

Zometa (zoledronic acid)

Aredia (pamidronate disodium)

Novartis and FDA notified dental healthcare professionals of revisions to the prescribing information to describe the occurrence of osteonecrosis of the jaw (ONJ) observed in cancer patients receiving treatment with intravenous bisphosphonates, Aredia (pamidronate disodium) and Zometa (zoledronic acid). *May 05, 2005*

Counterfeit Drugs Purchased in Mexico

The FDA warned the public about the sale of counterfeit versions of Lipitor, Viagra, and an unapproved product promoted as "generic Evista" to U.S. consumers at pharmacies in Mexican border towns. The "generic Evista" was analyzed by FDA in coordination with the National Association of Boards of Pharmacy and was found to contain no active ingredient. The counterfeit Lipitor and counterfeit Viagra were analyzed by Pfizer, Inc. and were also found to contain no active ingredient. Consumers who have any of these counterfeit products should not use them and should contact their healthcare provider immediately. *May 10, 2005*

Famotidine Injection, 20 mg/2 mL

Bedford Laboratories and FDA notified healthcare professionals of the voluntary recall of one lot of Famotidine Injection, 20 mg/2 mL (NDC 55390-029-10), Lot# 609336, exp. 04/06, due to a lack of sterility assurance. *April 29, 2005*

Xigris [drotrecogin alfa (activated)]

Eli Lilly and FDA notified healthcare professionals of the stopping of enrollment in a randomized, double-blind, placebo-controlled trial of Xigris in pediatric patients with severe sepsis. Xigris is not indicated for use in pediatric severe sepsis. A planned interim analysis showed that Xigris was highly unlikely to show an improvement over placebo in the primary endpoint of "Composite Time to Complete Organ Failure Resolution" over 14 days. A numerical increase in the rate of central nervous system (CNS) bleeding in the Xigris versus the placebo group was also noted. Over the infusion period the number of patients experiencing an intracranial hemorrhage event was 4 versus 1 for the overall population (Xigris vs. placebo), with 3 of the 4 events in the Xigris group occurring in patients aged 60 days or less. *April 21, 2005*

Neurontin (gabapentin)

Pfizer Inc. and FDA notified healthcare professionals of the voluntary recall of one lot (40,000 bottles) of 100 mg capsules of its epilepsy medication, Neurontin, after a manufacturing mechanical failure resulted in some bottles containing empty or partially filled capsules. *April 22, 2005*

Betaseron (interferon beta-1b)

Berlex, Inc. reminded healthcare professionals of the prescribing information for Betaseron (interferon beta-1b) as it pertains to hepatic toxicity. Betaseron is approved for the treatment of relapsing forms of multiple sclerosis to reduce the frequency of clinical exacerbations. There have been reports during post-marketing safety surveillance of serious hepatic injury including autoimmune hepatitis and severe liver damage leading to hepatic failure and transplant. *April 15, 2005*

Trileptal (oxcarbazepine) Tablets and Oral Solution

Novartis Pharmaceuticals and FDA notified healthcare professionals about revisions to the WARNINGS and PRECAUTIONS sections of the prescribing information for TRILEPTAL (oxcarbazepine) tablets and oral suspension, indicated for use as monotherapy or adjunctive therapy in the treatment of partial seizures in adults and children ages 4-16 years with epilepsy. The updated WARNINGS section describes serious dermatological reactions, including Stevens-Johnson syndrome (SJS) and toxic epidermal necrolysis (TEN) that have been reported in both children and adults in association with Trileptal use. *April 18, 2005*

Atypical Antipsychotic Drugs

The Food and Drug Administration has issued a public health advisory to alert health care providers, patients, and patient caregivers to new safety information concerning an unapproved, "off-label" use of certain antipsychotic drugs approved for the treatment of schizophrenia and mania. FDA has determined that the treatment of behavioral disorders in elderly patients with dementia with atypical (second generation) antipsychotic medications is associated with increased mortality. Clinical studies of these drugs in this population have shown a higher death rate associated with their use compared to patients receiving a placebo. *April 11, 2005*

COX-2 Selective and Non-Selective Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)

After concluding that the overall risk versus benefit profile is unfavorable, FDA has requested Pfizer, Inc. to voluntarily withdraw Bextra (valdecoxib) from the market. This request is based on: The lack of adequate data on the cardiovascular safety of long-term use of Bextra, along with the increased risk of adverse cardiovascular (CV) events in short-term coronary artery bypass surgery (CABG) trials that FDA believes may be relevant to chronic use. Reports of serious and potentially life-threatening skin reactions, including deaths, in patients using Bextra. The risk of these reactions in individual patients is

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unpredictable, oc- of sulfa allergy, and after both short- and long-term use. Lack of any demonstrated advantages for Bextra compared with other NSAIDs. FDA is also asking manufacturers of all marketed prescription NSAIDs, for their products to include a boxed warning and a Medication Guide. The boxed warning will highlight the potential for increased risk of CV events with these drugs and the well-described, serious, and potentially life-threatening gastrointestinal (GI) bleeding associated with their use. The Medication Guide will accompany every prescription NSAID at the time it is dispensed to better inform patients about the CV and GI risks. Finally, FDA is asking manufacturers of non-prescription (OTC) NSAIDs to revise their labeling to include more specific information about the potential GI and CV risks, and information to assist consumers in the safe use of the drug. *April 07, 2005*

Reminyl (galantamine hydrobromide)

Ortho-McNeil Neurologics modified the PRECAUTIONS section of the Prescribing Information for Reminyl, approved only for the treatment of mild to moderate Alzheimer's Disease. The changes provide new safety information regarding the results of two randomized, placebo-controlled trials of 2 years duration in subjects with mild cognitive impairment (MCI). A total of 13 subjects on REMINYL (n=1026) and 1 subject on placebo (n=1022) died. The deaths were due to various causes which could be expected in an elderly population. About half of the REMINYL deaths appeared to result from various vascular causes (myocardial infarction, stroke), and sudden death. *March 31, 2005*

Zometa (zoledronic acid)

Novartis and FDA notified healthcare professionals of revisions to the DOSAGE AND ADMINISTRATION and WARNINGS sections of the prescribing information to reflect new safety information on management of patients with advanced cancer and renal impairment, whose baseline creatinine clearance is 60 ml/min or lower. The recommended Zometa doses for patients with reduced renal function (mild and moderate renal impairment) are provided in a table. It is recommended that, during treatment, serum creatinine be measured before each dose and treatment should be withheld for renal deterioration. *December 20, 2004*

Trecator (ethionamide tablets, USP) Tablets

Wyeth Pharmaceuticals announced that Trecator-SC (ethionamide tablets, USP) Sugar-Coated Tablets have been reformulated to film-coated tablets and renamed Trecator. The new film-coated tablet is more rapidly absorbed, resulting in higher peak concentrations (C_{max}) of ethionamide, which may potentially lead to patient intol-

erance when introduced at the same initial dose as the old sugar-coated tablet. *March 10, 2004*

PharMEDium Services Magnesium Sulfate 1 gram in 50mL D5W (piggyback) IV solution

FDA and PharMEDium Services of Houston notified healthcare professionals of the withdrawal of one lot of PharMEDium Services Magnesium Sulfate 1 gram in 50mL D5W (piggyback) IV solution, which may be contaminated with *Serratia marcescens* bacteria that can cause serious, life-threatening illness in patients with compromised immune systems. *April 8, 2005*

Xigris [drotrecogin alfa (activated)]

Eli Lilly and FDA notified healthcare professionals about revisions to the WARNINGS section of labeling for Xigris [drotrecogin alfa (activated)], a biological therapeutic product indicated for the treatment of adult patients with severe sepsis who are at high risk of death. This warning is based upon analyses of two clinical trial databases. Among patients with single organ dysfunction and recent surgery, all-cause mortality was numerically higher in the Xigris group compared to the placebo group. Patients with single organ dysfunction and recent surgery may not be at high risk of death and therefore may not be among the indicated population. *March 2005*

Avonex (interferon beta-1a)

FDA and Biogen notified healthcare professionals of revisions to the WARNINGS, PRECAUTIONS/Drug Interactions and ADVERSE REACTIONS/Post-Marketing Experience sections and Medication Guide. Severe hepatic injury, including cases of hepatic failure, has been reported in patients taking Avonex. Asymptomatic elevation of hepatic transaminases has also been reported, and in some patients has recurred upon rechallenge. In some cases, these events have occurred in the presence of other drugs that have been associated with hepatic injury. *March 2005*

Elidel (pimecrolimus)

Protopic (tacrolimus)

The FDA issued a public health advisory to inform healthcare providers and patients about a potential cancer risk from use of Elidel (pimecrolimus) and Protopic (tacrolimus), products that are applied to the skin. This concern is based on information from animal studies, case reports in a small number of patients, and how these drugs work. It may take human studies of ten years or longer to determine if use of Elidel or Protopic is linked to cancer. In the meantime, this risk is uncertain and FDA advises that Elidel and Protopic should be used only as labeled, for patients who have failed treatment with other therapies. *March 10, 2005*

A Comatose Patient With A Mixed Overdose

Case Report:

Contributed By: Helen Koskinaris, Pharm D Candidate, St John's University, Tom Caraccio, Pharm.D., DABAT, Randi Mestel, RN, CSPI. Long Island Poison and Drug Information Center

PK is a 41 year-old male who was found unresponsive by his wife with several empty bottles of beer and the following medications by his side: Prozac® 10mg, Luvox® 25mg, Lexapro® 5mg and Percocet®. Upon presentation to a local emergency department (ED), he was reported to be comatose with the following vital signs: blood pressure of 194/107 mmHg, heart rate of 120 beats per minute, and respiratory rate of 6 per minute.

What Initial Measures should be considered?

Initial assessment of all medical emergencies follows the principles of basic and advanced cardiac life support. The adequacy of the patient's airway, degree of ventilation and circulatory status should be determined. Vital functions should be established and maintained. Vital signs, such as core body temperature, respiratory rate, and depth and air exchange, should be measured frequently. If the patient is comatose, management requires administering intravenous glucose, thiamine, and if hypoventilating, naloxone. Endotracheal intubation should also be considered to protect the airway. For all intentional ingestions, determination of the acetaminophen plasma concentration should be done 4 hours or more after ingestion.

What were the laboratory results for PK?

His electrolytes and a complete blood count were reported within normal limits except for a low potassium of 3.3 mEq/L and an elevated glucose level of 136 mg/dL. The acetaminophen level was reported as 12.2 µg/mL at unknown time of ingestion with normal liver function tests and the ethanol blood concentration was elevated at 173 mg/dL. The urine toxicity screen for common substances of abuse was reported as negative for benzodiazepines, barbiturates, opioids, cocaine, amphetamines and phencyclidine.

What Initial Measures for PK were performed?

In the ED the patient was given 4 mg of intravenous naloxone (Narcan®) and an amp of 50% dextrose without a response. This was followed by endotracheal intubation and placing the patient on assisted ventilation. His vital signs were measured at frequent intervals.

What type of drugs were found near this patient and how toxic could they be?

Fluoxetine (Prozac®) is a selective serotonin reuptake inhibitor (SSRI) antidepressant. It has been used for treatment of major depressive disorder, binge-eating and vomiting in patients with moderate-to-severe bulimia nervosa, obsessive-compulsive disorder (OCD), premenstrual dysphoric disorder and panic disorder. Fluoxetine is a second-generation antidepressant agent, which is a specific inhibitor of serotonin reuptake and does not effect the reuptake of norepinephrine or dopamine. It is available in 10, 20, 40 mg capsules and a 90 mg delayed release capsule; tablets of 10,

20 mg and an oral liquid of 20mg/5 ml.

The therapeutic dose usually ranges from 20-80 mg/day. Peak levels occur in 4 to 6 hours after oral administration and it is metabolized to an active metabolite, norfluoxetine. The half-life of fluoxetine is quite long (range of 1 to 4 days) and the metabolite can have a half-life of up to 16 days. Ingestions of 40 to 800 mg have produced minimal toxicity in adults. Common clinical effects after overdose include blurred vision, vomiting, lethargy, dizziness, insomnia, diarrhea, tremors, and abdominal pain. Seizures and significant cardiovascular toxicity and the development of serotonin syndrome (SS) is rare. The estimated human lethal dose of fluoxetine is 1,200 to 2,000mg.

Fluvoxamine (Luvox®) is a second selective serotonin reuptake inhibitor antidepressant used for the treatment of obsessive compulsive disorders. It is available in 25, 50 and 100mg tablets. The therapeutic dose range is 50 to 300 mg per day. Peak levels occur in 5 hours and the drug is metabolized to inactive metabolites. The half-life is about 15 hours. Patients have survived exposures with doses up to 6.5 grams. Coma has been reported in overdoses of 1.5 and 3 grams. Effects after overdose are similar to fluoxetine.

Escitalopram (Lexapro®) is a serotonin reuptake inhibitor antidepressant that this patient took used for the treatment of depression and generalized anxiety disorder. Escitalopram is the S-enantiomer of citalopram and is available in 5, 10 and 20 mg tablets and an oral solution of 1 mg/ml. The therapeutic dose range is 10-20mg/day orally. Peak levels occur in 4-6 hours for the parent drug. Escitalopram is metabolized by the liver via CYP2C19 and 3A4 to an active metabolite, S-desmethylcitalopram. The half life of the parent drug is 27-32 hours and 59 hours for its metabolite. Toxicity is thought to be similar to citalopram (Celexa®). Seizures are reported following overdoses which have exceeded 600 mg of citalopram and several reports of overdose with citalopram have resulted in death following doses greater than 2,000 mg (Grundemar et al, 1997). Unique toxic effects have included seizures, and prolongation of the QTc interval (Personne et al, 1997). Patients should be monitored for a 24 hour period.

(Percocet®) is a narcotic analgesic combination which contains acetaminophen and oxycodone. Acetaminophen is used primarily for its antipyretic and analgesic effects, which are mediated via the central nervous system. Oxycodone is an opioid which stimulates the mu and kappa subtypes of the opiate receptor, thereby causing analgesia. Percocet® is available in several different strengths of acetaminophen from 325-650 mg and oxycodone in concentrations of 2.5-10mg. The total daily therapeutic dose should not exceed 4,000 mg of acetaminophen and 60 mg of oxycodone. Ingestion of acetaminophen in an acute overdose of greater than 150mg/kg or 7.5g has caused liver injury. In acetaminophen overdose, the glucuronidation and sulfation

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pathways become saturated which increases P450 mediated production of the highly reactive metabolite, N-acetyl-p-benzoquinoneimine (NAPQI). This exhausts the natural protective stores of cellular glutathione resulting in cell death and zone 3 (centrilobular or distal acinar) degeneration of the liver.

What are the different phases of Acetaminophen Toxicity?

There are four phases of the intoxication usually described for acetaminophen intoxication. Remember that the clinical course may overlap and the absence of a phase does not exclude toxicity. Phase I occurs within 0.5 to 24 hours after ingestion and may consist of a few hours of malaise, diaphoresis, nausea, and vomiting or produce no symptoms. CNS depression or coma is usually not seen in this phase unless an extremely high level has been reported. Phase II occurs 24 to 48 hours after ingestion and is a period of diminished symptoms. The liver enzymes AST (earliest), and ALT may increase as early as 4 hours or as late as 36 hours after ingestion. Phase III occurs 48 to 96 hours after ingestion with peak liver function abnormalities at 72-96 hours. The degree of elevation of the hepatic enzymes does not correlate with outcome. Recovery starts about 4 days unless hepatic failure develops. Less than 1% of patients develop fulminant hepatotoxicity. Phase IV occurs 4 to 14 days after ingestion with hepatic enzyme abnormalities reaching resolution. If extensive liver damage has occurred, sepsis and disseminated intravascular coagulation may ensue. Death can occur at 7-14 days. Transient renal failure may develop at 5-7 days with or without evidence of hepatic damage. Rare cases of myocarditis and pancreatitis have been reported.

How toxic is Oxycodone?

Oxycodone acts to depress the central nervous system and may produce coma, cessation of respiration and miosis. Ingestions of opioids in doses greater than 1 mg/kg have produced mild to moderate symptoms of CNS depression in 51% of children in 30 to 60 minutes. Although the lethal dose of oxycodone is unknown, the estimated lethal dose for codeine in adults is 7 to 14 mg/kg. Addiction following chronic usage of oxycodone is common and results in a withdrawal state upon termination.

How toxic is Beer?

Beer can contain ethanol in concentrations of 2.5% to 6%. Ethanol is the most common psychoactive drug used by children and adolescents in the United States, and it is one of the most commonly abused drugs in the world. Ethanol is a GABAergic central nervous system depressant. It promotes cutaneous vasodilation (contributing to hypothermia), stimulates secretion of gastric juice (potentially causing gastritis), inhibits secretion of antidiuretic hormone, inhibits gluconeogenesis (potentially causing hypoglycemia), and influences fat metabolism (potentially causing lipidemia). The concentration of ethanol peaks 30-60 minutes after ingestion. The co-ingestion of food also slows absorption. Ethanol is primarily metabolized in the liver. Approximately 90% of an ethanol load is broken down in the liver to acetaldehyde and ultimately carbon dioxide and water; the remainder is eliminated as the parent drug by the

kidneys and lungs. The toxic dose is 1 mL/kg of absolute or 100% ethanol or 200-proof ethanol (proof defines alcohol concentration in beverages) results in a blood concentration of 100 mg/dL. Children are considered more sensitive to the effects of ethanol compared to adults. The potentially fatal dose is 3 g/kg for children vs 6 g/kg for adults. Children frequently develop hypoglycemia at a blood level greater than 50 mg/dL. The clinical effects following an acute exposure are dose related and can include CNS depression (narcosis, coma, respiratory failure, death), hypothermia, acidosis, hypoglycemia, hypotension, GI upset/bleed, dysrhythmias, aspiration and electrolyte imbalances. Chronic exposure can produce physical dependence. CNS effects (amnesia, dementia, somnolence), cardiomyopathy, hepatotoxicity, pancreatitis and GI bleeding may be associated with chronic abuse.

What is the role of Gastrointestinal decontamination for the drugs taken by this patient?

Gastrointestinal decontamination can be carried out by administering activated charcoal if the patient presents awake and alert with a history of a toxic dose of fluoxetine, fluvoxamine, escitalopram, acetaminophen/oxycodone within 1 hour post ingestion. Ethanol does not readily adhere to activated charcoal. The activated charcoal can be given as a slurry (240 mL water/30 g charcoal). The usual dose is 25 to 100 g in adults/adolescents, 25 to 50g in children (1 to 12 years old), and 1g/kg in infants less than 1 year old.

How do you treat seizures from these drugs?

If seizures occur, administer IV benzodiazepines such as lorazepam (dose for an adult is 2 to 4mg; dose for a child is 0.05 to 0.01 mg/kg) or diazepam (dose for an adult: is 5 to 10mg), which can be repeated if necessary.

How should hypotension be managed?

Place the patient in the trendelenburg position and administer 10 to 20 ml/kg of 0.9% saline as a bolus. Further fluid therapy should be guided by central venous pressure or right heart catheterization to avoid volume overload. Pressor agents such as intravenous norepinephrine, 0.1 to 0.2 microgram/kg/minute can be used to maintain adequate blood pressure.

How should other cardiac complications be treated?

For a **wide QRS complex**, IV sodium bicarbonate administration in a dosage of 1 to 2 mEq/kg can be given as needed to maintain a serum pH 7.45-7.55. Monitor ECG, serum electrolytes and arterial blood gases carefully.

Torsades de pointes may occur from drugs such as escitalopram. In hemodynamically unstable patients, electrical cardioversion may be indicated. Torsades de pointes in stable patients can be treated with either magnesium sulfate, isoproterenol, and/or atrial overdrive pacing. Magnesium sulfate can be administered in a dose for adults consisting of 2 g IV over 1 to 2 minutes. It can be repeated as a 2 g bolus and an infusion of 0.5 to 1g/hr can be given if

dysrhythmias recur. The dose for children is 25 to 50 mg/kg given as an IV infusion over 5 to 15 minutes. Isoproterenol is a less desirable as an alternative because of the vasodilation effects that can be produced.

In an overdose, an ECG should be obtained in symptomatic patients, and monitor for evidence of serotonin syndrome which can be induced by the SSRI's.

How should the **SEROTONIN SYNDROME** be managed?

Patients can be managed by discontinuing the serotonergic drug therapy and using supportive care. Careful attention to decreasing excessive muscle activity and thereby decreasing incidence of hyperthermia is critical. Benzodiazepines are useful for excessive muscle activity, however, non-depolarizing paralytics may be used in severe cases. For mild/moderate asymptomatic hypertension, pharmacologic intervention is usually not necessary. For hypertensive emergencies, nitroprusside is preferred. 0.1 to 5 microgram/kg/minute IV infusion; up to 10 micrograms/kg/minute may be required.

Cyproheptidine (Periactin®) (4-8 mg orally initially and repeated every 4 hours) can help block the action of serotonin and may counteract SS symptoms. The syndrome tends to resolve within 24 hours but it may last for days if the half-life of the interacting drugs are prolonged. Monitor the vital signs and EEG, creatine kinase and urine for myoglobinuria if symptomatic. Use fluids to maintain a urine output of >3 mL/kg/hour if there is risk of myoglobinuria producing renal failure. If systemic acidosis or urine pH <6 and myoglobinuria is present alkalinize the urine with sodium bicarbonate.

What specific antidotes can be used for an acetaminophen/oxycodone overdose?

Naloxone (Narcan®) can be administered in a suspected overdose of an opioid drug. The adult and pediatric dose is 0.4 to 2mg IV, repeated as needed to reverse the signs and symptoms of respiratory depression.

N-acetylcysteine (NAC, Mucomyst®, Acetadote®):

NAC is the recommended treatment for acetaminophen (APAP) poisoning because of several beneficial effects including generation of glutathione, enhancing non-toxic routes of acetaminophen metabolism, detoxifying N-acetyl-p-benzoquinonimine, and free radical scavenging. If an APAP level is in the potentially toxic range on the nomogram or if a toxic amount has been ingested (7.5 grams or more), NAC therapy should be started, preferably within 8 hours of ingestion.

How can NAC be given?

The **oral loading dose** is 140mg/kg as a 5% solution in a soft drink or juice. The oral maintenance dose is 70mg/kg orally as a 5% solution in a soft drink or juice every 4 hours. If the patient vomits or is unable to take the oral form of NAC, there is an IV preparation available called Acetadote (R). The recommended **IV dose** regimen for acetaminophen poisoning is a loading dose of 150 mg/kg in 200mL of 5% dextrose over 30 minutes followed by a first maintenance dose of 50 mg/kg in 500mL of 5% dextrose over 4 hours;

and a second maintenance dose of 100 mg/kg in 1000mL of 5% dextrose over 16 hours. The volume of diluent should be altered in young pediatric patients. Although Acetadote (R) should be administered 8 to 10 hours after ingestion of a potentially hepatotoxic dose of acetaminophen, it can still be effective if given after this time frame.

What is the management for Ethanol intoxication?

Treatment includes supportive care. The patient should be positioned to prevent aspiration. Thiamine, glucose, and naloxone, should be considered. Airway Management- Intubate if clinically indicated for airway protection or ventilatory support. Fluid/Electrolyte Balance Regulation- An IV line should be started. Hydrate with 0.9% NaCl with 5% dextrose as clinically indicated. Dextrose is indicated if the bedside glucose level is less than 60 mg/dL.

Comments and Pearls

1. In 2004 the FDA issued a Public Health Advisory warning that all the SSRI can increase the risk of suicidality (thinking and behavior) in children and adolescents. A black box warning about this is now required to be in the package insert for all of the SSRI's regarding this concern.
2. For SSRI like fluoxetine, remember that they should not be used in combination with a non-selective MAO inhibitor such as isocarboxazid (Marplan®) or phenelzine (Nardil®), because of a potentially fatal interaction. At least 5 weeks should elapse between discontinuation of an SSRI and initiation of treatment with an MAO inhibitor and 14 days between the discontinuation of an MAO inhibitor and the initiation of treatment with an SSRI.
5. The **adverse event** most commonly associated with IV NAC administration is an anaphylactoid reaction including rash, wheezing, itching and in some cases hypotension. These reactions are dose related and therefore are most common with the loading dose. The frequency of adverse events has been reported to be between 0.2% and 20.8%. Anaphylactoid reactions associated with IV NAC are thought to be non-immunologic and perhaps caused by histamine release, according to dose response and rapidity of reaction in patients not previously exposed to the drug.

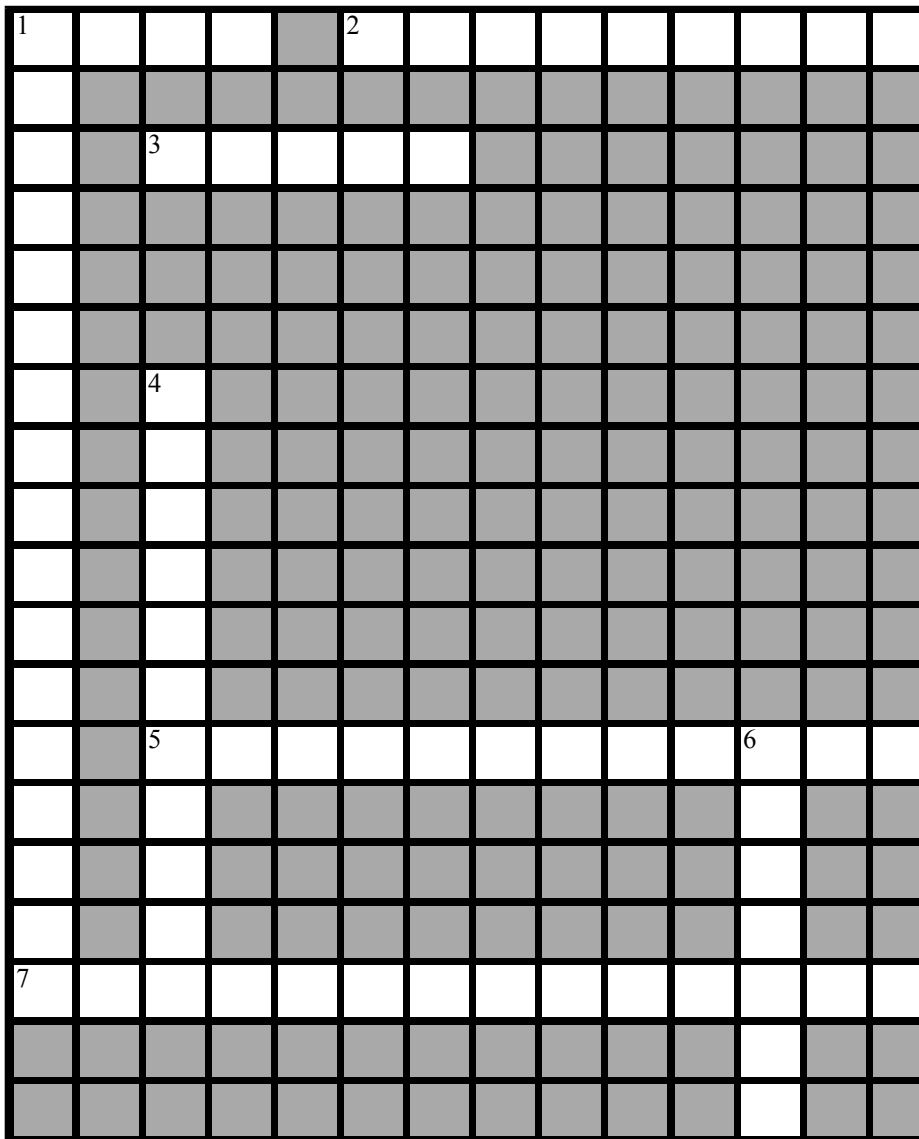
What was the Outcome of the case?

The following morning the patient was admitted to the ICU. He remained intubated and sedated. He was on assist control and breathing over the vent at a rate of 10-16. His heart rate was 70s to 90s bpm, blood pressure was 100/50mmHg. IV Fluids were given (0.9% saline at a rate of 100 mL/hour). Thiamine IV was given. The patient was to be continued to be observed. NAC was given until the APAP level was negative and the liver function tests remained normal. Later that same day, the patient was extubated. Respirations were within normal limits. His vitals were recorded as stable. The patient was described as awake and alert. The patient continued to be observed and was going to be transferred out the next day, after psyche evaluation. All laboratory tests were reported within normal limits.

TOXICOLOGY CROSSWORD

DRUGS

Contributed by: Laurie Piwinski, RN, CSPI Central New York Poison Control Center, Syracuse, NY



Across

1. What class of drugs does Fluoxetine (Prozac®) belong to?
2. The toxicity of Escitalopram (Lexapro®) is similar to which agent?
3. What is the longest number of days it usually takes for renal toxicity to develop in acetaminophen intoxication?
5. What is a serious effect produced by ethanol intoxication in children?
7. Which test should be monitored for 24 hours in a Escitalopram overdose?

Down

1. What syndrome has been associated with an excessive amount of Escitalopram?
4. What is the name of the key substrate that becomes depleted in acetaminophen overdose?
6. Name a clinical effect produced by an oxycodone overdose?



SPI CORNER TOPIC: **MORNING GLORY**

Contributed by: William Gaffney, MS, Tom Caraccio, Pharm.D., DABAT, Randi Mestel, RN, CSPI, Long Island Poison and Drug Information Center

An article entitled "Seeds of Destruction" recently appeared in a Long Island newspaper following the hospitalization of a local teenager who experimented with the ingestion of Morning Glory seeds. The reporter examined an alarming incident which exposed the ease of access which young adults have to this hallucinogen. The teenager had a reaction to the "trip" he likely won't soon forget. According to a friend, the youngster and another friend decided to try the seeds because they had "heard it was like LSD," and "it was available without having problems with the law." While the teen's "trip" began during the weekend, he continued to react to the drug as he began his week at school and was soon admitted to a local hospital.

Upon being admitted to the hospital the Poison Center was consulted regarding this case. The real incidence of the abuse of these seeds by teenagers isn't known. The morning glory seeds are a known hallucinogen containing alkaloids that are similar to LSD.

Consumption of these seeds was popularized in the 1960s by teenagers and young adults who ingested the seeds for their hallucinogenic properties. Common street names include *Heavenly Blue*, *Blue Star* and *Flying Saucers*. The seeds must be chewed for absorption of the alkaloids to occur. Restlessness, increased awareness and socialization followed by relaxation for several hours are typical effects

reported with ingestions of 20-40 seeds. A dose of 100-150 seeds has produced effects similar to ingestion of 75-150 ug/kg of LSD. This amount has been associated with spatial distortions, hallucinations, enhanced imagery and mood elevations for 1-4 days. Ingestions of 200-250 seeds have produced additional effects of nausea, vomiting, abdominal pain, lethargy and paresthesias. In a case reported in the literature, a 24-year old who took 300 seeds had effects which allegedly led the victim to commit suicide.

While the victim's friend stated that the consumption of drugs like morning glory seeds are not common and that only a small group of kids know about them, he also said that medications like Sudafed® or NyQuil® are used recreationally when there is nothing else going on. At least one local merchant has said young girls often come in and buy the seeds, and the merchant was not aware that the seeds could be harmful. Morning Glory is not a controlled plant in the United States. Live plants and seeds of any variety are legal to buy, sell or possess. Both plants and seeds are regularly sold by botanical supply companies. In some jurisdictions, Morning Glory (*ipomoea* species) is considered to be an invasive, unwanted weed plant and the control of growing the plant and distribution of the seeds fall under laws and regulations of weeds. In Arizona all *ipomoea* species are listed as "noxious weeds" and are illegal to cultivate.

