Exotic Animal Toxicoses November 14, 2020 ISVMA Annual Conference Laura Stern, DVM, ABVT

#### Introduction

### INTRODUCTION

Exotic animals can present a challenge due to differences in physiology and response to toxins. History taking for toxicologic patients is always important but is especially imperative for exotic animals. In addition to details about the toxic exposure, it is important to obtain information about the patient, such as environment, diet, reproductive status, previous illnesses, husbandry practices, and other animals in the home.

Stress is a major killer of our exotic animal patients, so always be sure to take it slow, give the exotic patient a chance to rest, and use sedatives and anesthesia, if needed.

#### DECONTAMINATION

Most decontamination techniques transfer easily from one species to another. For example, the general principles of flushing eyes will be the same for all species but exotic species may be more in need of sedation and rest periods to minimize stress. There are some species specific tips, however.

#### **Dermal Decontamination**

Dermal exposures may require bathing to remove the toxicant. Special care should be used with rabbits to provide appropriate restraint and nonslip surfaces to prevent injury to their back. All small exotics should not become chilled after a bath. Reptiles are particularly sensitive to corrosive injury of the skin. They should be returned to optimal temperature and humidity immediately after bathing. With small dermal exposures, birds may be lightly misted to remove toxicants, but with larger exposures, full bathing will be required. Oiled birds will require bathing with a liquid dishwashing detergent, as the oil disrupts the interlocking structure of their feathers and leaves them unable to fly, subject to hypothermia, drowning, and unable to forage.

#### **Oral Decontamination**

In hamsters, always be sure to empty cheek pouches using a cotton swab, as they can hold large amounts of toxic substances.

Emesis can be induced in pigs and ferrets, if safe to do so. Emesis should not be induced vomiting in species that cannot vomit, such as rabbits, rodents, marsupials, birds, and reptiles. Crop lavage is an alternative for birds. It requires sedation or anesthesia and endotracheal intubation. Body temperature saline is gently flushed into the crop and then aspirated repeatedly. Activated charcoal can be instilled into the crop after the lavage but care should be taken to ensure that the volume is not too large for the size of the crop to prevent regurgitation. Activated charcoal can be considered for recent ingestions in asymptomatic patients. Magnesium sulfate cathartics should not be used with reptiles, due to concerns of excessive absorption of magnesium. Warm water enemas can instead be used to help decrease gastrointestinal transit times in reptiles. Enemas should not be performed in birds.

## SPECIES SPECIFIC TOXICANTS

## Birds and Polytetrafluoroethylene

Polytetrafluoroethylene (PTFE, Teflon®) is inert under ordinary circumstances, but when it is heated, PTFE fumes may be released. While any animal can shows signs of toxicosis, birds are particularly sensitive to the chlorofluorocarbon fumes because they have a very efficient respiratory tract. Birds that have underlying cardiovascular disease are more sensitive. These fumes sensitize the myocardium causing arrhythmias, pulmonary congestion, and cardiac failure. The birds that are the closest to the source of the fumes are not always the most affected birds, due environmental conditions, ventilation, and air flow patterns within homes.

#### Ferrets and Ibuprofen

Ferrets are particularly sensitive to ibuprofen. Their dosages also tend to be higher, given their small size. Unlike cats and dogs, neurologic signs, such as ataxia, tremors, seizure and coma, tend to predominate. In APCC cases, 50% of ferrets showed signs of GI upset. However, 93% of ferrets exposed to ibuprofen had neurologic signs reported. Activated charcoal can be administered to asymptomatic ferrets. Treatment consists of intravenous fluid diuresis, gastroprotectants, and naloxone to attempt to reverse the neurologic signs. Prognosis is guarded if neurologic signs are present.

#### **Lizards and Fireflies**

Fireflies (*Photinus* sp.) contain lucibufagins which are steroidal pyrones that can cause cardiotoxicity. They are structurally similar to cardiac glycosides (cardenolides) found in some plants (such as *Nerium oleander*) and

bufadienolides in certain species of toads (such as Cane toads (*Rhinella marina*) and Colorado River Toad (*Incilius alvarius*)). It is theorized that half of a firefly may cause toxicosis in a 100 g lizard. All species of lizards are thought to be susceptible to firefly toxicosis. Toxicosis has been reported in chameleons, but is most commonly reported in bearded dragons. Bearded dragons are thought to be more likely to develop toxicosis as they are indiscriminant eaters. Clinical signs in lizards include: head shaking, oral gaping, retching, regurgitating, dyspnea, color change, and death. Clinical signs are typically noted within 15 minute to 2 hours post exposure. Death is typically noted within 2 hours post exposure. Treatment recommendations are unknown, as there are no case reports in the literature of lizards surviving long enough to receive veterinary care. Digoxin immune fab is helpful for related toxicants, but the effects are unknown for lucibufagens and lizards. One anecdotal report of a bearded dragon that survived after ingesting a firefly with the timely endoscopic removal of the firefly from his stomach. Prognosis is grave in lizards showing clinical signs.

## Fipronil and Rabbits

Fipronil has a narrow margin of safety in rabbits, and its use is contraindicated due to the potential for lifethreatening signs and the availability of safer, alternative spot on products for external parasite control. Seizures, anorexia, adipsia, and lethargy are common clinical signs in rabbits treated with a topical fipronil product. The onset of seizures may be significantly delayed in these patients (see Table 1) and at-home monitoring for the development of seizures for several weeks after application is warranted. Mild seizures may last for several weeks. Prognosis is guarded for all rabbits exhibiting seizures. Treatment consists of nutritional support, antiepileptics, and fluid support.



# **Avocados and Exotic Animals**

The toxic principle of the avocado (*Persea americana*) is the r-enantiomer of persin that is present in the leaves, fruits, bark, and seeds of the avocado tree. Birds, ruminants, horses, rabbits, rodents have all been shown to be susceptible to avocado toxicosis. There are potential concerns with other species, but nothing proven. Ingestion of avocado can cause sterile mastitis in rabbits, cattle, goats, and horses. It can cause myocardial necrosis in rabbits, goats, and caged birds. Rabbits are likely to develop cardiac arrhythmias, submandibular edema, and death. Birds tend to develop dyspnea, subcutaneous edema, pericardial effusion, and organ congestion. Species variations in toxicosis are likely due to differences in the digestive tract physiology. The toxic principle, persin, is contained in a double cellulose wall of an idioblast. Mechanical disruption of the idioblast releases the persin. Species that are inefficient at mechanically disrupting the idioblast, such as cats and humans, don't appear to exhibit signs of avocado toxicosis.

## **D-limonene and Male Rats**

D-limonene is a terpene that is commonly found in citrus peels. It is a common component of citrus oil flea dips and natural flea control products. D-limonene can cause nephropathy and an increased incidence of renal tumors in male rats. D-limonene binds to alpha 2U-globulin in male rat kidneys, causing protein accumulation in the renal tubules. Male rats excrete alpha 2U-globulins at a rate of approximately 100 times that of female rats, making them uniquely sensitive to d-limonene toxicosis.

# **Ivermectin and Chelonians**

Chelonians are sensitive to ivermectin, but the mechanism of toxicity is unknown. Ivermectin can cause depression, paralysis, coma, and death in turtles and tortoises. Some lizards and snakes (especially ball pythons)

may also show mild neurologic signs. Treatment for ivermectin toxicosis is symptomatic and supportive (fluids, nutritional support, heat support, oxygen). Ivermectin and other avermectins should never be given to chelonians, pregnant reptiles, and neonates. Prognosis for chelonians is poor.

# Pyrethrins/Pyrethroids and Reptiles

Pyrethrins and pyrethroids are insecticides that are used to control insects (often fleas) on animals and in the environment. Pyrethrins are natural insecticides that are derived from *Chrysanthemum* sp. and pyrethroids are synthetic. They are found in topical spot-ons, shampoos, dips, sprayed, powders, dusts, collars, and granules. Pyrethrins and pyrethroids alter sodium channel activity in the nervous system and cause repetitive firing of the nerves. They are widely available, as they are among the safest for use in mammals. However, cold blooded animals, such as fish and lizards are more sensitive to them. Pyrethrin sprays can cause neurologic signs, including seizures in snakes, especially boa constrictors. Pyrethroid sprays are reportedly less toxic, but neurologic signs have been reported in some reptiles. Decontamination by bathing the reptile and removal of the product from its environment are both important. Treatment for clinical signs is symptomatic and supportive. Benzodiazepines are recommended for seizure control.

# Guinea Pigs and Bromethalin Rodenticide

While most of the toxicoses that we learn about include exotic animals that are **more** sensitive to toxicants due to their unique physiology, guinea pigs are actually **less** sensitive to bromethalin, due to differences in biotransformation pathways. Bromethalin is desmethylated to desmethylbromethalin, which is the toxic metabolite. While guinea pigs are good methylators, they are severely deficient in their ability to desmethylate. Because they don't desmethylate bromethalin, they don't form the toxic metabolite. The LD<sub>50</sub> for bromethalin in guinea pigs is greater than 1g/kg.

# **REFERENCES AND SUGGESTED READINGS**

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