Proceedings of the 33rd World Small Animal Veterinary Congress

Dublin, Ireland - 2008

Next WSAVA Congress:

Reprinted in IVIS with the permission of the Congress Organizers
5 STEPS - HOUSEHOLD POISONS - BLEACH, PARACETAMOL, PLANTS

Kate Hopper BVSc(Hons), MVSc, DACVECC
Dept Veterinary Surgery & Radiology, Room 2112, Tupper Hall, University of California, Davis, Davis CA 95616, USA

General principles of toxicology
There are so many potential toxins our patients maybe exposed to that it is impossible to know them all. For this reason it is essential to have access to a comprehensive textbook of toxicology. Several excellent examples are listed in the reference section of this discussion. In addition 24 hour poison information hotlines are available for both people and veterinary patients and they can be an invaluable resource.

1. Owner advice
If an animal has had a topical exposure it should be immediately washed with mild soap and copious volumes of warm water. Advise the owners to wear gloves while handling the pet. If the animal has been witnessed to ingest a substance considered non-caustic within the last 2-3 hours, then presentation of the animal to the closest veterinary facility for evaluation and possible induction of emesis is advised. If an owner declines veterinary care then instructions can be provided for inducing emesis at home along with warnings of possible complications of this procedure. Emesis can be induced by giving 3% hydrogen peroxide (1-2 mg/kg orally in dogs and cats) or syrup of ipecac (1-2 ml/kg in dogs, 3 ml/kg in cats orally).

2. Stabilization
As with all emergency patients initial stabilization protocols should be adhered to. Evaluation of the airway, breathing and circulatory status should be made and appropriate therapy administered as indicated. Extremes in body temperature and seizure activity will also require immediate intervention before addressing the intoxication directly. Emergency blood work may include packed cell volume, total protein, blood glucose, electrolytes, blood gases, activated clotting time or PT/PTT and lactate measurement depending on their availability. It is recommended that a blood sample in a plain clot tube and a urine sample where possible are collected and stored before any therapy is given. These samples can later be submitted for toxin analysis if required.

3. Decontamination
All efforts should be made to reduce the total dose of toxin absorbed by the patient. For ingested substances this may involve induced emesis or gastric lavage. Emesis is considered to remove 50-60% of gastric contents at best, a well performed gastric lavage maybe more effective but is associated with more serious adverse effects. Contraindications to emesis include ingestion of a caustic substance, respiratory distress, central nervous system depression and seizures. Gastric lavage requires general anesthesia and intubation. Neither emesis nor gastric lavage are indicated when the ingestion occurred more than 3-4 hours previously. A detailed history from the client is essential as there can be toxins in the animal’s environment that the owner is unaware of. Any possible toxic substances should be presented for examination with the packaging when possible.

Emesis
A detailed discussion of specific agents and their use in animals is beyond the scope of this course. Emesis can be induced by giving 3% hydrogen peroxide (1-2 mg/kg orally in dogs and cats) or syrup of ipecac (1-2 ml/kg in dogs, 3 ml/kg in cats orally). Hydrogen peroxide is a more effective emetic in cats. Xylazine can be used as an emetic for cats at 0.44mg/kg IM, this can later be reversed with yohimbine 0.5mg/kg IV.

Adsorbents
Activated charcoal is considered the most effective intervention for most ingested toxins and should be administered in almost all cases. The recommended dose of activated charcoal is 1-4 g/kg and is best given as a slurry (mixed in water), either orally or via oro/ nasogastic tube. Toxins that have enterohepatic circulation would benefit from readministration of activated charcoal every 4-6 hours.

Cathartics
Decreasing gastrointestinal transit time may reduce the total dose of toxin absorbed. The most common cathartic used is sorbitol 70% given at 1-3 ml/kg PO; there are commercially available products of activated charcoal combined with sorbitol. Sodium sulfate and magnesium sulfate can also be used as cathartics.

Caustic ingestions
Caustic or corrosive substances include alkalis (household cleaning products), turpentine and petroleum products. When ingested, these substances can cause signs from mild mucosal irritation to mucosal necrosis to gastrointestinal perforation and shock. Emesis is contraindicated, dilution of the noxious substance by giving milk or water can be attempted. Activated charcoal and gastric lavage are ineffective and therapy primarily consists of supportive care and gastric protectants such as sucralfate and antacids. Anti-inflammatory doses of corticosteroids in the first 1-3 days may help reduce...
stricture formation.

**Topical exposure**

Dermal contaminants should be removed as quickly as possible with bathing and clipping as appropriate. Powders may be best vacuumed from the coat. Ocular exposure requires immediate irrigation and evaluation for ocular damage.

4. **Antidote**

There are very few toxins which have a true antidote, when an antidote is available it should be administered as soon as possible.

5. **Supportive care**

Following emergency stabilization and treatment as appropriate for the specific toxin the patient should then receive ongoing supportive care. As with all critical patients, cardiovascular and respiratory function should be closely monitored and therapy such as intravenous fluids and oxygen provided as indicated. Patient comfort is essential and analgesics maybe indicated. For example following ingestion of a caustic substance, animals can suffer severe pain from oral, oesophageal and gastric ulceration.

**Common household poisons**

There are numerous sources of poison in the average household. These include over the counter and prescription medications, household cleaning agents and indoor plants and flowers. A few important household poisons will be discussed here. The interested reader is directed to a suitable textbook and/or a poison information hotline for further information on these and other household toxins.

**Household cleaners (bleach etc.)**

**Action**

Household cleaners are toxic due to their caustic nature. Caustic household cleaners include:

- Machine dishwasher detergent
- Bleach (sodium hypochlorite)
- Detergents (quaternary ammonium compounds)

These products can be toxic if there is ocular or dermal exposure or if ingested. Their corrosive nature can cause inflammation and ulceration of tissues.

**Diagnosis**

Commonly patients are witnessed to have had exposure to the product. Animals may smell of the cleaning product on presentation. In severe ingestions salivation, oral ulceration and oropharyngeal oedema and hemorrhage may be evident.

**Treatment**

Topical or ocular exposures should be immediately irrigated. Eyes are best irrigated with sterile saline while dermal contamination can be bathed in tap water.

Irrigation should be continued for 15-20 minutes. Emesis is contraindicated if the substance is ingested. Instead the patient should be encouraged to drink milk or water. Treatment is largely supportive with analgesic therapy, gastric protectant drugs such as antacids and sucralfate and intravenous fluids to replace fluid losses and maintain hydration. The oral, oesophageal and gastric ulceration that can occur following ingestion of these substances will generally cause anorexia. Nutrition may have to be provided by a feeding tube if anorexia is persistent. Oesophageal and gastric perforation can occur subsequent to corrosive substance ingestion and oesophageal strictures can occur following healing of oesophageal ulceration.

**Lily ingestion**

**Action**

Members of the *Lilium sp.* including the Easter lily, Day lily, Tiger lily, Japanese show lily and the Rubrum lily can all cause acute renal failure in cats. The toxic principle in these plants has not yet been identified.

**Diagnosis**

The diagnosis is based on the history of access to plants of the lily family and the subsequent development of clinical signs. Initial clinical signs are usually vomiting and diarrhea within hours of ingestion which then progresses to renal failure.

**Treatment**

Emesis and administration of activated charcoal within hours of ingestion is strongly recommended. In cats that develop clinical signs aggressive supportive care to maximize renal function is indicated. Most cases will require hemodialysis or peritoneal dialysis. Recovery from the acute renal failure is possible although there is a high mortality rate and animals that survive may develop chronic renal failure.

**Raisins and grapes**

**Action**

There are now several reports of dogs developing acute renal failure after ingesting grapes or raisins, the toxic substance in this fruit is presently unknown.

**Diagnosis**

Diagnosis is based on access to grapes and raisins within days of the development of acute renal failure.

**Treatment**

Given the severity of acute renal failure it is suggested that any dog witnessed to ingest grapes or raisins should be induced to vomit and activated charcoal/sorbitol given. Once clinical signs of renal failure have developed supportive care is the only therapeutic option and these animals are likely to require hemodialysis or peritoneal dialysis. The prognosis for recovery is fair to good, the renal injury appears to be fully reversible and survival is primarily dependent on the availability of adequate medical support. Severe ingestions can be fatal.
Paracetamol (acetaminophen)

Action
Paracetamol is a common, over the counter pain killer for people that can be fatal to cats and dogs. The toxic dose in dogs is in the range of 75-100 mg/kg or higher while in cats it is as low as 10 mg/kg. Doses of 140 mg/kg or higher are likely to be fatal to cats. The toxic effects of paracetamol include liver damage and hemoglobin damage. The hemoglobin damage causes the formation of Heinz bodies and methemoglobin. Methemoglobin cannot carry oxygen effectively and can give the blood a chocolate brown colour while Heinz bodies causes destruction of red blood cells and can cause anemia.

Decontamination
When dealing with a suspected or witnessed acute ingestion (last 1-2 hours) of paracetamol emesis should be induced. The longer the time between ingestion and emesis the less effective this will be at reducing the dose of drug absorbed. In addition emesis is not 100% effective so a patient could still potentially be poisoned despite vomiting up some pills. Activated charcoal is effective at adsorbing paracetamol and can be of great benefit if administered within 2 hours of ingestion.

Treatment
Patients considered to have been exposed to a toxic dose of paracetamol or showing symptoms of paracetamol poisoning should be treated with n-acetylcysteine. Protocols for the administration of this drug are readily available in toxicology textbooks. The effectiveness of treatment is dependent on timing. Acetylcysteine is unlikely to prevent fatal consequences of a lethal dose if given 24 hours or longer after ingestion. If there is evidence of methemoglobinemia oxygen therapy is indicated. In cases of severe Heinz body anemia blood transfusion may be necessary. Patients with severe hepatotoxicity have a poor prognosis for recovery. Clinical signs of less severe hepatic injury and methemoglobinemia should improve in 3-5 days.

References
3. Osweiler GD. Toxicology Williams & Wilkins, Philadelphia, 1996
4. Peterson ME, Talcott PA. Small Animal Toxicology, 2nd ed. Saunders, St Louis, 2005