Preface: Common Toxicologic Issues in Small Animals

Safdar A. Khan and Stephen B. Hooser


Mary Kay McLean and Steven R. Hansen

Veterinary toxicology is a constantly evolving field. The authors use the ASPCA Animal Poison Control Center's medical record database to examine recent trends in veterinary toxicology/animal poisoning incidents received from 2002 to 2010. The demographics of animals exposed to potentially harmful substances, the types of substances ingested, changes/emerging trends in substance exposures, and trends in therapies used to treat exposures are discussed.

Investigative Diagnostic Toxicology and the Role of the Veterinarian in Pet Food–Related Outbreaks

Christina R. Wilson and Stephen B. Hooser

Due to the potential implications of food-related illnesses in animals, recognition of pet food–related outbreaks is one of the many crucial roles of the veterinarian. This article describes the veterinarian’s role in investigating and reporting food-related illnesses in cats and dogs. Recommendations regarding taking thorough case histories, appropriate sample collection, effective use of veterinary diagnostic laboratories, and recommendations for reporting such illnesses are described.

Pet Food Recalls and Pet Food Contaminants in Small Animals

Karyn Bischoff and Wilson K. Rumbeiha

Most pet foods are safe, but incidents of chemical contamination occur and lead to illness and recalls. There were 11 major pet food recalls in the United States between 1996 and 2010 that were due to chemical contaminants or misformulations: 3 aflatoxin, 3 excess vitamin D₃, 1 excess methionine, 3 inadequate thiamine, and 1 adulteration with melamine and related compounds and an additional 2 warnings concerning a Fanconi-like renal syndrome in dogs after ingesting large amounts of chicken jerky treat products. This article describes clinical findings and treatment of animals exposed to the most common pet food contaminants.
Use of Intravenous Lipid Emulsions for Treating Certain Poisoning Cases in Small Animals

Sharon Gwaltney-Brant and Irina Meadows

Intravenous lipid emulsion (ILE) infusions have become an emerging treatment modality in managing intoxications of veterinary patients. The advantages of ILE include an apparent wide margin of safety, relatively low cost, long shelf-life, and ease of administration. Based on limited case and anecdotal reports, ILEs have shown promise in the management of toxicoses from a variety of lipophilic agents, including drugs and pesticides. More studies are needed to determine optimum dosing regimens and identify potential adverse effects from the antidotal use of ILE in veterinary medicine.

Calcium Channel Blocker Toxicity in Dogs and Cats

Cristine L. Hayes and Michael Knight

The widespread use and availability of calcium channel blockers in human and veterinary medicine pose a risk for inadvertent pet exposure to these medications. Clinical signs can be delayed by many hours after exposure in some cases, with hypotension and cardiac rhythm changes (bradycardia, atrioventricular block, or tachycardia) as the predominant signs. Prompt decontamination and aggressive treatment using a variety of modalities may be necessary to treat patients exposed to calcium channel blockers. The prognosis of an exposed patient depends on the severity of signs and response to treatment.

Management of Attention-Deficit Disorder and Attention-Deficit/Hyperactivity Disorder Drug Intoxication in Dogs and Cats

Laura A. Stern and Mary Schell

Two types of drugs are generally used for treating attention-deficit/hyperactivity disorder or attention-deficit disorder in humans: amphetamines or similar stimulants and the nonamphetamine atomoxetine. We describe the toxicity and treatment of both amphetamines and similar medications and atomoxetine in dogs and cats. Amphetamine intoxication can cause life-threatening stimulatory signs. Treatment is aimed at preventing absorption, controlling the stimulatory signs, and protecting the kidneys; prognosis is generally good. Atomoxetine also has a fast onset of action; stimulatory signs such as hyperactivity and tachycardia are often seen. There are little published data about treatment of atomoxetine toxicity in cats and dogs.

Toxicology of Frequently Encountered Nonsteroidal Anti-Inflammatory Drugs in Dogs and Cats

Safdar A. Khan and Mary Kay McLean

Nonsteroidal anti-inflammatory drugs (NSAIDs) are a group of heterogeneous compounds extensively used in both human and veterinary
medicine for their antipyretic, anti-inflammation, and analgesic properties. NSAIDs consist of a wide range of pharmacologically active agents with different chemical structures, with similar therapeutic and adverse effects. The ASPCA Animal Poison Control Center received 22,206 NSAID incidents in dogs and cats (3% of total cases; dogs [15,823] and cats [1244]) during 2005 to 2010. This is roughly equivalent to 4% NSAID incidents reported in humans. The most common NSAID involved was ibuprofen, followed by aspirin, naproxen, deracoxib, meloxicam, diclofenac, piroxicam, indomethacin, nabumetone, and etodolac. This article provides a brief overview of classification, mechanism of action, pharmacologic and toxicologic properties, and treatment information involving frequently encountered human and veterinary NSAIDs in dogs and cats.

Xylitol Toxicosis in Dogs 307
Lisa A. Murphy and Adrienne E. Coleman
The sugar alcohol xylitol is a popular sweetener used in gums, candies, and baked goods. While xylitol has a wide margin of safety in people and most mammalian species, when ingested by dogs it is believed to stimulate excessive insulin secretion leading to severe hypoglycemia, potentially followed by acute hepatic failure and coagulopathies. Additional clinical findings may include thrombocytopenia, hypokalemia, and hyperphosphatemia. The prognosis for recovery in dogs that develop uncomplicated hypoglycemia is generally good with prompt and aggressive veterinary care.

Toxicology of Avermectins and Milbemycins (Macrocylic Lactones) and the Role of P-Glycoprotein in Dogs and Cats 313
Valentina M. Merola and Paul A. Eubig
The macrocyclic lactones (MLs) are parasiticides able to kill a wide variety of arthropods and nematodes. They have a high margin of safety for labeled indications, and ivermectin has become the best-selling antiparasitic in the world. Dogs of certain breeds and mixtures of those breeds have a defect in the ABCB1 gene (formerly MDR1 gene) that results in a lack of functional P-glycoprotein, which leads to accumulation of the MLs in the central nervous system and a higher risk of adverse effects when exposed. There is no specific antidote for ML toxicosis so the most important part of treatment is good supportive care.

Toxicology of Newer Insecticides in Small Animals 335
Tina Wismer and Charlotte Means
In the broadest definition, a pesticide (from fly swatters to chemicals) is a substance used to eliminate a pest. Newer insecticides are much safer to the environment, humans and non target species. These insecticides are able to target physiologic differences between insects and mammals, resulting in greater mammalian safety. This article briefly
reviews toxicity information of both older insecticides like organophosphates (OPs), carbamates, pyrethrins, and pyrethroids, as well as some newer insecticides.

Common Rodenticide Toxicoses in Small Animals 349
Camille DeClementi and Brandy R. Sobczak

This article focuses on the 3 most commonly used rodenticide types: anticoagulants, bromethalin, and cholecalciferol. It is important to verify the active ingredient in any rodenticide exposure. Many animal owners may use the term “D-con” to refer to any rodenticide regardless of the actual brand name or type of rodenticide. The EPA released their final ruling on rodenticide risk mitigation measures in 2008 and all the products on the market had to be compliant by June 2011, changing to consumer products containing either first-generation anticoagulants or nonanticoagulants including bromethalin and cholecalciferol. These regulations are likely to cause an increase in the number of bromethalin and cholecalciferol cases.

Toxicology of Explosives and Fireworks in Small Animals 361
Patti Gahagan and Tina Wismer

Intoxication with explosives or fireworks in dogs or cats is not common, but serious toxicosis can result from exposure to different types of explosives depending on the chemical class of explosive involved. This article will discuss the different types of materials/chemicals, clinical signs of toxicosis, and their treatment. Despite the complexities of explosives and plethora of different devices currently in use worldwide, the toxic potential is more easily explained by looking at the relatively short list of chemical classes used to produce these materials. This article combines structurally similar explosives into different groups and focuses on the toxicity of the most commonly available explosives.

Mushroom Poisoning Cases in Dogs and Cats: Diagnosis and Treatment of Hepatotoxic, Neurotoxic, Gastroenterotoxic, Nephrotoxic, and Muscarinic Mushrooms 375
Birgit Puschner and Colette Wegenast

Of the several thousand species of mushrooms found in North America, less than 100 are toxic. Species in the genus *Amanita* are responsible for the vast majority of reported mushroom poisonings. In general, the number of reported mushroom poisonings in animals is low, most likely because toxicology testing is available for a limited number of mushroom toxins and thus many cases are not confirmed or reported. Also, only a limited number of mushrooms are submitted for identification purposes. Mushroom intoxications require tremendous efforts from clinicians and toxicologists in terms of making a diagnosis and treatment, and management is challenging.
Differential Diagnosis of Common Acute Toxicologic Versus Nontoxicologic Illness

Safdar A. Khan

This table outlines common toxicologic versus nontoxicologic rule outs based on clinical abnormalities seen in an acutely ill animal. The purpose is to provide an initial guideline for considering toxicologic versus nontoxicologic rule outs when a patient is presented to a practicing veterinarian. Major clinical abnormalities followed by common toxicologic rule outs and non-toxicologic rule outs have been listed so that practicing veterinarians can narrow down an etiology quickly. Based on history, physical examination findings, and blood work changes, once a reasonable etiology has been narrowed down or established, the reader is encouraged to review a more detailed discussion on management of the particular poisoning or disease listed in this or other references.

Common Reversal Agents/Antidotes in Small Animal Poisoning

Safdar A. Khan

Different antidotes counteract the effect of a toxicant in several different ways. Antidotes can reverse, decrease, or prevent action of a toxicant. They can also help in achieving stabilization of vital signs, directly or indirectly, and promote excretion of a toxicant. However, overreliance on an antidote can be unrealistic and dangerous. While expectations of rapid recovery from antidotes are usually high, in a real life situation, there are many impediments in achieving this goal. The timing of its use, availability, cost, and sometimes adverse effects from the antidote itself can influence the results and outcome of a case. The majority of toxicants do not have a specific antidote therapy indicated and patients in these cases equally benefit from supportive care. In this chapter, commonly used antidotes and reversal agents in small animals are listed in a table form. The table lists generic name along with brand name of an antidote/reversal agent whenever available, main indications for their use, and provides comments or cautions in their use as needed. After stabilizing the patient and establishing the etiology, the clinicians must review more detailed management of that particular toxicant discussed here or in other references.

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