120. Mechanisms of Adverse Reactions to Intravenously Acetylcysteine in Acetaminophen Overdose

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Background: Mechanisms involved in adverse reactions (ARDs) to IV acetylcysteine (NAC) are poorly understood. We have previously reported a differential degree of mortality in different ARD presentations which correlate to NAC-related adverse reactions.

Discussion: We have reported increases in serum histamine related to ARDs from NAC in acetaminophen (AP) overdose (EAPCCT Congress, Seville), and now report endothelial and hematocrit data in this group. Methods: An IRB approved prospective study of 22 patients receiving IV NAC for AP overdose in a large academic institution. For diagnosis, CRP, IP, P, WBC, and clotting factors were determined before and at intervals during treatment. ARDs were pre-categorized as minimal (no or mild GI), moderate (GI requiring anti-emetic and/or mild analgesics), severe (GI requiring intubation), or systemic (GI or other features requiring NAC). Results: Septic shock and SAH occurred in 7 cases (13%). NAC-related fatalities were observed in 4 cases (8.2%). Conclusion: The results support the finding of increased serum histamine related to ARDs from NAC.

121. Differential Toxicological Diagnoses Using a Computerized Knowledge-Based Model

Schiper JD,1 Schauben JL,2 Dankel II DD,3 Arroyo AA,4 Sollee DR.5

Background: Poisoning death investigations are often hampered by the limitations of the traditional pathologic diagnostic process. The computerized application allows for the rapid and accurate diagnosis of the most likely poison(s) based on the presence of biochemical and/or pathologic evidence. The system makes use of pre-test probabilities and likelihood ratios. To overcome the limitations of the traditional diagnostic process, the system is adjusted to account for all possible outcomes. Using adjusted likelihood ratios facilitates system selection while closely modeling the calculations of traditional likelihood ratios. Accuracies are calculated as the percentage of correct diagnoses in the top 10% of all possible diagnoses. Results: Trained and tested on single exposure data from 2002–2006, the system achieved accuracies as high as 81.0% on cases involving at least three clinical effects. Adding exposure data from 2006, the system was trained on a combination of single effects as well as the primary contributors in multiple exposure cases. With this training combination, the system achieved accuracies as high as 86.9% on cases involving at least three clinical effects. Discussion: The results of this research are modest, yet promising. The current system design assumes no prior knowledge in the field of toxicology. System performance should improve by the addition of certain knowledge, such as removing the “unknown toxin” diagnosis, combining various formulations of the same generic substance, and grouping substances by intelligence based on similar clinical effects. Conclusions: Many improvements to increase system utility and accuracy are readily apparent. With time, it is hoped that these studies will yield an effective consultant for the diagnosis of primary contributors in toxic exposure cases.

122. Demographics of Toxic Exposures Presenting to Three Public Hospital Emergency Departments in Singapore 2001 – 2003

Ponnaparam R,1 Tan HH,1 Ng KC,2 Lee WY.2

Background: The objective of this study is to establish the demographic profile of toxic exposures that presented to the EDs of three public hospitals in Singapore from 2001 to 2003. The data were collected through a search of the ICD code. Data for age, gender, race, and quantity of toxic exposure, treatment and disposition of the patients were collected on a standard survey form and analyzed using the SPSS software. Results: The total number of toxic exposure cases for the 3 years was 9212 (0.94% of the total ED attendance). Accidental exposures made up 39.6% (deliberate self-harm:20.9%, abuse and misuse of drugs:39.5%). Conclusion: The results of this research are modest, yet promising. The current system design assumes no prior knowledge in the field of toxicology. System performance should improve by the addition of certain knowledge, such as removing the “unknown toxin” diagnosis, combining various formulations of the same generic substance, and grouping substances by intelligence based on similar clinical effects. Conclusions: Many improvements to increase system utility and accuracy are readily apparent. With time, it is hoped that these studies will yield an effective consultant for the diagnosis of primary contributors in toxic exposure cases.

123. Drug Combinations Associated with Serotonin Syndrome in Patients Admitted to a Toxicology Treatment Center

Kirschnner RL,1 Chimikoski WJ,2 Donovan JW.2

Background: Serotonin syndrome, a state of excess CNS serotonin activity, is typically associated with combinations of drugs that enhance serotonin release, block its metabolism, inhibit its reuptake, or act as potent receptor agonists. The condition can also occur after overdose of a single drug. Some agents originally linked with serotonin syndrome are now unavailable or less widely used. Methods: We reviewed the records of all patients admitted to a regional toxicology treatment center with the diagnosis of serotonin syndrome to determine the drugs, and drug combinations associated with the diagnosis. Results: Of the 175 patients assigned a diagnosis of serotonin syndrome from July 2003 through December 2006 were reviewed, and drug associations determined. Only those meeting the Hunter Serotonin Toxicity Criteria were included in the final analysis. Results: We reviewed records of 231 patients, 107 of whom met the Hunter Criteria. Twenty (19.6%) had taken an overdose of a single agent. Life-threatening toxicity occurred only in patients exposed to multiple drugs affecting serotonin activity by different mechanisms. Among the 87 patients with serotonin toxicity in the setting of multiple drug exposures, the most common combinations were a serotonin reuptake inhibitor (SRI) with either cocaine (28.7%), bupropion (11.5%), fentanyl (8%), amphetamine (7%), lithium (7%), dexamethasone (7%), or tramadol (5.7%). Discussion: In 1991 most reported serotonin syndrome cases were exposed to drug combinations that included a monoamine oxidase inhibitor (MAOI) (84%) or tryptophan (55%). Today serotonin syndrome is more likely to be associated with the combination of an SRI antidepressant and cocaine, serotonergic antagonists, amphetamines, or lithium. Conclusion: These agents should be used cautiously in the setting of chronic SRI use. The diagnosis of serotonin syndrome should be considered in patients with delirium who are exposed to any of these drug combinations.

124. Reversible Bilateral Hearing Loss after Heroin Overdose

Simson S, Murphy C, Mullin DK.2

Background: Transient sensorineural hearing loss has been associated with heroin overdose, however, the incidence of this phenomenon is not known. Case Report: A 22 year-old female with a history of recent abstinence from intravenous (IV) heroin use presented to the emergency department (ED) unoriented and cyanotic. The patient and a friend each injected a “bag of heroin” nine hours prior to arrival. Within an hour the patient became difficult to arouse. In the ED, the patient was successfully treated with 2 mg of intramuscular naloxone and supplemental oxygen. On awakening, the patient reported hearing bilateral low-frequency hearing loss. Weber–Rinne testing did not lateralize and her cranial nerve exam was normal save for subjective hearing loss. Within 12 hours after presentation the patient’s hearing had grossly recovered. The patient’s friend, by contrast, reported no changes in her own hearing. Outpatient audiometric testing was requested but the patient did not attend the appointment. The patient’s friend reported that temporary hearing loss after heroin overdose was common knowledge in her local IV heroin using community. Case Discussion: Five cases of heroin-associated acute hearing loss are reported in the medical literature. Three of the cases are well described, and feature abrupt bilateral hearing loss after a heroin overdose. Two additional cases are briefly discussed in abstracts. A comparison of available details suggests that a period of opiate abstinence followed by a potentially life threatening overdose Immediate hearing loss. The deafness was of variable duration, lasting 3 days in 2 cases, 3 weeks in one case, and was permanent in two. Vertigo and tinnitus were not universal. Audiometric data, available in 3 cases, revealed high-frequency hearing loss, and suggested cochlear injury. Propoxyphene and hydrocodone induced hearing loss have also been described. Permanent high-frequency hearing loss was a common finding in these cases, which outnumber the heroin cases. Conclusion: Transient hearing loss is a rarely reported sequela of heroin overdose. Similar features are found with propoxyphene, propoxyphene, and hydrocodone associated hearing loss cases suggest a common pathophysiology.

125. Acetone Clearance Improved with Hemodialysis

Wheeler MT,1 Pirson AF,2 Lynch M,3 Katz K,4 Schwartz A.5

Background: Severe life threatening acetone intoxication is infrequently reported in the literature. A case of severe acetone toxicity in which hemodialysis was used to expedite clearance is reported. Case Report: A 49 year-old woman was found in the bathtub with an altered level of consciousness and an empty bottle of nail polish remover. She presented to the emergency department obtunded and diaphoretic. Vital signs were 34.7°C, pulse 114 bpm, respiration 34 bpm, blood pressure 118/74 mmHg and SaO2 100% on 15L face mask. Physical exam revealed: GCS 4, markedly dry mucous membranes, perioral cyanosis and pinpoint diaphoresis. After 30 minutes, the patient was intubated on hospital day 2 due to a persistent coma and an estimated acetone elimination of 5% per day. The patient’s acetone levels rose to 910 mg/dL while she was intubated. A case discussion: Developing a viable clinical toxicology service could improve patient outcome.

126. Acute Carbon Monoxide Poisoning in a Child with a Patent Fenestrated Ductus Arteriosus

Bakhtiar M,1 Khayyat H,2 Yaghoobi H,2 Khan H.3

Background: Carbon monoxide (CO) is a colorless, odorless, tasteless, and extremely toxic gas that can cause significant morbidity and mortality. Case Report: A 3 year-old female was found in the bathtub with an altered level of consciousness and an empty bottle of nail polish remover. She presented to the emergency department obtunded and diaphoretic. Vital signs were 34.7°C, pulse 114 bpm, respiration 34 bpm, blood pressure 118/74 mmHg and SaO2 100% on 15L face mask. Physical exam revealed: GCS 4, markedly dry mucous membranes, perioral cyanosis and pinpoint diaphoresis. After 30 minutes, the patient was intubated on hospital day 2 due to a persistent coma and an estimated acetone elimination of 5% per day. The patient’s acetone levels rose to 910 mg/dL while she was intubated. Case Discussion: Developing a viable clinical toxicology service could improve patient outcome.