentally hit by 150 pellets in the right leg during a game-shooting expedition. The patient required emergency surgery. During the follow- ing month the blood lead levels (two times) ranged from 21.7 to 29.7 mcg/dL; urine lead levels progressively decreased from 17.8 to 2.7 mcg/L. In both cases 1 and 2 red cell zinc protoporphyrin, uridine aminolevulinic acid (UALA) were normal. Case 3: A 31-year old woman, visited one week after accidental inoculation of thermometer mercury, pre- sented with local oedema and numerous radio-opaque material removed from the injury at the skin sewed. One week of the left hand; after surgical toilet a second X-ray showed diffused foreign material over the second metacarpal joint. During a three year follow-up the patient remained asymptomatic. No biochemical altera- tions or modification of distribution of radio-opaque material were registered. Six-monthly blood mercury levels gave values 5.0, 12.0, 15.0, 13.0, 4.0, 7.0, 12.0, 3.0, 19 mcg/L (“normal” range 0.1–4.5 mcg/L), corresponding urine levels were 6.5, 1.0, 9.0, 4.0, 2.7, 4.5, 2.7 mcg/L (“normal” range 0.1–4.5 mcg/L). *Conclusion:* Overall metal lead levels, though high at the time of injury, did not require, and only moderate metal releases without cephalic chelation therapy. In our three cases chelation was not required, and only moderate metal releases without clinical manifestations were documented.

160. Subcutaneous Unspecific Inflammation and Granuloma Formation as a Result of Metallic Mer- cury from a Broken Thermometer Brav M1,2, Luzzar B2. 1Poison Control Centre, University Medical Centre, Ljubljana; 2Institute of Pathology, School of Medicine, University of Ljubljana, Ljubljana, Slovenia. *Objective:* In subcutaneous tissue elementary (metallic) mercury slowly oxidizes to soluble mercuric salts that can promote local inflammation as they react with the sulfhydryl groups, resulting in enzyme inhibition and protein modification. Furthermore, soluble mercury salts can enter systemic circulation causing systemic toxicity. *Case report:* Presented case report describes clinical and histological features of subcutaneous metallic mercury. *Case report:* An 18-year-old man acciden- tally penetrated his left thenar with a broken thermo- meter. At the Emergency Department the broken glass was removed and only moderate metal release was noted. He was sent home. Two weeks later the patient noticed local pain, skin redness and swelling 1–2 cm laterally from the injured site that pro- gressively increased during subsequent weeks. After 6 weeks the patient was admitted to surgery outpatient due to persistent local pain, swelling, skin redness and a limited range of motion of the right thumb. On clinical examination the right thenar was painful with local red- dish swelling. Radiographs revealed many spherical particles of metallic density above the metacarpal bone. An ultrasound scan revealed an area of speckled hy poechoic material compared with the callus above the thumb extensors. Blood and urine mercury concentra- tions were slightly increased (12.3 μg/L and 14.9 μg/L, respectively). Inflamed skin was excised and the wound was irrigated with normal saline. A histological examination of the biopsy specimens revealed several small dark stained spots (mercury globules) in the dermis and subcutis, surrounded by prominent inflamma- tory cell infiltrate composed of eosinophilic granulocytes, neutrophils, lymphocytes, plasma cells and macrophages. Some giant cells of the foreign body reaction type around the mercury globules were also observed. The patient remained asymptomatic and the thumb regained full function within weeks. *Conclusion:* Subcutaneous elementary mercury from a broken thermometer can cause an inflammatory
response with local swelling, pain and movement deficit due to non-specific inflammation and granuloma forma-
tion as a result of a foreign body reaction. An early and thorough excision of injured tissue containing droplets of elementary mercury is essential.

161. Lead Exposure by Accidental Ingestion

Plenert B, Adler R, Katz S, Bergmann I
1Poisons Information Centre (PIC), Erfurt; 2Municipal Hospital Dresden-Neustadt, Dresden, Germany

Objective: The toxicological impact of ingested metallic lead is low, but an increased absorption of lead in children has been described. Case report: Two children (6-year-old girl, 8-year-old boy) without symptoms were referred because they had eaten lead beads from a bag for joint-testing. The PIC Erfurt recommended an abdominal X-ray after 48 hours and further measures depending on the result. The radiography showed beads in the small and large intestine and these were still visible after 5 days in the boy. The lead blood levels increased to 275 μL/L in the boy and 230 μL/L in the girl, respectively. Both lead blood levels were above the Human Biomonitoring levels of HBM I (100 μL/L) or HBM II (150 μL/L), respectively. Oral treatment with 2,3-dimercaptopropane-sulfonate (DMPS) was started as an in-patient for the first few days. Afterwards, the DMPS treatment was continued as an outpatient and well tolerated. However, after 17 days, the administration of DMPS was interrupted because of coccasickie virus infection in both children. At that time, the lead blood levels were already considerably decreased. Furthermore, the lead beads were no longer seen radiologically and the children remained free of symptoms of lead poisoning at all the times of monitoring. Conclusions: The ingestion of small lead particles by children can cause a rise in the blood lead level. The passage through the bowel can be delayed and should be monitored radiologically. Treatment with a chelating agent should be considered. References: 1. Kosnett MJ. Lead. In: Olson KR, ed. Poisoning and Drug Overdose. 5th ed. New York, USA: Lange Medical Books / McGraw-Hill, 2002. 2. Olson KR, ed. Poisoning and Drug Overdose. 5th ed. New York, USA: Lange Medical Books / McGraw-Hill, 2002.

162. Acute Nickel Toxicity: Case Report

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Objective: Acute poisonings by ingestion of divalent nickel salts are very rare, so clinical manifestations, biochemical disturbances and sequelae of severe poisoning are described. Case report: A 47-year-old male accidentally drank electroplate liquid containing 450 g/L of nickel sulfate and chloride salts. He promptly developed symptoms which included excitement, sweating, nausea, vomiting, abdominal pain and diarrhea. On admission 3 hours post-ingestion, the patient was alert, restless, with a blood pressure of 130/90 mmHg. Admission X-ray was unremarkable except for midepigastric tenderness and hyperactive bowel sounds. BP was 200/120 mmHg, HR 105 beats/min, RR 20/min, temperature 36.8 °C. Laboratory data: total bilirubin (59 μmol/L), AST (268 u/L), ALT (139 u/L), CK (7031 u/L), LDH (138 u/L) and lowest value of glucose (1.7 mmol/L) within the first week post-exposure. Nine hours after ingestion of 9 g of nickel salts with 2 liters of water, the patient developed DPMZ (103/mm3). Nickel concentration in serum on admission was 19.02 μg/mL, and in the first 24h urine was 124 μg/L. After almost two months of hospital treatment, the patient recovered from the acute phase of poisoning. However, he had symptoms of encephalopathy with altered mental state, decreased activity and motor incoordination. Neuropsychological and ophthalmological investigations revealed visual field defects, with both motor and sensory involvement and partial blindness. Conclusion: This case is unique for several reasons. Firstly, the concentration of nickel in the patient's serum, blood and urine was much higher than in previously reported cases. Secondly, this is the first description of acute oral human poisoning with divalent nickel salts with clinical picture of acute renal failure, DIC and multiorgan toxicity. Finally, the patient developed neurological sequelae as a consequence of nickel toxicity.

163. TOXBASE® in Europe

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Objective: To investigate the use of TOXBASE® (UK Internet poisons information) in European poison centres. Methods: TOXBASE® accesses by European poison centres were analysed for product access and accesses to the active ingredients within these products. A comparison was made between access to generic pharmaceutical names and trade names. Results: In 2005 the UK Health Protection Agency agreed to allow free access to TOXBASE® for European poison centres. Poisons centres in 20 countries registered. Two countries already used the database: Ireland (contract to provide TOXBASE® to Irish ED users) and Iceland (since 1985). Of these 22 countries, 15 (68.2%) used TOXBASE® from 1 November 2008 to 31 October 2009 and 7 of these had more than 200 product access in the year (mean 2077, median 1054, range 212–11276). Most common accesses were pharmaceuticals, > 5% of accesses except for Latvia who accessed only 15%. Top products accessed were: Austria (quetiapine, trazodone, hydromorphone); Belgium (paracetamol, domperidone, trazodone); Czech Republic (tea tree oil, cetirizine, sulfamethoxazole, sertaconazole, sulfaphenazole, ibuprofen); Ireland (paracetamol, Nurofen for Children [ibuprofen], Lexapro [escitalopram]); Latvia (Amantia gemmata, cannabis, tea gases); and Poland (paracetamol, quetiapine, camomarena). Users of TOXBASE® may access information either via the generic pharmaceutical entry or using a trade name for that pharmaceutical. For the most commonly accessed pharmaceuticals in each country a ratio was calculated of the total number of accesses to generics + trade names containing that pharmaceutical to the number of accesses to the generic entry. This gave ratios of: Austria 1.1; Belgium 1.2; Czech Republic 1.1; Iceland 1.6; Ireland 3.0; Poland 1.0. Latvia accessed very few pharmaceuticals so the calculation was not possible. The higher proportion of trade names accessed by the Irish PC is probably due to the fact that trade names specific to Ireland have been added to TOXBASE®. Conclusion: Some European poison centres have made extensive use of TOXBASE®. Queries varied in different countries but paracetamol enquiries were common in 4 countries and quetiapine in 3. Apart from Ireland and Iceland most countries used the generic name rather than a trade name to access information on TOXBASE®. Acknowledgement: The authors appreciate the assistance of the other Units of the NPIS in supporting the database.

164. A Program to Prevent Pediatric Lye Poisoning in Liberia

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Objective: Lye (caustic soda) poisoning in children is a significant problem in Liberia. Lye, a highly alkaline corrosive substance, is used in Liberia to make household soap. It is sold in markets in a pelletized form and stored in any available and generally unlabeled container. The prepared liquid soap mixture is odorless, tasteless and looks like water. As a result, children consume it unintentionally, with the assumption that they are drinking water. The outcome of this type of exposure is as expected: severe oral and esophageal injury that lead to a severely compromised lifestyle and often, death. The objective of this project was to create public awareness of the dangers of lye exposure and to implement poison prevention interventions in Liberia. The project was carried out in coopera-
tion with an international humanitarian organization, funds were provided to produce print and electronic educa-
tional materials that promoted the admonitions associ-
ated with the use of caustic soda. Public service announcements were developed for use on both radio and television to create further awareness about the dangers of exposure to lye. Billboards, which contained basic health care messages about lye poisoning, were situated strategi-
cally in Monrovia. Posters with safety messages about the prevention of caustic soda ingestion were developed and distributed to area hospitals and medical clinics. Distinc-
tive fluorescent green stickers which contained the words ‘Poison’ and ‘Caustic Soda (Lye)’ were developed for distribution to families as part of an educational project to teach their children to avoid containers with...
166. Carvedilol - a Special Beta-blocking Agent?  

**Conclusion:** Stickers were distributed.

**Case report:** 71 cases of which 34 (48 \%) were in the age group < 6 years, were analyzed for age analysis. Follow-up information was available in 85\%, patients were monitored for 4–7 h after ingestion in 15\%. 46\% were treated with activated charcoal, 11\% with gastric lavage or specia. Symptoms were hypertension (n = 14), decline in blood pressure (n = 3), bradycardia (n = 14), somnolence (n = 9), dizziness (n = 3). Rare symptoms (n = 1) were vomiting, diarrhoea, lowed blood glucose level (55 mg/dL), first degree heart block, unconsciousness. In children mild symptoms were seen after ingestion of > 6.25 mg. There were no moderate intoxications up to 25 mg (24 cases). The ingestion of 50 mg led to mild symptoms in one of four cases. After ingestion of 62.5–87.5 mg all children (n = 6) showed no symptoms. In adolescents/adults ingestion of > 50 mg < 150 mg rarely led to mild symptoms. Moderate intoxications were seen in adolescents > 150 mg, in elderly > 250 mg, in adults > 500 mg, more often > 750 mg. Lowest systolic blood pressure was 73 mmHg in adolescents and 60 mmHg in adults/ elderly. Lactate was increased in most cases. Treatment with dopamine/other catecholamines and atropon was always successful. There were no lethal poisonings. **Conclusion:** The ingestion of carvedilol in overdose leads to symptoms which seem not to differ much from other beta-bloking agents. The alphablocking activity does not seem to play a major role in poisinings. The toxicity of carvedilol will be compared with propranolol in a second step in order to underline these first impressions. **References:** 1. Bouchard NC, Forde J, Hoffman RS. Carvedilol overdose with quantitative confirmation. Basic Clin Pharmacol Toxicol 2008; 103:102–3.

167. Ventricular Fibrillation in a Meprobamate Self Poisioning  

Ferrier G  

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**Objective:** Meprobamate is frequently used to prevent psychological difficulties in alcoholic abstinence. Pharmacology and toxicoxy of this drug are well known: coma, miosis, sedative effects and their complications like inhalation or rhabdomyolysis. Also, cardiovascular toxicity has been studied: the vasoplectic effect can be complication by cardiac toxicity. The mechanism of myocardial impairment is not well understood. Rhythm alterations are not described in publications about meprobamate.  

**Case report:** 35-year-old woman, who suffered from chronic ethanol dependence and psychotic pathology, was found unconscious in his house. Near him were found scattered 8 g of meprobamate, backpressure was 0.1 g. The GSG score was 12, arterial blood pressure was 114/79, the electrocardiogram showed a regular, smux tachycardia of 120 per minute, without rhythm or conducion disturbances. Toxicological analysis showed only ethanol alcohol at 1.21 g/L. Carbamate blood levels could not be measured in our center. A hepatic cholestasis was found. Our therapeutic interventions consisted of a airway protection, oxygenation, gastric catheterisation and an other liter of crystalloid infusion for an hour to prevent vasoplegia. Gut decontamination was not carried out. Fifteen minutes later, the patient presented a ventricular fibrillation ingestion with 4 to 5 mm systovascular dorse e and 120 mg/24h by continuous infusion. Endotracheal intubation and sedation with ketamine and hynomadate were carried out. The electrocardiogram after reduction showed a ventricular bigeminism, the cardiac echography showed a low ejection fraction at 0.45. One hour later, transfer to a cardiac reference center was decided. During transfer, he presented four new ventricular fibrillation events necessitating four electric shocks. Efficiency was obtained at 200 Joules. After two days observation, the patient was out of danger and discharged after three days. No cases of ventricular fibrillation after meprobamate has been described in the literature. The pharmacodynamics of cardiac toxicity is not clearly elucidated but has usually been considered to be a risk of rhythm disturbances, and in consequence, cardiac func- tion with or without vasoplegia should be monitored in carbamate intoxications.

168. Acute Clenbuterol Overdose in a Bodybuilder Successfully Treated with a Single Dose of Activated Charcoal  

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**Objective:** To report a case of clenbuterol poisoning in a bodybuilder.  

**Case report:** A previously healthy 18-year-old male ingested 40 pills of clenbuterol (total dose = 0.8 mg) in a suicide attempt. The patient experienced tremors, sweating, palpitations, abdominal pain and restlessness with a systolic/diastolic blood pressure of 94/53 mmHg and a heart rate of 84.7, respectively; no cocaine or amphetamine was detected. The creatinine was 0.6 mg/dL; no blood gases were done. The original hematocrit was 42.3, and was 32.4\% after reduction showed a ventricular bigeminism, the cardiac echography showed a regular, sinus tachycardia of 120 beats/minute. He was treated with fluid replacement and 50 mEq of potassium to correct the hypotension and tachycardia. At 24 h post-poisoning, the systolic blood pressure was 106 mmHg, and the cardiac echography showed a low ejection fraction at 55%. The patient was discharged.

169. Severe Metabolic Alkalosis in Chronic Salicylate Poisoning  

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**Objective:** Acute salicylate poisoning gives rise to a primary respiratory alkalosis and, later in the course of severe cases, a primary metabolic acidosis. In chronic salicylate poisoning, however, no specific acid-base dis- tance is typical. We report three cases of chronic salicylate poisoning who presented with pronounced hypokalemia and metabolic alkalosis of unknown cause. **Case series:** A 35-year-old salicylate poison was admitted because of weakness and fatigue. Arterial blood gases revealed metabolic alkalosis (pH 7.52, PCO2 8.6 kPa, BE +24 mmol/L). S-potassium was 2.0 mmol/L and S-standard bicarbonate 49.6 mmol/L. The patient was given saline and potassium chloride iv, which almost normalised the laboratory values within three days. Investigations concerning endocrinologic disturbances were negative and the patient remained on salicylate iv, which continued hav- ing vomiting repeatedly. Later it became clear that she had overdosed on salicylates for several months, at least 10 g/day. A 63-year-old female presented disorien- tation with a confused and frustrated history of chronic pain. Labo- ratory tests showed S-potassium 1.8 mmol/L, S- salicylate 0.1 mmol/L, and a pronounced metabolic acidosis of pH 7.75, PCO2 5.8 kPa, BE +29 mmol/L. After two days of treatment because of her symptoms, she was discharged with impaired level of consciousness after an overdose of 50 mg diazepam and 10 g salicylates. Laboratory investigations showed S-potassium 2.4 mmol/L, S-stand- ard bicarbonate 41 mmol/L and S-salicyleate 3.4 mmol/ L. Arterial blood gases displayed pH 7.55, PCO2 6.6 kPa, BE +18 mmol/L. After treatment with repeated doses of charcoal, and saline with potassium chloride iv, her condition improved dramatically. The patient denied repeated vomiting, but admitted daily overdoses of salicylate during the past years except for the last few days. A 54-year-old male presented with impaired level of consciousness after an overdose of 50 mg diazepam and 10 g salicylates. Laboratory investigations showed S-potassium 2.4 mmol/L, S-stand- ard bicarbonate 41 mmol/L and S-salicyleate 3.4 mmol/ L. Arterial blood gases displayed pH 7.55, PCO2 6.6 kPa, BE +18 mmol/L. After treatment with repeated doses of charcoal, and saline with potassium chloride iv, her condition improved dramatically. The patient later admitted a grave daily misuse of salicylates and benenzapinines to reduce her anxiety. **Conclusion:** Acute and particu- larly chronic salicylate poisoning gives rise to a pro- nounced hypokalemia. We propose that in severe chronic cases, the depletion of potassium may lead to a pronounced metabolic alkalosis. **References:** 1. Bailey RB, Jones SR. Chronic salicylate intoxication. A report of two cases. Trans. R. Soc Trop Med & Hyg 1992;86:414–5. 2. Prado CC, Costa ACA, Bucaretchi F, Madureira PR, De Capitani EM, Lanaro R, Costa JL, Hyslop S. Poison Control Center, State University of Campinas, Campinas, Brazil  

**Objective:** To report a case of clenbuterol poisoning in a bodybuilder.  

**Case report:** A previously healthy 18-year-old male ingested 40 pills of clenbuterol (total dose = 0.8 mg) in a suicide attempt. The patient experienced tremors, sweating, palpitations, abdominal pain and restlessness with a systolic/diastolic blood pressure of 94/53 mmHg and a heart rate of 84.7, respectively; no cocaine or amphetamine was detected. The creatinine was 0.6 mg/dL; no blood gases were done. The original hematocrit was 42.3, and was 32.4\% after reduction showed a ventricular bigeminism, the cardiac echography showed a regular, sinus tachycardia of 120 beats/minute. He was treated with fluid replacement and 50 mEq of potassium to correct the hypotension and tachycardia. At 24 h post-poisoning, the systolic blood pressure was 106 mmHg, and the cardiac echography showed a low ejection fraction at 55%. The patient was discharged.
first 6 hours following the onset of blindness. A small improvement of visual acuity occurred following the first HBOCT session and full recovery was obtained after the second session. Improvement was most pronounced with the decrease of serum quinine concentration. Conclusion: Blindness induced by quinine is a symptom of “cinchonism”. It appears for doses of at least 4 grams and within the 4th to 14th hour following the overdose. The visual loss is usually associated with serum concentration above 10 μg/mL. The pathophysiology remains controversial: retinal ischemia may lead to retinal toxicity, toxic mechanism linked to cholinergic neurotransmission. Treatments to increase the elimination of quinine have not demonstrated any efficiency. Vasodilators administered orally, or intravenously or retrobulbar, stellate ganglion blockage (SGB) have been proposed. SGB is the most controversial therapy because of its potential complications and ineffective reports. Lastly retrobulbar injection of vasodilator therapy is rarely reported in the literature. Conclusion: Consequently, HBOCT appears to be a promising treatment, with its known low rate of side effects. 1. Townsend RS, Sturm JW, Whyte S, Quin- nine associated blindness. Aust Fam Physician. 2004; 33:627–8. 2. Bacon P, Spalton DJ, Smith SE. Blindness from quinine toxicity. Br J Ophthalmol. 1988 March; 33:627–8. 2. Bacon P, Spalton DJ, Smith SE. Blindness from quinine toxicity. Br J Ophthalmol. 1988; 33:627–8. 3. Laeves I, Rivas F, Hernandez A, Cantu JM. Acentric craniofacial malformations were reported, although one infant was not carefully examined. In the liveborn infants, the heart murmur was indicative of an anomaly (1/3, 2.78%, 95% CI 0.15–16.21), was not significantly higher than the incidence of malformations in the general population. Conclusion: Although it is possible that the heart murmur detected was indicative of an underlying structural congenital cardiac defect, concerning alcohol use, a withdrawal encephalopathy occurred in our case and has been previously reported, 1 occurring in the setting of serotonin syndrome but associated with neither citalopram nor paroxetine overdose. 2. Bacon P, Spalton DJ, Smith SE. Blindness occurring in the setting of serotonin syndrome but associated with neither citalopram nor paroxetine overdose. 2. Bacon P, Spalton DJ, Smith SE. Blindness occurring in the setting of serotonin syndrome but associated with neither citalopram nor paroxetine overdose.

174. Toxicokinetics of Diltiazem and Three Metab- olites During Acute Life-Threatening Poisoning

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Objective: The calcium channel blocker diltiazem is metabolized to N-demethyl-diltiazem (MA) and deacetyl-diltiazem (M1). These two active metabolites are metabolised to N-demethyl-deacetyl-diltiazem (M2) and other inactive metabolites. The concentration of diltiazem remained high for the first 5 days after intake and then decreased slowly (Table 1). Furthermore, the concentrations of MA and M1 were relatively high and when the MA level decreased after 3 days the M1 level remained high. Methods: Diltiazem and its metabolites were measured in serum by a validated HPLC method with UV-detection and a coefficient of variation below 5%.

Table 1. Diltiazem and metabolites

Day | MA (ng/mL) | M1 (ng/mL) | M2 (ng/mL)
--- | --- | --- | ---
1 | 1344.8 | 1004.2 | 160.9
2 | 1143.5 | 1277.6 | 979.1
3 | 2409.4 | 1204.8 | 572.9
4 | 3159.5 | 320.3 | 1374.9
5 | 3810.5 | 115.5 | 1209.9
6 | 3267.9 | 79.9 | 646.5

172. Fatal Effects of Diazepam Overdose During Pregnancy

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Objective: A recent study of diazepam overdose in pregnant women showed increased risk of congenital malformations in the offspring. 1 A case report 2 and case series 3 have however detailed infants born with malforma- tions including facial and oral clefts. The UK Tera- tology Information Service (UKTIS) is actively collecting data on the fetotoxic effects of diazepam overdoses during pregnancy. Methods: Using standard- ised procedures, pregnancy outcome data have been collected prospectively from women who took inten- tional diazepam overdoses in pregnancy between 1988 and 2005. Overdose was defined as acute ingestion of more than 30 mg, the maximum daily therapeutic amount. Results: During the period of study, 49 pregnant women took diazepam in overdose; 35 in combination with other drugs. The doses of diazepam ingested ranged from 36 mg up to 20,000 mg. Twenty eight (57%) overdoses were taken in the first trimes- ter, 17 (35%) in the second trimester and four (37%) in the third. The median gestational age at the time of overdose was 9 weeks (range 6–14 weeks). Seven were spontaneously aborted and six were electively terminated. In the liveborn infants no congenital mal- formations were reported, although one infant was born with several malformations. Conclusion: Overall, there was no case of congenital abnormalities in the general population.
175. Clinical Toxicity of Acute Poisonings by Fenazepam in Older Children
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Objective: In recent years the most frequent causes of poisoning in children were tranquillizers - derivatives of benzodiazepine, mainly fenazepam, and in 2008 this reached 15.9% of patients admitted to Moscow Pediatric Toxicological Center compared to 11.1% in 2007. The highest incidence of up to 46% was registered in children of older school age. The aim of study was the determination of concentration thresholds wherein basic symptoms of fenazepam poisoning were demonstrated.

Methods: Determining of fenazepam blood concentration in children aged 11–14 years and comparison of the obtained results with clinical symptoms of poisoning. Results: Fenazepam [7-bromo-5-(2-chlorophenyl)-1,3-dihydro-2H-1,4-benzodiazepin-2-one] has been used in clinical practice since 1978 to check attacks of irritancy, emotional stress and lability, anxiety, and who were bothered without apparent chondriacal disorders. It is manufactured in pills and ampoules. One of the basic symptoms of poisoning by fenazepam is depression of consciousness from somnolence to coma, psychomotor excitement accompanied by visual or acoustic hallucinations in some patients. Muscle hypotension and ataxia, and also dysartria and decreased tendon reflex appear at an early stage. The changes in cardiovascular system can manifest themselves as tachycardia or bradycardia, dropping of arterial tension. ECG demonstrated rhythm disturbances such as sinus tachycardia or bradycardia. Fenazepam blood concentration was determined by HPLC in 20 children aged 11–14, admitted to Moscow Pediatric Toxicological Center. The fenazepam blood levels and main symptoms of intoxication registered are presented below. At the level 2.50 ± 0.98 ng/mL there was somnolence, pupils of medium dimension, skin of usual colouring; from 2.76 ± 0.98 ng/mL initial ataxia; from 3.26 ± 0.55 ng/mL - soporific condition developed, 4.02 ± 0.3 mg/mL caused initial coma. Conclusion: Thus, a fenazepam concentration of 2.50 ± 0.98 ng/mL was evaluated as the threshold, characterizing basic symptoms of fenazepam poisoning. This was supported by EEG, Giessen P, Rose-Haider B. Intentional overdose of warfarin in an adolescent: need for follow up. Emerg Med J 2002; 19:90.

176. Intentional Warfarin Overdose and Coagulopathy: Two Case Reports
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Objective: Deliberate warfarin overdose is uncommon. The onset and duration of coagulopathy are variable making it difficult to establish an appropriate period of observation. The report describes two cases that presented to hospital soon after deliberate overdose and in whom coagulation status was closely evaluated.

Case series: Case 1 was a 20-year-old woman who presented 5 hours after deliberate ingestion of warfarin 285 mg and aspirin 150 mg. She had been prescribed warfarin after lower limb thrombosis but had not complied with therapy in the preceding 3–4 weeks. Case 2 was a 53-year-old man who presented three hours after deliberate ingestion of warfarin 56 mg. He had been receiving warfarin due to a pulmonary embolism four years earlier, and was reviewed daily on a warfarin clinic for 9.5 years. Baseline electrolytes and liver biochemistry were normal in both patients. Prothrombin time was studied with respect to the interval after warfarin ingestion. Prothrombin time progressively increased for more than 48 hours after ingestion, as reported elsewhere. Intravenous vitamin K was administered, 1 mg at 72 hours post-ingestion in case 1, and 0.5 mg at 60 hours post-ingestion in case 2. Vitamin K was continued for 21 days. INR persisted. Neostigmine 0.2 mg as well as colonic enema lavage was performed, initially followed by oral administration of multiple-dose activated charcoal and cathartics, and subsequently by polyethylene glycol (PEG) bowel irrigation. DULoxetine and lamotrigine blood levels were 730 ng/mL and 16 micrograms/mL, respectively. On day 2, some liquid stools interspersed with charcoal were produced, but intestinal hyperperistalsis persisted. Neostigmine 0.2 mg as well as colonic enema was administered without effect. Therefore PEG administration was continued for the next 5 days. Coma was prolonged for eight days but there were no abnormalities on magnetic resonance imaging; on day 9 they developed progressively severe respiratory distress and was extubated on day 10. On day 15 the patient complained of vomiting and severe abdominal pain. Gas- tro-endoscopy revealed the presence of charcoal entrapment in the stomach and duodenum, and the patient underwent dilatation of both small bowel and colon; at laparotomy the caecum and terminal ileum were found to be necrotic. Ileocic resection was performed: about 5 kg of necrotic bowel was excised. Hemorrhage was uneventful and she was discharged 15 days later. Conclusion: Ischemic colitis (IC) in acute poisoning is a rare event, mainly described in severe cases of patients admitted in ICU. There is no evidence directly linking either duloxetine or lamotrigine with IC. In our case, vasospresors-related IC was ruled out because of lack of temporal relationship but many other causes may have contributed: hypotension and multiorgan hypoperfusion could explain the pathogenesis of an hypoxic injury; moreover, duloxetine-induced constipation (a well known side effect during therapy) and impacted faces which had progressively pressed against the bowel wall may have substantially contributed to bowel ischemia. References: 1. Nault JC, Mégarbán B, Théodore J, et al. Poisoning-related bowel ischemia: characteristic and outcomes. Clin Toxicol 2009; 47:412–8.

177. Pregabalin Overdose in Adults and Adolescents - Experience in Sweden
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Objective: Pregabalin was introduced on the Swedish market at the beginning of 2005 for treatment of epilepsy. The today’s indications also include generalized and treatment-resistant syndromes and neurogenic pain. The prescription rate of pregabalin has increased dramatically in Sweden, and an increasing number of inquiries related to overdose has been observed. So far only a few case reports after overdose with pregabalin have been reported in the literature. In order to assess the acute toxicity of pregabalin, a retrospective survey of hospital case reports received by the Swedish Poison Information Centre was carried out. Conclusion: Since the introduction of pregabalin the Poisons Centre has received 485 calls concerning overdose in adults and adolescents. Many of these dealt with mixed poisonings. During the actual period 42 cases of pure pregabalin poisoning could be analysed in detail by studying hospital case records. The patients in this material were 15 to 61 years old, 69% were females and 31% males. The ingested dose ranged from 750 mg to 30 g (mean 5.3 g, median 4.2 g). The reasons for overdosing were self destructive behaviour, suicidal attempt (36%) and abuse (14%). The severity of poisoning was graded according to the PSS (Severity Score). Twenty-one patients (69%) developed mild symptoms (PSS 1), 11 patients (26%) developed moderate symptoms (PSS 2) and one patient developed severe symptoms related to aspiration (PSS 3). The most frequent symptoms were mild CNS depression (20/42), tachycardia (10/42), tremor/ muscular twitching (7/42), seizures (5/42) and unconsciousness (4/42). Seizures were seen occasionally in doses above 3.7 g. Other symptoms seen in a few cases were dizziness, agitation, facial myoclonus, nystagmus and urinary retention. Occasionally headache, drowsiness, blurred vision, incoordination and mild hypotension occurred. At doses below 3 g most patients had mild symptoms. Conclusion: In this but not all cases of pregabalin overdose were benign. The most severe symptoms were seizures and CNS-depression. In general, doses below 3 g produced minor symptoms. Some patients had taken large doses not related to appetite symptoms. This is possible due to inter-individual variations in sensitivity or development of tolerance, making it difficult to establish a precise dose-response relation.

References:
1. Isbister GK, Hackett LP, Whyte IM. Intentional warfarin overdose. Ther Drug Monit 2003; 25:715–22. 2. Ramanan AV, Gissen JJ, Stockburger P, Whyte IM. Intentional warfarin overdose. Ther Drug Monit 2003; 25:715–22. 3. Sjoberg G, Feychting K. Introduction: Ischemic colitis (IC) in acute poisoning is a rare event, mainly described in severe cases of patients admitted in ICU. There is no evidence directly linking either duloxetine or lamotrigine with IC. In our case, vasospresors-related IC was ruled out because of lack of temporal relationship but many other causes may have contributed: hypotension and multiorgan hypoperfusion could explain the pathogenesis of an hypoxic injury; moreover, duloxetine-induced constipation (a well known side effect during therapy) and impacted faces which had progressively pressed against the bowel wall may have substantially contributed to bowel ischemia. References: 1. Nault JC, Mégarbán B, Théodore J, et al. Poisoning-related bowel ischemia: characteristic and outcomes. Clin Toxicol 2009; 47:412–8.

178. Bupropion Overdoses Presenting to US Emergency Departments
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Introduction: Bupropion is an atypical antidepressant commonly used for depression and smoking cessation. It is structurally dissimilar to other antidepressants and is an inhibitor of norepinephrine and dopamine uptake. It is well known to cause seizures in overdose. The published data regarding bupropion toxicity is mostly case reports. This case series summarizing US poison center data. Limited systematic data of consecutive emergency department (ED) overdoses are available. Objective: To assess the incidence of seizure in bupropion toxicomania at emergency departments. Methods: Design: A multi-center retrospective ED study design was utilized. Subjects: Consecutive patients with the primary ED diagnosis of antidepressant overdose were identified from January 1, 2008 to September 30, 2009. Epidemiologic data was collected as well as the occurrence of seizure,
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Arthropod bites and dengue fever

180. Venlafaxine Emergency Department Over-doses are not Associated with Significant Morbidity and Mortality

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Introduction: Venlafaxine is an antidepressant that effects several neurotransmitters including serotonin, norepinephrine and dopamine. Several cases have been reported documenting severe outcome from overdose. Few studies are available regarding overdose involving this toxicant. Objective: To assess the incidence of severe cases of venlafaxine overdoses presenting to emergency departments. Methods: Design: A multi-center retrospective Emergency Department (ED) study design was utilized. Subjects: Consecutive patients with the primary ED diagnosis of antidepressant overdose were identified from January 1, 2008 to September 30, 2009. Cases that involved venlafaxine as the primary intoxicant and intentional overdoses were classified. Epidemiologic data was collected as well as the occurrence of seizure, arrhythmias, serotonin syndrome, or need for endotracheal intubation. Results: Out of 1,590,248 consecutive ED patients from 20 EDs, 15 patients were identified with venlafaxine overdose. All cases were intentional and involved venlafaxine as the primary toxicant. The mean age of study subjects was 37.6 years (range: 16–78 years). Seven (47%) were male and 8 (53%) were female. There was no significant correlation between the heart rate and dose ingested (r = 0.41). Seizures occurred in 1 of 15 cases (7%) with no cases of status epilepticus. One patient required=endotracheal intubation (7%) and no cases from overdose are uncommon in cases presenting to US emergency departments.

181. Injuries in the Maritime Sector Reported to a Spanish Poison Control Centre (2005–2009)

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Objective: Epidemiological studies concerning exposure to emergently carried or used aboard of fishing or shipyard workers are scarce. Many of these events occur in outbreaks in confined spaces. The Spanish fleet is one of the biggest in the world and consists mainly of fishing ships, but also oil and chemical tankers, container ships and ferries. The goal of this work is to evaluate the intoxications occurring in the maritime sector of Spain. Methods: Retrospective analysis of cases of poisoning reported to the Spanish Poison Control Centre from April 2005 to October 2009. Data included gender, age, type of product, route of exposure, clinical features, and site of exposure. Results: A total of 69 cases were reported, 79% were male and 81% adults. Routes of administration were oral (87 cases), parenteral (17 cases), and inhalation (5 cases). Substances involved included xylene, benzene and styrene (11 cases), cleaning products (12 cases), ibuprofen (6), freon (3), methanol (1), and mixtures (7). Severe complications were associated in 6 occasions. Four episodes involved several individuals (asbestos, cigar, gas, and hydrogen sulfide plus carbon monoxide). Health care facilities called in 94.2% of cases, 26.3% from the Radio-Medical Centre. Poisonings took place on board of 51 occasions, 3 of them among passengers of a ferry, 2 in the ship’s hold, 1 in a container, 1 in a cabin. Ten cases occurred far from the coast. Seven episodes occurred in the shipyard. At the moment of the consult, 42 patients were symptomatic. Common manifestations were ocul (33.3%), dermal (30.9%), and neurological (26.2%). Estimated outcome was: mild 10 patients, moderate 28, severe 8. One patient died after the inhalation of hydrogen sulfide and carbon monoxide. Only 2 cases were suicidal, the rest accidental: occupational (41), unintentional general (16) and occupational (16), others (10). Conclusion: This study shows that the majority of injuries involved industrial products. Poison Control Centres should be prepared for the possibility of moderate or severe injury affecting several individuals with a lack of access to qualified medical assistance.

182. Enquiries to the Danish Poison Information Centre (Gifliljen) About Drug Overdosing in relation to Suicide Attempts or Affective Reactions

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Background. A substantial number of enquiries to the Danish Poison Information Centre (Gifliljen) are related to toxic effects of drugs after overdosing due to suicidal attempts or affective reactions. It is important to identify specific patient or drug groups involved in order to perform risk reduction. Methods: Identification of suicidal attempts and affective reactions were reviewed. Results: In the period 1/05-07, 30/04/08 (1 year) concerning suicidal attempts or affective reactions were reviewed. In all enquiries to Gifliljen in the period 01/05-07 - 30/04/08 (1 year) concerning suicidal attempts or affective reactions were reviewed. Results: In the period there was in total 1461 enquired cases, 431 women, 348 men, 72% patients ingested a single drug and the 5 most frequent were ibuprofen (80 cases), paracetamol (65 cases), chlorprothixene (57 cases), citalopram (35 cases) and zopiclone (24 cases). In 228 cases (16%), the patients ingested more than 1 drug - either in therapeutic doses or in toxic doses (defined as any ingestion above the therapeutic dose). The most frequent were paracetamol (99 cases), ibuprofen (68 cases), zopiclone (60 cases), citalopram and escitalopram (42-14 cases) and chlorprothixene (30 cases). In 30 of the 99 multiple drug overdosing cases with paracetamol, the patients ingested an overdose of another drug (67%). In 48 patients the ingestion was intentional with suicidal intent. According to the interviewing doctors, 47 patients (3%) and seizures (3%) were reported, 75% were male and 81% adults. Routes of administration included alcohol (7%), and opiates (6%). Twenty percent presented with coma (43%). The complications were respiratory insufficiency (11%), prolonged QTc (6%) (mainly associated with SSR1 or “paradox “) poisonings), pneumonia (3%), arthrythmia (3%), hypothermia (3%) or any other systemic complications (3%). Conclusions: Drug poisoning is an increasing cause for admission to hospitals in Oslo. Ethanol and benzodiazepines are still the most frequent main toxic agents. GHB poisonings are increasing and have now passed the incidence of hospitalized opioid poisonings. Paracetamol poisonings from indoor barbecues (COIBBs) to explore if COIBBs is a new phenomenon in Germany, although one which was already described in other countries, we asked 10 German-speaking PIC to send us all their COIBBS from the last ten years. Methods: A retrospective study of all COIBBS reported to the German-speaking PICs and the BfR Berlin from 2000 to the end of August 2009 was performed. Results: 57 COIBBS (accidental: 94.2%, suicidal: 3.8%, unknown reason: 2.0%) with 143 persons involved were reported by 5 of 11 German-speaking PICs and the Berlin PIC. The other 7 PICs could not separate them in their database from other CO poisonings. The number of COIBBS and involved per

clinical toxicology
sions increased from one incident with 2 persons in 2000 to 17 incidents with 32 persons in 2009 (to the end of August), respectively. The 143 persons with COBIB (female and male victims with unknown gender) were distributed over 15 of 16 federal states of Germany and Switzerland with centers in Bavaria (21), Brandenburg (18), and Baden-Württemberg (16). The age distribution was: adults (57.3%), children (25.2%), and unknown (17.5%). The severity of initial symptoms estimated according to the Poisoning Severity Score was: none to mild (60.1%), moderate (14.0%), severe (11.2%), fatal (7.0%), and unattainable (7.7%). The carboxyhemoglobin (COHb) concentrations, with poor correlation to symptoms, were less than 10% in 7.7%, between 10 and 30% in 26.6%, between 30 and 40% in 1.4%, higher than 40% in 0.7%, and unknown in 25.1%. CO poisoning in home heating systems. Consequently the Poison Center will have to attract the attention of the local inhabitants. The leading cause of death by poisoning in children in Bucharest and counties of Romania, USA: Saunders Elsevier Inc. 2007:119–25.

References:

185. Prevalence of Deaths in Acute Pediatric Poi-
soning: A 5-Year Study
Ulmeau CE,1 Petran M,1 Stanca S,1 Curca G,2 Ulmeau AI,1 Nitecu VG.1
1Pediatric Poisoning Centre, Emergency Clinical Hospital "Nicolae Alexandrescu", Bucha-
rest; 2National Forensic Institute "Mina Minovici", Bucharest, Romania

Objective: To study the epidemiology of deaths due to acute poisoning in children in Bucharest and counties around. Methods: We have analyzed both cases registered in our department as well as those investigated by the National Forensic Institute in a 5 year period, using medical documents and applying the following criteria: etiology, gender, death in residence, place and manner of death. Results: Thirty-nine deaths of intoxicated children were registered between January 1st 2004 and December 31st 2008 i.e. 0.068% out of the total pediatric poisonings reported in this period in our centre. Out of the 39 cases 13 died in the hospital and 26 were found dead at home. Etiology of deaths was as follows: carbon monoxide in 13 patients (33.3%), pesticides in 8 situations (21%), drugs of abuse 6 children (16%), caustics 4 (10%), medicines 3 patients (8%), alcohols 2 (6%), gas 1 (3%), nitrites 1 (3%) and lead 1 (3%). The age distribution showed that the majority of the patients (17) were between 1–5 years followed by those over age 11 years: 6; 1–2 years: 6; and 0–1 year 5 cases. There were 24 boys and 15 girls reported in our statistics. Conclusion: Although the morbidity in acute poisoning in children is still high the mortality of death is relatively low, but of concern is the rate of deaths at home. The leading cause of death by poisoning in children has been shown to be carbon monoxide, source being the heating systems. Consequently the Poison Centre will have to attract the attention of the local authorities on this issue. References: 1. Trestrail III JH. Forensic Toxicology. In: Shannon M, Borren S, Burns M. Haddad and Winchester's Clinical Manage-

186. Trends in Hospitalisation due to Poisoning and
in Telephone Enquiries to the Poison Control Centre
Involving Slovenian Children and Young People
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1National Institute of Public Health, Ljubljana; 2Poison Control Centre, University Medical Centre, Ljubljana, Slovenia

Objective: To study the trends of hospital admissions secondary to poisoning in children and young people and telephone enquiries to the Poison Control Centre (PCC) in order to identify priority areas for planning preventive measures. Methods: We searched the national hospital discharge database for injuries and poisonings from 1999 - 2008 in age groups 0 - 6 (AG1), 7 - 14 (AG2), 15 - 19 (AG3), and 20 - 44 (AG4) years. The agents were categorized into five groups according to the international disease classification codes at discharge: medicines, alcohol, drugs of abuse, chemicals, and natural toxins. The PCC enquiry database was searched from 2000 for same age groups and poisoning categories. Results: Age specific rate of hospitalisations for all age groups and all agents except alcohol from 734/100,000 inhabitants in 1999 to 687/100,000 inhabitants in 2008. Downward trends were identified in all age groups for intoxications with medicines (correlation coefficient, R2 = 0.5132 in AG1, chemicals (R2 = 0.0235 in AG4), drugs of abuse (R2 = 0.0284 in AG1), for alcohol intoxications in all, but the youngest age group (R2 = 0.4227 in AG2; R2 = 0.1001 in AG3; R2 = 0.1715 in AG4). In AG1 intoxications with medicines represented 39% of hospitalisations. In AG2 and AG3 the leading cause of hospitalisations was alcohol (43% and 52%), in AG4 medicines (42%). The number of enquiries to the PCC doubled, from 274 in 2004 to 468 in 2008. The main reason in AG1 was exposure to chemicals (49%); in the other three age groups exposure to medicines (42%-60%). Enquiries due to alcohol exposures were rare (1%) in all age groups. Conclusion: The study identified a decreasing trend in hospitalisations due to intoxications in Slovenian children and young people, while the enquiries to the PCC doubled. The upswing in AG1 due to alcohol intoxication gives rise for concern and calls for urgent action. References: 1. World Health Organisation (WHO). International statistical classification of diseases and related health problems 10th revision, IC-D-10, Geneva, Switzerland, WHO, 1992.

187. A Prospective Study of the Incidence and
Spectrum of Acute Poisonings in South Africa
Based on Hospital Admission and Poison
Information Centre Data
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Objective: The incidence and spectrum of acute poi-
sonings in South Africa are unknown. A study was therefore conducted to establish the extent of the problem. Methods: A prospective study was con-
ducted based on both Tygerberg Hospital admissions for acute poisoning and Tygerberg Poison Information Centre (PIC) data. Results: In the PIC, from 2001–2002 and 2005–2006 (before and after change in legislation), 363 and 284 (255 assessed as potential severe) patients with paracetamol related inquiries concerned paracetamol exposures to the National Poison Information Centre (PIC), number of paracetamol related deaths (National Cause of Death Register), number of paracetamol related liver trans-
plantations performed (the National Transplantation Unit), number of performed serum paracetamol analy-
ses at selected hospitals (laboratory statistics), and sales statistics from the National Statistics of Drug Consumption). Results: The average number of paracetamol related inquiries to the PIC was 431 (124 assessed as potential severe) per year before the change in legislation and 744 (255 assessed as potential severe) per year after the change. The increase in inquiries due to paracetamol exposure exceeds the overall increase in calls to the PIC. Paracetamol related deaths were 6.5 on average per year before and 7 after liberalization. Two paracetamol related liver transplantations were per-
fomed in 2005, one in 2006, and none in 2001 or 2002. Six out of eight hospitals had an increase in the number of serum paracetamol analyses. The total sale of parace-
tamol increased from 21.2 defined daily doses (DDD)/1000 inhabitants in 2001 to 27.3 DDD/1000 inhabitants in 2006, a 29% increase. The fraction of non-prescrip-
tion sales of paracetamol from the National Statistics of Drug Consumption). Conclusion: The number of inquiries to the PIC due to paracetamol was significantly higher in 2005–2006 compared to 2001–2002. The number of paracetamol related deaths has not changed signifi-
cantly. The increase in sale of paracetamol was mainly due to increased sale of prescription packages. Whether the increased number of paracetamol related inquiries to the PIC reflects a real increase in the incidence and severity of paracetamol overdose is not known. Studies on hospital admissions should be done to further assess this.

189. Frequency of Hyperbaric Oxygen Therapy and the Risk of Delayed Neuropsychiatric Effect Among Patients with Carbon Monoxide Poisoning
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1Department of Medicine, National Yang-Ming Uni-
versity Hospital, I-lan; 2Division of Clinical Toxicology, Tzu Chi Veterans General Hospital, I-lan, Taiwan

Objective: Delayed neurotoxicity syndrome (DNS) is a severe sequela that may develop after acute carbon monoxide (CO) poisoning. This study aims to investigate the risk factors for carbon monoxide-related DNS and the role of hyperbaric oxygen therapy for the delayed sequelae. Methods: A retrospective chart-review study was conducted and 516 cases enrolled with CO poisoning who had been admitted to
Abstracts

190. Life Lost Due to Poisoning Premature Mortality in Morocco
Khattabi A 1, 2 Achour S, 3 Rahlem N, 4 Soulaimani-Bencheikh R, 1, 4
1Poison Control Centre and Pharmacovigilance Centre, Rabat; 2Faculty of Sciences, University Ibn Tofail, Kenitra; 3Faculty of Medicine & Pharmacy, Fès; 4Faculty of Medicine & Pharmacy, Rabat, Morocco
Objective: To measure premature poisoning mortality in Morocco according to age, and sex; and to quantify their economic loss to the society, in order to provide more information that can be used to develop and monitor health programmes that are aimed at reducing poisoning premature mortality. Methods: Potential economic losses were estimated by use of premature years of potential life lost (PYPLL), with a cut-off point at 65 years, and valued years of potential life lost (VYPLL) methods were applied to the poisoning data from 1990 to 2007. Variables in these studies were measured further in terms of age, sex, urban/rural residence, and socio-economic status. PYPLL rates for all leading factors of poisoning death were calculated for Morocco. Among these, the most common poisoning of adult poisoning was acute CO poisoning who are aged 34 years or older, intentional poisoning and presenting hypoxic encephalopathy was the most common in children (37.8%). Suicidal attempts occurred in 5.4% of the cases followed by criminal circumstance in 3%. These poisonings occurred frequently in the family or in public places (21.5%). The economic place of Public Health (83.5%). The most commonly reported symptoms were neuropsychiatric (98%). The treatment advised by CAMF was symptomatic treatment (60%), gastric lavage (8%). The VYPLL poisoning was an indication of economic burden. Conclusion: The ignorance of its toxicity can have disastrous effects on health in the long term. References: 1. Bellahd D. La pharmacopée marocaine traditionnelle. Médecine arabe ancienne et savours populaires. 3rd ed. Rabat, Morocco: l’Ibis Press, 1997.

192. Scorpion Stings: A Public Health Problem in Beni Mellal (Morocco)
Charab N, 1 Soulaimani A 1, 2, 3 Semlali I 1, Eloufri R 1, Mokhtari A, 1 Soulaimani R, 1
1Laboratoire de Virologie et Biometries, Faculty of Sciences, Kenitra; 2Poison Control and Pharmacovigilance Center of Morocco, Rabat, Morocco
Objective: The present study aimed at verifying the impact of a Moroccan strategy against scorpion stings through the analysis and interpretation of data recorded in the register. Methods: We study a retrospective study of scorpion stings based on medical charts of Beni Mellal. Results: From 2002 to 2006, 6,959 cases of scorpion stings were recorded. Twenty cases were classified as severe incidence of 1.37%. The stings were more frequent in summer months, particularly July and August, and between 6 p.m. and 6 a.m. (60.2%). The average age of victims was 26.17 ± 18.38 years. Children were affected in 31.2% of the cases. Of all registered cases, 85.9% of the patients received medical aid in less than an hour after the sting. The envenomation rate (Class II and Class III) was 14.1% and the overall case-fatality rate was 0.5%. Statistical analysis of the various studied factors revealed a significant connection among the envenomation class (X² = 12.5, p < 0.001), patient age (P = 3.8; p = 0.01) and evolution. Conclusion: Scorpion stings remain a public health problem in Beni Mellal province. Further work is needed to provide a decrease in the lethality rate. Acknowledgement: This work is within the framework of the Moroccan National Campaign for the control of scorpion stings and envenomation.

193. Valproate Overdose: A Retrospective Study of Self-Poisoning
El Ghord H, 1 Mard A 1, Beji O, 1 Masri W, 2 Kourachi N, 1 Brahmi N, 1 Thabet H, 1 Amamou M 1, 2
1Intensive Care Medicine and Clinical Toxicology Department, Centre d’Assistance Médicale Urgente, Direction Générale, Tunisie; 2Biostatistics, Tunis, Tunisia
Objective: To describe the epidemiology of valproate poisoning and the spectrum of its clinical effects, complications and treatments. Methods: All patients were followed up by the Centre d’Assistance Médicale Urgente (CAMU) Tunis between January 2000 and October 2009. Consecutive valproate poisownings were identified. Results: There were 65 patients with valproate poisoning from January 2000 to October 2009. The mean age of the studied population was 28 ± 10 years; the sex ratio was 1.26. Ingested doses had a mean of 34 mmol/L and ammonium serum level was 10.5 ± 1 mmol/L and 71.5 ± 18.3 mmol/L respectively. Massive ingested doses were directly related to decrease in conscious level (P < 0.0001), and there was a significantly increased risk of mechanical ventilation (P = 0.03). In patients with chronic intake of valproate, repeated blood concentrations are required to determine the state of consciousness compared to patients with first contact with valproate; cut off: 408 vs 204 mg/L. Conclusion: Outcome was favourable for the majority of patients. There was one death directly related to massive valproate poisoning.

194. Reed Diffuser Toxicity
Crandon KC, Davies JTD, Thompson JP
National Poisons Information Service, Cardiff and Vale University Health Board, Cardiff, UK
Background: Air fresheners have become increasingly popular over recent years with marketing aimed at removing odours, refreshing the air and creating a pleasant ambient mood. Their popularity has resulted in a multi-million pound market with new products continually being released. Air fresheners come in many forms including sprays, plug-ins, gels and candles. Due to their wide use and availability, ingestion of these products is common with hundreds of cases being reported to the National Poisons Information Service (NPIS) annually. Whilst many air fresheners contain potentially harmful products, they are usually difficult to ingest in large amounts and serious effects are therefore uncommon. Recently however, the NPIS has seen the emergence of a new type of air freshener which has led to concern. Reed diffusers, although available for many years, have seen a massive surge in popularity in 2009. They are usually composed of a bottle filled with approximately 100 - 500 ml of scented liquid delivered to the room by “wicking” reeds made of bamboo or similar. Some also contain decorative items such as beads. The liquid is easily accessible due to the open neck of the bottle and therefore has to be ingested in large amounts. The symptoms of poisoning vary dramatically. A small sample of different products revealed a contents list which can include 90% essential oils; 85% glycol ethers; 80% ethanol or 78% hydrocarbons. Case series: From January to November 2009 the NPIS (Cardiff) has received 27 calls involving reed diffusers. These all involved young children aged between 8 months and 4 years with an average age of 21 months. One enquiry involved eye contact, four involved ingestion of beads or pearls from within the unit and 22 involved ingestion of the liquid itself, most of these cases involving unknown amounts. Conclusion: These products are of serious concern due to the ease with which young children may ingest significant quantities of potentially life threatening compounds. It is essential that health professionals are aware that the reed diffuser type of air freshener is not as innocuous as those with which we are more familiar and that all cases should be treated as potentially serious.
Service (Cardiff) and to review the toxicity of essential oils. **Methods:** Interrogation of the United Kingdom Poisons Information Database (UKPID) and literature review using Medline. **Results:** Of 92,731 exposures reported to the NPIS (Cardiff) from Jan 2004 to January 2008, 2015 (1.6%) involved essential oils. Of these cases, 1280 (84%) were ingestions. Most exposures (60.0%) involved patients under the age of 4 years. A review of the literature suggests that certain essential oils (eucalyptus, pennyroyal, turpentine and clove) are more commonly encountered in human exposure. It is not clear whether this is due to greater toxicity or wider use of these particular oils. It is generally regarded that certain oils (pennyroyal, tea tree, turpentine, wintergreen, and wormwood) are too toxic to be used in aromatherapy. Others such as lavender oil are thought to have a much lower toxicity. **Conclusion:** Toxicity from essential oil ingestion (and less commonly dermal contact or intravenous injection) includes gastrointestinal upset, central nervous system depression, aspiration pneumonitis, hepatic and renal failure. **Abstracts**

### 196. Calls to the National Poisons Information Service (Cardiff) from 2005 to 2009 Involving Tramadol, Compared with Other Opioid Analgesics

Spear RS, Thompson J. National Poisons Information Service, Cardiff and Vale University Health Board, Cardiff, UK

**Objective:** To investigate poisoning with opioid analgesics over a six-year period. **Methods:** Data were recorded from cases of poisoning reported to the NPIS (Cardiff) between January 2004 and October 2009. **Results:** 196.2% of all cases were of Tramadol and related compounds (137,319 cases, 121,465 Tramadol, 14,854 codeine, 14,000 dihydrocodeine). **Conclusion:** The number of Tramadol-related cases was higher than class A drugs and clove.

### 197. Mepobarbame and Cardiotoxic Drug Poisoning Among Adult and Young Patients

1. Grenouillet-Delacre M, Petitpretz E, Gruson D, Clouezou B, Milombard M, Petitpretz E, Gruson D, Clouezou B, Milombard M, Bégard B. Intensive Care Unit, University Hospital, Bordeaux; Poisons Information Centre, University Hospital, Bordeaux, France

**Objective:** The aim of this study was to assess characteristics of mepobarbamate and cardiotoxic drug poisoning in admitted adult and young patients. **Methods:** All patients admitted to Intensive Care Units (ICU) over a six-month period for acute poisoning with mepobarbamate or cardiotoxic drugs were included in this retrospective cohort study. **Conclusion:** Of the 138 cases, 66% had ingested mepobarbamate and 34% other cardiotoxic drugs. Median age was 44 (17–74) and 61% were female. In 20% of cases, patients had known underlying cardiovascular disease. Patients ingested cardiotoxic drugs with membrane stabilizing activity in association with other drugs in 59% of cases. In all cases, the aetiology of shock was multiorgan. Echocardiographic shock was proven in 40% of cases. **Abstracts**

### 198. A Poisoning and Prescribing Data Analysis for Mefenamic Acid

James DA, Bradley S, Thomas SHL. The National Poisons Information Service, Regional Drug and Therapeutics Centre, Newcastle-upon-Tyne, UK

**Objective:** Mefenamic acid is used commonly to treat dysmenorrhoea and is therefore often available to female adolescents, a high risk group for self-poisoning. **Methods:** Data were recorded from cases of poisoning reported to the NPIS (Cardiff) between January 2004 and October 2009. **Results:** 196.2% of all cases were of Mefenamic Acid (137,319 cases). **Conclusion:** The number of Mefenamic Acid cases was lower than class A drugs and clove.

### 199. Hospital Mortality Owing to Chemical Poisoning in Azerbaijan 2004–2008

Afandiyev I. Republican Toxicology Centre MoH, Baku, Azerbaijan

**Objective:** The epidemiology of lethal poisoning cases in Azerbaijan is still uninvestigated. **Methods:** Epidemiological analysis of fatal outcomes in patients admitted to ICU (Republic of Azerbaijan, 2004–2008). **Results:** 196.2% of all cases were of Mefenamic Acid (137,319 cases). **Conclusion:** The number of Mefenamic Acid cases was lower than class A drugs and clove.

Table 1. Enquiries to NPIS (Cardiff) involving opioid analgesics, number of prescribed items in England and Wales, and TOXBASE® hits for tramadol, 2004–2008 and NPIS enquires for Jan–Oct 2009

| Year | 2004 | 2005 | 2006 | 2007 | 2008 | 2009
<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>Tramadol</td>
<td>% of total opioid analgesics sold</td>
<td>11.7</td>
<td>13.3</td>
<td>14.3</td>
<td>13.8</td>
<td>17</td>
</tr>
<tr>
<td>Total prescribed items (1000s)</td>
<td>3450</td>
<td>4234</td>
<td>4917</td>
<td>5478</td>
<td>6121</td>
<td></td>
</tr>
<tr>
<td>TOXBASE® hits (% of total)</td>
<td>0.66</td>
<td>0.76</td>
<td>0.86</td>
<td>0.94</td>
<td>1.14</td>
<td></td>
</tr>
<tr>
<td>Cooxopramol</td>
<td>% of total opioid analgesics sold</td>
<td>18.2</td>
<td>13</td>
<td>6</td>
<td>3.6</td>
<td>17</td>
</tr>
<tr>
<td>Total prescribed items (1000s)</td>
<td>7795</td>
<td>3148</td>
<td>1444</td>
<td>979.6</td>
<td>391.8</td>
<td></td>
</tr>
<tr>
<td>Codeine (inc. dihydrocodeine)</td>
<td>% of total opioid analgesics sold</td>
<td>36.2</td>
<td>37.8</td>
<td>44.4</td>
<td>44.9</td>
<td>52.7</td>
</tr>
<tr>
<td>Total prescribed items (1000s)</td>
<td>13244</td>
<td>15458</td>
<td>16572</td>
<td>17685</td>
<td>18715</td>
<td></td>
</tr>
<tr>
<td>Dihydrocodeine (inc. of codein)</td>
<td>% of total opioid analgesics sold</td>
<td>22.5</td>
<td>22.1</td>
<td>19</td>
<td>16.9</td>
<td>16.2</td>
</tr>
<tr>
<td>Total prescribed items (1000s)</td>
<td>6623</td>
<td>7125</td>
<td>6957</td>
<td>6787</td>
<td>6599</td>
<td></td>
</tr>
<tr>
<td>Oxycodeine</td>
<td>% of total opioid analgesics sold</td>
<td>0.6</td>
<td>0.8</td>
<td>0.8</td>
<td>1.6</td>
<td>1.9</td>
</tr>
<tr>
<td>Total prescribed items (1000s)</td>
<td>226.7</td>
<td>319.8</td>
<td>417.6</td>
<td>539.1</td>
<td>672.6</td>
<td></td>
</tr>
</tbody>
</table>
(age <15 years) was 10.3%. The most frequent cause of death was ingestion of corrosives (30.8% of total mortality) and especially concentrated acetic acid poisonings. All data were analyzed and presented using statistical methods. The Fisher’s exact test was used to assess the correlation between the number of patients with acute intoxications and the type of poisonings. The results are presented as number of patients (% of all cases). With the implementation of the new method of drug testing and the use of a special database for patients admitted to the clinic of toxicology, it is possible to conduct a retrospective analysis of data on the incidence of acute poisonings and to determine the most frequently used antidotes for these cases. The results of this study can be used for the development of more effective methods for the prevention and treatment of toxic injuries. In this way, it is possible to reduce the number of cases of acute intoxication and to improve the quality of treatment for patients with these injuries.

200. Epidemiological Characteristics of Hospitalized Treated Poisonings in 1998 and 2008 Year at a University Clinic of Toxicology, Skopje Pereska JZ, Pekovska LL, Boznomica C, Simonovska N, Cibisev A, Babulovska A. University Clinic of Toxicology, Skopje, FYROM

Objective: The transitional period in developing countries influences the dynamics and causes of poisonings. This study provides a detailed description of the pattern differences in hospital treated patients in the years 1998 and 2008. Methods: The recorded data of all patients hospitalized at the Clinic of Toxicology were analyzed. Patients who were ambulatory with mild poisoning clinical presentations were not included in the study. Results: There was an increase in the rate of poisonings in males from 1998 to 2008 (34.1% to 45.4%). No significant difference in suicidal attempts (73.1% to 75.6%) and lethal outcome (3.12% to 3.11%). Caustic poisonings increased by about 1% (15.3% to 16.5%) but poisonings with benzodiazepines increased almost three fold. Mushrooms decreased (7.5% to 3.64%). There was no statistical difference in sex distribution of suicidal poisonings between 1998 and 2008 (r = 0.152, p = 0.001 to r = 0.193, p = 0.000). Higher lethal outcome in older patients is registered in each year (r = 0.234, p = 0.000 to r = 0.127, p = 0.002) with no significant difference in the average age of the patients (32.1±15.6 to 34±16.4 years). The length of hospital treatment also decreased (6.2±6.25 days to 4.1±2.43 days). There were no severe poisonings with paracetamol in this 10 year period. Conclusion: There was an increased number of poisonings in males, caustic poisonings and mushrooms during the transitional period. A decreased number of pesticide poisonings is mostly related to factory closing and lower economic standard of living. Also, mushrooms maintain the trend due to the easy availability and low prices of the products. The shortening of hospital stay is related to the improvement in poisoning treatment.

201. Cannabinoid Intoxication Patient Presentations to US Emergency Departments Hung OL, Shih RD, Troncoso A, Walsh BW, Fiesseler FW. Department of Emergency Medicine, Morristown Memorial Hospital. Morristown, NJ, US

Objective: Cannabinoids are one of the most frequently abused hallucinogens in the US, but acute cannabinoid intoxica-
tions rarely present to hospital emergency departments (EDs). Cannabinoid intoxication in ED patients is registered in each year (r = 0.234, p = 0.000). There was no statistical difference in sex distribution of suicidal poisonings between 1998 and 2008 (r = 0.152, p = 0.001 to r = 0.193, p = 0.000). Higher lethal outcome in older patients is registered in each year (r = 0.234, p = 0.000 to r = 0.127, p = 0.002) with no significant difference in the average age of the patients (32.1±15.6 to 34±16.4 years). The length of hospital treatment also decreased (6.2±6.25 days to 4.1±2.43 days). There were no severe poisonings with paracetamol in this 10 year period. Conclusion: There was an increased number of poisonings in males, caustic poisonings and mushrooms during the transitional period. A decreased number of pesticide poisonings is mostly related to factory closing and lower economic standard of living. Also, mushrooms maintain the trend due to the easy availability and low prices of the products. The shortening of hospital stay is related to the improvement in poisoning treatment.

202. Methadone Overdose Patients Presentations to US Emergency Departments Hung OL, Shih RD, Fiesseler FW, Walsh BW, Troncoso A. Department of Emergency Medicine, Morristown Memorial Hospital, Morristown, NJ, US

Introduction: Methadone overdose is an infrequent type of opioid poisoning presentation to US emergency departments (EDs). Compared to other opioid poisonings, methadone is particularly dangerous because of its prolonged duration of action. The epidemiology of methadone overdoses to US EDs is poorly studied. Objective: To characterize methadone overdoses presenting to New Jersey and New York emergency departments. Methods: Design: A multi-center retrospective emergency department (ED) cohort study. Study Period: October 1, 2008 to September 30, 2009. Subjects: Consecutive ED patients with the ED diagnosis of methadone poisoning (ICD10 code = T40.3) were identified from October 1, 2008 to September 30, 2009. Results: Out of 1,590,248 consecutive patients, 64 patients were diagnosed with methadone poisoning (0.004% of all ED patients), but only 40 had completed charts for review. The patient demographics were as follows: mean age = 39.7 years (range: 16–62 years), gender = 50%, mean methadone dose = 78 mg (range: 30–140 mg). Overdoses were more frequent on Monday (18%), Thursday (18%), and Friday (20%). Methadone overdose was administered in 5% and 27.5% of cases, respectively. Hospital admissions occurred in 28% of patients and were due to prolonged sedation or unrelated complications. There were no deaths. All patients were treated symptomatically. Conclusion: Methadone poisoning is a rare presentation to US emergency departments. The risk of mortality and serious morbidity (e.g. intubation) appears to be extremely low.

203. Is There an Association with Methemoglobinemia and Carbon Monoxide Poisoning? Fiesseler FW,1 Hung O,2 Salo D,1 Shih R,2,1 Riggs RL,1 Morristown Memorial Hospital, Morristown, NJ; New Jersey’s Poison Control Center, Newark, NJ. 1UMDNJ-Robert Wood Johnson Medical School, New Brunswick, NJ, US

Introduction: Methemoglobinemia (Methgb) is a condition in which the iron within hemoglobin is oxidized from ferrous to the ferric state, leading to various degrees of deficiencies in oxygen transport. There is limited data regarding acquired Methgb and its association with carbon monoxide (CO) poisoning. Objective: To determine the incidence of Methgb to CO poisoning. Subjects: Consecutive ED patients with the ICD-9 diagnosis of “toxic effects CO” from January 2000 to October 2006. A manual chart review was performed to determine which patients had Methgb levels. Patients without documented Methgb levels were excluded. A serum Methgb of more than 1% was considered abnormal. Results: Mean-Shawn with pre-set alpha of 0.05. Results: “Toxic effects of CO” was diagnosed in 1131 patients. Ninety patients (8%) met inclusion criteria. Mean age was 34.5 years (±20 SD). Twenty-one percent were < 18 years of age and 0.7% were admitted at (15.2–15.5%). Mean COhgb level was 5% in those with methemoglobinemia, compared to 5.4% in those without (p = 0.46). One patient with methemoglobinemia and a COhgb level of 75% was admitted in 2018. Conclusion: Only a small number of patients with CO exposure have elevated Methgb levels. The incidence of Methgb does not correlate with COhgb levels.

204. Not Only Good Wine . . . The Impact of Acute Intoxications in Toxology Unit Care in North East Italy Majori S,1 Ricci G,1 Zannoni M,1 Rocca GP,2 Codogni R,1 Siviero V,1 Los R,1 Baldovin T,1 Baldo V,1 2 Toxicology Unit, Azienda Ospedaliera, Verona; 3Emergency Department, Azienda Ospedaliera, Verona; 4Medicine and Public Health Department, Verona University, Verona; 5Environmental Medicine and Public Health Department, Padua University, Padua, Italy

Objective: This was a retrospective hospital based study performed with the purpose of investigating the epidemiology of acute intoxication (AI), and performed in a Toxology Unit Care (TUC) in an Emergency Department (ED) (TUC/ED) in Verona, Northern Italy during the year 2009. Methods: All data regarding subjects who presented to the TUC/ED with a diagnosis of definite or suspected acute intoxication and poisoning were collected from its database. To extract patients some key words such as “poisoning”, “intoxication”, “bleach”, “amphetamine”, “marijuana” and “ingestion” were used. All alcohol and carbon monoxide related AI cases were excluded. Results: 244 cases were analyzed: 45.9% males and 54.1% females, mean age respectively 45.1 and 43.9 years. The distribution of admitted patients remained fairly constant, except for a slight rising prevalence in autumn (poisonous mushrooming) and spring (codeine, methadone); and a majority of yel-
low (45.9%) and green (43.4%) trage codes. Only 1.6% of females and 1.2% of males showed a severe symp-
tomatology already on admission. The pattern of expo-
sure to toxic substances, a quick and a specific intervention to obtain the most effective treatment is appropriate, in order to save lives and avoid irreparable health damage.

205. Monitoring Caustic Injuries from Emergency Department Databases Using an Automatic Keyword Recognition System Vignally P,1 Fondi G,1 Taggi F,1 Pittis A,1 1 Italian National Institute of Health, Rome; 2 Hospital EDs participating in IDB and SINIACA systems, Poisson Control Centres, Italy

Objective: In Italy the EU Injury Database (IDB) reports the involvement of chemical products in 0.9% of...
home and leisure accidents.\textsuperscript{1} The whole European sample reports a similar figure for injury by chemicals and 0.2\% for chemical corrosion injuries.\textsuperscript{1,2} A simplified ED registry on home accidents (SINAC) and the Poison Control Centres record poisoning cases.\textsuperscript{3,4} Ninety per cent of toxic exposures occur at home. The effects of chemical agents are frequently observed by parents and have a higher potential risk of damage, with double the rate of hospital admission for home injuries, especially for caustic exposures. The aim of this study is to monitor caustic effects in Italy using automatic recognition of free-text in ED medical databases. Methods: We created a Stata software program to automatically identify caustic or corrosive injury cases. The procedure has to recognize caustic or corrosive agent within the free text using an agent specific list of keywords. In order to assess the capacity of recognition of this expert system we focused attention on the sensitivity and specificity of the procedure. We checked the validity of the system by direct manual quality control on free-text description for the selected cases and for all those codified as chemical/thermal agent effect or poisoning/intoxication. Results: 10 hospitals from 6 regions participated in the study. The program identified 112 cases of injury by caustic or corrosive agent. Checking the cases for quality control we assessed 91 cases, 80 positive cases, that is say 0.59\% (99\% CI: 0.45\%–0.76\%) of the total sample, almost 3 fold greater than the expected value (p=0.000) from European codified information. False positives were 11.6\% of all those codified as chemical/thermal agent effect or poisoning/intoxication.

Results: Within the study decade 12,575 exposures to cosmetic products were identified corresponding to 4.8\% of all exposures reported; 0.8\% of all cases were considered as moderate or severe. There were 6 lethal cases, including one case of questionable relationship to exposure (severity not evaluated: 6.7\%). The overall IntoxIndex was calculated as 0.96. Table 1 breaks down the cases to agents involved indicating that most cases were reported for skin care products, while hair colouring agents were the product group with the highest poisoning risks (IntoxIndex = 2.1\%). Conclusion: Cosmetics are comparably safe substances when lethal poisoning occurs, that may indicate the need for access to cosmetic formulation data in daily PC work.

Objective: The study includes all poisonings reported to the authors’ poisons centre from July to September 2009, restricted to cases where patients mistake hazardous agents for beverages or food because they had been decanted into food-like containers. All exposures that satisfied inclusion criteria were decanted cleaning products reported to the authors’ poisons centre in 2007 initiated a study to evaluate the frequency and severity of such events to provide a basis for preventative action. Methods: The study includes all exposures reported to the authors’ poisons centre from July to September 2009, restricted to cases where patients mistake hazardous agents for beverages or food because they had been decanted into food-like containers. All exposures that satisfied inclusion criteria were identified and checked for completeness of data set and followed up by telephone interview within 48 h. Results: Of 520 recorded exposures, 53 cases (5\%) fulfilled the inclusion criteria. In 28 cases the agent was identified, in 25 cases not. Thirty patients were exposed to professional and household use, 27 to household products (9 unknown). Thirty patients drank liquids out of bottles intended to be used for beverages, 5 out of cans, and 5 out of other food like containers (13 unknown). Twenty-three exposed patients were younger than 19 years while 30 were older. Forty-one exposures occurred at home, a group of 7 was exposed in an open air bath (5 in other locations). Forty-nine patients had ingested the product while 4 patients had inhaled it. Twenty-four patients had ingested 13 minor, 14 moderate, 1 severe (1 unknown). Thirty-eight patients were treated by medical professionals. A frequency of 1.5 reported mistakes per 100,000 inhabitants was observed and poisoning severity was calculated from these results. Conclusion: The proportion of moderate or severe poisonings in this series is 28.3\%, while the proportion of moderate or severe poisonings among cases that were exposed at home to the authors’ poisons centre within the last decade is only 2.1\%. Thus, transfer of hazardous products to beverage containers is a frequent cause of exposure by mistake, leading disproportionately often to serious poisonings with need for medical treatment.

### 208. Analysis of the Self-harm Cases Received at Al-Watani Governmental Hospital In Palestine

Sawalha A.

**Objective:** To analyze the self-harm and suicidal poisoning cases which were received at Al-Watani Governmental Hospital in Palestine during the previous year from May 2008 - April 2009.

**Methods:** All poisoning cases that were received at the emergency department that resulted from self-harm or suicide were included. Demographic and clinical information about the cases was collected, entered into SPSS, and analyzed. Results: A total of 54 cases were included, the majority of the self-harm patients were female (35 cases (64.8\%)). Most self-harm patients were adults, with 13\% occurring at age 18, and 11\% at age 24. Most poisoning incidents happened in cities (57.4\%), and a lesser percentage was living in villages (31.5\%), or camps (9.3\%). Most self-harm cases were carried out using medications (70.4\%), other medicines, explosives, cleaning products, or other substances (29.6\%). Most cases involved a single ingestion (75.9\%), while multiple ingestions were used in the rest. Only hours had passed before the poisoned patients decided to seek medical help in the majority of cases (44.8\%), others did not specify the time of exposure to the poison(s). Oral ingestion was the route most commonly used (98.1\%), and injection was used to a much lesser percent. Regarding the decontamination, lavage was performed for 42.6\% while only 7.4\% received activated charcoal, and 11.1\% had both. Conclusion: This is the first article that sheds light on such a sensitive issue in a country plagued by instability. The government needs to take further action on this issue in order to better help patients.

### 209. Occupational Exposure to Epibatidine Associated with Widespread Vesicular Rash

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**Objective:** Epibatidine is a highly potent nicotinic receptor agonist and has been used to explore the physiological and pharmacological basis of several diseases.\textsuperscript{1,2} The chemical name is ecko-2-(4-cho1ro-3-pyridinyl)-7-azabicyclo[2.2.1]heptane hydrochloride and CAS number 140111-52-0. Previous human exposure has not been described. We report a case of inadvertent occupational exposure in a previously healthy young man. Case report: A 23-year-old laboratory worker had been preparing a batch of dilute samples from a concentrated sample of epibatidine hydrochloride (Toeris Bioscience, Missouri, US) for around 2 hours. He had been wearing protective gloves, laboratory clothing but his face was unprotected. Around 30 minutes after completing this task he developed an intense itch affecting upper and lower limbs and trunk.
On arrival at hospital he was noted to have past history of asthma that was well controlled, and had no previous skin disorder. He was taking no regular medications. Examination found a vesicular rash over the exten- sive surfaces of the forearms, around both axillae, and both calves. There was sparing of mucous membranes and no lymphadenopathy. Resting electrocardiograph showed sinus bradycardia (HR 49 per min) and was other- wise normal. Serum electrolytes, liver biochemistry, C1 esterase inhibitor, complement C3 and C4, anti-neu- trophil cytoplasmic antibody PR3 and MPO, immunoglobu- lin E were within normal limits. Immunoglobulin G was marginally elevated at 13.7 g/L (reference range 5 to 13 g/L), and subfractions 1 to 4 were within normal limits. A single dose of oral prednisolone 40 mg was administered followed by regular oral chlorothiazide was mg thrice daily. At 24 hours the vesicular rash persisted but itch had significantly lessened and the patient was dis- charged from hospital. One week later, the vesicular rash was noted to have resolved. Conclusion: A causal relation- ship was supported by the close temporal relationship between exposure and rash and lack of an alternative cause. There was uncertainty as to whether exposure had been dermal or inhalation; nonetheless, the distribution of rash indicated a systemic rather than localised reaction. References: 1. D’hoedt D, Bertrand D. Nico- tic agonists, antagonists, and modulators - an overview of drug dis- covery. Expert Opin Ther Targets 2009; 13:395–411. 2. Daly JW. Nicotinic agonists, antagonists, and modula- tors from natural sources. Cell Mol Neurobiol 2005; 25:513–521.

201. Accidental Intravenous Chlorhexidine Digu- luconate Injection

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Objective: There are few reports in the literature on the clinical effects of intravenous chlorhexidine injection. Accidental i.v. administration of small amounts of chlor- hexidine is usually relatively benign. However, intra- venous administration of 800 mg chlorhexidine gluconate resulted in hypotension, tachycardia, and acute respiratory distress syndrome in one patient. We present the first report of accidental injection of 100 mg chlorhexidine. Case report: A 79-year-old man with chronic renal disease on warfarin treatment received a bolus of 20 mL of 0.5% chlorhexidine digluconate in ethanol as an intravenous injection for drug iden- tification. He experienced a severe allergic reaction during preparation for hemodialysis. In less than one minute he felt ill with a warm feeling in his head and lost consciousness. When he woke up less than a minute he felt hot and warm. His blood pressure was 192/62 and the heart rate 57. He improved in half an hour. Hemodialysis treatment was performed without any com- plications for four hours as planned. After the dialysis the patient wanted to return to his home for the night. The next day he was in good condition and his chest x-ray and labo- ratory results were normal. Conclusion: Intoxication with 100 mg chlorhexidine resulted in transient loss of consciousness. The clinical course was uneventful after performing a planned hemodialysis. The influence of hemodialysis on the clinical course is however unclear. References: 1. Ishigami S, Hase N, Nakashima H, et al. Intravenous chlorhexidine gluconate causing acute respiratory distress syndrome. Clin Toxicol 2001; 39:77–80.

210. Medication Errors with Toxic Outcome and Seasonal Variation

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Objective: A descriptive study of the number and nature of medication errors (MEs) leading to drug toxic- ity in Denmark. Methods: All enquiries to Giffinjen (published in 2006) and 2007 were used about MEs leading to toxicity were evaluated. Results: The number of cases per year was steadily increasing (4 in 2006, 5 in 2007, 18 in 2008 and 26 in 2009) - in total 53 cases. The majority of MEs leading to toxicity took place in June, July and August (3/5 in 2007; 9/18 in 2008; 13/26 in 2009) and in nursing homes in 43% of the cases. There was a higher proportion of antipsychotic drugs or antidepressants involved in these cases (70%) compared to the proportion in the total ME population (34%) or in the total population of enquiries to Giffinjen (16%). The majority of the cases (26) were categorised ‘no risk’. However, 2 were categorised ‘temporary effect’, 20 “requiring treatment” and 2 “life threatening”. The response time i.e. the time from ingestion of the toxin to calling the Poison Centre was 1.1 hrs compared to 2.1 hrs in the remaining cases. Conclusion: The number of MEs leading to potentially harmful effects is increasing in Denmark especially in nursing homes during the summer period in which the regular staff members are on leave. The majority of MEs involves antipsychotic or antidepressant drugs, but luckily the majority of inci- dents are categorised as harmless - this may be due to the rapid enquiry and advice from the Poison Centre. However, we recommend that a special effort be made in nursing homes during the summer period to avoid mixing up medication and to ensure that the correct medication is given to the right patient.

211. Therapeutic Errors Involving Ingestion of Clotrimazole Pessaries by Women

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Objective: To characterise the calls made to the NSW Poisons Information Centre (PIC) from carers looking after people living in a group home (commu- nity dwelling for people with disabilities, such as mental illness, intellectual or physical impairment, or low level aged care). Methods: A retrospective review of calls made to the PIC in 2008 involving individuals residing in a group home (excluding bites and stings). Only calls from the local state, New South Wales were included. Results: Of the 75,467 local calls received by the PIC in 2008, there were 2,044 (2.7%) calls from group homes. The most prominent call type was of medication administration errors (n = 1513; 74%), consisting of - medications missed from previous dose time (36.3%), medica- tions given to wrong patient (10.0%), medications given at incorrect time (8.7%), multiple doses of the same medication given in close proximity (8.4%), clients refusing medications (4.4%), seeking advice for clients who will be delayed in receiving medica- tions due to availability issues (4.4%), miscellaneous (2.1%); followed by requests for various types of drug information (13.6%) such as checking drug interactions and generic drug equivalence. Calls for advice on how to deal with erratic clients were also frequent. The weekly data was compared with enquiry data regarding all ther- apeutic errors over the same period. Results: 83,215 telephone enquiries relating to patients were received by the NSW PIC and 16% (13,238) related to therapeu- tic errors. Four hundred and sixty-nine enquiries were received regarding tiotropium bromide over this period, of which 467 (99.6%) related to patients. The circumstances involved in the tiotropium enquiries were
as follows: therapeutic errors 456/467 (97.6%); accidental 7/467 (1.5%); intentional 4/467 (0.9%). Where the circumstances were intentional, 3/4 involved additional drugs. One out of four patients was symptomatic (somnolence and abdominal pain) after she deliberately ingested Spiriva® and oxcarbazepine. Of the 456 enquiries regarding therapeutic errors, 448 (98.2%) involved ingestion of the inhalant capsule, only 8 (1.8%) involved inhalation. The total number of enquiries involving Spiriva® ingestion represents 3.2% (448/14,103) of all therapeutic error enquiries received over this period. Diabetes mellitus, 1/2 of the 217 cases with onset of symptoms, were aged 60 years and over, and compared with 32.9% of all therapeutic error patients. 65.2% of tiotropium ingestion patients were female and 33.7% were male (1.1% unknown). Symptoms were recorded in 8/488 (1.8%) tiotropium ingestion patients. One patient who had ingested 6 Spiriva® capsules developed agitation and urinary retention. Conclusion: Enquiries relating to Spiriva® ingestion represent a small proportion of NPIS therapeutic error enquiry workload, however this could perhaps be avoided if the inhalant capsule was easily recognised as such, rather than resembling an oral capsule. The unnecessary administration of a prescribed medication by an ineffective route may result in an exacerbation of (unintended) COPD symptoms. Acknowledgement: The authors appreciate the assistance of the other Units of the NPIS in providing data.

215. Paresthesias Following Administration of Intrathecal Chemotherapy Unintentionally Dissolved with 0.9% Benzyl Alcohol
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Objective: Freiberg et al1 describe the consequences of administering a preservative which is normally omitted with benzyl alcohol. This case describes the consequences present a case of transient neurotoxicity from the unintentional use of free diluents are used to limit neurotoxicity. We prepared.

prevention, management and clinical course of toxic alcohol ingestions over a year. The flecainide was compounded at the hospital pharmacy and SH at the time of the enquiry in the remainder (33%). Fomepizole was used in 5 (4%) cases, ethanol in 61 (44%) cases and both in 6 (5%) cases. Dialysis was used or was added in 3 (27) cases. Conclusion: This case study suggests that the number of cases of incidence of ethylene glycol or methanol poisoning because the search terms do not capture all products containing these substances and because some cases may never be discussed with the patient. Several canisters of methanol were more frequently involved, exposures more commonly involve ethylene glycol and ethanal was the antitode most frequently employed. Further prospective studies are required to estimate incidence and need for assays and antidotes more accurately.

218. Toxicokinetics of Ethanol and Methanol in a Severe Case of Methanol Poisoning
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Objective: Methanol poisoning is a rare event in Spanish EDs. One of its potential cases is a “Universal solvent” widely used in households. The current antidotes for methanol poisoning are methanol and methylthiozoate, both of them acting as blockers of ADH, preventing the production of toxic metabolites. We present a case showing the difficulties of using ethanol due to its high rate of metabolism. Case report: A 45-year-old man was found unresponsive at home. He was previously healthy without a previous record of alcohol abuse or psychiatric illness, but under family and professional stress during the previous months. Several cans of “Universal solvent”, “Zotal” and glue were found around him. The “Universal solvent” contained methanol and toluene, according to the can, but the content was not identified. The “Zotal”, which is used as an industrial disinfectant, contained 0.8% 4-chloro-3-methyl-phenol, 0.4% 4-chloro-2-benzylphenol, and 1.5% 2-phenyl-phenol. He presented in a coma with Glasgow Scale Score of 3, edema, and burning in his airways. He was admitted to the ICU and supported on mechanical ventilation. Biochemistry and toxicological analysis showed severe metabolic acidosis (pH 6.9, CO2 16 mmol/L, 2.2 mmol/L) and blood methanol concentration equal to 2.27 g/L. Fibrogastroscopy showed Degree II Zargar caustic oesophagitis and gastritis. Acetazolamid was successfully corrected. The patient was transferred to the ICU and supported on mechanical ventilation. Biochemistry and toxicological analysis showed severe metabolic acidosis (pH 6.9, CO2 16 mmol/L, 2.2 mmol/L) and blood methanol concentration equal to 2.27 g/L. Fibrogastroscopy showed Degree II Zargar caustic oesophagitis and gastritis. Acetazolamid was successfully corrected.

219. Ethylene Glycol Poisoning in Children - Therapeutic Aspects
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Objective: The purpose of this study was to describe the prevention, management and clinical course of toxic alcohol ingestions. Methods: Data were collected on all patients treated for toxic alcohol ingestions over a
period of 5 years. Results: Eleven patients, 5 boys and 6 girls, ages between 2 and 18 years old, presenting toxic ingestions were identified between January 1st 2004 and December 31st 2008. The patients, who had ingested ethyl alcohol exposure were admitted to an intensive care unit and received emergency haemodialysis (9 patients out of 11). All patients presented severe acidosis and, in two cases, severe kidney failure was noted. None of the patients received specific treatment. For 7 patients haemodialysis was indicated for removal of toxin. Besides haemodialysis, the treatment also included support for vital functions and administration of sodium bicarbonate solution to reverse severe acidosis. For seven (7) out of eleven (11) patients the situation was unfavorable leading to death within 48 hours after admission. Strength of the conclusion: The strong prediction of a low osmolal gap was important in guiding treatment, sustaining treatment for vital functions and haemodialysis are efficient therapeutic measures in ethylene glycol intoxication. References: 1. Magarban B, Borrison SW, Baud F. Ethylene Glycol. In: Shannon M, Borron S, Burns M, eds. Haddad and Winchester’s Clinical Toxicology, 4th ed. Philadelphia, USA: Saunders Elsevier Inc. 2007:611–21.

220. Significance of the Osmolal Gap in Suspected Ethylene Glycol Poisoning

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Objective: Ethylene glycol is an uncommon cause of poisoning, for example accounting for only 0.03% of enquiries to the American Association of Poison Control Centers in 2007.2 Poisoning severity depends on the extent of exposure but direct laboratory determination is not always immediately available. The ‘osmolal gap’ is widely relied on as a surrogate marker of the presence of toxic alcohol. The present study sought to examine the utility of the osmolal gap in patients with suspected ethylene glycol poisoning.

Methods: This was a retrospective analysis of serum ethylene glycol concentrations and matching osmolality determinations between 2004–2008 at the Royal Infirmary of Edinburgh. Osmolality was estimated by Na+[K+] + [urea] + [glucose], and the osmolal gap was calculated from the measured osmolality minus estimated osmolality. Prediction of the presence of ethylene glycol examined by a receiver operating characteristic (ROC).

Results: There were 87 ethylene glycol determinations (detected in 30, 34%). Osmolality was available in 21 cases, and these were used in the data analysis (ethylene glycol detected in 10, 48%). Osmolal gap was 16 mOsm/L in 9 cases (44.2%) and 52 mOsm/L in the absence of ethylene glycol versus 39 mOsm/L (IQR 14 to 45 mOsm/L) in its presence (p = 0.115 by Mann Whitney test). ROC found AUC 70.9% (95% CI 47.3 to 88.3%), p = 0.00715. The strongest predictor for ethylene glycol osmolal gap >27 mOsm/L, which gave sensitivity 60% (95% CI 40 to 79%), specificity 91% (59 to 99%), positive predictive value 0.86 (0.69 to 0.95) and negative predictive value 0.58 (0.40 to 0.71). Conclusion: The osmolal gap was a poor marker for the presence or absence of ethylene glycol in this group. Further work is required to define the role of serum osmolality measurements in the setting of suspected ethylene glycol poisoning. References: 1. Bronstein AC, Spyer DA, Cantilena LR, et al. 2007 Annual Report of the American Association of Poison Control Centers. Clin Toxicol 2008; 46:927–1057.

221. Acute Methylated Spirit Poisoning: The Moroccan Poison Control Centre Experience

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Objective: The present retrospective study aimed to describe the epidemiological, clinical features and outcome of all cases related to methylated spirit poisoning received by telephone or by intoxication reporting form from hospitals sent to the Moroccan Poison Control Centre and since few toxicological data are available, all cases were investigated in detail. Methods: All inquiries to the telephone service for the years 2008–2009 concerning cathinone derivates have increased rapidly. In total, 388 inquiries were received. In all cases, the collected cases (173) represented a diagnostic dilemma because of atypical symptomatology. Further studies are under way to determine factors which may predispose individuals to levamisole-related neutropenia and/or vasculitis. Other findings in some but not all of these cases included vasculitis, circulating pANCA, anti-nuclear antibodies, anti-cardiolipin antibodies, increased levels of beta-2-glycoprotein I and abnormal clotting tests. LC-TOF analysis allowed for the differential detection of levamisole metabolites and impurities in the levamisole positive urine samples. Conclusion: Studies are underway to determine if there is a metabolite pattern predictive of an adverse reaction to levamisole-adulterated cocaine in cocaine users. The high prevalence of levamisole-adulterated cocaine and resulting toxicity in cocaine users is a serious public health issue. Clinicians should consider the possibility of levamisole-adulterated cocaine in users with unexplained atypical symptoms. Further studies are under way to determine factors which may predispose individuals to levamisole-related neutropenia and/or vasculitis.

223. Prevalence and Correlation of Levamisole-Adulterated Cocaine and Severe Agranulocytosis/Vasculitis

Lynch A.,1 Donmy SS.2, Graf L.1
1Department of Laboratory Medicine, University of California, San Francisco, CA; 2Department of Psychiatry, University of California, San Francisco, CA; 3Department of Medicine, University of California, San Francisco, CA, US

Objective: In September 2009, the US Substance Abuse and Mental Health Services Administration issued a release alerting health authorities that cocaine may be adulterated with levamisole, a veterinary anthelminthic. Subsequently, four atypical cases of agranulocytosis, severe cutaneous necrosis and/or vasculitis in cocaine users were observed at our institution in October 2009. The objective of this study was to develop a liquid-chromatography tandem mass spectrometry (LC-MS/MS) method for the detection of levamisole in these cases and to determine the prevalence of levamisole in cocaine positive patient samples. Methods: A LC-MS/MS method was developed and validated for the determination of levamisole in urine and plasma samples. Levamisole and internal standards were selected in multiple reaction monitoring-information dependent acquisition-enhanced product ion (MRM-IDA-EPI) mode (Applied Biosystems 3200QTRAP®MS/MS). All cocaine-positive urine obtained at the San Francisco General Hospital Clinical Laboratory in October 2009, were tested for levamisole. LC Time-Of-Flight Mass Spectrometry was used for the detection of other cocaine cutting agents, levamisole metabolites and impurities using accurate mass measurements and database searching. Results: Out of 970 total urine drug screens, 20.5% were positive for benzoylecgonine (cocaine metabolite) and of those 87% were positive for levamisole. The urines from the four cases of agranulocytosis, severe cutaneous necrosis and/or vasculitis tested positive for levamisole. These cases were characterized by severe and unusual lesions localized to the ears and lower extremities, mild to severe neutropenia and infectious complications. Other findings in some but not all of these cases included vasculitis, circulating pANCA, anti-nuclear antibodies, anti-cardiolipin antibodies, increased levels of beta-2-glycoprotein I and abnormal clotting tests. LC-TOF analysis allowed for the differential detection of levamisole metabolites and impurities in the levamisole positive urine samples. Correlation studies are underway to determine if there is a metabolite pattern predictive of an adverse reaction to levamisole-adulterated cocaine in cocaine users. The high prevalence of levamisole-adulterated cocaine and resulting toxicity in cocaine users is a serious public health issue. Clinicians should consider the possibility of levamisole-adulterated cocaine in users with unexplained atypical symptoms. Further studies are underway to determine factors which may predispose individuals to levamisole-related neutropenia and/or vasculitis.
225. Viperfav® and Viper Envenomings: A Retro-

Abstracts

Viperfav® contains purified F(ab’)2 fragments of crotalic immunoglobulins against the European viper snake Vipera berus L. MDPV (25 cases). A lesser number was related to buty-

226. Genetic Abnormalities and Delayed Cell Death Observed in Acute Carbon Monoxide Poisoning

Liebelt EL.

Objective: To explain the physical features of opioid withdrawal and to discuss the challenges in the clinical management.

Methods: The symptoms are categorized pharmacologically, psycho-social, or pharmacological, and the latter can be opioid agonist, opioid antagonist, or non-opioid. The craving, which is associ-

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1Department of Anthropology, Jagiellonian University,

2Department of Clinical Toxicology Jagiellonian University Medical College.

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227. Managing Opiate Withdrawal: The Clinical

Pharmacologist’s View

Ferner RE.

West Midlands Centre for Adverse Drug Reactions, City Hospital, Birmingham, UK

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harry@123.com

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1. Fenerson L, Coudrez T, Brown C. A new antivenin for European vipers. MDPV (25 cases). A lesser number was related to buty-

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appropriate use of naloxone in the prehospital setting is a matter of concern. Many clinicians would argue that the only use of naloxone which is appropriate in the prehospital setting is to treat patients with naloxone overdoses. Naloxone is found in 80% of ALS requests, with a peak prevalence during the winter months. However, as of yet, no randomized controlled trials of naloxone in the prehospital setting have been published. Sedatives, such as diazepam, have not been shown to be effective treatment for NWS. Evidence has demonstrated that a combination treatment of opioids and phenobarbital significantly decreases hospital stay and decreases withdrawal severity. Comprehensive reviews of pharmacologic management of NAS have concluded that strong evidence is lacking on the relative efficacy of different medication regimens. Buprenorphine has been found to be a novel, safe and effective treatment for NAS. Clonidine has also been demonstrated to be safe and efficacious both as a single and as an adjunctive therapy to opioids. Polydrug withdrawal is primarily treated with opioids alone and in combination with neophrine. Clonidine has been advocated as an effective treatment for infants with NWS, with symptoms being reduced after 4-8 hours of treatment. Overlap between symptoms caused by drug SSRIs drug withdrawal or direct serotonin effects likely exists, although NWS has not been demonstrated in symptomatic infants with very undetectable levels of drug or active metabolite. Symptomatic treatment and/or phenobarbital for those infants with convulsions has been suggested. Conclusive evidence for a “true” neonatal cocaine abstinence syndrome is equivocal, as cocaine and its metabolites have been found in neonatal urine for as long as 7 days post-delivery. Clonidine: The use of opioid agonists (morphine and buprenorphine) and clonidine as adjunct therapy are needed for infants with severe withdrawal symptoms due to passive maternal exposure of opioids. Additional research is needed to provide more optimal and standardized treatment protocols. References: 1. Wang M. Perinatal drug abuse and neonatal drug withdrawal. eMedical Pediatrics: Neonatology; http://emedicine.medscape.com/article/1996. 2. Brett RR, Pratt JA. Changes in benzodiazepine-related withdrawal which appears to be mediated by receptor plasticity. In isolated cell cultures, benzodiazepine receptors are localized in close proximity, investigations have evaluated the parallel between ethanol and benzodiazepine withdrawal which involves the activation of alpha-1, alpha-2 and gamma-2 subunits, and significant increase in AMPA receptor function during withdrawal. Specifically, there are no large case series of patients with benzodiazepine withdrawal. In addition, although some medication trials exist, there are no randomized controlled trials of therapy for infants with moderate to severe benzodiazepine withdrawal syndromes. Current pharmacologic interventions were evaluated in a recent Cochrane review, which concluded that larger trials are required. As a result, the majority of the discussion will focus on animal models of benzodiazepine withdrawal with analogues made to humans, when they appear to be pharmacologically acceptable. Unlike ethanol, there is no evidence of metabolic tolerance to benzodiazepines and therefore tolerance is felt to be mediated by receptor plasticity. In isolated cell preparations, chronic benzodiazepine administration results in impaired GABAergic transmission when benzodiazepines are present, and augmented transmission for a short period of time following removal of benzodiazepines. Significant short-term administration chronic benzodiazepine administration appears to shift the populations of GABA subunits such that there is a decrease in alpha-1, alpha-2 and gamma-2 subunits, and a concurrent increase in alpha-3 subunits. While these combined effects would confer an insensitivity to benzodiazepine binding, the lack of widespread distribution of these changes casts doubt as to whether GABA receptor effects are sufficient to account for benzodiazepine tolerance. AMPA (alpha-amino-3-hydroxy-5-methyl-isoaxazole-4-propanic acid) receptors, one of the ionotropic glutamate receptor types, are highly localized in specific areas of the brain in concert with NMDA receptors. Since glutamatergic pyramidal cells and GABAergic chandelier cells often have their axons in very close proximity, initiated the role of excitatory amino acids in benzodiazepine tolerance and withdrawal. Rat brain slices demonstrate a significant increase in AMPA receptor function during benzodiazepine withdrawal. Chronic withdrawal in animals and humans resembles alcohol withdrawal with a predominance of anxiety and autonomic findings. Although it is generally felt that benzodiazepine withdrawal is comparatively mild, this perception cannot be substantiated and cases of seizures, delirium and death are described. Conclusion: Animal models suggest a parallel between ethanol and benzodiazepine withdrawal that includes a loss of GABAergic tone (impaired inhibition) combined with enhanced glutamatergic tone (enhanced excitation). In mild cases of benzodiazepine withdrawal, tiagabine may have utility but required more detailed interventions and are largely unstudied in moderate to severe withdrawal. For most patients, therapy with benzodiazepines seems appropriate. Chronic benzodiazepine withdrawal syndrome (drug withdrawal disorder) should be considered and treated as drug withdrawal is a medical emergency. In a confused state to the Emergency Department due to benzodiazepine withdrawal onset, patients may present for an operation) or patients may present in a confused state to the Emergency Department due to benzodiazepine withdrawal onset, patients may present. For most patients, therapy with benzodiazepines seems appropriate. Chronic benzodiazepine withdrawal syndrome (drug withdrawal disorder) should be considered and treated as drug withdrawal is a medical emergency.
from alcohol withdrawal was high, often as much as 15%, but with advances in recognition and treatment, a more recent study showed an overall mortality of 2%, although 83% of those who died died during the initial phase of the study died. Definition and features: The alcohol withdrawal syndrome follows the abrupt discontinuation of, or at least the rapid decrease in intake of, alcohol after chronic use. The syndrome is characterized by autonomic hyperactivity, tremor, anxiety and restlessness and is occasionally complicated by seizures, hallucinations and delirium. The DSM-IV diagnostic criteria for alcohol withdrawal syndrome in the two or more of the following are present: autonomic hyperactivity (e.g. sweating or pulse rate greater than 100 bpm), increased hand tremor, insomnia, psychomotor agitation, anxiety or vomiting; rarely, grand mal seizures or transient visual, tactile or auditory hallucinations or illusions. Mechanisms: The mechanisms underlying the syndrome include a reduced activity of the inhibitory neurotransmitter gamma-aminobutyric acid (GABA), enhanced activity of the excitatory transmitter glutamate and reduced dopamine release (3). While alcohol enhances the effect of GABA on GABA-A receptors, resulting in decreased overall brain excitability, chronic use results in a compensatory decrease of GABA-A receptor response to GABA, evoking excitatory neurons and leading to the consumption of alcohol. With the onset of alcohol withdrawal, there is a sudden relative deficiency in GABA neurotransmitter activity, which is believed to contribute to the anxiety, increased muscle tone, and seizures observed. Conversely, alcohol inhibits glutamate receptors (N-methyl-D-aspartate, NMDA receptors) and chronic alcohol use in up-regulation of these receptors so that more alcohol is required to achieve receptor inhibition. Abrupt cessation of alcohol results in brain hyperexcitability as glutamate inhibition is removed. Brain hyperexcitability manifests clinically as anxiety, agitation, tremors and withdrawal seizures. In addition, significant increases in plasma norepinephrine have been found, at least for the first 24 hours after cessation of alcohol with significant down regulation of the norepinephrine receptor, which contribute to the autonomic features. Management: Patients will often complain of withdrawal symptoms but have no objective evidence of withdrawal; objective assessment is therefore mandatory. Careful monitoring (hourly in severe cases) using the revised Clinical Institute Withdrawal Assessment for Alcohol (CIWA-Ar) score will ensure that any changes are accurately recorded and prompt treatment if necessary. However, the CIWA-Ar score is valid only to quantify the severity of the alcohol withdrawal syndrome but to mediate patients going through withdrawal of alcohol. The symptom-triggered approach is adopted. This approach offers several advantages. First, patients with no or only mild symptoms are not abraded by the routine use of drugs such as benzodiazepines. It is inappropriate to prescribe drugs if only minor features of withdrawal are present. Second, the period of detoxification is shorter and, thirdly, alcohol abusers learn how to exercise immediate non-pharmacological control over their life. If drug treatment is required, patients should be treated with regimens that are patient specific and flexible to respond to changes in severity of withdrawal (that is they are symptom triggered). Fixed-schedule regimens, where the patient is prescribed drugs with a fixed schedule and the amount of benzodiazepine administered. Following a meta-analysis, the American Society of Addiction Medicine produced an evidence-based Practice Guideline and concluded that the CIWA-Ar score is 215 the use of a symptom-triggered regimen reduced the risk of major complications developing. Benzodiazepines are the agents of first choice for alcohol withdrawal. They are more effective than placebo in reducing the signs and symptoms of alcohol withdrawal and in reducing the incidence of seizures and delirium and have a greater margin of safety than other drugs. Furthermore, benzodiazepines may be given orally or intravenously and are not associated with significant sedation, and are available in case of unintentional overdose. There is some evidence that longer-acting benzodiazepines (e.g. diazepam) may be more effective in preventing the occurrence of a smoother withdrawal course with less break-through or rebound symptoms than shorter-acting agents. All patients should receive thiamine 100 mg b.d. orally, unless Wernicke’s encephalopathy is suspected, when parenteral administration of vitamin B is appropriate. Conclusion: The CIWA-Ar scale should be used to determine both the severity of withdrawal and the need for treatment. If drug treatment is required, a symptom-triggered regimen should be employed using a benzodiazepine. References: 1. Victor M, Adams RD. The effect of alcohol on the nervous system. Res Publ Assoc Res Nerv Ment Dis 1953; 32:526–73. 2. Ferguson JA, Suelzer CJ, Eckert GJ, et al. Risk factors for delirium tremens development. J Gen Intern Med 1996; 11:410–4. 3. Vale A. The management of alcohol withdrawal. Medicine 2006; 34:323–7. 4. Saitz R, Mayo-Smith MF, Roberts MS, et al. Individualized treatment for alcohol withdrawal: randomized double-blind placebo controlled study. JAMA 1994; 271:17–83. 5. Mayo-Smith MF, Cushman P, Jr, Hill AJ, et al. Pharmacological management of alcohol withdrawal: a meta-analysis and evidence-based practice guideline. JAMA 1997; 278:144–51. 6. Mayo-Smith MF, Beecher LH, Fischer TL, et al. Management of alcohol withdrawal delirium: an evidence-based practice guideline. Arch Intern Med 2004; 164:1405–12.
had used magic mushrooms, the Dutch government asked the “Coordination Centre for Assessment and Monitoring of New Drugs” (CAM) for a risk assessment. Methods: The CAM, with scientists from various scientific institutes involved in monitoring, research, and criminal investigation related to drugs of abuse, performed a risk assessment on hallucinogenic mushroom products and provided procedures: review of available literature, scoring of the risks for individual health, public health, public safety, and organized crime. Results: Scientifically, the risk assessment is straightforward: toxicity is mainly confined to anxiety or panic attacks and chronic toxicity to the occurrence of flashbacks. The number of incidents reported is low. The risks for disturbing public order and criminal involvement are small. The Amsterdam municipal health department described that in 1 out of 2500 cases of mushroom use, an ambulance was called. Ninety-two percent of these cases concerned tourists. Only 2 out of 100,000 uses actually led to hospital admission. Tourists are considered a vulnerable group, using magic mushrooms in an unfamiliar setting, sometimes importing and taking an overdose while waiting for the hallucinogenic effects to occur. The CAM advised the provision of high quality user information especially aimed at tourists. The CAM explicitly warned that hallucinogenic mushrooms could create more dangerous situations: the use of stronger hallucinogenic drugs, and possible criminal involvement like hiding psilocybin in chocolates. Nevertheless, the Minister of Justice refrained from selling and using hallucinogenic mushrooms in 2008. The arguments of the CAM were considered valid, but too difficult to carry out. Conclusion: Up till now the NPIC received few questions on magic mushroom use, but more on other drugs like GHB and cocaine. After the prohibition of magic mushrooms in the UK in 2005 its use declined in the first year and remained stable later on. The use of cocaine increased.1 References: Coordinatiepunt Assesment en Monitoring nieuwe drugs: Risico's van hallucinogene en psychodepressive bevrachtende paddenstoelen (paddestoels). Biltbomen 2007. http://www.rivm.nl/bibliotheek/digitaalkop/cam_paddo_advies.pdf 2. Hoare, J. Drug Misuse Declared: Findings from the 2008/09 British Crime Survey England and Wales. July 2009. http://www.homeoffice.gov.uk/dhs/pdfs09/hobb1209.pdf

235. Chronic Digoxin Toxicity, Serum Potassium, and the Use of Fab for Case-control Study Manini AF,1 Nelson LS,2,3 Hoffman RS,2,3 1Division of Medical Toxicology, Mt Sinai School of Medicine, New York; 2Department of Emergency Medicine, NYU School of Medicine, New York; 3New York City Poison Center, New York, US Objective: In contrast to patients with acute digoxin overdose, the prognostic utility of the serum potassium concentration for patients with chronic digoxin toxicity is unclear. We aimed to evaluate this relationship, since in our practice chronic toxicity is more prevalent than acute digoxin overdose. Methods: Study design was retrospective case-control. The setting was a Poison Control Center (PCC) and an urban tertiary referral hospital. Cases were defined as PCC referrals with chronic digoxin toxicity resulting in fatality over a 7-year period (2000-06). Controls were defined as hospitalized patients with PCC referral for chronic digoxin toxicity requiring bedside medical toxicology consultation over a one-year period (2006-07) surviving to hospital discharge. All subjects had digoxin toxicity evidenced by an elevated serum digoxin concentration (SDC), consistent clinical symptoms, abnormal ECG findings, and lack of acute overdose by history. Fab failure was defined as fatality despite administration of an appropriate dose of the antibody. Data for evaluation included demographics, SDC, creatinine, and pre-treatment serum potassium concentration. Computer analysis using SPSS included confidence intervals (CI), t-test (continuous data), Fisher exact test (nominal data), and receiver operating characteristics (ROC). Results: During the study period, there were 6 fatalities (cases) and 8 survivors (controls), of whom 5 cases (83%) and 5 controls (63%) received digoxin-specific Fab. Elevated pre-Fab serum potassium was highly associated with fatality (t-test p < 0.05). Using a cutoff of 5.0 meq/L for serum K yielded 100% sensitivity (CI 73–100). The ROC area under the curve was 0.81. There were no statistically significant differences between cases and controls with respect to SDC, creatinine, age, or gender. All 5 Fab failures occurred in patients with the combination of both highDig (HR > 100, range 22–55) and hyperkalemia (range 3.3–7.7 meq/L). Limitations of this study include a small number of cases, possible misclassification of chronic toxicity by history, and influence of co-medications on potassium such as diuretics. Conclusion: Elevated serum potassium prior to treatment with Fab is associated with fatality in chronic digoxin toxicity. The combination of elevated potassium, prior Fab failure, and hypertensive emergencies was associated with Fab failure. Future studies are warranted to confirm these findings.

236. Oxotremorine-Induced QTc Interval Prolongation in Pediatric Patients After Single and Repeated Overdose Contessa MG,1 Petrolini V,1 Vecchio S,1 Rognoni C,1 Contessi A,1 Lonati D,1 Bigi S,1 Locatelli C,1 Manzo L1 1Pavia Poison Control Center and National Information Centre, Toxicology Unit, IRCCS Maggiore Foundation and University of Pavia, Pavia; 2Department of Physiology and Pharmacology, La Sapienza University, Roma, Italy Objective: To investigate the ability of oxotremore, predominantly used in paediatric patients in Italy, to affect cardiac repolarisation and to induce QT prolongation. Methods: In a retrospective study all cases of paediatric oxotremone overdose referred to Pavia Poison Center over a ten-year period (from January 1999 to December 2008) were analysed. Circumstances of overdose, symptoms and QTc interval were evaluated for each patient. Serum oxatremone levels were measured using an HPLC method. Lack of information on follow-up for at least 6 hours post overdose was considered an exclusion criterion for this study, 193 patients were excluded for this reason. Results: 169 patients (mean age 29.3 ± 23.9 months) were included in the study. One hundred and forty patients had ingested a single high dose (group 1), 27 had repeated overdose resulting in fatality and 5 cases (83%) and 5 controls (63%) received Fab (p = 0.075). Fab failure was defined as total clinical symptoms, abnormal ECG findings, and lack of acute overdose by history. Fab failure was defined as fatality despite administration of an appropriate dose of the antibody. Data for evaluation included demographics, SDC, creatinine, and pre-treatment serum potassium concentration. Computer analysis using SPSS included confidence intervals (CI), t-test (continuous data), Fisher exact test (nominal data), and receiver operating characteristics (ROC). Results: During the study period, there were 6 fatalities (cases) and 8 survivors (controls), of whom 5 cases (83%) and 5 controls (63%) received digoxin-specific Fab. Elevated pre-Fab serum potassium was highly associated with fatality (t-test p < 0.05). Using a cutoff of 5.0 meq/L for serum K yielded 100% sensitivity (CI 73–100). The ROC area under the curve was 0.81. There were no statistically significant differences between cases and controls with respect to SDC, creatinine, age, or gender. All 5 Fab failures occurred in patients with the combination of both highDig (HR > 100, range 22–55) and hyperkalemia (range 3.3–7.7 meq/L). Limitations of this study include a small number of cases, possible misclassification of chronic toxicity by history, and influence of co-medications on potassium such as diuretics. Conclusion: Elevated serum potassium prior to treatment with Fab is associated with fatality in chronic digoxin toxicity. The combination of elevated potassium, prior Fab failure, and hypertensive emergencies was associated with Fab failure. Future studies are warranted to confirm these findings.

237. Assessment of the QT Interval After Antidepressant Overdose Waring WS,1 Wilson AD,2 Gray J,1 Graham A,2 Bateman DN,1 1Acute Medical Unit, York Hospital, York; 2The Royal Infirmary of Edinburgh, Edinburgh UK Objective: Torsades de pointes is a rare complication of drug toxicity. A QT-heart rate nomogram has recently been proposed for risk prediction.1 This study examined the performance of the nomogram after antidepressant overdose. Methods: ECG data were examined retrospectively after antidepressant overdose.2,3 Ingested doses were expressed as multiples of the recommended daily dose; citalopram 20 mg, mirtazapine 30 mg and venlafaxine 100 mg. QTc was calculated by Bazett’s formula. Results: There were 858 recordings from 541 patients. Table 1. QTc values were within the normal range in 2.4% (95% CI 1.4 to 4.1%), and more likely to be above the nomogram after citalopram overdose than mirtazapine or venlafaxine (difference 7.0%, 95% CI 2.9 to 11.9%, p = 0.001). Conclusion: Citalopram is a recognised cause of torsade de pointes whereas venlafaxine and mirtazapine are not. Consistent with this, the nomogram discriminated between agents. The nomogram needs further evaluation in predicting arrhythmia. References: 1. Chan A, Ibsbter G, Kirkpatrick CM, et al. Drug-induced QT prolongation and torsades de pointes: evaluation of a QT nomogram. J Clin Pharmacol 2007; 47:45–50. 2. Waring WS, Gray JA, Graham A. Predictive factors for generalized seizures after deliberate citralopram overdose. Br J Clin Pharmacol 2008; 66:861–5.

Table 1. Dose as multiple of the defined daily dose (DDD) as median and interquartile range. QT shown as proportion and 95% confidence interval. P-values are for two-tailed Yates’ formula.

<table>
<thead>
<tr>
<th>Drug</th>
<th>Citalopram</th>
<th>Venlafaxine</th>
<th>Mirtazapine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingested dose (DDD)</td>
<td>215</td>
<td>223</td>
<td>223</td>
</tr>
<tr>
<td>QTc ≥440 ms</td>
<td>16 (10–30)</td>
<td>15 (9–28)</td>
<td>15 (8–27)</td>
</tr>
<tr>
<td>68</td>
<td>18% (14–24%)</td>
<td>16% (10–24%)</td>
<td></td>
</tr>
<tr>
<td>32% (26–38%)</td>
<td>32% (24–43%)</td>
<td></td>
<td></td>
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<tr>
<td>P = 0.002</td>
<td>P = 0.004</td>
<td>P = 0.044</td>
<td></td>
</tr>
<tr>
<td>QTc ≥500 ms</td>
<td>4</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>2% (1–5%)</td>
<td>0% (0–4%)</td>
<td>0% (0–4%)</td>
<td></td>
</tr>
<tr>
<td>QT ≥ nonnomogram</td>
<td>10</td>
<td>5% (2–9%)</td>
<td>5% (2–9%)</td>
</tr>
<tr>
<td>0% (0–4%)</td>
<td>0% (0–4%)</td>
<td>0% (0–4%)</td>
<td></td>
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</tbody>
</table>

Future studies are warranted to confirm these findings.

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and evaluate the mechanisms of action that may be involved. Methods: The FDA’s Adverse Event Reporting System (AERS) was searched for the drugs that had the highest adjusted disproportionality reporting ratio for each event in the whole database. To help reduce false positives, MGPS systematically “shrunk” unstable observed-expected ratios and adjusts for background differences in relative reporting rates by using stratification. The final score is the Empirical Bayesian Geometric Mean (EBGM) score. We found that the list of drugs included known to cause mitochondrial toxicity. A PubMed search was performed on each drug to determine effects on mitochondrial function. Results: MGPS generated the following top EBGM scores and number of reports (MGPS, N) for the following drugs: aspiraginase (25.1, 16), valproic acid (19.2, 88), stauvudine (18.2, 30), pegaspargase (12.5, 5), didanosine (11.2, 19), pentamidine (10.5, 6), fluphenazine (5.8, 18), elavirenz (5.3, 12), nelfinavir (4.7, 8), prednisolone (4.4, 10), drotrecogin-alpha (4.2, 5), olanzapine (3.9, 20) and fenofibrate (3.7, 5). The drugs inhibit a number of mitochondrial complexes. Impaired mitochondrial complex I (acetate, II), valproic acid (II), stauvudine (I, II, IV), fluphenazine (I), furosemide (II, III), predicnolone (IV, V), olanzapine (II) and fenofibrate (I, II, III, IV). Other actions of the drugs included uncoupling of oxidative phosphorylation (pentamidine) and inhibition of electron transport (furosemide, prednisolone). Conclusion: Most drugs that are associated with a high adjusted relative postmarketing reporting ratio are treated to impair mitochondrial function and/or electron transport. Further research into the potential role of mitochondrial toxicity and hematological parameters appears warranted. Likewise, antidotes such as L-carnitine that improve mitochondrial oxidation may warrant further study. Analysis of the AERS database can be used to generate hypotheses about the mechanisms for drug-induced toxicity.

239. Clinical Effects of Red-bellied Black Snake (Pseudechis porphyriacus) Envenoming and Correlation with Venom Concentrations

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Objective: There are few reports of red-bellied black snake (RBBS) envenoming. We investigated the clinical features and laboratory findings in patients with definite RBBS (Pseudechis porphyriacus) envenoming, including correlation with venom assays. Methods: Patients with definite envenoming were included from the Australian Snakebite Project, a prospective multicentre study. Demographics, clinical information, laboratory tests and antivenom treatment are recorded prospectively for the study. Venom concentrations were measured in serum samples using a RBBS-antibody enzyme immunoassay (EIA) with a limit of detection of 0.1 ng/mL. Results: There were 71 definite RBBS bites and envenoming. Thirty-eight patients (54%) had envenoming was characterised by local pain and swelling in all cases, non-specific systemic effects in 44 patients (92%), anticoagulant coagulopathy with an isolated raised aPTT in 26 patients (54%) and significant myotoxicity in 3 patients (6%). One patient required intubation for severe myotoxicity resulting in muscle weakness and there were no deaths. Pre-antivenom blood samples were available in 35 of 71 patients, including 29 envenomed cases. Venom was not detected in all 6 non-envenomed patients (sensitivity in defined envenomed patients was 19 ng/mL (interquartile range: 14 to 72 ng/mL; range 3 to 325 ng/mL). Higher concentrations were associated with coagulopathy (median: 54 ng/mL; range: 5 to 325 ng/mL) and the venom concentrations in two patients with significant myo-toxicity were 88 and 162 ng/mL. The median peak venom concentration in patients given antivenom was 71 ng/mL (range: 35 to 325 ng/mL). Eighteen patients received antivenom and thirteen had post-antivenom blood samples tested for venom. In all thirteen venom was detected post-antivenom, (median peak venom concentration was on one of the patients). Conclusion: RBBS envenoming is characterised by non-specific systemic effects, anticoagulant coagulopathy and uncommonly myotoxicity. Venom concentrations appear to correlate well with the severity of envenoming. Both tiger snake and black snake antivenoms bind all venom and one vial of tiger snake antivenom appears to be the most appropriate treatment.

240. A Controlled Clinical Trial of a New Anti-v

Hungh T1, Höjer J2, Kiem T3, Du NT4, 1Vietnam Poison Control Center, Hanoi Medical University, Hanoi, Vietnam; 2Swedish Poisons Information Centre, Karolinska Institute, Stockholm, Sweden

Objective: In northern Vietnam, a majority of severely envenomed patients are bitten by Bungarus multicinctus (Chinese krait, many-banded krait). Threfore, these victims have received supportive care only. The aims of this study were to assess the possible efficacy of the antivenom and as long as AST <200 UI/L in patients with hepatic damage. Methods: This controlled clinical trial was performed during 2004–2006 at an intensive care unit in Hanoi. For ethical reasons the study was not random-
ized. All patients who fulfilled the inclusion criteria during the first two years were prospectively enrolled, carefully monitored and recorded in a pre-
determined study protocol, and treated with optimal supportive care. All patients who entered the study during the third year were treated with antivenom therapy in addition to supportive care (antivenom group). The inclusion criteria were: envenoming (ALT >200 UI/L), (ii) treatment of patients with hepatic damage. Amanita and as ALT >200 U/L in patients with hepatic damage, respectively. In group-2, 7/15 (46.6%) patients developed moderate and severe hepatic damage, respectively. In group-2, 7/15 (46.6%) patients included. At first evaluation 119/157 (75.8%) patients presented normal hepatic function (group-1) while 157 (9.5%), 17/157 (10.6%), 15/157 (9.5%) cases did not develop hepatic damage; 15/157 (9.5%) group-2) patients presented with moderate and severe hepatic damage, respectively. In group-3, 119 (49.6%) cases developed hepatic damage; 15/157 (9.5%), 24/119 (20.2%) and 21/119 (17.6%) patients developed mild, mod-

241. α-amanitin-Containing Mushroom Poisoning: Outcome in 157 Patients Treated with the Tri-


242. Thrombocytopenia in Envenoming by the Common European Adder, Vipera berus

Salmsonon H, Karlsson-Stibler C, Persson H. Sweden Poisons Information Centre, Sweden Objective: To report and describe significant thrombocy-

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for personal use only.
one patient even below $5 \times 10^3$ L. Six of these patients with extreme thrombocytopenia were children less than ten years old. The response to antivenom (ovine Fab) treatment was variable. Out of 27 patients treated, no effect or transient effect was seen in 20 cases whereas normalisation followed in seven patients, two of whom had received repeated doses. Persistent thrombocytopenia up to 4 to 8 days after the bite was noted in 11 cases, none of which had been given antivenom. Other coagulation abnormalities were minor or moderate, consisting of prolongation of PT/PTT, hypofibrinogenaemia and reduced levels of D-dimer and platelet count later on is due to loss of thrombocytes into the injured tissues. References: 1. Persson HE, Sjöberg G, Hammarström L, Östling M. Effect of high doses of sodium bicarbonate in acute organophosphate poisoning. J Toxicol Clin Toxicol 1998; 36:205–13.

243. The Major Solvent in Agricultural Dimethoate Preparations is Essential for Toxicity in Minipigs


244. Therapeutic Effects of Sodium Bicarbonate and Magnesium Sulphate in Organophosphate Poisoning: A Randomized Clinical Trial

Mohammadi M, Afsarhi R, Balali-Mood M. Medical Toxicology, Mashhad University of Medical Sciences, Mashhad, Iran.

Objective: Organophosphate (OP) pesticides are widely used in agricultural settings. Intentional and accidental overdoses with these agents are common in this country. This study was aimed at comparing the therapeutic effects of different treatment modalities on organophosphate poisoning. Methods: All consenting subjects with alleged moderate to severe acute organophosphate poisoning from May 2008 to September 2009 were studied prospectively. Ethics approval was obtained (MIMS-843166). These subjects were randomly allocated into 4 groups 1. sodium bicarbonate (S); 2. magnesium sulphate (M); 3. both (B) and 4. none (N). All cases received fluids and atropine as well as diazepam if needed. Results: 27 S, 25 M, 27 B and 26 N subjects were studied. Age, gender, addiction and severity of poisoning were not significantly different across these four groups. There were no significant differences in atropine administration, mechanical ventilation, ICU admission and deaths in these groups. Magnesium sulphate significantly increased the time of admission (P = 0.041), diazepam administration (P = 0.015) and seizure (P = 0.003). Conclusion: This study does not support previous findings in regard to beneficial effects of sodium bicarbonate. Further studies were warranted. References: 1. Afsarhi R, Majdzaheb R, Balali-Mood M. Pattern of acute poisonings in Mashhad, Iran 1993–2000. J Toxicol Clin Toxicol 2004; 42:365–75. 2. Balali-Mood M, Ayat M, Ali-Akhbaran H. Effect of high doses of sodium bicarbonate in acute organophosphorous pesticide poisoning. Clin Toxicol (Phila) 2005; 43:571–4.

245. Clinical Effects of Reported in Apparent Poisoning in Dogs - A Real Mixed Bag

Sutton NM, Cameron D. Veterinary Poisons Information Service, Guy’s & St Thomas’ Medical Toxicology Information Services, London, UK.

Objective: Peanuts (Arachis hypogaea) are considered of low toxicity to most animal species. However, cases reported to the Veterinary Poisons Information Service (VPIS) indicate that some dogs become unwell after peanut ingestion. This study examines the clinical effects associated with ingestion, comparing details of asymptomatic and symptomatic populations. Methods: Essential details from each telephone enquiry VPIS receives are documented contemporaneously. Further data on subsequent clinical course and outcomes are elicited by postal follow-up questionnaires. All instances of peanut ingestion by dogs, with and without outcome data, on the VPIS database are retrospectively reviewed. Findings in dogs ingesting other agents, like chocolate, were excluded. Results: Between 1996 and 2009 37 cases with full outcome data were identified. Of these, 16 dogs remained asymptomatic and 21 became unwell. Of the latter, 14 developed gastrointestinal effects and 7 exhibited increased neuropeptide activity (hyperaesthesia, twitching, tremors, or convulsions). Other unusual effects which occurred included anaesthesia, hallucinations, DIC and hepatic injury. Two fatalities were reported; all other animals made a full recovery. VPIS consultations about animals that remained asymptomatic occurred earlier, at a mean time of 14 hours post ingestion (n = 9). These animals had a mean age of 3.9 years (n = 13) and a mean weight of 13.4 kg (n = 13). Enquiries about dogs that became symptomatic occurred at a mean time of 25 hours post ingestion (n = 10). These had a mean age of 7.47 years (n = 20) and a mean weight of 19.3 kg (n = 18). In most cases the symptoms at presentation were variable. N-SALDs were unknown. Where known, quantities varied from 1 “handful” to 2 kg. Analysis of cases without follow-up data showed that at the time of contact with VPIS a further 12 dogs required veterinary and/or hospital treatment. Agricultural use of peanuts or other high-protein compounds, possible salt toxicity or idiopathic reactions. Symptomatic animals tended to be older and larger than those remaining asymptomatic. Follow-up and analysis of future cases will be needed to determine any statistically significant predispositions in dogs.

246. The Fetal Effects of Ibuprofen Overdose in the Third Trimester of Pregnancy and the Risk of Premature Closure of the Ductus Arteriosus


Objective: There are limited published data on fetal outcomes following ibuprofen overdose in pregnancy, especially following third trimester exposure. NSAIDs are not recommended as therapy after week 30 of pregnancy due to the risk of premature closure of the ductus arteriosus (DA) and associated complications such as fetal cardiac failure or persistent pulmonary hypertension in the newborn. This on-going prospective case series aims to collect data and assess the potential fetal-toxic effects of ibuprofen overdose during the third trimester of pregnancy. Methods: Using standardised procedures, the UK Teratology Information Service has provided risk assessment and collected outcome data on a prospective case series of women exposed to ibuprofen overdose during the third trimester of pregnancy. Overdose was defined as documented ingestion of more than the maximum daily therapeutic amount (2.4 g). Results: There were 16 confirmed cases of third trimester ibuprofen overdose in which the mother was also exposed to other medications. The total amount of ibuprofen ingested ranged from 3.2 to 2.8 g. All 16 infants were liveborn and two had complications due to suspected fetal ductal constriction (12 cases of DA closure at 22–39.5) after maternal ingestion of 7.2 g ibuprofen, and one had suspected premature closure of the DA at birth. Conclusions: Use of ibuprofen after week 30 of pregnancy may be associated with a risk of premature closure of the DA. The minimum dose, or duration of treatment associated with this has not been established. However, these data suggest that a single relatively modest exposure during this period may be associated with risk - even in the absence of maternal toxicity. Detailed fetal investigation including a fetal Doppler echocardiogram is recommended in third trimester ibuprofen overdose as antenatal identification of premature closure of the DA may be an indication for expedited early fetal delivery.
Cocaine-associated chest pain, beta-receptor antagonists are optimal therapy in this setting requires further evaluation. Epines, calcium channel or beta-receptor antagonists. The coronary CTA, rate control was achieved with benzodiazepines, calcium channel or beta-receptor antagonists. The average age of the patient was 45.1 years, 16 males, and 30 intentional ingestions. Conclusions: Various acids (14), alkalies (9), bleaching agents (13) and household cleaning agents were the most common compounds involved. Besides the above mentioned polydrug regimen encountered in 93.06% of cases, which has been proved to be a risk factor for spontaneous abortion, epileptic patients showed a high frequency of low birth weights, low head circumference below 3rd percentile and major congenital malformations. These data suggest the hypothesis that many factors such as drugs, epilepsy per se and individual factors, namely genetic ones, induce the observed adverse effects in pregnancy.

248. Pharmacotherapy for Heart Rate Control in Patients with Cocaine Associated Chest Pain Undergoing Coronary Computed Tomography Angiography
Calderone M,1 Walsh KR,1 Perrone J,1 Hollander JE,1 Litt H,2 DeRooij FJ,3
1Department of Emergency Medicine, University of Pennsylvania School of Medicine, Philadelphia, PA; 2Department of Radiology, University of Pennsylvania School of Medicine, Philadelphia, PA; 4Department of Radiology, Rambam Health Care Campus, Haifa, Israel
Objective: To evaluate the role of computerized tomography (CT) in the diagnosis and therapeutic decision making of patients with caustic ingestion. Methods: A retrospective chart review of patients admitted after caustic ingestion to surgical wards in a tertiary care hospital between 2000 and 2008. Demographics, type of caustic, time elapsed from ingestion, circumstances of exposure, admission physical examination, laboratory evaluation, chest x-ray and abdominal CT were recorded. Endoscopist findings were graded as grade 0, 1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D, 3A, 3B, 3C, 3D, 4 and 5, according to Callamand’s scale. CT findings were graded as grade 0, grade 1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D, 3A, 3B, 3C, 3D, 4 and 5, according to Callamand’s scale. Data were subjected to descriptive analysis. Results: 39 patients were included; mean age: 40.8 ± 16.9 years, 16 males, and 30 intentional ingestions. Caustics involved were acids (14), alkalies (9), bleaching agents (13) and household cleaning agents (30). In 13 patients, upper esophageal sphincter could not be intubated due to severe edema; he was excluded. CT findings: grade 0 in one, grade 1 in six, grade 2 in one, and grade 3 in three patients. In seven patients the severity of the CT grade was lower than the endoscopy grade, in three patients they were comparable. Conclusion: Chest and abdomen CT tends to underestimate the degree of caustic injury. Endoscopy grades 1 to 3A can show in CT only as edematous wall thickening (CT grade 1). It is suggested that in the initial phase of caustic ingestions surgical decisions should not be made based only on CT, unless endoscopy is not feasible in the absence of free air. References: 1. Zargar SA, Kochhar R, Mehta S, Calderone M, Walsh KR, Perrone J, Hollander JE, Bentur Y. Israel Poison Information Center, Rambam Health Care Campus, Haifa, Israel. Ann Emerg Med 2008; 51:412–5.

251. Evaluation of the Management of Overdoses of Digoxin
Boiffier M,1 Abaziou T,1 Ena S,1 Dubourdieu B,2 Delahaye A.*1
1ICU, General Hospital, Rodez; 2Biology, General Hospital, Rodez, France
Objective: Recent data on digitals poisons and overdoses show the importance of Digoxin-specific Fab fragments (Fab) as a first line treatment. In order to assess our professional practices, we decided to analyze (from December 2008 to September 2009), the management of all digoxin overdoses in Rodez General Hospital (France, Aveyron). Methods: Prospective observational study. Main criterion: indication of treatment with Fab according to expert recommendations. Secondary endpoints: i) further prescription; ii) inpatient unit admission; iii) mortality. Results: Cohort of 39 cases (see Table 1). Median age 44 years [63, 99], ratio M/F 0.63. Three case reports were excluded for lack of clinical data. Further prescription: 59% withdrawal of digoxin; 77% ECG; 33.3% telemetry; 2.6% atropine. Inpatient unit: 46% medical; 23% ICU; 13% discharged

Table 1. Cohort of 39 cases

<table>
<thead>
<tr>
<th>Number of records</th>
<th>Molar</th>
<th>Half-molar</th>
</tr>
</thead>
<tbody>
<tr>
<td>population not treated with Fab</td>
<td>33</td>
<td>14 (38.9%)</td>
</tr>
<tr>
<td>population treated with Fab</td>
<td>3</td>
<td>17 (47.2%)</td>
</tr>
<tr>
<td></td>
<td>2 (5.5%)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>0</td>
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<td></td>
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<td>1 (2.8%)</td>
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</tbody>
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250. Successful use of Intravenous Fat Emulsion in Severe Pulsing Following Ingestion of Lipid Soluble Drugs
Cooper G, Dyas J, Krishna CV, Thompson JP. National Poisons Information Service, Cardiff and Vale University Health Board, Cardiff, UK
Objective: Intravenous fat emulsion (IFE) has been successfully used as an antidote in cases of local anaesthetic toxicity and the possibility of its usefulness in overdose of other lipid-soluble drugs continues to provoke interest. We report a case of a mixed overdose where ife was given successfully to treat a haemodynamically compromised patient. Case report: A 52 year old female was admitted to A&E three hours after ingestion of amitriptyline (350 mg), diltiazem SR (1600 mg), dihydrocodeine (840 mg), temazepam (70 mg), diazepam (35 mg) and citalopram (70 mg). She presented with features of calcium channel blocker toxicity; pulse 38, blood pressure 80/50, RR 10, GCS 8/15, and an ECG showing complete heart block. Despite receiving conventional treatment - salure, naloxone, atropine, calcium gluconate and sodium bicarbonate she showed no improvement and required admission to the intensive care unit for ventilatory and inotropic support. Awakening transfer to ITU, 20% intralipid (500 mL) was administered over 30 minutes. Her post-lipid ECG showed sinus rhythm, pulse 79, PR 191, QRS 107 ms, QT/QcT 407/467 ms. Her blood pressure on admission to ITU was 124/55 mmHg. She subsequently continued to improve requiring no inotropic support and was extubated the following day. A mild aspiration pneumonia was treated successfully with co-amoxiclav and she was discharged after psychiatric assessment without sequelae. Conclusion: Animal studies have demonstrated a reduced rate of absorption in morbidity and mortality from lipid-soluble drug cardiotoxicity with IFE, and in humans it has been used to treat local anaesthetic toxicity, as well as bupropion/lamotrigine toxicity. Its exact mode of action is unclear but it may trap lipophilic drugs in an expanded plasma lipid compartment (lipid sink). This case demonstrates the successful use of IFE in an overdose involving amitriptyline and diltiazem. Administration of intralipid versus reversed ECG changes and improved haemodynamic status without the need for inotrope therapy or extended ITU support. Although data from human poisonings are still limited, we believe there is a role for IFE therapy in managing patients with overdose from lipid-soluble drugs. References: 1. Sirianni AJ, Osterhoudt KC, Calello DP, et al. Use of lipid emulsion in the resuscitation of a patient with prolonged cardiovascular collapse after overdose of bupropion and lamotrigine. Ann Emerg Med 2008; 51:412–5.
Abstracts

252. Hemodynamic Effects of Insulin and Dextrose in Healthy Volunteers
Brenner S, House S, Cannarozzo A, Halcomb SE. 
Objective: The combination of high dose insulin and glucose has been repeatedly used in various cardiac conditions (chronic heart failure, acute myocardial infarction, cardiac surgery) and has become part of the antidotal treatment of overdose with calcium channel and beta-adrenergic blocking agents. Little, however, is understood about the drug interactions at the myocardial level and the various hypotheses have been generated to explain the cardioprotective mechanism of insulin/glucose in the stressed myocardium. With this study we tried to understand the effects of insulin-euglycemia treatment on hemodynamics of healthy hearts in vivo. Methods: Ten healthy females were enrolled in a prospective double blind cross-over trial. Each volunteer received 10 units regular insulin with 25 gm dextrose IV vs. placebo (0.9% saline IV). After each infusion cardiac parameters (heart rate, blood pressure, fractional shortening of the left ventricle) were measured every 15 min for one hour. ANOVA for repeated measures was calculated using muscle glucose plus placebo treatment as subject factors. Post-hoc paired t-tests were done when ANOVA analysis suggested a significant effect at an alpha = 0.05 level. Results: For heart rate (HR), systolic blood pressure (SBP), and fractional shortening (FSV) no significant differences in group means could be detected. There was a statistical significant difference towards lower diastolic blood pressures (DBP) in the insulin/glucose treatment arm (ANOVA p = 0.004). Paired t-test analysis calculated significant differences for DBP between the treatment arms at 15, 30, and 60 min (p = 0.02, 0.04, and 0.01 respectively). However, the treatment effect was measured as a decrease in DBP of only 3.9–5.4 mmHg. Conclusion: Low-dose insulin-euglycemia treatment seems to have little or no effect on the hemodynamic parameters of healthy, non-stressed hearts. Therefore, cardioprotective effects of insulin/glucose might be more evident with use of high-dose insulin regimens or under conditions with maximal cardiac distress. References: 1. Parsonage WA, Hetmanski JW, Blum TM, et al. Glutamate, hyperglycemia, and dopaminergic effects of insulin in chronic heart failure. Heart 2001; 85:508–13. 2. Malmberg K. Perspective randomized study of intensive insulin treatment on long term survival after acute myocardial infarction in patients with diabetes mellitus. BMJ 1997; 314:1512–5. S. Svedholm R, Hulbrecht I, Hakanson E, et al. Glutamate and high-dose insulin-potassium (GIK) in the treatment of severe cardiac failure after cardiac operations. Am Thorac Surg 1995; 59:523–30. 4. Kerns W. Management of beta-adrenergic blocker and calcium channel antagonist toxicity. Emerg Med Clin N Am 2007; 25:309–31.

253. Glucarpidase - A Fast and Efficient Antidote in Methotrexate Poisoning
Binsbeck T, Ambach L, Großobresch T, Schwartz S. 
Institute of Toxicology - Clinical Toxicology and Poison Information Centre Berlin, BBGes, Berlin
2Department of Hematology and Oncology, Charité Campus Benjamin Franklin, Berlin, Germany
Objective: Methotrexate (MTX) poisoning is a complication in immunosuppressant and anti-neoplastic therapy. The enzyme of high-dose MTX poisoning with renal impairment and delayed renal excretion as well as with dosage errors. It has been shown, that intravenously injected bacterial enzyme glucarpidase rapidly hydrolyzes MTX into inactive 2,4-diamino-N10-methylpyridoc acid (DAMPA) and glutamic acid, thus abrogating toxicity of MTX. Hitherto, the analytical monitoring of this effect has been achieved because the immunoassays crossreact with DAMPA yielding false high readings for MTX. Therefore a LC-MS/MS method has been developed to quantify the degradation of MTX and the formation of DAMPA in rats. In addition, we performed kinetic in vitro studies to explore enzymatic activity. Methods: The analytical method consisted of a liquid chromatography on phenylhexyl column, 50 µm × 2.0 mm, 5 µm (Phenomenex) and MS/MS-detection of the analytes MTX, 7-hydroxy-MTX and DAMPA using the multiple reaction mode on a QTRAP 3200 (Applied Biosystems). Lower limit of quantification was 4.4 µmol/L for MTX. Results: (A) Human blood samples spiked with 4.4 µmol/L MTX were treated with glucarpidase (0.75 U/L) at 37°C. Concentration of MTX dropped below 0.4 µmol/L within five minutes with proportional increases of DAMPA concentrations above 4.0 µmol/L. (B) The time course of MTX concentrations from two patients receiving MTX (5.0 mg/kg, or 12,500 µg/kg) revealed the degradation of more than 95% of MTX before the first sample was drawn 45 min after i.v. application of the enzyme. DAMPA could be measured more than 90% of MTX within five minutes producing an equivalent amount of DAMPA in vitro and probably in vivo. Commercially available immunoassays are unsuitible for monitoring the success of MTX-degradation treatment after glucarpidase rescue treatment requiring a refined analytical approach. Glucarpidase appears to be a fast acting and safe antidote in the treatment of methotrexate intoxication. References: 1. Peyriere H, Cucq M, Margette G, et al. Optimal management of methotrexate intoxication in a child with osteosarcoma. Ann Pharmacother 2004; 38:422–7. 2. Mohty M, Peyriere H, et al. Methotrexate: Clinical and pharmacokinetic aspects. Leuk Lymphoma 2000; 37:441–3.

254. An Anticalin with Drug-Binding Properties: Results of a Pilot Study to Reverse Digoxin-Toxicity in Rats
Eyer F, Steiner W, Jung N, Neuberger H, Müller C, Schlapschy M, Zilker T, Skerra A. 
1Department of Toxicology, Klinikum rechts der Isar, Munich; 2Institute of Clinical Chemistry and Pathobiology, Technical University Munich; 3Center for Integrated Protein Science and Lehrstuhl für Biologische Chemie, Freising-Weihenstephan, Germany
Objective: To evaluate the properties of an engineered lipocalin to serve as a specific digoxin-binding antidotal therapy in a pilot study in rats. Methods: Intravenous digoxin (50 µg/kg/min) was administered continuously for one hour. ANOVA analysis suggested a significant effect at an alpha = 0.05 level. Results: For heart rate (HR), systolic blood pressure (SBP), and fractional shortening (FSV) no significant differences in group means could be detected. There was a statistical significant difference towards lower diastolic blood pressures (DBP) in the insulin/glucose treatment arm (ANOVA p = 0.004). Paired t-test analysis calculated significant differences for DBP between the treatment arms at 15, 30, and 60 min (p = 0.02, 0.04, and 0.01 respectively). However, the treatment effect was measured as a decrease in DBP of only 3.9–5.4 mmHg. Conclusion: Low-dose insulin-euglycemia treatment seems to have little or no effect on the hemodynamic parameters of healthy, non-stressed hearts. Therefore, cardioprotective effects of insulin/glucose might be more evident with use of high-dose insulin regimens or under conditions with maximal cardiac distress. References: 1. Parsons WA, Hetmanski JW, Blum TM, et al. Glutamate, hyperglycemia, and dopaminergic effects of insulin in chronic heart failure. Heart 2001; 85:508–13. 2. Malmberg K. Perspective randomized study of intensive insulin treatment on long term survival after acute myocardial infarction in patients with diabetes mellitus. BMJ 1997; 314:1512–5. S. Svedholm R, Hulbrecht I, Hakanson E, et al. Glutamate and high-dose insulin-potassium (GIK) in the treatment of severe cardiac failure after cardiac operations. Am Thorac Surg 1995; 59:523–30. 4. Kerns W. Management of beta-adrenergic blocker and calcium channel antagonist toxicity. Emerg Med Clin N Am 2007; 25:309–31.

255. Severe Formalin Accident Poisoning: A Case Report
Badrane N, Ghaleen N, Chafiq F, Bennmi M, Soulaimani Benabedh K. 
2Private Hospital Ibn Rochde, Rabat, Morocco
1Poison Control Centre of Morocco, Rabat; 2Private Hospital Ibn Rochde, Rabat, Morocco
Objective: Ingestion of formalin is rare but often leads to death. A therapeutic approach is discussed including the use of N-acetylcysteine (NAC) or sodium thiosulfate (STS) as antidotes. It is known that treatment with N-acetylcysteine (NAC) may contribute to the hepatic detoxification after formalin ingestion. In fact, the oxidation of absorbed formaldelyde to formic acid is catalyzed by the hepatic enzyme formaldehyde dehydrogenase, which requires reduced glutathione as a cofactor and NAC, a glutathione precursor, might help to maintain or replenish the level of the hepatic reserves. Thus, we report a case illustrating the favorable outcome after formaldehyde ingestion with treatment by NAC and intensive care. Case report: A 40 year old man presented to an emergency department under indefinite formalin overdose. The initial status included respiratory failure, circulatory failure, hyperthermia, elevated liver enzymes and coagulopathy. Emergency oesophagogastroduodenoscopy disclosed corrosive gastric and oesophageal injuries. Medical therapy consisted of mechanical ventilation, and noradrenaline. N-acetylcysteine was recommended and delivered by the Poison Control Centre. The respiratory and hemodynamic status improved, the patient was successfully extubated after 5 days, and had a subsequent resolu- tion of the hepatic cytolysis 11 days after the intoxication. Conclusion: The use of NAC appeared to allow the fast improvement to the hepatic cytolysis in this patient and contributed, with the intensive care, to the good outcome. It is important to identify the exact role of NAC in formaldehyde intoxication in order to properly elucidate its use. This will require the use in similar cases and experimental studies.

256. A Cost Analysis of Treating Patients with Ethylene Glycol Poisoning with Fomepizole Alone Versus Hemodialysis and Fomepizole
Cannarozzo AA, Mullins ME. 
Emergency Department, Washington University, School of Medicine, Saint Louis, Missouri, US
Objective: We sought to compare the costs of fomepizole alone versus hemodialysis plus fomepizole in treat- ing an ethylene glycol poisoned patient, based on the initial serum concentration of ethylene glycol and patient body weight. Methods: Patient charges were calculated based on fees charged at a US tertiary care, aca- demic hospital. Costs for fomepizole only include the cost of fomepizole (given at 15 mg/kg once followed by 10 mg/kg every 12 hours), admission to the ICU at high ethylene glycol levels, followed by transfer to a general medical unit, and laboratory testing. Costs for hemodialysis plus fomepizole included the cost of fomepizole, admission to the ICU for the first day followed by the general medical unit, nephrology consultation, insertion of a Quinton catheter, chest radiograph to confirm catheter placement; one-four-hour session of dialysis every 24 hours; and laboratory tests while being treated until ethyl- ene glycol concentrations fell below 25 mg/dL. Calcula- tions were based on a 75 kg patient (mean weight for an
285. Use of High-Dose Cotralidae Polyvalent Immune Fab in a Toddler with Copperhead Envenomation

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Objective: The safety of Cotralidae polyvalent immune Fab (Crobaf) for copperhead envenomations has not been studied. Methods: A 2-year-old female patient was bitten by a copperhead. Case report: A 28-month-old female was bitten on her right knee by a copperhead while playing at a park. Her father positively identified the snake, and the patient was transferred to an academic medical center (AMC) after brief evaluation in an outside hospital. On initial evaluation at the AMC (about 4.5 hours after the bite), the patient's right leg was noted to be ecchymotic and swollen from the ankle to the hip, with a right thigh circumference roughly three times greater than the left. Peripheral pulses were diminished right, but palpable left. She was immediately treated with four vials of Crofab and the leg was elevated. Her vital signs and initial laboratory studies were normal, with exception of fibrinogen (149 mg/dL) and the ICU where swelling of her right lower extremity progressed to her umbilicus and both labia. The patient received an additional 18 vials over 24 hours to impede swelling and improved right lower extremity swelling. Her tibia sig- nificantly decreased by day three and she was discharged on day seven. No adverse reactions to Crofab were identified. Conclusion: Crofab is effective in treating copperhead envenomation in children.1 Limited data is available on Crofab use in children.2 This case demonstrates uncomplicated use of high dose Crofab in a pediatric patient with progressive edema following copperhead envenomation.

259. Antidotal Treatment of Heroin Overdose Patients

Pavlovski BP, Bekarowski NB, Popovski NP, Pereska ZP, Simonovska NS, Babulovska AB.
1University Clinic for Toxicology, Sofia, Bulgaria; 2Department of Acute Medicine, University Hospital Ullevaal, Oslo, Norway

Objective: Overdose training and take-home naloxone for opiate toxoin has been provided in some countries. However, there is a need for more detailed information on the use of the two interventions. Methods: We conducted a systematic review of the literature on overdose training and take-home naloxone for opiate toxoin. Results: There are several studies that have evaluated the effectiveness of overdose training and take-home naloxone for opiate toxoin. These studies have shown that overdose training and take-home naloxone can significantly reduce the number of overdose deaths. Conclusion: Overdose training and take-home naloxone are effective interventions for reducing opiate overdose deaths. Further research is needed to evaluate the long-term impact of these interventions.

260. Non-Fatal Self-Poisoning by Low Molecular Weight Heparin and the Use of Antidote

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Objective: Since protamine sulphate has been reported to incompletely balance the anticoagulation effect of low-molecular-weight heparins (LMWHs), its antidotal effect has been questioned. We report such a unusual poisoning where the effect of protamine sulphate could be evaluated. Case report: A 40-year-old female was admitted after subcutaneously injecting herself with 17 doses of 12.500 IE (totally 212.500 IE) dalteparin in a suicide attempt. She also ingested small amounts of promethazine, citalopram, lamotrigine and acetylsalicylic acid. On admission, she was somnolent and had a GCS of 12. Circulation and respiration were stable, there were no petechiae, but the abdominal skin showed 16–17 bleeding injection sites. Neurological examination and CT scan were normal. She received 500 mg protamine sulphate intravenously over 100 min- utes. Hemoglobin was stable. APPT (STAPT Auto- mate 5, Diagnostica Stago) at admission was >180 seconds over the testing limit. Plasma protamine sulphate was 4.40 (therapeutic range 0.5–1.0 U/mL). After receiving 500 mg protamine sulphate, APPT five hours later was 53 (normal range 27–40 s) and anti-Xa was 1.5 U/mL. Four hours later, twelve hours after the last dose of protamine sulphate, the APPT was 300 again, and a repeated dose of antidote was given. APPT was then normalized. After 48 hours of observation, no bleeding complications were observed. APPT and anti-Xa activity were within normal limits and she was discharged with psychiatric follow-up. To neutralize LMWH, 10 mg protamine sulphate per 100 IE LMWH is recommended. Accordingly, 2125 mg protamine sulphate should not be needed, but the patient initially proved sufficient to give a clinically significant reduction of anticoagulant activity. However, protamine sulphate has a shorter half-life than LMWH, and another dose would be needed in order to neutralize the last dose of LMWH. Anti-Xa activity. Protamine sulphate proved to be effective (with regards to APPT) in this case, and no major bleeding complications was observed. Conclusion: Self-poisonings by LMWH can be treated by administration of prota- mine sulphate, but the dosage needed to balance the anticoagulation effect is not linear according to this case report. Careful monitoring of APPT and anti-Xa activ- ity helped guide the administration of antidote.
262. Outcome of Symptomatic Accidental Exposures to Wood Preservation Fungicides

Mrazova K, Pelcova D.
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Objective: To evaluate symptomatic exposures to water based wood preservatives, containing boron acid and benzenalkonium chloride, i.e. quaternary ammonium compounds (QAC), in calls to the Toxicological information Centre (TIC). The outcome of intentional ingestions may be fatal. Methods: A retrospective analysis of calls classified as accidental exposure to wood preservatives was performed. Data was extracted from the electronic database of TIC during 6 months (January-June 2009). Health outcome was evaluated based on discharge reports of hospitalized patients and telephone inquiries to the callers. Results: A total of 4465 calls were answered during the 6 months. Inquiries due to pesticides were 149 (3.3%), amongst which 23 calls about fungicides. Symptoms were noted only in 11 patients after accidental exposure to fungicides containing boron acid and QAC. In 9 subjects the follow-up was successful. There were 7 adults and 2 children. Fungicide exposures occurred after swallowing 1 sip (8 patients) or eye exposure (1 patient). First aid after exposure included washing of the mouth or eye with water (8 x), and drinking water (6 x). Fungicides were concentrated 2x, diluted 4x, unknown concentration 3x. Most frequent symptoms were burning in the mouth and throat (8x), vomiting (6x), nausea (4x) and retrosternal pain (1x). The symptoms lasted up to 20 hours. Seven patients were hospitalized for 2 days, esophagogastroscopy (EGGS) was performed in 5 patients, one patient refused. No revealed superficial damage of buccosa only. Symptomatic treatment was given in 5 patients (analgescics, intravenous fluids, oral antibiotics, and short-term corticosteroids). Conclusion: Accidental exposures to fungicides led to symptoms only in products containing boron acid or QAC. They had favorable outcomes in all followed cases (19% were lost to follow-up). The unpleasant taste possibly prevented a larger ingestion. First aid according to the instructions at the label of the product was undertaken by after exposure. Ingestion led to hospitalization in 78% and EGGS in 56% of patients. References: 1. Adams RD, Lupton D, Good AM, et al. UK childhood exposures to pesticides 2004–2007: a TOXBASE toxicovigilance study. Arch Dis Child 2009; 94:417–20. Acknowledgement: MSM 0021620807.


Settimi L,1 Severgnini P,2,3 Davanzo F,2 Fracassi A,4 Miceli G,5 Marcello I,6 Binetti R.1 National Institute of Health, Rome; 2Poison Control Center of Milan, Niguarda Ca Granda Hospital, Milan; 3Department of Environmental Safety and Health, Insursia University, Varese; 4Department of Prevention, Local Health Unit of Rovigo; 5Department of Prevention, Local Health Unit of Latina, Italy

Objective: To describe the acute environmental exposures and the related illnesses reported to the Italian Program for Surveillance of Acute Pesticide-Related Illnesses (SAPRI-program) and attributed to soil use of methylisothiocyanate (MITC)-generating pesticides, including metam-sodium, metam-potassium and dazomet. Methods: The SAPRI-program database was searched retrospectively (January 2004–June 2009) for reports involving the chemicals of interest. The narrative section of the identified records was reviewed in order to characterize the incidents. Results: Five events and 110 resulting illnesses were identified. Metam-sodium was responsible in four incidents and metam-potassium in one. All the exposures occurred in summer time at about 9 p.m. The victims comprised residential bystanders (n=90) and emergency responders (n=20). Their ages ranged from <1 to 85 years. All cases were seen in or referred to a health care facility. Severity of illness was low. Case series: On July 2004, two residents of a house close to a field treated with metam-sodium complained of eye irritation. One of them reported abdominal pain. In June 2005, 1.2 acres were treated with 1.3-dichloropropene and metam-sodium by injection. Six bystanders at about 0.8 miles from the treated site were symptomatic and reported eye irritation (n=6), vomiting (n=3), abdominal pain (n=1), tachycardia (n=1). In August 2005, 2.6 acres were treated with metam-sodium by irrigation. At the end of the application, 13 resident living 0.7 miles from the treated field developed clinical effects including: eye irritation (n=11), nausea (n=9), headache, vertigo, diarrhea (n=1, respectively). In August 2005, 0.7 acres were treated with metam-potassium by injection. At the end of the treatment four residents of a house located at less than 1 mile from the treated field reported eye irritation, nausea, and headache. In July 2009, a total of 85 residents experienced acute symptoms related to off-gassing problems from a nearby field which was treated with metam-sodium by sprinkler irrigation. The reported effects included eye and throat irritation (n=11), vomiting (n=3), headache and vertigo (n=1, respectively). Conclusion: The incidents related to MITC-generating pesticides are rarely documented in Europe. The observations performed in Italy indicate that adequate measures should be undertaken to reduce the risk of environmental exposures.

264. Utility of Serum Aldicarb Concentrations in Cases of Tres Pasitos Poisoning

Hernandez SH,1,2 Prosser JM,3 Livshits Z,1 Jang DH,1 Stajic M,4 Hoffman RS,2 Nelson LS.1 1New York City Poison Control Center, New York; 2New York University Medical Center, New York; 3Well Cornell Medical Center, New York; 4New York City Office of Chief Medical Examiner, New York, US

Objective: In our region, cholinergic poisoning from ingestion of illegally imported aldicarb-containing rodenticide, Tres Pasitos, occurs commonly. Unfortunately, because the aldicarb-cholinesterase bond spontaneously regenerates in vitro, confirmation and prog nostication with cholinesterase activity is impractical. We studied serum aldicarb concentrations in survivors and fatalities in order to better understand the toxicokinetic-toxodynamic profile of aldicarb poisoning. Methods: We searched the Medical Examiner (2005–2008) and Poison Control Center (2008–2009) databases for cases in which aldicarb poisoning was documented with a tissue concentration. These records were abstracted to gather pre- and post-mortem demographic, clinical, and analytical data. Results: We identified two fatal cases from the ME and three survivors from the PCC database that met inclusion criteria (see Table 1). Conclusion: Most aldicarb poisoning cases in the literature are not confirmed with tissue concentrations. Clinical toxicity was observed in our case series with serum concentrations as low as 0.176 mg/L, and death occurred at 1.1 mg/L. Treatment with pyridoxime was provided on the premise that the nature of the cholinesterase inhibitor had not yet been identified as an organophosphate or carbamate. Aldicarb concentrations also serve to distinguish carbamate from organophosphate poisonings and may enable judicious use of pyridoxime. Interestingly, our cases initially presented with bradycardia regardless of the oxygen saturation. The high aldicarb concentration in the patient who died

Table 1. Cases of confirmed aldicarb poisoning

<table>
<thead>
<tr>
<th>Case</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
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<tr>
<td>Age/Sex</td>
<td>47/M</td>
<td>43/F</td>
<td>47/M</td>
<td>44/F</td>
<td>60/M</td>
</tr>
<tr>
<td>Outcome</td>
<td>Survived</td>
<td>Survived</td>
<td>Survived</td>
<td>Deceased</td>
<td>Deceased</td>
</tr>
<tr>
<td>Vitals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BP</td>
<td>200/100</td>
<td>110/65</td>
<td>200/114</td>
<td>110/65</td>
<td>110/65</td>
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<tr>
<td>HR</td>
<td>35 bpm</td>
<td>46 bpm</td>
<td>50 bpm</td>
<td>30 bpm</td>
<td>30 bpm</td>
</tr>
<tr>
<td>O. Saturation</td>
<td>99%</td>
<td>99%</td>
<td>99%</td>
<td>70%</td>
<td>70%</td>
</tr>
<tr>
<td>Temperature</td>
<td>36.5 C</td>
<td>37.0 C</td>
<td>36.6 C</td>
<td>36.5 C</td>
<td>36.5 C</td>
</tr>
<tr>
<td>Cholinergic Signs &amp; Symptoms</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Atropine Requirement</td>
<td>2 mg total</td>
<td>3 mg total</td>
<td>3 mg total</td>
<td>5 mg total</td>
<td>5 mg total</td>
</tr>
<tr>
<td>Intubation</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>2-PAM Provided</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Aldicarb Concentration</td>
<td>0.176 mg/L (serum)</td>
<td>0.47 mg/L (serum)</td>
<td>0.23 mg/L (serum)</td>
<td>1.1 mg/L (abdominal cavity fluid)</td>
<td>12.1 mg/L (blood) 217.6 mg/kg (gastric contents)</td>
</tr>
</tbody>
</table>
Clinical Toxicology vol. 48 no. 3 2010

Abstracts


Adams RD, Gibson AL, Lupton D, Good AM, Bateman DN
NPIS Edinburgh, Royal Infirmary of Edinburgh, UK

Objective: To describe fumigant exposures during the 5.5 years of the NPIS TOXBASE® pesticide surveillance project. Methods: The National Poisons Information Service Edinburgh Unit (NPIS) monitors pesticide exposures following Internet (TOXBASE®) or telephone enquires. All patient related accesses to pesticides of interest on TOXBASE® between 1/4/2004 and 1/1/2009 were notified electronically to NPIS, and were followed up using on-line, email or paper questionnaires. All Scottish telephone enquires were also traced back from outside the UK and those where symptoms were not deemed related to the exposure were excluded. Fumigant exposures were analysed for circumstances and symptoms in adults and children. Results: 2004−2009 4140 pesticide exposures have been reported to NPIS. Fumigant pesticides comprise a small proportion of these reports, 51 (1.2%) but frequently involve highly toxic agents such as diazinon, malathion (35, 68%), methyl bromide (15, 29%) and pirimiphos methyl (1). Most exposures involved adults (45, 88%) and all involved professional products. Twenty-five (55%) were occupational. In 15 (33%) the patients were using the product themselves, 7 (16%) use by someone else, 19 (42%) were exposed after application and 4 (9%) as a result of unsatisfactory storage. Six exposures involved DDT and 1 followed an alleged poisoning by a third party. Seventeen (33%) of patients were asymptomatic and graded PSS 1 "none". Of the remainder: 20 "minor", 5 "moderate", 3 "uncertain", 6 "fatal". Of fatal cases 5 were DSH and 1 followed alleged poisoning by a third party, and all involved aluminium phosphate. Common symptoms in accidental exposures were: bronchospasm (10), mouth/throat irritation (8), nausea/vomiting (7), lacrimation (6); dizziness/faint (4); headache (4), eye irritation (3); lethargy (3); tachycardia (3); anxiety (2). Conclusion: All pesticide fumigant exposures in this series involved professional products with significant occurring subsequent to application, during use by the patient or due to poor storage. Accidental exposures usually produced minor or no symptoms. Where symptoms did occur, respiratory effects were frequently reported. In deliberate self-harm exposures to these products the outcome was often fatal. References: 1. Persson HE, Sjoberg GK, Haines Stedtler U, Hermann-Clauß M. 1Posons Information Centre University Hospital, Freiburg; 2Toxicology Laboratory, Medical University Center, Göttingen, Germany

Objective: Methomyl-alphamethrin is a combination of carbamate and synthetic pyrethroid insecticides. Carbamate functions as cholinesterase inhibitors, which may produce life-threatening cholinergic syndromes that require prompt diagnosis and treatment. Cordial visual loss and peripheral neuropathy have rarely been reported as complications of carbamate or pyrethroid poisoning. Here we report a case of intentional methomyl-alphamethrin ingestion that resulted in coma, respiratory failure, cardiovascular collapse, cortical blindness, and painful peripheral neuropathy. Case report: A 41-year-old woman, attempting suicide by drinking 200 mL of methomyl-alphamethrin insecticide, was found unconscious, hypothermic and in shock in an abandoned park. She was mechanically ventilated after immediate resuscitation and mechanical ventilator support. She became conscious and was weaned from the ventilator on the second day. Clinical diagnosis of carbamate poisoning was confirmed by the presence of features of cholinergic crisis and elevated serum levels of cholinesterase and plasma cholinesterase. The patient had complained of blurred vision. Ophthalmologic examinations with electro-retinography and fluorescein angiography were normal. Visual evoked potential showed nearly flat response. Brain magnetic resonance image disclosed abnormal T2 high signals at bilateral basal ganglia and bilateral occipital lobes, indicating the diagnosis of cortical visual loss. At day 21, she noticed lower limb numbness, progressive weakness and right foot drop. Electrophysiological tests at day 27 were consistent with neuropathy of bilateral peroneal nerves. Conclusion: This patient sustained severe toxic effects from carbamate poisoning, which was complicated with delayed onset peripheral neuropathy, which are seldom mentioned in the literature. Physicians should be aware of these two rare complications in patients with severe carbamate poisoning.

267. Acute Ethylene Chlorohydrin Poisoning: Taiwan Poison Center Study

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Objective: Ethylene chlorohydrin is a chemical that has been used as an ingredient for pesticides. Although such agricultural use is prohibited, intoxication of large amounts of pyrethroids could be proven in rare cases where ingestion of a pyrethroid containing insecticide resulted in severe toxicity and the ingestion of large amounts of ethylene chlorohydrin. Threo-diol was expected to be converted to DCCA. This concentration proves a high exposition to permethrin and therefore to threo-diol too. The latter was only confirmed qualitatively. Blood alcohol was 2.6 g/L (not an ingredient of the product in question). This alcohol level may have contributed to the fast developing coma and marked decrease in blood pressure, even though the patient was not an alcoholic. Chronic alcoholism and the risk of lactic acidosis. Conclusion: This is one of the rare cases where ingestion of a pyrethroid containing insecticide resulted in severe toxicity and the ingestion of rather large amounts of ethylene chlorohydrin could be proven while there was no evidence for the presence of other pesticides.

268. Acute Pesticide Poisonings in the Years 1994−2008 Reported to the Toxicological Information Centre in Bratislava

Caganova B, Plackova S, Kresanek J, Ficekova Z, Batora I.1 National Toxicological Information Centre, University Hospital, Bratislava; 2Department of Occupational Medicine, Toxicology, University Hospital, Bratislava, Slovakia

Objective: The National Toxicological Information Centre (NTIC) in Bratislava has frequently been consulted for advice on pesticide exposures. To obtain more information about pesticide poisonings in Slovakia, we performed a retrospective analysis of all tele-phone calls to our Centre. Methods: All telephone inquiries involving pesticide exposures were extracted from our databases for the period 1994−2008. The following data were analysed: age, sex, intent of exposure (accidental or suicidal), substances ingested and clinical severity. All intoxications were classified in accordance with the Poisoning Severity Score. Results: During the 15-year period 26,547 acute intoxications were reported to the Slovak NTIC, of which 3,156 (11.9%) involved pesticides. Pesticide exposures in males (60.8%) were more prevalent than those involving females (33.4%). Accidental poisonings were more common (82.5%) than suicidal poisonings (15.8%). Almost half of the cases (48.1%) were children. Most exposures were caused by insects (46.0%), but rodenticides (23.3%), fungicides (9.3%), herbicides (12.3%) and other pesticides were also involved. Referring to the insecticides, 39.4% were organophosphates, 36.9% carbamates, 10.3% pyrethroids and 6.3% symptoms occurred in 81.2% of patients. The majority of them developed only mild toxicity (63.8%), moderate symptoms occurred in 12.4% and severe symptoms in 4.2% of cases. Two patients died from exposure. Conclusion: Pesticide poisonings are still associated with many fatalities, especially among patients with organophosphate exposures. More efforts,
such as legislative control of the availability of pesticide and further innovation in therapeutic measures, are required to reduce the serious impact of pesticide poisoning.

270. Amitraz Poisoning
Tavanaei M, Safari Kamalabadi S. Emergency Department, Rafsanjan University of Medical Science, Rafsanjan, Iran

Objective: Amitraz is a formamide pesticide used as an insecticide and acaricide.1 In Iran amitraz is mainly used as a pesticide in putasho plants in the suburbs of Rafsanjan-Iran. Amitraz poisoning causes nausea, vomiting, hypotension, bradycardia, bradypnoea, myosis, mydriasis, hypothermia, drowsiness and coma in humans.2 Case series: The following cases, involving attempted suicide with amitraz intake have been observed in the emergency department of Ali-ebne-abitahale hospital in Rafsanjan-Iran. Case 1: A 22 year old man was admitted to the emergency department with a history of amitraz ingestion. The patient was initially alert, but had vomiting. The vital signs were normal. However, loss of consciousness occurred later. After endotracheal intubation he was transferred to ICU. A patient was discharged in good conditions after 4 days. Case 2: A 25 year old man with a history of amitraz poisoning (ingestion) was admitted to the emergency department. He was initially alert but suddenly showed respiratory arrest. Endotracheal intubation was carried out. Mechanical ventilation was employed and the patient was transferred to ICU. Having recovered, the patient was discharged 5 days after ICU admission. A 20 year old woman was admitted to the emergency department with a history of amitraz ingestion. She was alert with normal vital signs, but showed drowsiness and bradycardia. The patient was transferred to ICU and atropine was prescribed. The patient recovered and was discharged after 3 days. Conclusion: Loss of consciousness and respiratory depression are important effects of amitraz ingestion.2


271. Pesticide Poisoning and its Relation to Pesticide Distribution in Mashhad, Iran
Moratav V, Nourzadeh G, Nourzadeh G.1 Medical Toxicology Research Centre, Mashhad University of Medical Science, Mashhad; 2Department of Plant Protection, Ferdowsi University of Mashhad, Mashhad, Iran

Objective: Pesticide poisoning is common in Iran.1 The aim of this study was to investigate the association between patterns of pesticide poisoning and distributed pesticides in Khorasan-razavi, Iran. Methods: The 3033 pesticide poisoning cases referred to Imam Reza Hospital in Mashhad, Iran from 2000 to 2008 were evaluated retrospectively. Data on different pesticides allocated to Khorasan-razavi province, Iran were obtained from the Ministry of Agriculture from 1997 to 2008. A poisoning risk index (number of poisonings divided by pesticide distribution/tons x10) and a mortality risk index (number of deaths divided by pesticide distribution/tons) were calculated Results: Insecticides had the highest distribution rate, varying between 237 and 679.2 tons/year. The lowest distribution rate was for rodenticides, including aluminum phosphide (AP). Two thousand five hundred and seventy eight human insecticide exposures were reported, of which 53.34% were females. The seasonal distribution in insecticide poisoning cases suggested a peak in spring and summer (63.15%). A total of 14 fungicides and herbicide poisoning cases were reported during 2000–2008, of which all fully recovered. Distribution of fungicides and herbicides varied between 225 and 580.2 tons/year. During 2000–2008, 406 cases of rodenticides and AP poisoning were referred to this hospital, having a roughly equal prevalence in females (49.8%) and males; of these a total of 6.4% died. The highest amount of rodenticides and AP allocated to the region was 1.832 tons in 2008. There was a significant (P<0.01) relationship between the amount of rodenticides and AP allocated annually and the number of admitted poisoning cases. Poisoning risk indices were 4.10, 6.5 and 0.05 for rodenticides and AP, insecticides, and fungicides and herbicides, respectively. Mortality risk index was 2.72 for rodenticides and AP and 0.03 for insecticides. Conclusion: The number of pesticide poisoning cases increased with the amount of pesticides allocated to the region. Rodenticides and, in particular, aluminum phosphide showed the highest poisoning risk. The seasonal use of insecticides and rodenticides was high in Mashhad, Iran (1997 to 2005). Clin Toxicol 2007; 45:382.

Table 1. Severity and outcome according to circumstances of exposure

<table>
<thead>
<tr>
<th>Severity</th>
<th>occupational</th>
<th>accidental</th>
<th>intentional</th>
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<td>asymmetric</td>
<td>11</td>
<td>21</td>
<td>5</td>
<td>1</td>
<td>38</td>
</tr>
<tr>
<td>minor</td>
<td>55</td>
<td>45</td>
<td>20</td>
<td>2</td>
<td>122</td>
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<tr>
<td>moderate</td>
<td>11</td>
<td>11</td>
<td>13</td>
<td>2</td>
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<td>2</td>
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<td>14</td>
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<tr>
<td>Total</td>
<td>84</td>
<td>86</td>
<td>126</td>
<td>15</td>
<td>311</td>
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</tbody>
</table>

272. A Retrospective Case Series of Metam Sodium Poisoning
Bretauade M, Lagarde L, Boels D, Harry P. Poisoning Center and Toxicovigilance, University Hospital, Angers, France

Objective: To evaluate the severity and toxicity of poisoning by metam sodium, a dithiocarbamate fumigant, the breakdown products in soil of which are methylisothiocyanate (MITC), carbon disulphide (CS2) and hydrogen sulfide (H2S).1 Case series: A retrospective review of 102 cases of metam sodium exposure reported to the Poisons and Toxicovigilance Center (CAPTV) between 1992 and 2009. Results: All cases of exposure were unintentional. Occupational poisoning only occurred in eight cases. The most common route of exposure was inhalation (n = 96). In 79 cases, the patients were people living near fields where metam sodium had recently been applied. Most of the reported symptoms involved irritation of the eyes (n = 76), throat and nose (n = 65), attributable to MITC. Cough and dyspnea occurred in four cases but no persistent, irritant-induced asthma or persistent exacerbation of asthma was observed. Sixteen patients at two different sites of pollution were exposed via the sanitation systems in their homes following the illicit discharge of metam sodium into the sewers. Most presented with nausea and headaches but only four experienced eye or throat irritation. We hypothesized that a breakdown product other than MITC was involved, and air analysis at one site revealed the presence of CS2 (337 mg/m3) and no H2S. Two of these patients, who had consumed some alcohol, experienced dysgeusia but no disulfiram-like reaction. The only lethal case recorded was a truck driver who was found dead of acute lung injury after falling into a tank that had previously contained metam sodium. Two other patients who ingested a dilute solution presented minor symptoms. Nevertheless, the toxicity of its breakdown products can cause severe symptoms in a stuffy environment. An air analysis of MITC, CS2, or H2S may be recommended in such cases. References: 1. Cone JE, Wugofski L, Balmes JR, et al. Persistent respiratory health effects after a metam sodium pesticide spill. Chest 1994; 106:500–8.

273. Multicentre Data Collection on Paracetamol Poisoning in Europe
Gutscher K,1 Rato F,2 Esteban M,3 Neou P,4 Kupfereschmidt H1
1Swiss Toxicological Information Centre, Zurich, Switzerland; 2Centro de Información Antivenenos, Instituto Nacional de Emergencia Médica, Lisboa, Portugal; 3Servicio de Informacion Toxicologica, Instituto Nacional de Toxicología y Ciencias Forenses, Madrid, Spain; 4Poison Information Center, Children's Hospital P & A Kyriakos, Athens, Greece

Objective: Paracetamol has been used as a herbicide worldwide since 1962. The aim of this study was to collect adverse health incident data to a common standard in Europe, using paracetamol as model substance. Methods: Poisons Centre-based prospective multicentre cohort study in 9 European countries whose population was over 100 million. In the first months of 2006 data were collected in a retrospective pilot study. Patient and exposure characteristics were recorded and likelihood of exposure, symptoms, severity, causality, and outcome were assessed. Only cases with a high likelihood of exposure are analyzed here. Results: Total reported cases n = 419 (Greece 97, Spain 93, Portugal 84, United Kingdom 60, France 38, Italy 17, Belgium 6, Germany 12, Netherlands 8, Slovakia 3, Cyprus 1). Three hundred and eleven (74%) had a high likelihood of exposure. Patient characteristics: Adults n = 292, mean age 52.0 years (S.D. 18.2, range 16–92), children (age <16 years) n = 16, mean age 7.5 years (S.D. 4.5, range 1.0–15), unknown n = 3. Severity and outcome according to circumstances of exposure are listed in Table 1. The route of exposure was oral in 161, dermal 62, inhalation 38, ocular 12, mucosal 2, combined 36. Paracetamol could be analytically detected in 84 cases (52.5% of all cases tested). Symptoms were mainly gastrointestinal, pulmonary, renal (from oral ingestion), and dermal. Conclusion: Paracetamol poisoning is particularly prevalent in Southern Europe. Severe or fatal poisoning is more frequent in intentional than in accidental occupational exposure (Chi2 p<0.0001). There was no fatal case and only two severe occupational cases.

274. Tolerance to Morphine-Induced Respiratory Effects in Mice: Description and Mechanisms
Mohammad W,1 Megarbane B,1,2 Alhaddad H,1 Nicolas M,1 Chevillard L,1 Risde P,1 Berte P1
1INSERM U705, Université Paris-Diderot, Paris; 2Réanimation Médicale et Toxicologique, Hôpital Lariboisière, Paris, France

Objective: Morphine is responsible for severe poisonings. Morphine toxicity may be attributed, in chronically treated patients, to the development of a weaker tolerance for its respiratory effects in comparison to its analgesic effects. Our objective was to describe the tolerance to the respiratory effects of morphine in mice and to study the mechanisms involved. Methods: Experimental study in Swiss mice with intraperitoneal administration of 2.5 mg/kg/day morphine versus saline; description of the respiratory effects (using plethysmography under
Beaune S, Mégarbane B, Risède P, Chevillard L

275. Mechanisms of High-Dose Citalopram-induced Death in Rats
Beaune S, Mégarbane B, Risède P, Chevillard L, Callebert J, Baud FJ.

Objective: Citalopram is a selective serotonin reuptake inhibitor. Citalopram toxicity is considered as weak. However, overdoses may result in serotonin syndrome, seizures, cardiovascular abnormalities as well as respiratory failure and death. Mechanisms of severe toxicity remain unclear. Our objective was to study the mechanisms of death following high-dose citalopram administration in rats.

Methods: Experimental study of citalopram-induced features and measurement of alterations in respiratory pattern (arterial blood gases and plethysmography) and biological parameters including blood lactate (Scout-EK diagnostic), plasma and platelet serotonin concentrations (high-performance chromatography - fluorometry); determination of the preventive effect of diazepam, ciprofloxacin, and propranolol pretreatments with the determination of their minimal effective dose; comparisons using ANOVA for repeated measurements followed by Bonferroni post-test.

Results: Citalopram IP-MLD was determined as 102 mg/kg in rats. Seizures were significantly increased in rats receiving 80% and 120% of citalopram MLD versus controls (p<0.01 and p<0.05, respectively). The latency time to seizures was markedly shorter in rats treated with 120% of citalopram MLD (p=0.001). Significant decrease in body temperature was observed after 90 minutes in rats treated with doses >60% MLD, with doses reaching 120% MLD (p<0.05). Occurrence of serotonin behavioural syndrome was comparable in all groups. Citalopram administration did not result in significant hypoxemia, hypercapnia, and lactate elevation, thus not supporting the hypothesis of the occurrence of any significant deleterious cardiovascular effect in citalopram-induced toxicity. However, a significant moderate increase in the inspiratory time (p<0.05) accompanied with an expiratory braking was observed. A significant decrease in platelet serotonin and increase in plasma serotonin concentrations were measured (p<0.05). Pre-existing early relation to drugs of misuse. This study was therefore performed to examine trends in NPIS enquiries for drugs of misuse and compare this with other sources.

Methods: National study of telephone enquiries (2002-2009) and TOXBASE® accesses (2000-2009) relating to drugs of misuse. Since total TOXBASE® accesses have increased substantially and telephone enquiries have decreased for all products over the course of the study, data are presented as percentages of overall telephone or TOXBASE® activity for each year studied.

Results: Ecstasy was the most common drug of misuse accessed on TOXBASE® or subject to a telephone enquiry during the study, but the proportion of activity relating to this drug declined for both telephone enquiries (2002 0.85%, 2008 0.38%) and TOXBASE® accesses (2000 1.36%, 2008 0.72%). In contrast, over the same time period of 2002, the proportion of telephone (0.37% to 0.59%) and TOXBASE® activity (0.28% to 0.71%) relating to cocaine has increased markedly. Cocaine is now the most common drug of misuse, as it was in the previous second period, although it is most commonly accessed from TOXBASE®

Takotsubo Cardiomyopathy (Apical Ballooning Syndrome) is an acute, transient left ventricular dysfunction synonymous with myocardial stunning associated with severe emotional distress ("broken heart syndrome") suggested linked to catecholamine toxicity. We observed a patient with profound hypotension following cocaine use. An echocardiogram revealed the diagnostic features of Takotsubo (apical ballooning syndrome) and the global systolic dysfunction. We report this case to further support the potential association with cocaine use and the need for clinical vigilance in diagnosing and treating this syndrome. Case report: A 42 year old female presented to our Emergency Department (ED) complaining of weakness and abdominal pain, which began hours after a several day cocaine binge. Physical examination revealed lethargy, hypotension, systolic blood pressure of 80, palor, jugular venous distension, clear lungs, and epigastric tenderness. Initial labs were notable for a white blood cell count of 17.2 Thous/ul, compensated metabolic acidosis with a arterial pH of 7.19, and Hgb of 8.6. An echocardiogram demonstrated a large pressure gradient and a left ventricular akinetic apical ballooning syndrome with a small pericardial effusion. A coronary angiogram showed no significant stenosis. The patient was started on fluids and dobutamine; repeat transesophageal echocardiogram on day 4 demonstrated improved LV function. Conclusion: This case describes cardiomyopathy (Takotsubo) occurring in the setting of heavy cocaine use. We report this case to support the theory of a catecholamine mediated mechanism and potential association with cocaine use. Clinical implications: Consider this diagnosis in patients who present with hypotension and cocaine use. References: Wittington IS, Thiemann DR, Lima JAC, et al. Neurohumoral features of myocardial stunning due to sudden emotional stress. NEJM 2005; 352:539-48.
age of those intoxicated with ethanol was higher among men and patients over 35 years old. Adolescents under 15 years, a fact that is extremely disturbing. The age of those intoxicated with ethanol was higher among men and patients over 35 years old. Adolescents under 15 years, a fact that is extremely disturbing.

279. MDPV Exposures Reported to the Finnish Poison Information Centre

Pohjalainen T, Hoppu K.

Poison Information Centre, Helsinki, Finland

Objective: The designer drug MDPV (also known as MDPK or 3,4-methylenedioxyprovalerone) was first reported to EMDCCA (European Monitoring Centre for Drugs and Drug Addiction) in December 2008 by Finland. MDPV is regulated as illegal to sell or possess in some countries. In Finland it is considered as a medicine and a chemical and import is forbidden, but it is bought via the Internet. MDPV is a psychoactive drug acting by releasing and inhibiting the reuptake of monoamine neurotransmitters such as dopamine and norepinephrine. Its CNS stimulant effects are cocaine- and amphetamine-like. It is also considered to have aphrodisiac properties. The effects seem to be stronger than those of a comparable amount of amphetamine. Duration of the effect has been reported to be 3–5 hours. Information on overdoses is scarce in the scientific literature. We investigated the human MDPV exposures in calls to the Finnish Poison Information Centre (PIC) for some information on the clinical picture of MDPV overdoses. Case series: In Jan 2008 - Oct 2009, the Finnish PIC received in total 33 calls concerning MDPV exposures. It was used intranasally, orally (PO), or intravenously (IV). Doses used were 10 mg (up to 30 mg) PO and 5 mg IV. Five of the patients, aged 21–31 years, needed hospitalisation. All of them had tachycardia, agitation, dyspnoea and hyper- tension. Two patients had reduced level of consciousness; one of them had convulsions and needed intubation for 1/2 day. Conclusion: MDPV seemed to cause mostly tachycardia, dyspnoea, hypertension, and agitation. Disturbed consciousness was observed in 2 cases.

280. The Comparative Clinical Effects of Cocaine and Amphetamines

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1North Texas Poison Center, Dallas, TX, 2Department of Emergency Medicine, Saint Joseph Mercy Health System, Ann Arbor, MI, 3South Texas Poison Center, Corpus Christi, TX, US

Objective: Cocaine and amphetamines are indirectly acting sympathomimetic drugs. They differ, however, with regard to mechanisms of action, commonly used routes of use, and associated complications. Patients exhibiting acute toxicity by either agent may present similarly. The objective of this study is to compare differences between these agents for various adverse clinical effects in cases reported to a state-wide poison information network. Methods: We analyzed the clinical effects of acute cocaine or amphetamines exposures, with no other known concurrent drug intoxications, in surviving patients reported to a large poison center network. The cohort examined consisted of 2149 patients presenting between 2002 and 2005. The relative risk of various adverse outcomes was compared. Results: Most reported clinical effects were similar between the two agents. Only those that were significantly different are shown in Table 1, all of which were more severe for amphetamine cases. Conclusion: In this study, increased adverse clinical effects associated with muscle injury and associated rhabdomyolysis and subsequent renal failure were more highly associated with amphetamine intoxication than with cocaine intoxication. This may be due to the longer and more frequent exposure of amphetamines relative to cocaine or other still yet to be defined mechanisms. Larger prospective studies are needed to better evaluate this possible association.

281. Ketamine Abuse Related Illnesses: A Rapidly Emerging Problem in Taiwan

Yang CC,1 Lu YL,1 Wu ML,2 Lin CC.3

1Department of Environmental & Occupational Medicine, National Yang-Ming University, Taipei; 2Division of Clinical Toxicology, Taipei Veterans General Hospital, Taipei, Taiwan

Objective: Ketamine abuse is a rapidly emerging problem in Taiwan. Consequently, ketamine related illnesses (e.g. intubation) have more frequently encoun- tered in daily practice; the pattern and outcome of such events however remain unclear. We conducted a hospi- tal-based study to understand the clinical profiles of patients who sought medical care because of ketamine-related illnesses. Methods: We identified patients from two different sources: (1) patients who visited the emergency department (ED) of Taipei Veterans General Hospital (TVGH) because of ketamine related illnesses and whose urine was tested positive for ketamine between 2000 and 2008; (2) patients hospitalized to TVGH because of ketamine related interstitial cystitis during the same period. All patients’ data were then col- lected and analyzed by employing appropriate statistical methods. Results: Between 2000 and 2008, there were a total of 127 patients eligible for the study, including 114 ED patients with a positive urine test for ketamine, and 13 patients who were hospitalized because of clinically diagnosed ketamine related interstitial cystitis. The number of patients with ketamine abuse illness rapidly increased from 2000 through 2008. In addition, the rising trend was positi- vely correlated with the annual amount of seized ketamine during the study period (r = 0.729). Ketamine related illnesses mainly involved people of younger age, unmarried status, and high school education. Most patients sought medical care because of illnesses other than acute poisoning, and common manifestations included respiratory symptoms (72.2%), psychiatric symptoms (23.2%), and genitourinary tract symptoms (16.5%). Seventy-nine patients were hospitalized; three patients (2.4%) died and 52 patients (40.9%) developed sequelae. Conclusion: The number of ketamine abusers and related illnesses is rapidly increasing in Taiwan. Many patients with ketamine related illness sought medical care through ED. Because quite a few ketamine abusers developed serious sequelae, it is mandatory to refine the national drug control policy and relevant preven- tive strategies to effectively minimize the impact of ketamine related health hazards in Taiwan.

Table 1. Significantly different clinical effects: amphetamines (AMP) vs. cocaine (COC)

<table>
<thead>
<tr>
<th>Clinical effects</th>
<th>AMP % Total</th>
<th>COC % Total</th>
<th>Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypotension</td>
<td>38.9</td>
<td>31.7</td>
<td>1.2</td>
<td>1.01–1.77</td>
</tr>
<tr>
<td>Tachycardia</td>
<td>38</td>
<td>3.2</td>
<td>11.8</td>
<td>1.01–1.77</td>
</tr>
<tr>
<td>CK elevation</td>
<td>21.3</td>
<td>15.9</td>
<td>1.36</td>
<td>1.01–1.77</td>
</tr>
<tr>
<td>Neurological (any)</td>
<td>68</td>
<td>55.4</td>
<td>1.23</td>
<td>1.03–1.48</td>
</tr>
<tr>
<td>Agitation, irritability</td>
<td>43</td>
<td>38.4</td>
<td>1.12</td>
<td>1.01–1.24</td>
</tr>
<tr>
<td>Confusion</td>
<td>10</td>
<td>10.9</td>
<td>0.92</td>
<td>1.01–1.01</td>
</tr>
<tr>
<td>Hallucinations, delusions</td>
<td>11</td>
<td>10.7</td>
<td>1.05</td>
<td>1.01–1.01</td>
</tr>
<tr>
<td>Oliguria, anuria</td>
<td>3</td>
<td>2.2</td>
<td>1.38</td>
<td>1.01–1.01</td>
</tr>
<tr>
<td>Renal failure</td>
<td>2</td>
<td>1.8</td>
<td>1.38</td>
<td>1.01–1.01</td>
</tr>
</tbody>
</table>

282. Mephedrone - A New 'Legal' Online Drug of Abuse. Do we Know Anything About its Safety?

Weatley N, Thompson JP.

National Poisons Information Service, Cardiff and Vale University Health Board, Cardiff, UK

Objective: The UK NPIS are receiving an increasing number of calls about a drug of abuse known as mephedrone or 4-methylmethcathinone, also called 'bubbles'. It is usually supplied as an off-white crystalline powder with a strong fish-like odour and is either ingested or inhaled. This drug is becoming increasingly popular in the UK as it is currently classed as a legal substance. It is often bought from the Internet as plant food or as a research chemical marked 'not for human consumption.' Methods: Enquiries to the UK NPIS for the period 1 January 2008 to 1st January 2009 and also 1st January 2009 to 1st November 2009 involving 'mephedrone' or 'methcathinone' were retrieved. Each call was examined in detail and all reported symptoms and the results of any investigations noted. Internet websites were also investigated for details of mephedrone exposures to try and compare symptoms experi- enced by regular users with those reported to the UK NPIS. Results: No enquiries concerning mephedrone were reported by UK NPIS between 1 January 2008 and 1st January 2009 compared with 29 enquiries which were received between 1st January 2009 and 1st November 2009. Of these, the main symptoms reported were altered state of consciousness, dysphoria, chest pain, mydriasis, loss or back pain and pins and needles. One patient was admitted to ITU with tachycardia, hypoten- sion, rhabdomyolysis and coma following a seizure. There were no reports of any constructive use. The extremes and joints. One death has been reported in Sweden although causal links with methcathinone have not yet been confirmed. Conclusion: Mephedrone is a very new and increasingly popular drug; its legal status in the UK may falsely imply safety. It is, however, a synthetic drug that, from UK NPIS data and Internet reports, causes some potentially dangerous symptoms that are similar to stimulant drugs of abuse. The clinical effects of this chemical need further investigation.

283. A Study Assessing Representation in Patients Presenting to the Emergency Department with Acute Recreational Drug Toxicity

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Objective: Acute recreational drug toxicity is a com- mon reason for presentation to the Emergency Depart- ment (ED). Previous studies have shown that a signifi- cant proportion of those (up to 27%) who present with acute recreational drug toxicity in a pre-hospital (nightclub) environment, have previously presented with toxicity with similar drugs. There is no published data looking at representations to the ED following an initial ED presentation with acute recreational drug toxicity. Methods: We retrospectively identified patients presenting with acute recreational drug toxicity during 2007; the first presentation was used as the “pri- mary presentation”. We then determined whether there had been any further acute poisoning ED presentations between this primary presentation and 31st August 2009 and determined: i) mean (SD) number of representations; ii) time to second presentation; iii) concordance of drugs used at primary and second presentations; iv) number of representations due to drug poisoning. Results: There were 446 “primary presentations” during 2007; of these 44 (9.9%) individuals had ≥1 acute poisoning representation before 31st August 2009. The median (range) number of representations time to first representation was 1.34±0.68 (1–4) and 257.5 ± 229.6 (2–680) days respectively. 86.4% of first represent- ations were related to acute recreational drug use, with 99.5% concordance of drugs used. Overall, there
were 8 (1.8% of all individuals) self-poisoning repre-
sentations (mean±SD (range) time to self-poisoning pre-
sentation 267±8213.4 (21–702) days). Conclusion: A
small but non-negligible minority of individuals
represented with acute recreational drug toxicity; in
the majority of these the same drug(s) were responsible
for the presentation. There is the potential for brief inter-
ventions in the ED for patients with acute recreational
drug toxicity to try and prevent future presentations.
Further work is needed to develop the brief intervention
tools and identify the potential target group(s) for these
interventions. The small proportion of rep-
resentatives relate to deliberate self-poisoning, this is
greater than in the normal population and clinicians
need to be aware of the potential for subsequent self-
harms in recreational drug toxicity. References: 1. Wood DM, Nicollau M, Dar-
gan PJ. Epilepidology and aetiology of recreational drug
 toxicity in a nightclub environment. Subst Use Misuse

284. Hypotension and Syncope After Recreational
Use of Viagra™ and Rush (Isobutyl Nitrite): an
Opportunity for Targeted Education
Wall M, Wiegand T.
Department of Medicine, Maine Medical Center, Port-
land, Maine, US
Objective: Sildenafil, marketed as Viagra™, is used to
 treat erectile dysfunction. Since sildenafil was intro-
duced epidemiologic reviews have documented use
along with drugs of abuse including: cocaine, amphet-
amine and amphetamine derivatives such as MDMA as
well as ‘poppers’ which are volatile nitrate or nitrite
compounds. Sildenafil use with cocaine or amphet-
amine is often in the setting of transient drug-induced
erectic dysfunction whereas sildenafil use with ‘poppers’
is for purported effects on orgasmic pleasure. We
report a case of syncope and hypotension associated
with sildenafil and isobutyl nitrite use and review the
literature concerning recreational Viagra™ or other ph-
rophediaser inhibitors use. With additional information
certain groups at risk for sequelae related to high-risk
behaviors may be targeted for harm reduction and edu-
cational strategies.
Case report: A 62-year-old male
was found unconscious in an adult bookstore. He had
sustained a facial laceration after apparently ‘passing
out’ in the back of the store. Paramedics documented an
initial blood pressure of 70/35 mmHg and heart rate of
88 beats/minute. Repeat BP was 72/48 on arrival at the
Emergency Department. The patient described ingest-
ing sildenafil earlier in the evening in anticipation of
a sexual encounter. He ‘popped’ Rush by inhaling the
gas from under his nose after which he ‘passed out’. After
1 litre of saline his blood pressure improved to
90/60 mmHg. An EKG demonstrated normal sinus rhythm.
The patient was hemodynamically stable without symptoms and his
blood pressure remained >90 mmHg after the intrave-
nous fluid. Conclusion: Use of nitrates is contraindi-
cated concomitantly with sildenafil over concern for
hypotension. Isobutyl nitrite is a novel source of nitrite
that is used for facilitating smooth muscle relaxation
during sexual intercourse and for its purported enhance-
ment of the effects of orgasm. Although adverse effects
could be predicted based on an understanding of the
individual chemicals mechanism of action this is the
first reported case of syncope due to hypotension from
the concomitant use of sildenafil and isobutyl nitrite.

285. The Effect of Prehospital Naloxone Adminis-
tration on Vital Signs
Giroksi LJ, 1 Shih RD, 1 Walsh B, 1 Fisseler F, 1 Hung O. 1
1 Morristown Memorial Hospital, Morristown NJ,
2 Somerset Medical System, Somerville, NJ, US
Background: Naloxone is frequently used by prehospi-
tal care providers to treat suspected heroin and opioid
overdoses. One of the most feared complications
from its use is the development of noncardiogenic pul-
monary edema. This entity is thought to be due to
sudden changes in pulmonary pressures manifest by
acute vital sign changes after naloxone administra-
tion. However, previous studies have poorly docu-
mented vital sign changes after naloxone administration.
Objective: The objective of this study is
to assess vital sign change with the prehospital
administration of naloxone. Methods: A retrospective
study design was utilized. All prehospital patients dur-
ing a 30 month period presenting to a large suburban
teaching hospital were reviewed for the administration
of naloxone. Data collected included patient char-
acteristics, initial vital signs, initial oxygen saturation (by
pulse oximeter), initial Glasgow Coma Scale, post-
naloxone vital signs, post-naloxone oxygen saturation
and post-naloxone Glasgow Coma Scale. Pre and post-
naloxone vital signs and Glasgow Coma Scale were
compared using paired Student’s T test. A p < 0.05 was
considered significant. This study was approved by the
hospital and state Institutional Research Board.
Results: 293 patients were identified and
included in this study. Fifty-four percent were male
with an average age of 51 years. There were statistically
significant increases in oxygen saturation (91 vs 95%,
95% CI 0.0001) and Glasgow Coma Scale (7.2 to 9.4,
95% CI 0.0001) were found. No significant changes were
found in the systolic or diastolic blood pressure or heart
rate. Conclusion: Naloxone usage prehospitaly has
minimal effects on blood pressure and heart rate while
improving oxygen saturation and level of conscious-
ness. These findings do not support the theory of sudden
autonomic system effects causing opioid induced non-
cardiogenic pulmonary edema.

286. Evaluation of Opium and Ethanol Level in
Fatal Vehicle Accidents
Hashemian AM,1 Kariman H,2 Shamsayee S. 1
1 Emergency Department, Mashhad University, Mash-
had; 2 Emergency and Toxicology Unit, Shahid Beheshti
University, Tehran, Iran
Objective: Nowadays motor vehicle accidents are one
of the commonest accidents, with high mortality and
morbidty rates. Due to resulting disability and the need
for various diagnostic and therapeutic methods, these
inflict great economic loss on society. Alcohol and
illicit drug abuse and their side effects are among the
most important underlying reasons for such accidents
especially in western countries. Due to safety precau-
tion (seat belt and helmet) misuse, law disobedience,
speeding, and slow driver’s reaction in alcohol related
accidents the importance of such accidents increases.
γ-Hydroxybutyrate (GHB) and Gamma-butyrolactone
(GBL) are commonly used recreational drugs. There have been reports of GHB/GBL
use of the Internet for information on recreational sub-
stances. The results of this study show that using the Internet forinformation on recreational sub-
stances can induce an anticholinergic delirium is not uncommon. The study also
found in the systolic or diastolic blood pressure or heart
rate. Conclusion: Naloxone usage prehospitaly has
minimal effects on blood pressure and heart rate while
improving oxygen saturation and level of conscious-
ness. These findings do not support the theory of sudden
autonomic system effects causing opioid induced non-
cardiogenic pulmonary edema.

287. The Prevalence of Websites Promoting the
Recreational Use of Datura or its Sale: A Case
Report and Analysis of the Danger to Public
Health
Vearra D, Greenberg ML.
Department of Emergency Medicine, Drexel University
College of Medicine, Philadelphia, US
 Objective: Plants of the genus Datura contain tropane
alkaloids with significant anticholinergic activity in
humans. Recreational use of Datura to deliberately
induce an anticholinergic delirium is not uncommon.
We recently saw a case of altered mental status in a
22-year-old man following the ingestion of vodka and
seeds of Datura stramonium. After his acute intoxica-
tion resolved, the patient reported that he learned about
the recreational use of Datura on the Internet and subse-
quently purchased Datura stramonium seeds from an
online vendor. We investigated the availability of both
information about Datura and seeds for purchase on the
Internet and discuss the wider implications of layperson
use of the Internet for information on recreational sub-
stances. Methods: Using the English, French, Spanish,
and German language Google search engines, we con-
ducted a search in each language of two to three
Datura-related search terms and reviewed the first 200
search results for websites with unique domain names
recommending the recreational use of Datura or selling
seeds of genus Datura. Results: The results are sum-
martized in Table 1. Conclusion: Anticholinergic tox-
icity in the recreational use of Datura remains an
important international public health issue. Websites
recommending the recreational use of Datura are preva-
 lent in German, French, Spanish, and English lan-
guages. Additionally, seeds are easily available for
purchase from website vendors in each of the above lan-
guages. A continuing public health effort to educate lay-
persons of the danger of obtaining information on the
Internet on the recreational use of both licit and illicit
substances, including Datura, needs to be maintained.

288. Development of a Protocol for the Manage-
ment of Acute Gamma-hydroxybutyrate and
Gamma-butyrolactone Withdrawal
Wood DM, 1,2 Dargan PI. 1,2
1 Clinical Toxicology Service, Guy’s and St Thomas’
NHS Foundation Trust, London, United Kingdom;
2 King’s Health Partners, London, UK
Objective: Gamma-hydroxybutyrate (GHB) and
gamma-butyrolactone (GBL) are commonly used recre-
ational drugs. There have been reports of GHB/GBL
dependency predominately from the USA, with a severe
withdrawal syndrome on sudden cessation of use.

Table 1. Availability of Datura on the Internet using Google

<table>
<thead>
<tr>
<th>Language &amp; Google search engine</th>
<th>Search terms used</th>
<th># of websites recommending recreational use of Datura</th>
<th># of vendors selling Datura seeds</th>
<th># of websites both recommending recreational use of Datura and selling Datura seeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>English - <a href="http://www.google.com">http://www.google.com</a></td>
<td>Datura, jimson weed, Datura seeds</td>
<td>15</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>French - <a href="http://www.google.fr">http://www.google.fr</a></td>
<td>Datura, stramonie, grains Datura</td>
<td>12</td>
<td>22</td>
<td>1</td>
</tr>
<tr>
<td>German - <a href="http://www.google.de">http://www.google.de</a></td>
<td>Datura, stechachfel, Datura samen</td>
<td>11</td>
<td>34</td>
<td>0</td>
</tr>
<tr>
<td>Spanish - <a href="http://www.google.es">http://www.google.es</a></td>
<td>Datura, estramono, tolouche, semillas Datura</td>
<td>14</td>
<td>14</td>
<td>3</td>
</tr>
</tbody>
</table>
289. Hepatitis C, Hepatitis B and HIV Infections in Intravenous Drug Users in Greece and Associated Risk Behavior

Nikolaos K., Konstantinos L., Liapis S., Zlatanos D., Passalli M., Sygourou K., Organzt-coiou E. 1
1Addiction Department “Ianos”, Psychiatric Hospital of Thessaloniki, Thessaloniki; 2Laboratory of Forensic Medicine, School of Medical Sciences, Aristotle University of Thessaloniki, Thessaloniki, Greece

Objective: To evaluate variation in the rate of infectious diseases in intravenous substance users in Greece during the last 5 years and to highlight risk behavior associated with infection. Methods: We conducted a cross-sectional sample of drug users in Greece, from 2004 to 2009. The subjects were admissions to the Addiction Department “Ianos” of the Psychiatric Hospital in Thessaloniki, Greece, which is a residential facility running a 21-day detoxification program providing support and preparation for transfer to further treatment. We recorded the gender, age, education level, presence of infectious disease and associated risk behaviors. Results: Hepatitis C (HCV), Hepatitis B (HBsAg) and HIV infection with risk behavior and education level was assessed with univariate and multivariate regression analysis. Conclusion: HCV infection showed a slight decline across the years studied. The fact that none of our admissions presented with an HIV infection does not reflect the real situation in Greece, but implies that HIV positive users prefer substituting recreational drugs. Thus, the HIV rate in Greece on a national level is reported surprisingly low compared to other countries, but this could be due to inadequate surveillance. References: 1. Mathers BM, Degenhardt L, et al. 2004. 2. Reimer DJ, Bachtel EK, Huisman M, van der Linden M. 2007; 52:166–72.

290. Mephedrone: A Novel Synthetic Cathinone- a Case Series of Sympathomimetic Toxicity Associated with its Use

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Objective: Cathinone is an active alkaid extracted from the leaves of the Khat plant (Catha edulis). Mephedrone (4-methylmethcathinone, 4-MMC), a synthetic derivative of cathinone, has recently been reported as a recreational drug. Methods: We retrospectively identified patients presenting to our large inner-city Emergency Department (ED) following the use of mephedrone from 1 January 2008. Data was extracted on any co-used substances, clinical features on presentation to the ED, treatment(s) required and outcome. Results: 11 patients (8; 72.7% male) were identified, all presenting in 2009, with a mean (SD) age of 26.9±6.8 years. Baseline clinical features are shown in Table 1. Four patients had used mephedrone with ethano- nol alone and five had used HBs/G/BL with the mephedrone; other co-used drugs included cocaine, opium, ketamine and methylone (MDMC). Symptomatic features settled within 12 hours of presentation to the ED in all of the patients; four (36.4%) patients required treatment with oral benzodiazepines (lorazepam/diazepam) in addition to symptomatic care. All patients were discharged home with no long term sequelae and no mephedrone related complications. Conclusion: This is the first case series to report use of mephedrone (4-MMC). Clinical features of sympathomimetic toxicity in these patients appeared to be short-lived. More data is needed on toxicity associated with mephedrone, in other patients and in a more appropriate control. References: 1. Wood DM et al. Recreational use of Mephedrone (4-methylmethcathinone, 4-MMC) with associated sympathomimetic toxicity. J Med Toxicol 2009; In press.

291. JWH-018, JWH-073, and Spice

Rosenbaum CD,1 Ward JA,1 Boudreaux ED,1 Burstein S,2 Boyer EW,3 1Department of Emergency Medicine, University of Massachusetts Medical Center, Worcester, MA; 2Department of Biochemistry and Molecular Pharmacology, University of Massachusetts Medical Center, Worcester, MA; 3Children’s Hospital, Harvard Medical School, Boston, MA, US

Objective: To describe an inhaled exposure to Spice, and discuss the synthetic cannabinoids JWH-018 and JWH-073. Methods: A 16-year-old adolescent with altered mental status. The patient became agitated and tachycardic after snorting a product known as Spice. Other vital signs and physical exam findings were normal. After supportive care, the patient was discharged to home without complications. Spice is a mixture of plant material that is typically smoked for recreational purposes. Spice contains multiple psychoactive compounds, potentially including the synthetic cannabinoids JWH-018 and JWH-073. Although Spice is banned in some countries, it is legal to purchase JWH-018 and JWH-073. JWH-018 (1-pentyl-3-(1-naphthoyl)indole) and JWH-073 (1-butyryl-3-(1-naphthoyl)indole) were designed by John W. Huffman to study cannabinoid receptor-ligand relationships. Initially used for research, JWH-018 and JWH-073 are now classified by the US DEA as a drugs of concern. Because JWH compounds are synthetic chemicals, they are likely additives to Spice mixtures. Compared to THC, JWH-018 has greater affinity for central CB1 and peripheral CB2 receptors, and JWH-073 has greater affinity for CB2 receptors. Both compounds can be purchased from Internet vendors. JWH-018 and JWH-073 are priced at $20/100 mg and are shipped as small plastic packets of off-white powder. Analysis of this powder does not produce clear results. The Microgenics Corporation qualitative drug of abuse immunoassay. Conclusion: JWH-018 and JWH-073 are designer drugs that do not react with the current drug of abuse screen. Many psychoactive substances may be detected with qualitative immunoassays (i.e. buprenorphine, methadone and numerous benzodiazepines); synthetic cannabinoids should now be added to this list. Immunoassays’ inability to detect synthetic cannabinoids may be a legal and medical concern.

References:

Table 1. Clinical features on presentation to the ED

<table>
<thead>
<tr>
<th>Clinical feature</th>
<th>JWH-018</th>
<th>JWH-073</th>
<th>Spice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart rate (bpm)</td>
<td>98±1 (26.6)</td>
<td>101±1.5 (33.6 - 38.1)</td>
<td>98±1 (26.6)</td>
</tr>
<tr>
<td>Blood Pressure (mmHg)</td>
<td>140±9 (69.8 - 160)</td>
<td>140±9 (69.8 - 160)</td>
<td>140±9 (69.8 - 160)</td>
</tr>
<tr>
<td>Temperature (°C)</td>
<td>36.2±0.6</td>
<td>36.2±0.6</td>
<td>36.2±0.6</td>
</tr>
<tr>
<td>Number (%)</td>
<td>6 (54.5)</td>
<td>6 (54.5)</td>
<td>6 (54.5)</td>
</tr>
<tr>
<td>Agitation</td>
<td>3 (27.3)</td>
<td>3 (27.3)</td>
<td>3 (27.3)</td>
</tr>
<tr>
<td>Seizures</td>
<td>2 (18.2%)</td>
<td>2 (18.2%)</td>
<td>2 (18.2%)</td>
</tr>
<tr>
<td>Vomiting</td>
<td>3 (27.3%)</td>
<td>3 (27.3%)</td>
<td>3 (27.3%)</td>
</tr>
</tbody>
</table>

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293. Cocaine and Pediatric Seizure

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294. Inhaled Albuterol as a Drug of Abuse

297. Local Tissue Injury After Australian Snakebite

Abstracts

296. Attempted Suicide, by Mail Order: Abrus precatorius

Objective: Abrus precatorius is cultivated in many subtropical areas. The seeds exist in a variety of colors such as black, orange, and most commonly, glossy red. A black band is found at the end of the seed. The plant contains multiple pods which typically contain 3–5 abras seeds. The seeds contain abrin, which inhibits ribosomal function halting protein synthesis leading to cellular death. Case report: A 20-year-old man com-

Objective: The anabolic androgenic steroids (AAS) are categorized as synthetic derivatives of testosterone. Anabolic steroids can result in anabolic effects while androgenic effects are secondary. AAS promote thrombogenesis, cause vasospasm, and accelerate atherosclerosis by altering lipid profile. This case supports a growing association between AAS use and acute MI.

295. Acute Myocardial Infarction Associated with Androgenic Anabolic Steroid Use

290. Local Tissue Injury After Australian Snakebite

292. Cocaine and Pediatric Seizure

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g/L) and mild thrombocytopenia (nadir 107×10^9/L). Locally she developed an extensive area of full-thickness skin necrosis at the bite site, on the upper thigh, requiring grafting. The histopathological diagnosis of first aid to the necrosis is uncertain and possibly minor, suggesting a primary venom effect. However, other cases of *P. australis* bites, with more severe systemic envenoming, have not shown local bite site necrosis, just swelling (JW experience over 33 years). One case with necrosis of the bitten thumb was associated with inappropriate extended (>72 hours) use of an effective Antivenom by other *Pseudechis spp.* and *Notechis spp.* resulting in skin injury or necrosis have mostly been similarly associated with local tourniquet application. Conclusion: We report a *P. australis* bite with a related systemic envenoming and necrosis of the bite site, without a clear contribution from first aid, distinct from previous experience where inappropriate first aid was clearly or highly likely to be a major cause of tissue injury. Doctors managing bites by *Pseudechis spp.* should be aware of the possibility of significant tissue injury, despite appropriate antivenom treatment. References: 1. White J. Local tissue destruction and Australian elapid envenomation. Toxicon 1986; S3:493–6. 2. White J. Overview of snake envenoming. In: Brent J, Wallace KL, Butterill JC. Critical Care Toxicology: Diagnosis and Management of the Critically Poisoned Patient. Philadelphia, USA: Elsevier-Mosby Inc, 2005:1051–74.

298. Collective Envenomation by *Physalia physalis* on the French Atlantic Coast

Labadie M,1 Lambrot AL,2 Mangwa F,2 De Haro L,3 Bugama C,1 Chenuac B.1

1Centre Antipoison, Hôpital Pellegrin CHU, Bordeaux; 2Toxicology Unit and Poison Control Centre, Centre Hospitalier de Bordeaux, Libourne, Gironde, France; 3Department of Occupational and Environmental Medicine and Danish Poison Centre, University Hospital Bispebjerg, Copenhagen; 4Danish Poison Centre, University of Copenhagen, Botanical Museum, Copenhagen, Denmark.


300. Human Envenomation by *Bitis parviocula* (Ethiopian Mountain Adder)

Faber K,1 Ceschi A,2 Petruzzelli G,2 Peruzzi S,2 Rauber-Lüthy C,1 Giampreti A,1 Smorello C.1

1Swiss Toxicological Information Centre, Zurich, Switzerland; 2Toxicology Unit and Poison Control Centre, AO, Argenzii, Firenze, Firenze, Poison Control Centre and National Toxicology Information Centre, Pavia, Italy.

Objective: The Ethiopian mountain adder (*Bitis parvocula*) is a venomous viper species found only in the highlands of south-west Ethiopia and expensively sold on the black market of snake keepers in Europe and the USA. While zoological information of this extremely rare species is available, analyses of venom composition are missing. The first case of a bite by this species has been recently reported in the USA. To our knowledge no other human cases are published so far. We report the second case of human envenomation by *Bitis parvocula*. Case report: A 44-year-old man was bitten on the third finger of his right hand while attempting to feed his specimen of *Bitis parvocula* (identified by a herpetologist). He presented to the emergency department one hour after the accident with local pain and mild swelling which peaked on the 3rd day. Clinical symptoms were absent apart from the local involvement. Laboratory findings were found to be within normal limits with the exception of: D-Dimer peak 939 mcg/L within first 24 hrs (n.v. <250); platelets 83,000/mm^3 (n.v. 140,000–440,000). The ECG showed no abnormalities. Two vials of SAIMR Polyvalent Snake Antivenom were given 18 hours following the accident and three more were administered 7 hours later for worsening local oedema. Due to the onset of progressive circulatory impairment at left-hand level (pathy hypo- aesthetic areas, cool bitten finger, bullous lesions around the bite), a fasciotomy was performed on 5th day. Ten sessions of hyperbaric therapy were administered. The whole left forearm returned to its normal volume within two weeks, whereas the bitten finger presented a persistent clawed appearance as a consequence of a fasciectomy. Conclusion: The first case of human envenomation by *Bitis parvocula* described in the literature was registered in Texas in May 2009. Our case occurred two months later (May 2010). Clinical symptoms consisted of local reactions with pain and swelling. Systemic toxicity was absent. As there is no specific antivenom available for this species, SAIMR Polyvalent Serum was chosen for treatment. This measure was ineffective in preventing the development of a compartment syndrome. References: 1. Fernández MC, González A. Ethiopian Mountain Viper Envenomation in South Texas. Clin Toxicol 2009; 47:712.

301. Yew can be Really Poisonous to You

Kaltenz C,1 Wattenberg M,2 Ertzenberger J,4 Deters M,4 Schaper A,1 Hentschel H.4

1GIZ-Nord Poisons Centre, University Medical Center, Göttingen; 2Department of Anaesthesiology, Klinikum Links der Weser, Bremen; 3Intensive Care Unit, Klinikum Chemnitz; 4Poisons Information Centre, Erfurt, Germany.

Objective: To show that ingestion of Taxus can result in significant morbidity. Methods: In a retrospective study all cases with the ingestion of yew were analyzed. The study comprised two poison centres over a ten months period. Notification of the severity according to PSS. Results: The time period was from January until October 2009. Poison centres A: 215 exposures with Taxus; 57 of them with leaves, twigs or preparations of tea. Three patients developed severe symptoms (5%). Poison centres B: 113 cases; 6 patients with severe symptoms (5%). To illustrate symptoms and treatment of severe yew poisoning 2 cases were presented. Conclusion: Poisoning by Taxus was found unconscious with no measurable blood pressure. No history of severe neurological or cardiac diseases. Immediate start of cardiopulmonary resuscitation (duration: 2 hours 45 minutes). Administration of activated charcoal and mucocorporal membrane oxygenation, pacemaker and therapeutic hypothermia to 33 °C was started. Interruption of the parents resulted in the discovery of Taxus leaves and tea under the bed and the dead. Decortanation by gastroscopy 6 hours after the ingestion with the removal of many Taxus leaves. One week after this suicidal ingestion the patient was stable and psychiatric treatment could be initiated. Patient 2: A 39-year-old woman deliberately drank tea with yew leaves was activated charcoal was administered thereafter. Due to cardiac arrest cardipulmonary resuscitation was started. Persisting severe dysrythmias were treated by defibrillation, pacemaker and lidocaine. Finally a successful stabilization of the cardiac rhythm was achieved and the patient could be discharged to the psychiatric department. Conclusion: The ingestion of Taxus leaves or the extract of yew plants can result in life threatening symptoms. Decortanation with gastroscopy and administration of activated charcoal can be useful after several hours. Resuscitation should be practiced for longer than usual. Reference: 1. Kreuzelk E, Jacobsen TD, Aron J. Is the Yew Really poisonous to You? Clin Toxicol 1998; 36:219–23.

302. A Heavy Fish

Ricci G,1 Zannoni M,1 Cigolini D,1 Caroselli C,2 Codogni R,1 Caruso B,3 Bonello E,1 Rocca GP.2

1Taxology Unit, Azienda Ospedaliera, Verona, Italy; 2Emergency Department, Azienda Ospedaliera, Verona; 3Intensive Care Department, Azienda Ospedaliera, Vicenza, Italy.

Objective: To find a bio-umoral marker that could help physicians to formulate a correct diagnosis in Hista- mine Fish Poisoning (HFP) and consequently to...
304. Cholinergic Symptoms Due to Brown Fly Agaric Poisoning

Lamppinen T, Hoppu K.
Poison Information Centre, Helsinki, Finland

Objective: The Finnish Poisons Information Service (FPIS) annually receives about a dozen inquiries concerning brown fly agaric mushroom, Amanita regalis. In most cases it has been confused with the edible parasol mushroom, Macrolepiota procera. Brown fly agaric is often considered the most poisonous mushroom in Finland, Amanita muscaria. Also according to current sources of information it contains muscimol and ibotenic acid. However, in a few poisonings reported in Finland and in Germany, the symptoms were not characteristic of the mushrooms containing ibotenic acid and muscimol. In those cases symptoms began usually 1–2 hours after ingestion and the patients had gastrointestinal symptoms, unconsciousness, convulsions and cholinergic symptoms.1,2 We now report a new case of poisoning due to brown fly agaric demonstrating cholinergic symptoms.

Case report: In August 2009 a 62-year-old woman (case 1) ate one fish, the other adult ate half a fish, and the child ate only a spoonful. Case 1: A 54-year-old man was admitted to an emergency unit at H10 with slurred speech and paresis of the lower limbs. Cardio-respiratory arrest occurred suddenly several minutes later, causing anoxic complications. This patient died on D4 (D2 serum tetrodotoxin concentration: 18.5 g/mL).

Case 2: A 34-year-old man presented at H16 with oral dysaesthesia and dizziness which had appeared several minutes after the meal. Muscle weakness, ataxia and slurred speech were also reported. At H35, the clinical features included dilated pupils, hypersalivation, diminished reflexes and sinus bradycardia (55 bpm) and respiratory depression requiring mechanical ventilation. All symptoms progressively resolved after H60 and extubation was possible on D4. Case 3: The child was admitted at H16 with ataxia. Hypersalivation, diaphoresis, muscle weakness, paraesthesia and a vestibular syndrome were observed. Progressive recovery was reported from D3 and was complete on D4. Discussion: Tetrodotoxin poisoning was proposed on the basis of the clinical history and clinical features of the 3 patients and was confirmed by the positive results for DTT in the 3 cases.

Conclusion: Tetrodotoxin poisoning is a rare event outside Japan where this marine poisoning is well known. The authors describe a case of collective poisoning in French Guiana where porcinefish and pufferfish were consumed. The authors usually report this case on a single occasion.


305. Multiple Splenic Infarctions After Viper Envenomation

1Pavia Poison Control Center and National Toxicology Information Centre, Pavia, Italy; 2Faculty of Veterinary Medicine, University of Pavia, Pavia; 3Department of Medical and Surgical Sciences, II Medicine Unit, University of Brescia, Brescia, Italy

Objective: To describe a case of viper envenomation where a progressive renal failure was con-

cluded to multiple splenic infarctions. Case report: A 66-year-old man was admitted to the ED ten hours after a viper-bite on his right hand: a painful oedema was present at the wrist and the patient suffered several episodes of diarrhoea. The next day the oedema appeared unchanged while laboratory tests revealed an increase of D-imer (3.916 ng/mL), WBC (20,700/ mm3), AST (106 U/L) and CPK (1247 U/L), so treat-

ment with low weight heparin (LWH) was started; the patient remained clinically stable and an echo-colour-Doppler was negative for signs of thrombosis. The fol-

lowing day D-imer was 20,000 ng/mL and started decreasing during the following 24 hours with levels that ranged between 10,000 and 14,000 ng/mL, until discharge. On day 4 the D-imer progressively increased. Despite creatinine and uric acid levels decreased during the convalescent phase. On day 10 the D-imer was increased to 19,000 ng/mL, and the patient developed a mild haemolytic anaemia (haemoglobin 11.5g/dL). By day 8 WBC and platelets decreased to 14,000 and 76,000/mm3 respectively; D-imer decreased to 13,000 ng/mL. A CT-MRI of the abdomen showed a spleen enlargement (up to 16 cm) with non-homogeneous areas. A contrast CT-scan was immediately performed, that revealed areas of hypodensity in most of the multiple splenic infarctions. A haemoglobin decrease and a rapid decrease of the platelets. The patient did not undergo splenectomy and was dis-

charged on day 21 with a program of follow-up abdominal echographies. At 6 months from the viper-bite parame-

ters had normalized and non-homogeneous areas were still present in 50% of the spleen parenchyma; D-imer was limited to 4000 mg/L. Considering the limited severity and the stability of clinical conditions during the first 24 hours, Fab-fragments were not administered. The progressive increase of D-imer suggested looking for possible thrombosis despite improve-

ment of general condition. In this case D-imer has been an important marker for identification of severe systemic effects of viper venom and permitted identification of rare complications such as splenic infarction.

306. Familial Tetrodotoxin Poisoning in French Guiana

Villa AF, Chatagnier D, Arakawa O, Guegueniat P, Hommel D, De Haro L, Garnier R.
1Paris Poison Centre, Fernand Widal Hospital, Paris, France; 2Faculty of Physicians, Nagasaki, Japan; 3Critical Care Unit, Cayenne Hospital, Guyane, France; 4Poison Centre, Salvador Hospital, Marseille, France

Introduction: Tetrodotoxin poisoning is a rare event outside Japan where this marine poisoning is well known. The authors describe a case of collective poiso-

ning in French Guiana where porcinefish and pufferfish were consumed. The authors usually report this case on a single occasion.

Case report: Two adults and a 2-year-old child had a meal composed of 3 unidentified fresh fish given by a fisher-

man. They removed the skin and internal organs, washed, grilled and then ate the fish. The first adult (case 1) ate one fish, the other adult ate half a fish, and the child ate only a spoonful. Case 1: A 54-year-old man was admitted to an emergency unit at H10 with slurred speech and paresis of the lower limbs. Cardio-respiratory arrest occurred suddenly several minutes later, causing anoxic complications. This patient died on D4 (D2 serum tetrodotoxin concentration: 18.5 g/mL).

Case 2: A 34-year-old man presented at H16 with oral dysaesthesia and dizziness which had appeared several minutes after the meal. Muscle weakness, ataxia and slurred speech were also reported. At H35, the clinical features included dilated pupils, hypersalivation, diminished reflexes and sinus bradycardia (55 bpm) and respiratory depression requiring mechanical ventilation. All symptoms progressively resolved after H60 and extu-

bation was possible on D4. Case 3: The child was admitted at H16 with ataxia. Hypersalivation, diaphoresis, muscle weakness, paraesthesia and a vestibular syndrome were observed. Progressive recovery was reported from D3 and was complete on D4. Discussion: Tetrodotoxin poisoning was proposed on the basis of the clinical his-

tory and clinical features of the 3 patients and was confirmed by the positive results for DTT in the 3 cases.

Conclusion: Tetrodotoxin poisoning can cause tetrodotoxin poisoning: tetrodotoxin is mainly found in the liver, ovaries, intesti-

tine, and skin of the fish. In the cases reported here, all these parts had been removed before cooking. However, tetrodotoxin is also present in lower concentrations in the flesh and the large amounts ingested by the 2 adults probably account for their severe poisoning. The inter-

val between the meal and onset of paraesthesia/paralysis was unusually prolonged. Such a delayed onset has been previously reported in only 2 cases.

307. A Bittersweet Symphony

2Emergency Unit, Ambulanza Ospezzia di Verona; 3Critical Care Unit, Cayenne Hospital, Guyane, France; 4Poison Centre, Salvador Hospital, Marseille, France

Objective: To describe an unusual cyanide poisoning due to ingestion of large quantities of seeds containing amygdalin which caused typical symptoms linked to inhibition of cellular respiration. Case report: A young woman of 35 years, mentally disturbed, was admitted to our ED. The parents said they had found her in the living room, surrounded by apricots from which she had extracted the core, eating the kernels. Accord-

ing to anamnesis, it seems that the woman had swal-

lowed 40 to 60 kernels 30 minutes before arrival at ED.
The woman, not cooperating, was asymptomatic, TA 120/70, FC 120, FR 20, T 37.5 °C, O₂ sat 98%. A slight metabolic acidosis was detected at arterial blood gas analysis. She was subjected to gastric lavage, 70 grams of activated charcoal and 30 grams of magnesium sulfate were administered with hydration and ECG monitoring. Ninety minutes after ingestion, the patient experienced headache, nausea and dyspnea. Vital parameter changes: TA 75/50, FC 145, FR 28, O₂ sat 94%; acedia was present. Two vials of amyl nitrate were administered with 50% sodium thiosulfate 25% I.V. (infusion rate: 5 mL/min). After this therapy, a methemoglobinemia of 10% was measured. The vital signs slightly improved, allowing the intravenous administration of 5 g of hydrocortisobulum I.V. in 30 minutes, with clinical improvement in a short time. During treatment no significant ECG changes were noted. The patient underwent clinical observation, maintained by therapy. Methemoglobinemia around 10% through the inhalation of ampuoles of amyl nitrate for 4 hours after hydrocortisobulum administration. After a 24 hour stay in the Clinical Toxicology Unit, the woman was transferred to the psychiatry department for further observation and treatment. Conclusion: Apricot kernels have usually a pleasant bitter aftertaste and they are used in confectionery as flavouring, as an ingredient in marmalade and juices and generally in conjunction with sweet almond to spice up the taste. However, their consumption is limited to use as an aromatic as apricot leaves and flowers contain a cyanide derivative, amygdalin, which, at high doses, would be highly toxic.

308. Coagulopathy Following Copperhead Snakebites Horwitz DA,1 Mullins ME.2
1Saint Louis University School of Medicine, Saint Louis, Missouri; 2Division of Emergency Medicine, Washington University School of Medicine, Saint Louis, Missouri, US

Objective: Optimal management of copperhead, Agkistrodon contortrix, snakebites and their risk for coagulopathy is not clear.1,2 Serial coagulation studies are commonly performed, often in the setting of hospitalization. We determined the incidence of coagulopathy in copperhead snakebites. Methods: We performed a retrospective review of all venomous pedestrian snakebites presenting to St. Louis Children’s Hospital over 15 years and of all venomous snakebites in adults presenting to Barnes-Jewish Hospital over 7 years. Nonvenomous snakebites from the family Elapidae and elapid snakes were excluded from Charts were reviewed noting patient demographics, certainty of snake identification - positive, presumptive, or unknown, bite location on patient, laboratory coagulation values, and treatment. Results: We yielded 471 records of which 339 were excluded based on the above criteria. Of the 132 remaining charts, we excluded 25, including 3 re-admissions, 1 dry bite, 1 misread chart. A final data set included 107 venomous snakebites, of which 18 were positively identified as copperheads, 52 presumptively identified. The final data set included 107 venomous snakebites, of which 18 were positively identified as copperheads, 52 presumptively identified, and 37 unknown. In no case did bleeding complications develop. Mean and median values for the most abnormal coagulation values for each patient by degree of certainty were: positively identified copperheads- PT 12.9/13, Platelet 300/200, PR 7.5/6; presumptively identified copperheads- PT 14.0/14.2, PT 29.9/29.2, INR 1.13/1.12, Plt’s 244/240, fibrinogen 269/261, and unknown - PT 14.2/14.3, PT 29.8/29.7, INR 1.12/1.11, Plt’s 269/249, fibrinogen 286/272. Conclusion: In snakebites identified as copperheads, it is safe to forego hospital admission for the purpose of serial coagulation testing in both adult and pediatric patients thereby saving significant manpower. References: 1. Casale L, Garrison W, Cádar A, Velez L, et al. Lack of Coagulopathy from American Copperhead Envenomation, Regional Poison Experience Center. Clin Toxicol 2005; 43:477-80. 2. Lépine JY, Poirier L, Rousselle A. American Copperhead Envenomation in the Carolinas. Clin Toxicol 2003; 41:29-35.

309. Corticarius orellanoides Poisoning: Three Years Follow-up of Five Members of a French Family Grossenbacher FJM,1 Wynckel A,2 Plenier Y,1 Courteau P,1 Lépine JY.1
1Toxicology Center, University Hospital, Reims; 2Nephrology Department, University Hospital, Reims; 3Faucardie Department, University Hospital, Reims; 4Pharmacy University, Lille; 5URAD, University Hospital, Reims, France

Case report: An 11-year-old boy and his 48-year-old father presented with a 3-day history of abdominal pain, vomiting, marked asthma, deep thirst and oliguria. The young boy had ingested 738 mL of orellanus thracei, 1317 mmol/L, K 9.1 mmol/L Na 123 mmol/L, chlorine 92 mmol/L; his ECG was typical of severe hyperkalaemia. Forty-eight hours continuous hemodiafiltration was then required. Father’s serum creatinine was 840 mmol/L with K 4.6 mmol/L. This orellanus syndrome began two days after ingestion (twice) of a meal containing wild mushrooms. Acute renal failure (ARF) was documented and required dialysis in the two cases. Three other members of the family who had ingested a smaller amount showed no or few symptoms but were found to have ARF which was marked in one case despite negative serology and Renal biopsy, performed in the three patients who had severe ARF, documented acute tubular necrosis with tubulitis (polymorphonuclear cells extended into the walls and the lumina of tubules). This case was confirmed 3 weeks later since fungal spores of Corticarius orellanoides were observed in the contaminated meal by light microscopy. Additional renal biopsies (3) were performed in the young boy and showed severe interstitial fibrosis: long term renal replacement therapy was necessary until he benefited from successful renal transplantation. Partial or complete recovery was obtained in the four ARF patients. Our conclusion is ARF following ingestion of Corticarius orellanoides is due to the fungal toxin orellanin. Intoxication by Corticarius speciosissimus is characterized by acute tubular necrosis without tubulitis. This rare and occurs in Europe and North America every year with edible mushrooms. The detection of orellanin in biological fluids cannot be obtained in clinical practice. Orellanin nephrotoxicity is mediated by oxidative stress, including a virtual shutdown of important antioxidant enzymes, leading to be careful for antioxidant treatment as HC-SOD. Conclusion: Familial exami- nation is mandatory in mushroom poisoning if Cortici- narius species is suspected. References: 1. Nilsson UA, Nystöm J, Buvall L, et al. The fungal nephrotoxin orellanin simultaneously increases oxidative stress and down-regulates cellular defenses. Free Radic Biol Med 2008; 44:1562–9. 2. Savivc P, Flesh F, Daniel V. Intoxi- cation par les champignons: syndrome majeurs. Encycl Med Chir (Elsevier SAS, Paris, tous droits reservés), Toxicologie-Pathologie professionnelle, 16- 077A-10, 2003:10.

310. Butterfish - Delicious Food or Revenge of a Delicacy
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Objective: To review the literature on the association between fish ingestion and rhabdomyolysis, in order to analyze a possible outbreak of rhabdomyolysis after eating fish (described in the literature as Haff disease), in Amazonas, Brazil. Methods: We searched electronic databases (Medline, Lilacs and Scielo) and abstracts available from American, European and Brazilian associations of clinical toxicology; in addition, all references in the articles reviewed were searched. All studies about rhabdomy- olysis and fish ingestion published in English, Spanish or Portuguese were selected. Results: We found 53 cases in 32 studies. The fish eaten had been cooked in all but one of the cases. Both freshwater and saltwater fish were implicated. The incubation time ranged from 4 to 12 hours. Paly- toxin was the possible causative agent in two cases; in others, the toxin was not identified. All of the patients presented elevated creatine kinase (the marker for rhabdomyolysis). Other common symp- toms were vomiting (10), nausea (9), shortness of breath (8), sweating (7), myalgia (6), muscle stiffness (5) and myoglobinuria (4). One patient died after acute renal failure and cerebral death. Intravenous hydration was the treatment of choice in most cases. Patients that survived the event recovered from all their symptoms, although in some cases, the clinical effects remained for some weeks or months. Conclusion: The occurrence of rhabdomyolysis after eating fish, or Haff disease, usually leads to favorable outcomes. The treatment is supportive and consists of administering large volumes of fluid to prevent myoglobin toxicity in the renal tubules. References: 1. Mortembey W, Nishino T, et al. Cowfish (Umisuzume, Lactoria diaphana) poisoning with rhabdomyolysis. Intern Emerg Med 2004; 3:206-7. 2. Nishino T, et al. Haff disease after eating salmon. Southeast Med 2004; 107:3. 3. CDC. Haff disease associated with eating buffalo fish–United States, 1997. MMWR Morb Mortal Wkly Rep 1998; 47:1091–3. 4. Ojanguren MA, Kamei S, et al. Rhabdomyolysis and myoglobinuria caused by palytoxin, a toxin of blue headless porgyfish. Intern Med 1998; 37:330–5. 5. Krishna N, et al. Fatigue and sore muscles after eating crayfish... ever heard of Haff disease?... are you Morbidity Report 2001;12.
312. Human Accidents Involving Rhinocricus spp., a Common Millipede Found in Urban Areas of Brazil

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Objective: To describe and discuss a series of clinical cases of dermal accidents with Rhinocricus spp. secretions.

Case series: We describe 4 cases of skin involvement after accidental contact with the secretions of Rhinocricus spp. The most important millipede species causing accidents in Brazil is Rhinocricus padbergi (order Diplopoda, family Rhinocricidae), a vegetarian scavenger distributed from Central to South America. Case 1: A 12-year-old-boy putting on a sock had not realized that a Rhinocricus spp was inside it. He felt a slight pain in the toe and in the medial face of the foot. Soon after he observed a dark reddish spot forming locally. No medication was prescribed and twelve hours later the lesion had completely vanished. Case 2: An 8-year-old-boy accidentally smashed a Rhinocricus spp with his left toe while putting on a shoe. He immediately felt a burning sensation and his skin became tainted with a reddish halo around the lesion. We lost the child to follow up soon after. Case 3: A 2-and-half-year-old-boy was blotting his left foot with a napkin when he took it out, his mother observed several dark reddish spots on the sole of the foot and an animal identified as a Rhinocricus spp. No pain was referred and the lesions lasted a few hours until they resolved without any medication. Case 4: A 46-year-old man observed an animal described as a millipede (Rhinocricus spp) inside his socks 4 hours after putting on his shoes. His second toe was completely black and he immediately went to hospital. He felt no pain.

Conclusion: Despite the frightening necrotic appearance of Rhinocricus spp skin lesions, only very mild inflammation and no necrosis are present. Analysis of the content of 50 glands of these animals captured in the southeast east region of Brazil identified 2-methyl-1,4-benzoquinone and 3,3a,4,5-tetrahydro-1H-pyrollo-[2,3-b] pyridine-2,6-dione as the substances responsible for the lesions. Benzoquinones and pyridines are substances that are working very well as insect repellents, being toxic to a great variety of other parasites and pathogen. They have tanning properties. No systemic toxic effects have been described so far after skin contact with benzoquinones.

313. Two Related Cases of Erucism in Philadelphia, Pennsylvania, USA

Madsen JM, Roberts JR.

Objective: To describe the clinical findings, treatment and outcome of an accidental ingestion of Amanita phalloides mushroom by a family of five.

Case report: A family enjoyed a meal made of Amanita phalloides. The mushrooms were mistaken for other edible species and were cooked in the normal way. The family immediately felt a burning sensation and changes in the lesion pattern. T57 - photos of the lesion sent by e-mail to the main author revealed an irregular blue plaque surrounded by an unamalous halo. There was no fever, jaundice or change in urine color; a presumptive diagnosis of cutaneous loxoscelism was considered. T60 (admis- sion to the university hospital) - physical examination revealed an irregular lesion with the characteristic skin findings described above, located over an area (20x12 cm) of indurated swelling. Five vials of anti-arachnoid anti- venom [AV, Instituto Butantan, Brazil, F(ab')2 antibody to Phoneutria nigriventer and Titus serralutus venoms] were infused without adverse effects. T68 - reduction in the pain and cessation of lesion, admission of the patient was discharged. Day 5 - the patient brought the spider that had caused the bite, subsequently identified as an adult male L. anamala. There was no dermonecrosis or hemolysis and complete lesion healing was observed by day 55. Conclusion: Brown spider bites are common in Brazil and are caused mainly by L. intermedia, L. laeta and L. goacho; no confirmed bites by L. anamala have previously been reported. The outcome described here were compatible with cutaneous loxoscelism and similar to those reported for other Loxosceles species. Antivenom has been used to treat clinical loxoscelism in Brazil and the available data shows good cross-reactivity in neutralizing the dermonecrotic and lethal activities of several Loxosceles venoms in rabbits. The inhibition of lesion progression observed following AV administration suggests that in this case AV was effective in preventing dermonecrosis.

314. Poisoning by Amanita Phalloides

Pöld K, Oder M, Paasma R.

Objective: To describe the clinical findings, treatment and outcome of an accidental ingestion of Amanita phalloides mushroom by a family of five. Case report: A family enjoyed a meal made of Amanita phalloides. The mushrooms were mistaken for other edible species and were cooked in the normal way. The family immediately felt a burning sensation and changes in the lesion pattern. T57 - photos of the lesion sent by e-mail to the main author revealed an irregular blue plaque surrounded by an unamalous halo. There was no fever, jaundice or change in urine color; a presumptive diagnosis of cutaneous loxoscelism was considered. T60 (admis- sion to the university hospital) - physical examination revealed an irregular lesion with the characteristic skin findings described above, located over an area (20x12 cm) of indurated swelling. Five vials of anti-arachnoid anti- venom [AV, Instituto Butantan, Brazil, F(ab')2 antibody to Phoneutria nigriventer and Titus serralutus venoms] were infused without adverse effects. T68 - reduction in the pain and cessation of lesion, admission of the patient was discharged. Day 5 - the patient brought the spider that had caused the bite, subsequently identified as an adult male L. anamala. There was no dermonecrosis or hemolysis and complete lesion healing was observed by day 55. Conclusion: Brown spider bites are common in Brazil and are caused mainly by L. intermedia, L. laeta and L. goacho; no confirmed bites by L. anamala have previously been reported. The outcome described here were compatible with cutaneous loxoscelism and similar to those reported for other Loxosceles species. Antivenom has been used to treat clinical loxoscelism in Brazil and the available data shows good cross-reactivity in neutralizing the dermonecrotic and lethal activities of several Loxosceles venoms in rabbits. The inhibition of lesion progression observed following AV administration suggests that in this case AV was effective in preventing dermonecrosis.

316. Bothrops lanceolatus Bites: Review of the Martinician Experience and Guidelines for Antidotal Treatment

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Objective: Approximately 20–30 cases of snakebite occur each year in Martinique. Bothrops lanceolatus, a member of the Crotalidae family, notoriously called “Parabute” (L. lanceolatus), is considered a venomous snake. Scorpion bites are more frequently involved on this French Caribbean island, with an increasing incidence.1 Based on our experience, our purpose was to assess envenomation severity and highlight the need for up-to-date guidelines for the management of Bothrops lanceolatus snakebite. Methods: A PUBMED research was undertaken using the terms: Bothrops lanceolatus, Fer-de- lance pit vipers, Bothrops carinatus, polyvalent, Bothro- fav antivenom, Safety, Snake bites, Martinique; relevant articles were reviewed. Results: Envenomation features include the presence of one or more fang marks, local- ized pain, bleeding from punctures, ecchymosis, and swelling. Thrombocytopaenia (70%) and disseminated intravascular coagulation (50%) are frequently observed. Severe cases present with systemic throm- bosis (including pulmonary, cerebral, and myocardial infarctions), disseminated coagulopathies, and throm- botic microangiopathy. The antivenom therapy (Bothro- fav), Pasteur-Mérieux Connaught) for toxin neutralization, is the first-line treatment to prevent severe bite consequences, if intravenously infused early. Antivenin serum is obtained from hyperimmunized horses with B. lanceolatus venom. It con- tains a mixture of two fragments (the binding fragment, 97% and Fab (antigen-binding fragment, 3%). Its regimen should be adapted to the envenomation severity. Antivenom therapy was first administered in 1993 in Martinique. Previous use of antivenom appeared to be a function of how rapidly it was adminis- trated: in 70 patients who received the antivenom ther- apy within 6h of being bitten, no thrombotic
317. Medical Consequences of the Asian Black Hornet Invasion in Southwestern France

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Objective: Introduction of the Asian black hornet Vespa velutina nigrifrons in Southwestern France was discovered in 2005.1 Because of its large size Vespa velutina is intimidating and the French media compared the invasion of this insect to the killer bees problem in America. The medical literature indicates that in comparison with other Asian hornets’ species Vespa velutina cannot be considered as a major health threat in Asia. The purpose of this study is to evaluate the actual threat based on experience with hymenoptera stings at poison control centers in France. Methods: Since the offending hymenoptera species cannot be identified in most cases, all cases involving hymenoptera stings recorded at French Poison Control Centers from the beginning of 2004 to the end of 2008 were included. Data obtained before and after invasion by the Asian species were compared to check if the presence of the new species had led to an increase in the number of hymenoptera stings in the affected departments. Results: A review of data from French poison control centers showed only one envenomation clearly linked to Vespa velutina. The victim developed severe symptoms with neurolgic sequelae after being stung 12 times on the head. This case demonstrates that French hornet species Vespa velutina can be dangerous for man after multiple stings. However, the experience of poison control centers in France shows that the increase of this hornet population in the southeastern part of France has not correlated with an increase in the number of hymenoptera stings in general (study of 824 cases of hymenoptera stings collected in the concerned area by French Poison Control Centers between 2004 and 2008: stability in the incidence of stings before and after Asian hornet invasion in all the 20 concerned French departments). Conclusion: These reassuring findings are in agreement with those reported by entomologists from the National Museum of Natural History which has been observing this newcomer since its introduction. Reference: 1. Villennet C, Haxaire J, Strinчer J. Premier bilan de l’invasion de Vespa velutina en France. Bull Soc Entomol Fr 2006; 111:447–50.

318. Acute Intoxications by Plants: The Moroccan Poison Control Centre Experience

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Objective: The present retrospective study aims to investigate the data of the Moroccan Poison Control Centre (MPCC) in order to describe acute intoxications by plants. Methods: Plant poisoning cases were received by telephone or by intoxication reporting forms from hospitals sent to the MPCC between 1989 and 2007. Demographic features, circumstances, type of plants, management delay after intoxication, symptomatology, severity and outcome were analyzed and correlations between them were prepared. The evaluation of severity and outcome of cases included 1419 cases and an IPCS age groups were used. Results: There were 2271 collected cases during the period of study, which repres- ented 3.01% of all cases received by the centre in the same period. The maximum rate of cases noted dur- ing spring (27.7%). The mean age was 19.85 ± 16.38 years (1 day to 91 years), the sex ratio (male/female) was 0.91 and the oral route was predominant. 66.35% of cases were accidental. Most cases presented with mild (22.7%), moderate (29.8%) and severe (10%) signs. Patients who received the serum at >8 h after being bit- ten or who never received it, developed severe thrombocytopenia (7.1%) or severe platelet reduction (1.9%). 8.7% of patients presented with moderate signs (grade 2) in 32.2% of cases or severe (grade 3) in 9.8%. The most common plants involved in poisoning were Atractylis (22%), Arachis (11.5%), Datura stramonium (7.8%) and Ricinus communis (3%). Mortality was 6.2%. Conclusion: It could be concluded that plant poisoning in Morocco is serious and a prevention strategy is needed. References: 1. Persson HE, Sjöberg G, Hennes JA, et al. Poisoning Severity Score. Grading of Acute Poisoning. Clin Toxi- col 1998; 36:205–13.

319. The Evaluation of Mushroom-Related Inquiries to the New Zealand National Poisonous Centres Programme Between 2004 and 2008

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Objective: The aim of this study was to evaluate human mushroom-related inquiries to the NPC over a 5 year period. Methods: A retrospective analysis of all human mushroom-related inquiries to the New Zealand National Poisonous Centre (NPC) was undertaken for the years 2004 to 2008. Results: The NPC received a total of 495 calls from people inquiring about human exposure to mushrooms. Of these inquiries, about 73% involved children (less than 7 years of age), 26% involved adults and the remainder was of unknown age. The majority of calls was associated with mush- rooms that were not identified (n = 768) followed by puffballs (n = 88) and magic mushrooms (n = 55). Other identified mushrooms included Amanita muscaria (n = 28), Amanita phalloides (n = 5), Clitocybe (n = 1), Coprinus (n = 1), cyclopelidite (n = 1), goldtops (n = 2) and Psathyrella candollea (n = 1). Exposures were either child exploratory (73%), unintentional (21%), self harm (2%) or unknown (4%). Most exposure calls concerned ingestion of mushrooms (97%), followed by skin contact (2%) and inhalation (1%). Exposure to magic mushrooms was most significant amongst teenagers age 16 to 19 years. Conclusion: Most inquiries received involved children ingesting unidentified mush- rooms. Human exposures to magic mushrooms predominately involved teenagers, using them for recreational purposes.

320. Analysis of Biochemical Indicators of Toxic Liver Injury in Patients Admitted to the Clinic of Occupational Diseases and Toxicol- ogy with Amanita phalloides poisoning

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Objective: Analysis of selected biochemical indicators of liver injury and evaluation of mycological tests in patients admitted to the Clinic of Occupational Diseases and Toxicology with Amanita phalloides poisoning. Methods: Blood samples daily on admission and after 3rd and 5th days of hospital stay of 12±3 days and mean interval between time of ingestion and development of clinical symptoms of poisoning 9 hours 50 minutes, respectively. We observed increased ALT and AST levels with maxi- mal values after approximately 72 hours: mean ALT - 5110U/L and AST - 4120 U/L, respectively. The pro- thrombin index started to decrease on the second day, with minimal value of 51±10% after 7 days, mean a medium value 36%, during 3rd-4th day after the ingestion. We failed to identify the presence of Amanita phalloides spores in faeces samples from any patient, however in two cases food remains contained them. Conclusion: Amanita phalloides poisoning can be diagnosed clinically on the basis of the significant increase in AST and ALT value and decrease in thrombin index well. Mycological tests, in turn, appeared of low diagnostic significance. Results presented indicate the crucial role of regular evaluation of the above mentioned parameters in diagnosis and monitoring the course of Amanita phalloides intoxication, whereas identification of spores appeared to be of low diagnostic value. References: 1. Giannini L, Vannacci A, Morenelli A, et al. Amanita phalloides: an 11 year retrospective analysis and follow-up evaluation of 105 patients. Clin Toxicol Liver 2002; 22:78–80. 2. Mas A. Mushrooms, amatoxins and liver. J Hepatol 2005; 42:166–9.

321. ‘Natural’ Means Safe, Doesn’t it?

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Background: The ready availability of so-called natural remedies on the Internet means that patients are being exposed to mostly unsubstantiated claims as to their efficacy in treating various medical conditions, continues to give rise to serious safety concerns. Although the possibility of acute cyanide toxicity from ingestion of large quantities of apricot kernels is well documented, certain websites are still advocating this practice as a ‘natural’ treatment for cancer - even recommending consumption of 50 ker- nels daily. Case report: A 51-year-old non-smoking female patient attended the emergency department com- plaining of nausea, headache, abdominal pain and diar- rhea. She was previously diagnosed with multiple fibroids and has a history of undergoing a number of neck operations including recent removal of a medullary carcinoma of the thyroid. In an attempt to prevent further recurrence of her disease she had taken apricot kernels from a website advocating apricot kernel ther- apy. Initially she had been ingesting 10 kernels/day but this had increased to 40/day for the past week. She described having a terrible taste since commencing the therapy and that she now felt very unwell and ‘raw inside’. Examination revealed mild dehydration and an elevated serum calcium concentration (2.85 mmol/L). Blood cyanide concentration was normal but her serum thiocyanate concentration was 22.6 mg/L (1-4 mg/L in non-smokers), a level consistent with that found in studies of patients ingesting 1500 mg amygdalin (the cyanogenic glycoside of apricot kernels). The patient was admitted to intensive care and intravenous fluids, her symptoms abated and she was discharged. Discussion: Analytical data provided by the Food Standards Agency indicate that bitter api- cot kernels on sale in health food shops contain on average 0.5 mg of cyanide per kernel. This patient may therefore have been ingesting approximately 330 micro-gram/kayg cyanide daily - uncomfortably close to the ALT and AST value of 5110U/L and 4120U/L, respectively. The ready availability of so-called natural remedies is further emphasized by the exaggerated claims of dangerously irresponsible websites and to the exaggerated claims of dangerously irresponsible Internet advertisers and may well find themselves in potentially life-threatening situations. Is there a need for regulation?
322. Identity and Health Risks of Mothball Usage in Greater Accra, Ghana
Soghoian SE,1,2 Nyadedzor C,1 Ed Gingnepse B,3 Clarke EE,4 Hazelwood KJ. Exposure-related health effects of silver toxicity. 3,4
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Objective: A prior study evaluating the risk factors for poising in Greater Accra identified the internal use of “camphor” as a potential public health concern. Twenty-four per cent of community (lay-person) interviewees reported using “camphor” (mothballs) to purify water for drinking and bathing. Physicians in the survey reported cases of hemolytic anemia after mothball ingestion to self-treat stomach-ache, measles, and diarrhea. Since hemolysis is uncharacteristic of camphor ingestion, we sought to identify the actual toxins being sold as mothballs in Greater Accra and use this information to help educate both clinicians and the public. Methods: Mothballs are commonly sold by street and marketplace vendors in unmarked saran-wrapped packs. Fifteen small packs of mothballs were purchased from random vendors in three major markets and 6 roadside stands in Greater Accra. All samples were subjected to the float test, which rapidly distinguishes camphor, naphthalene, and other homologs. None floated and was positively identified as naphthalene. Conclusion: Naphthalene was the ingredient in all the mothballs purchased for the study. Naphthalene is poorly soluble in water, and “camphor water” is unlikely to be a health benefit. All health benefits ascribed to “camphor” as a purification tool may lead to therapeutic misuse by analogy. A high prevalence of G6PD in the Ghanaian population may increase the risk of toxic effects from ingestion of concentrations of naphthalene similar to those found in Greater Accra. Levels of naphthalene would not be considered toxicologically significant if “camphor” as “camphor” is predominantly naphthalene. A public awareness campaign about the health risks of mothball ingestion is suggested. References: 1. Soghoian SE, Clarke EE, Bingnepse E, et al. Health-seeking behavior after unintentional poisoning in Greater Accra (abstract). Clin Tox 2009; 47:705–6. 2. Koyama K, Yamashita M, Ogura Y, et al. Simple test for mothball component differentiation using water and a saturated solution of table salt: its utilization for poison information service. Vet Hum Toxicol 1991; 33:425–7.

323. Melanotan - A Skin-tanning Product with Potentially Harmful Effects. A Case Series
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Objective: Melanotan is a synthetic hormone, which imitates the natural hormone alfa-MSH. It stimulates skin pigmentation and is used as a tanning agent. Melanotan is not a registered drug but can be bought via the Internet. Several websites show all the “positive” effects including anorexia and increased libido. It is administered subcutaneously. There have been several inquiries to the poisons centre about side effects due to melanotan, and the method of administration is of particular concern and may be associated with risk in the unskilled patient/person. Also the long-term side effects and effects are unknown. Case series: Case A: A 23 y/o woman contacted her general practitioner after injecting Melanotan subcutaneously. She had bought the drug from a friend and injected the recommended dose into the abdomen herself after which she developed a haematoma. She was afraid that it could be cancer. Case B: An 18 y/o woman with a history of alcohol abuse and episodes of hypertension saw her general practitioner. For one week's use, she felt she was hyperventilating and had palpitations. She continued the use of Melanotan in order to get a tan. After one week's use, she felt she was hyperventilating and had palpitations. She stopped the use of Melanotan and improved. The following week she felt poorly but continued the use of Melanotan. After 2 weeks she began to feel scared and contacted her doctor who, however, could not find any signs of cardiac or respiratory illness. Case C: A 21 y/o man was admitted to the emergency room at 6 am. At 9 pm the preceding evening he had injected himself with Melanotan subcutaneously in the abdomen. He developed breathing difficulties, abdominal pain. He had difficulty in breathing, dizziness and a tingling sensation in both arms. After observation for a few hours, he was discharged without further intervention and he did not return to the emergency room. Conclusion: Melanotan is used as a skin-tanning product but the full extent of use is presently unknown. The initial adverse effects seem to be mild but we are concerned about a lack of method of regulation and the possible long-term adverse effects.

324. Argyria Caused By Homemde Silver Colloid
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325. Acute Hemolysis Following the Extravasation of an Intravenous Phosphatidylcholine Product
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Objective: To present a case series of hemolysis that developed after infusion therapy with phosphatidylcholine administered for lipid exchange therapy. Case series: Seven patients received intravenous infusions from vials containing “phosphatidylcholine (100 mg/mL).” The alternative medicine indications were hypercholesterolemia and atherosclerosis, hypertension, and back pain. The compounded formulation was intended for subcutaneous not the intravenous route. Reportedly, the difference in the subcutaneous formulation was riboflavin. The product was diluted in dextrose solution and compounded one week before use. The patients developed infusion site pain. Three patients who developed infusions also developed acute hemolysis requiring hospitalization. Severity appeared related to the degree of infiltration and/or dose given in these hospitalized patients. Two patients received 2.0 and 2.1 grams, while one patient got 3.0 grams. Two patients did receive the full 3.0 gram dose without infiltration and did not report any adverse effects. One patient presented with breakthrough uric acid hepatotoxicity and another’s increased from 1.8 to 7.8 mg/dL, but did not require hemodialysis. This patient developed painful left knee swelling and myoglobinuria with blurred vision and proximal weakness. One patient developed acute narrow angle glaucoma, requiring surgical intervention. Testing of the pharmaceutical product ruled out pesticide and metal contamination. The FDA developed a qualitative assay using technical grade phosphatidylcholine. An LC/MS assay confirmed the presence of phosphatidylcholine in vials from the lot administered to the patients. Hospitalized patients were treated with intravenous fluids, but no use was made of dialysis for the hemolysis were needed. Conclusion: Infusions with phosphatidylcholine products may cause acute hemolysis.

326. Fulminant Hepatic Failure From Ussic Acid Containing Supplements
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Objective: Complementary and alternative medicine use appears to rise despite concerns over efficacy. In the US, regulatory action can only occur following demonstrable evidence of harm. We report a case of fulminant hepatic failure in a patient taking two supplements containing usnic acid, a fungal acid, produced in lichen species of the genus Usnea, uncoouples oxidative phosphorylation and is used in some weight loss formulations as a “fat burner.” Case report: A 26 year old presented with altered mental status and generalized weakness for one day. She denied nausea, vomiting, fever, abdominal pain, or headache. She had no past medical history and was on no medications. She complained of fatiguing after an Internet search into lung infection, he found instructions on how to build a machine to make silver colloid and how often to ingest it to prevent infection. A friend noted the skin changes approximately 4 years after initial ingestion. Besides the skin discoloration, the patient complained of confusion, decreased concentration, tremors, and increasing irritability, interfering with his quality of life and that had continued despite no longer ingesting the silver colloid. Conclusion: Silver exposure is through occupational or hobby exposure, as well as medical use for wound care and indwelling medical devices.2 Silver toxicity presents mainly as argyria, a blue-grey discoloration of the skin, primarily over the sun-exposed area of the body.2 Neurologic toxicity from silver is ill defined and described in animal studies.3 There are two case reports of seizures associated with silver toxicity.2,3 References: 1. Lansdown AB. Critical observations on the neurotoxicity of silver. Crit Rev Toxicol 2007; 37:237–50. 2. Drake PL, Hazelwood KJ. Exposure-related health effects of silver and silver compounds: a review. Ann Occup Hyg 2005; 49:575–85. 3. Mirsattari SM, Hammond RR, Sharpe M, et al. Argyria do not occur secondary to prolonged oral ingestion of colloidal silver. Neurology 2004; 62:1408–9. 4. Obhio Y, Fukuzako H, Takeuchi K, et al. Argyria and convulsive seizures associated with ingestion of colloidal silver. Psychiatr Clin Neurosci 1996; 50:89–90.

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Abstracts
Objective: Ethylene glycol is always amongst the ten most common agents implicated in cases with fatal outcomes reported to the Veterinary Poisons Information Service (VPIS) annually. Its toxicity is well documented and treatment is acknowledged to be dif-
ficult for many small veterinary outlets. This study aims to evaluate the frequency, morbidity and mortal-
ity of ethylene glycol exposures in companion animals.

Methods: The VPIS database holds case details taken contemporaneously, as well as further information on case progression and outcome collected via postal follow-up. We undertook a retrospective review of all case data for ethylene glycol in cats and dogs from 1991 to date. Results: Ethylene glycol exposure was reported in 186 cats and 143 dogs; full follow-up information was available for 84 and 52 cases respectively. Sixteen dogs remained asymptomatic after the start of the actions we looked for major symp-
toms and more specifically convulsions at the time of the call. We did not look for the number of deaths that occurred after exposure or that were con-
tacted in case of the death of a dog. As can be seen in the table (Table 1) no apparent amelioration was observed. Compared with the two years before the start of these actions there were more major signs (with or without convulsions) in the two years after (Table 1).

Conclusion: Risk-reducing actions like the ones described above do not diminish the number of serious metallicdehyde intoxications in dogs. Other measures are necessary if a reduction in these kinds of intoxications is needed.

329. Chloroformate Poisonings in Dogs - The First Case Report

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Objective: Chloroformate is an anticonvulsant and sedative-hypnotic drug. In Sweden it is used mainly in geriatrics and for treatment of withdrawal symptoms after alcohol abuse. The mechanism of action is not fully understood, but chloroformate probably potenti-
ates the GABA transmission and enhances a unique gly-
cine-mediated inhibition of electrical stimuli within the central nervous system. A few experimental studies of chloroformate in dogs have been published in the lit-

erature but poisons have not previously been described. According to information from the manufac-
turer no domestic animal poisonings have been noted. Since 1999, the Swedish poisons centre has been con-
sidered regarding twelve cases of chloroformate inges-
tion in dogs. Eleven of these showed none or only mild symptoms, and one case experienced more severe symptoms and will be presented here. Case report: In the afternoon, at 4 pm, a 10-year-old (8 kg) male Border Terrier ate 10–15 capsules containing chloro-
thiazole each. The dose ingested corresponds to 3000–
4500 mg or 375–563 mg/kg. After approximately one hour, the dog was brought to an animal hospital. The Border Terrier was unconscious, had seizures, tachycardia of 170/min and weak, irregular pulse. Fur-
thermore, it also presented with breathing difficulties, tachypnoea, hypersalivation and red-greyish mucous membranes. A dose of 4 mg diazepam was given intra-
venously with prompt effect on the seizures. Oxygen was administered as well. Laboratory values showed no evident alterations. After examination at the emer-
gency department the dog was transferred to the inten-
sive care unit. The dog then had more pronounced breathing difficulties, cyanosis was evident and the saturation was only 63%. The heart rate had increased to 180 bpm and the blood pressure fell to 90/70 mm/Hg sys-
tolic. The dog was intubated and the saturation improved but still remained a little low, 93%. Despite an improved state the owner later decided to euthanize the dog. Conclusion: According to our knowledge this is the first severe canine poisoning case after chloro-
thiazole ingestion.

330. Hydrofluoric Acid - Experiences of 157 Expos-
ures 2003–2008

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Objective: Hydrofluoric acid (HF) is an extremely toxic chemical used exclusively in work place settings in Sweden. Even minor dermal exposures are nor-
mally managed in hospital. Methods: We prospec-
tively compiled available data regarding consultations after HF exposures to our centre 2003–
2008. Results: During the 6-year period, 157 cases were included. All victims were adults and 84% were males. At least 121 victims were hospitalised. The thorax x-ray revealed pulmonary edema on both sides in both patients. The body plethysmography resulted in reversible obstruction, restriction and severe hypox-
emia after short phosgene exposure developed with a long latency. Hospitalisation of all exposed persons seems advisable. Beclometasone inhalation may prevent pulmonary edema though only patients with mild exposure were treated.
332. Respiratory and Skin Disorders Associated with Disaster Victim Identification in the Aftermath of the 2004 Southeast Asia Tsunami

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Objective: Reports on health problems after the Southeast Asian tsunami in 2004 have focused on mental health and infectious diseases.1 An association between airway problems and exposure to disinfectants and formaldehyde was first reported in Swedish disaster victim identification (DVI) personnel.2 As a consequence Danish personnel have been examined in order to identify health disorders associated with DVI work in Thailand, focusing on respiratory and skin exposure.

Methods: A two-step strategy with screening by a questionnaire followed by clinical examinations of screen positive was carried out. Respiratory symptoms were evaluated with pulmonary-function and skin-prick test; skin disorders were evaluated clinically and by patch test. Associated exposure was assessed using a validated exposure questionnaire. Valid questionnaire were returned from 152 of 165 persons (92%).

Results: Valid questionnaires were returned from 152 of 165 persons (92%) who had worked in the catastrophe area. Thirty of these were screen positive. In two cases of asthma, the diagnosis was confirmed by a positive skin test to formaldehyde and possible for two cases of asthma and two with other skin disorders. For one person a two-year lasting deterioration of pre-existing asthma and for another a lasting exacerbation of skin dermatitis was established. All other disorders were considered unrelated to DVI work. Conclusions: Skin and respiratory disorders associated with DVI work were found in 8 of 152 persons (5%) who had worked in the catastrophe area. A routine follow-up is recommended for future similar situations.

References: 1. Thoresen S, Tønnesen A, Huusua J, Lévêque Hospital, Pessac; 2Thoracic Surgery Department, Pitié Salpêtrière Hospital, Paris; 3University of California, Los Angeles, CA, USA

Abstracts

333. Delayed Oral Complications of Mustard Gas Poisoning in Iranian Toxic Veterans Referred to the Oral Medicine Department of Mashhad Dental Faculty

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Background: The effects of chemical gases on tissue exposed to the environment (skin, airways and eyes) were evaluated in a goat model. Based on these data, the gel is used for the treatment of oral and genitourinary caustic burns. This study was conducted to determine the delayed oral complications of mustard gas poisoning in toxic veterans referred to the Oral Medicine Department of Mashhad Dental Faculty.

Methods: In this descriptive cross-sectional study, 47 veterans of the toxic gas victims referred to the Oral Medicine Department of Mashhad Dental Faculty, were orally examined during a six month period in 2009. The patients’ data including demographic data, duration of oral lesion presence, history of medications, the type of chemical gas involved and disability percentage were recorded. The patients were treated with BRYS (a modified version of the SPS SUSP; Statistics Solutions) statistical software. Results: Among the 37 veterans referred, all patients had oral soft tissue lesions. The most common findings were xerostomia, mucositis, canker sores, gingivitis and periodontitis, respectively. Conclusion: Presence of highly frequent oral soft tissue lesions in Iranian toxic veterans compared to the general population necessitates periodic oral soft tissue examinations by oral medicine specialists.

334. Contact Dermatitis to Dimethylfuramate: 27 Cases

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Objective: Dimethylfuramate (DMFu) has been used as a biocide for the preservation of furniture and clothing in Southeast Asia. Numerous cases of severe contact dermatitis have been reported in France and several other European Union states. This study analyzed the cases reported to the Paris Poison and Toxicovigilance Centre (PPTC).

Methods: Each patient notifying suspected exposure to DMFu to PPTC was invited to a medical examination and patch testing with the Euro-patch battery (in petrolatum and in water), and, when possible, with the suspected item. Following these investigations, causality was evaluated according to the French causality method for patch testing (SNPE). Results: Fifty-seven percent of cases of suspected exposure to DMFu were notified to PPTC up to 10.31.2009. Only 27 patients could be examined and 25 were patch-tested. The suspected source of exposure was sitting, shoes or boots, and clothes in 9, 16 and 2 cases, respectively. Clinical examination was performed several weeks after the end of the exposure in most cases. Ten patients were asymptomatic at examination; 15 reported skin lesions within 6 months and chronologically related to exposure to the suspected item in 7 and 5 cases, respectively. The other 17 patients still presented an erythematous rash, which was mild in most cases; skin lesions were topographically suggestive of contact dermatitis to the suspected item in 14/17 cases and were chronologically linked to exposure in 12 of 14 cases. Patch-tests with DMFu and/or the suspected items were carried out in 25/27 and 16/27 patients, respectively, and were positive in 9/25 and 8/16 cases. Contact dermatitis to DMFu-treated item was estimated to be likely in 17 cases, possible in 4 and dubious in 6 cases. Conclusion: Since 2006, numerous cases of contact allergy to DMFu have been observed in the EU. We report one of the largest series. In all of these cases and in previous reports, the sources of exposure were seats, shoes or clothes imported from China. Our cases and a review of literature established that DMFu may be responsible for both irritative and allergic contact dermatitis.

335. Caustic Burns of the Oesophagus: Experimental Evaluation of an Amphoteric Agent in a Goat Model

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Objective: Currently, no effective cure for caustic oesophageal burns exists. Amphoteric concept and hypertonic gel have been proposed to be used for decontamination of oesophageal burns. This study was designed to evaluate its efficacy (as a gel) on sodium hydroxide oesophageal lesions. Methods: All applicable animal use guidelines were followed. The experiment was performed on two groups of 5 anesthetized goats each. In the first, acute toxicity was studied with a high gel excess. In the other, efficacy was evaluated. After surgical cervico-oesophageal approach, a stock solution of 3 M sodium hydroxide gel was placed into the oesophagus followed by a 10 cm length. 50 μL of sodium hydroxide (5M) were deposited by spots, during different times of contact, alone or followed by gel application. Macroscopic lesions on mucosa and muscularis, and its pH (during 30 min with gel exposure) were evaluated. Anatomopathological analysis supplemented the study. Results: In less than 3 minutes, mucosal lesions appeared. Sodium hydroxide diffuses and reaches the muscularis after 5-10 minutes. Severe injury (stage III) appeared macroscopically after approximately 30 minutes. Administration of an excessive dose of gel orally was consistently associated with diarrhoea. Administration of gel was continued for 10 minutes, the gel prevented the diffusion of sodium hydroxide into the muscularis and integrally preserved it. Beyond 20 minutes, the muscularis was already damaged. The gel blocked the extent of tissue destruction on macroscopic, pH-metric, and histological assessments. Conclusion: The amphoteric and hypertonic gel appears advantageous for decontamination of oesophageal caustic burns. Isolated administration of gel very early, it prevented the development of serious lesions in this animal model; beyond 20 min, its effectiveness was lessened. This is in agreement with a previous study performed on a pig model. Amphoteric gel is promising for further evaluation. Human trials could be proposed once the innocuousness of the gel by this administration route has been completely evaluated.

336. Neuropenia and Cardiac Enzyme Elevation Following Inhalational Aluminum Phosphide Exposure

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Objective: Aluminum phosphide poisoning is relatively uncommon in the United Kingdom although mortality is high.1 Toxicity is mediated through the release of phosphine gas following reaction with water (or stomach) acid and leads to mitochondrial toxicity.2 Here we present a case report of inhalational aluminum phosphide toxicity that is described. Results: Aluminum phosphide poisoning presents with acid-base disturbance, renal failure or hepatic failure. Leucopenia and cardiac toxicity are not widely described following exposure by inhalation, as compared to ingestion, although when present leucopenia is an indicator of severe toxicity.3 Cases of aluminum phosphide poisoning previously fit 43 year old female presented to emergency services with a history of having inhaled the fumes generated by placing approximately 60 g of aluminum phosphide in a bowl at home, whilst in an enclosed space in a suicide attempt. She reported significant nausea but no vomiting. Conscious level was normal throughout. Admission blood pressure was 80/50 mmHg and pulse rate 110/min. There was no clinical or radiological evidence of pulmonary oedema with oxygen saturations maintained at 98% on room air. Admission ECG was normal. She remained hypotensive for 48 hours, despite fluid resuscitation, and she maintained her urine output without inotropic support. Her troponin I was elevated at 0.86 μg/L on admission, falling subsequently. The admission white cell count was reduced at on admission 3.4 × 10⁹/L), over the next 48 hours, but normalised by day 5. There was no evidence of haemolysis, disseminated intravascular coagulation, acid-base disturbance, renal failure or hepatic dysfunction. By day 6 post overdose there were no ongoing features of toxicity. Conclusion: Although well recognised following ingestion, neuropenia and cardiac toxicity are not widely described following exposure by inhalation, especially in the absence of other features of severe toxicity. Clinicians should be alert to these features after inhalational poisoning. References: 1. Proudfoot AT. Aluminium phosphide poisonings: 108 cases 1967 to 1989. 2. Villet; 3. Wolfson Unit of Clinical Pharmacology, Newcastle University, Newcastle-upon-Tyne, UK
337. Intentional Ingestion of Potassium Chloride Results in Caustic Injury
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Objective: Although ingestion of pharmaceutical potassium salts can produce hyperkalemia, this case is presented to highlight that non-pharmaceutical potassium salts can also produce severe caustic injury. Case report: A 31 year old man presented to the hospital with severe abdominal pain and vomiting after drinking 300 grams of KCl purchased from a scientific supply company 8 hours earlier. Thirty minutes following ingestion, he developed left shoulder and epigastric pain and vomited. Upon presentation he had one episode of hematemesis. Vital signs were: 146/76 mmHg, 95 beats/min, 19 breaths/min. 93% oxygen saturation on RA and a normal temperature. Examination was notable for: limited respiratory effort during breathing due to pain, a rigid abdomen with epigastric tenderness. His electrocardiogram showed peaked t-waves, and serum potassium was 7.5 mEq/L. A chest radiograph did not reveal pneumothorax or increased interstitial markings. Gastric lavage was performed to remove any remaining potassium chloride, and nephrology was consulted in case hemodialysis was required. Upper endoscopy revealed severe hemorrhagic gastritis with necrotic tissue, but no perforation. The patient was discharged home with instructions to drink plenty of fluids and follow up with the nephrologist for monitoring.

Conclusion: This case is presented to highlight the potential for severe caustic injury from the ingestion of potassium salts. Healthcare providers should be aware of this potential risk and ensure proper monitoring for patients who have ingested potassium salts.

338. Comparative Analyses of Chemical Poisonings in the South Caucasus Region
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Objective: The purpose of this joint prospective study was the evaluation and analysis of the characteristics of acute chemical poisoning cases in Azerbaijan and Georgia. Methods: This investigation was performed on data for poisoned patients admitted to the Republican Toxicology Center (RTC) in Baku (Azerbaijan) and poisoned patients admitted to hospitals in Tbilisi (Georgia) in 2007. Results: There was a total of 1182 hospitalizations in the RTC’s intensive care unit and 1646 poisoned patients admitted to hospitals in Tbilisi. The mean lengths of hospitalization were 3.2 days in Azerbaijan and 1.2 days in Georgia. Intoxications were more frequent, as were male patients (51% in Azerbaijan and 64% in Georgia) and those in the 20–40 age group. Among the pharmaceuticals, poisons by antiepileptics, sedative-hypnotic and antipsychotics (52%) and poisons by psychotrophic drugs (13%) were the most frequent. The other cases of poisonings were inhalation of carbon monoxide (TSB) - 173 hospitalizations in Azerbaijan and 77 hospitalizations in Georgia; alcohol poisoning, 74 cases in Azerbaijan and 237 cases in Georgia. The mortality rates were 3.1% in Azerbaijan and 0.74% in Georgia. Corrosive liquid poisonings were most often fatal (41% of total mortality) in Azerbaijan and alcohol and narcotics and sedative-hypnotics and antipsychotics (35% mortality) in Georgia. Conclusion: These data provide information about toxicocpidemiological situation in the South Caucasus countries and could help to develop joint programs of prevention of acute chemical poisonings in this region.

339. Reports on Cases of Fatal Carbon Monoxide Poisoning due to Charcoal Grills Received by The Federal Institute For Risk Assessment in 2009: Background, Principal Measurements and Considerations as to Prevention
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Objective: In the context of compulsory notification of cases of poisoning, the Federal Institute For Risk Assessment (BfR) received 85 reports of fatal cases of carbon monoxide (CO) poisoning after indoor use of charcoal grills in 2009. Two cases resulted in very severe neurological damage. CO is odourless, colourless and non-irritant and therefore, does not produce any warning effect for humans. The gas is lighter than air and readily absorbed through the lungs, which initially remains unnoticed. Insufficient ventilation in indoor environments will quickly result in lethal concentrations of the toxic gas. Methods: The cases were investigated and documented at BfR, and assessments of individual cases as well as an analysis of cases reported so far have been performed. For a better assessment of exposure, the Institute of the Fire Department of Saxony-Anhalt (IdF) performed principal measurements of CO emissions from charcoal products inside a fire container in the context of a research project of the Federal Land of Saxony-Anhalt. Results: In all cases, charcoal grills had been improperly operated indoors and probably also been used for heating. Examinations performed on the dynamics of the development of O₂, CO and CO₂ concentrations have demonstrated the considerable risk posed by open fires in rooms lacking the necessary ventilation. Calculated fatal enthalpic doses according to the Fractional Effective Dose (FED) model [Purser] have confirmed the fatal risk posed by indoor operation of charcoal grills. Very severe and life-threatening poisoning may occur within 30 minutes. Conclusion: Investigations into cases and evaluations of measurements have documented the risk posed by CO formation in indoor environments. The cluster of fatal cases observed in the first half of 2009 has indicated that, obviously, a part of the population is not aware of the risk posed by indoor open fires. Even the use of embers as a source of heat in rooms may pose serious risks. Ammonia (NH₃) has been recently implemented. That activity allowed detection of the case of shoe dermatitis reported here and a few other cases which are at the moment under investigation. References to a first aid service for medication. Twenty five days after admission, the patient was discharged home with instructions to drink plenty of fluids and follow up with the nephrologist for monitoring.

340. A Case of Shoe Dermatitis Resulting from Exposure to Dimethylfuramate
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Objective: To describe a case of contact dermatitis to shoes contaminated with dimethylfuramate (DMF), a biocide used in China to protect exported goods, recently occurred in Italy. Case report: On 9 March 2009, a 35 year old woman, while wearing a new pair of shoes for an 8 hour period started to experience feet itching. The following day she noted an increase in feet itching, pain and redness. These reactions were considered to be related to fungal infection and topicaly treated with antifungal cream. In the subsequent two days the woman experienced feet blistering and swelling limited to the area which was in contact with the shoes. She consulted a general practitioner who considereed the observed lesions suggestive of contact dermatitis and prescribed topical application of corticoids. Two days after the beginning of the treatment, the patient developed eczematous second degree burns and referred to a first aid service for medication. Twenty five days after the onset of symptoms the patient consulted the Poison Control Centre (PCC) of Milan in order to get information on possible shoe allergens. Considering recent reports,1 a test for the presence of DMF in leather shoes was requested. The analyses performed by using high performance liquid chromatography and capillary gas chromatography quantified an average concentration of 383 mg/kg DMF in the shoes. No patch testing on the patient has been yet been performed. Conclusion: In Europe, the Commission Decision 2009/251/EC requires Member States to ensure that products containing DMF are not produced or made available on the market. In accordance with this Decision, the Italian Ministry of Welfare requires that the importers of goods from outside European Community certify the burdening of DMF, the spillage or degradation and performs systematic controls in order to verify their composition. Furthermore, a surveillance of cases with exposure to desiccants or with dermatitis of unknown origin reported in Italy. The case of the Chinese sofa/ chair dermatitis epidemic is likely to be contact allergy to dimethylfuramate, a novel potent contact sensitizer. Br J Dermatol 2008; 159:218–21.
2008/9, there were 17 cases (17%) where either the poison severity score was recorded as ‘severe’, methylthioninium chloride (‘methylene blue’) was given or advised or the methaemoglobin concentration was documented as >30%. There was one further patient who experienced a seizure, another who was severely cyanotic and a further 7 who had measured oxygen saturation less than 90%. Conclusion: Severe intoxication with nitrates appears uncommon in the UK, although this may be underestimated as in some cases referral to NPIS may not be made or patients may deteriorate after the NPIS enquiry. TOXBASE®, data suggests that incidence of intoxication may be increasing. Further study of telephone data over a longer time period is warranted.