Top 10 Toxins Poisonous To Small Animals

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Did you know?

- The incidence rate of our top three toxicities in small animals
- In 2012 VPI Pet Insurance received

1. **Toxicity/overdose of OTC and prescription meds (incl flea/tick)**
   - # of Pets = 1,168
   - Avg. Cost per Pet = $581

2. **Methylxanthine toxicity (chocolate, caffeine)**
   - # of Pets = 966
   - Avg. Cost per Pet = $380

3. **Poisoning of plant origin (nuts, grapes, onions, tobacco, mushrooms)**
   - # of Pets = 750
   - Avg. Cost per Pet = $507
VPI® and Pet Poison Helpline® working together

- Shared mission in highlighting the importance of preparing for accidents and poisonings in small animals

- Addressing the cost of veterinary care
  - VPI covers the $39 Pet Poison Helpline fee when a pet is brought in to your hospital for care

- Enabling best medicine
  - Pet owners with VPI Pet Insurance spend twice as much on their pets (single events) than those without VPI Pet Insurance
VPI® and Pet Poison Helpline® working together

- Providing veterinary reviewed pet health information online
  - [www.petpoisonhelpline.com/owners](http://www.petpoisonhelpline.com/owners)
  - [www.petinsurance.com/healthzone.aspx](http://www.petinsurance.com/healthzone.aspx)

- Providing complimentary pet owner educational materials for your practice – available for ordering
  - First Aid for Your Pet brochure
  - Poisoning Emergencies brochure
  - Toxins in the Kitchen stickers
  - Toxic Human Meds stickers
  - Emergency Numbers stickers
Introduction

Ahna G. Brutlag, DVM, MS, DABT, DABVT

Associate Director

Pet Poison Helpline
Minneapolis, Minnesota
Pet Poison Helpline

• Animal poison control
  – 24/7 availability
  – $39 one-time fee/case
  – Unlimited case follow-up
  – Access to multiple specialists (DVM and others)
    • Board-certified veterinary toxicologists (DABVT, DABT, Board-eligible ABVT & ABT)
    • Emergency/Critical Care (2 DACVECCs, ECC resident)
    • Internal Medicine (DACVIM)
    • Herpetology
    • PharmDs/clinical pharmacologists
Selected Top 10 Toxins
See full section at www.petpoisonhelpline.com

- Chocolate
- SSRI antidepressants
- ADD/ADHD meds
- Sleep aids
- NSAIDS
- Insect bait stations
- Silica gel packs/Oxygen absorber sachets
- Batteries
- Household cleaners
Chocolate
Chocolate

- Contain naturally occurring methylated xanthine alkaloids (methylxanthines)
  - Theobromine
  - Caffeine

- Found in cacao beans, the seeds of the *Theobroma cacao* plant
Chocolate

• Stays in the stomach for a long time!
  – Slow absorption (up to 12 hours)

• Delayed emesis = OK

• Spontaneous vomiting often occurs with large ingestions.

• Long $T_{1/2}$: 17 hours (theobromine)

• May need to treat/observe for 72-96 hours
Chocolate

- Methylxanthines (theobromine and caffeine) = toxic component:

<table>
<thead>
<tr>
<th>Product</th>
<th>Theobromine</th>
<th>Caffeine</th>
</tr>
</thead>
<tbody>
<tr>
<td>White chocolate</td>
<td>0.25 mg/oz</td>
<td>0.85 mg/oz</td>
</tr>
<tr>
<td>Milk chocolate</td>
<td>44-60 mg/oz</td>
<td>6 mg/oz</td>
</tr>
<tr>
<td>Dark semisweet</td>
<td>135 mg/oz</td>
<td>20 mg/oz</td>
</tr>
<tr>
<td>Unsweetened baker’s chocolate</td>
<td>390-450 mg/oz</td>
<td>47 mg/oz</td>
</tr>
<tr>
<td>Dry cacao powder</td>
<td>400-737 mg/oz</td>
<td>70 mg/oz</td>
</tr>
<tr>
<td>Cacao beans</td>
<td>300-1500 mg/oz</td>
<td></td>
</tr>
<tr>
<td>Cocoa bean mulch</td>
<td>56-900 mg/oz</td>
<td></td>
</tr>
</tbody>
</table>
Chocolate

• When do you see signs? (theobromine)
  – Mild signs (agitation, GI): 20 mg/kg
  – Moderate signs (cardiotoxicity): 40-50 mg/kg
  – Severe signs (neurotoxicity): 60 mg/kg

• Clinical signs:
  – Chocolate vomiting
  – Chocolate diarrhea
  – Polyuria
  – Agitation/hyperactivity
  – Hyperthermia
  – Cardiac arrhythmias (tachycardia, VPCs)
  – Tremors
  – Seizures
Chocolate: Treatment

• Supportive

• IV fluids + frequent walks to keep bladder empty

• Temperature monitoring

• Anti-emetics/pro-kinetics
  – Maropitant: 1 mg/kg SQ q. 24
  – Metoclopramide: 0.1-0.4 mg/kg q. 6 SC, IM or 1-2 mg/kg/day as CRI IV
  – Ondansetron/dolasetron
Chocolate: Treatment

• ECG monitoring

• If agitated, tachycardic → sedation:
  – Acepromazine: 0.05 mg/kg IV PRN
  – Torbugesic: 0.1-0.4 mg/kg IV PRN

• Beta-blocker therapy
  – Esmolol: 0.25-0.5 mg/kg IV bolus, followed by CRI of 10-200 mcg/kg/min

• Anti-convulsant therapy
  – Diazepam: 0.25-0.5 mg/kg IV PRN
  – Phenobarbital: 4-16 mg/kg IV PRN
Antidepressants and Anxiolytic Drugs
The PURSUIT of HAPPINESS
Serotonin Reuptake Inhibitors (SSRI)

• Common Examples:
  – Fluoxetine (Prozac, Reconcile)
  – Paroxetine (Paxil)
  – Sertraline (Zoloft)
  – Trazadone (Trazolan, Desyrel)
  – Venlafaxine (Effexor)
  – Bupropion (Wellbutrin, Zyban): Not a true SSRI, but overdose can result in serotonin syndrome in dogs and cats.
SSRIs: Mechanism of action

- **MOA**: This group of drugs works by *inhibiting* the re-uptake of serotonin at the presynaptic membrane = *more serotonin at synapse*
  - As ↑serotonin, some animals develop serotonin syndrome
SSRIs: Toxicity

• **Range of toxicity**
  - Different for each medication
  - At 2-3X overdose, clinical signs more possible
  - As the dose of SSRI increases, the risk of serotonin syndrome increases

• **Caution!**
  - Many are rapidly absorbed and have a rapid onset of action
  - Many come in an extended release version (SR or XR)
SSRIs: Clinical signs

• Low doses: mild to moderate sedation
  – CNS: agitation, restless, vocalizing, tremors, seizures
  – GI: hypersalivation, vomiting, diarrhea
  – Cardiovascular: tachycardia, hypertensive
  – Respiratory: panting, hyperventilating
  – Other: hyperthermia

• High doses: more severe or serotonin syndrome

• Treatment: similar to ADD meds
ADD/ADHD Drugs
ADD/ADHD Drugs

• Common examples:
  – Dextroamphetamine /Amphetamine (Adderall)
  – D-amphetamine (Dexedrine)
  – Lisdexamfetamine (Vyvanse)—new!
  – Methamphetamine (Dexoxyn)
  – Methylphenidate (Ritalin/Concerta)

• Similar to methamphetamine
  – Crystal meth
ADD/ADHD Drugs: What are they used for?

- ADD/ADHD
- Obesity (weight loss)
- Narcolepsy
- Illegal/illicit purposes
ADD/ADHD Drugs: MOA

- Amphetamines are *sympathomimetic* compounds
- More potent and structurally related to norepinephrine
- Stimulate the release of norepinephrine
- Directly stimulate alpha and beta adrenergic receptors
ADD/ADHD Drugs: Range of toxicity

- Methylphenidate (Ritalin): 1 mg/kg can cause agitation
- Amphetamine (50% of Adderall) oral LD$_{50}$ (dog): 20-27 mg/kg
- Methamphetamine LD$_{50}$ (dog): 9-11 mg/kg
- One dog fatality from methamphetamine at 3.1 mg/kg
SSRI and amphetamines: Clinical Signs

- CNS:
  - Mydriasis
  - Agitation
  - Hyperactivity/over-stimulated
  - Head bobbing
  - Tremors
  - Seizures
  - Coma
  - Flicking ears/tail
SSRI and amphetamines: Clinical Signs

• **Cardiovascular:**
  – Tachycardia
  – Hypertension

• **Respiratory:**
  – Hyperventilating

• **Hyperthermia**
So how do I treat SSRI and ADD intoxications?
Decontamination

• Rapid onset of clinical signs →
  • Emesis best done in the clinic (not by owner!)
  • Emesis only if asymptomatic
  • Emesis only if early!

• Activated charcoal with a cathartic (once)

• If “XR” “LA” “SR” multiple doses of activated charcoal
  • No repeated doses of cathartic
Treatment

• Monitoring:
  – Monitor ECG and blood pressure
  – TPR

• Clinicopathologic testing:
  – Chemistry
    • Monitor renal function
  – Urinalysis
    • Pigmenturia
Treatment

• IV fluid therapy:
  – Cooling measure
  – Prevent myoglobinuric renal failure

• Hyperthermia:
  – IV fluids
  – Stop the agitation/tremoring
  – Cooling to 103.5°F/39.7°C and STOP
Treatment

Agitation:

- Acepromazine
  - 0.05-0.2 mg/kg IV, IM, or SQ, titrated to effect
- Chlorpromazine
  - 0.5 mg/kg IV, IM, or SQ, titrated to effect
Treatment

- Tachycardia (HR > 170 bpm in dogs):
  - Blood pressure measurement?
    - If hypotensive → IV fluids
    - If hypertensive/agitated →
      - Sedation (acepromazine)
      - Beta-blocker (propranolol 0.02-0.06 mg/kg IV)

- Seizures:
  - Phenobarbital 4-16 mg/kg IV or PO PRN, titrated to effect
  - Diazepam 0.25-0.5 mg/kg IV PRN, titrated to effect
    - Don’t use with serotonin syndrome?
Treatment:

• **Tremors:**
  - Methocarbamol 44-220 mg/kg IV or PO q. 6-8

• **Serotonin syndrome:**
  - Cyproheptadine (serotonin antagonist)
  - Dogs: 1.1 mg/kg PO or rectal q. 6-8-12 hours
  - Cats: 2-4 mg total PO or rectal q. 6-8-12 hours
Sleep Aids
Sleep Aids

- Are often benzodiazepines or non-benzodiazepine hypnotics

**Examples**
- Zolpidem (Ambien)
- Eszopiclone (Lunesta)

**MOA**
- The non-benzos are similar to benzos as they potentiate GABA transmission, increase frequency of chloride channel opening → resulting in inhibition of neuronal excitation
Sleep Aids

• Range of toxicity
  – Varies widely with the drug
  – Typically have a reasonably wide margin of safety

• Time to onset: ~ 1-2 hrs

• Duration of signs: ~ 12 hrs
Sleep Aids: Clinical signs

- CNS: ataxia, depression, paresis

- But… 40-50% of dogs → paradoxical CNS stimulation!
  Hyperactivity, agitation, panting, tremors

- Other: nausea, vomiting, diarrhea, hyperthermia

- Rare to see excessive respiratory and cardiac depression
Sleep Aids: Treatments

- Decontamination:
  - Early and judicious use of emetics if no CNS effects observed.
  - Activated charcoal + cathartic (A/C/C)

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**Sleep aid toxicosis in dogs: 317 cases (2004–2010)**

Adam R. Lancaster, DVM; Justine A. Lee, DVM, DACVECC; Lynn R. Hovda, RPH, DVM, MS, DACVIM; Brian T. Hardy, DVM; Lee X. Miyahara, VMD; Elizabeth P. Martin, VMD and Megan F. Whelan, DVM, DACVECC
Sleep Aids: Treatments

- If paradoxical stimulation → do NOT treat with benzodiazepines!
  - Phenothiazines or barbiturates are preferred

- Antidote:
  - Flumazenil should be used in *only severe cases* - re-dose as needed
    - Re-dose as needed
    - Monitor carefully for seizures
OTC meds: NSAIDs
NSAIDS

• Common products
  – Ibuprofen: All things Advil or Motrin
  – Naproxen: All things Aleve or Anaprox
  – Many things “cold and flu”
MOA of NSAIDs

• Competitive inhibitor of prostaglandin synthesis (cyclooxygenase) \( \rightarrow \downarrow \text{PGI}_2 \) and \( \text{PGE}_2 \)

• Affected organs:
  – GIT
  – Renal
  – Platelet
  – CNS (high dose)

• Sensitivities:
  – NSAID sensitivity
  – German shepherds
  – Cats
Ibuprofen: Toxic doses (dogs)

- **8 - 16 mg/kg:** Acute and chronic → mild gastritis
  - On post-mortem, GI ulcers, erosions, and severe gastrointestinal (GIT) disease present.

- **50 - 100 mg/kg:** Mild to severe GI upset

- **> 100 - 250 mg/kg:** Renal compromise to renal failure

- **> 300 mg/kg:** Fatalities (treated and untreated animals)
Naproxen: Toxic doses (dogs)

- Potent NSAID
- Long ½ life! 72 hours!
- Clinical signs: $\geq 5 \text{ mg/kg}$
- Study: 22 mg/kg PO X 3 days = duodenal ulcers, perforations, peritonitis
Ibuprofen and Naproxen

• **Ibuprofen range of toxicity for 20 kg dog:**
  – 5 tablets of ibuprofen (Advil, 200 mg tablet) → GI ulcers
  – 15 Advil → acute kidney failure (ARF)

• **Naproxen range of toxicity for 20 kg dog:**
  – ½ tablet of naproxen (Aleve, 200 mg tablet) → GI ulcers
  – 2 tablets of Aleve → duodenal ulcers, perforations, peritonitis
Clinical Signs with NSAIDS

• Pallor

• Prolonged CRT

• Tachycardia

• Tachypnea

• Vomiting

• Melena
  – Rectal, rectal, rectal!
NSAIDs: Treatment

• Decontaminate (emesis, activated charcoal)
  – Time since ingestion?
  – Gel cap vs. chewable?
  – Enterohepatic recirculation?
  – Activated charcoal + cathartic

• Baseline blood work
  – PCV/TS, renal panel q. 24 hours × 2-3 days
  – Recheck 3-5 days thereafter

• IV fluids
  – Vasodilate renal vessels → prevent ARF
  – 2-3.5× maintenance
NSAIDs: Treatment

• Gastric protectants x 7-10 days
  – Sucralfate
  – H₂ blocker
  – Proton-pump inhibitor
  – +/- Misoprostol

• Monitor CNS – treat seizures with diazepam
HOUSEHOLD ITEMS
Insect bait stations

- Low concentration abamectin, fipronil, hydramethylnon
- Peanut butter/sugar base
- Rarely toxic
- Plastic foreign body obstruction (FBO) risk
- **Treatment:** typically not necessary
Household cleaners

• Most household cleaners are not highly toxic or corrosive—mostly GI irritants

• Worrisome products (possibly corrosive)
  – Ultra bleaches
  – Drain/oven cleaners
  – Automatic dishwasher detergent

• Laundry detergent pods?
  – Aspiration after puncturing
Household batteries—3 common types

- **Dry cell**
  - Grey/black powder inside
  - Look for evidence on teeth

- **Button**
  - Size of pencil eraser
  - Rarely a concern if ingested (too small)

- **Lithium ion**
  - Risk of fatality if ingested!
Lithium Batteries

• Corrosive to GI mucosa due to *electrical discharge* and contents
  – Li batteries ➔ higher voltage, more tissue necrosis than button alkali batteries

• Onset of signs: within 1-12 h

• Diagnostics
  – Physical exam
  – Radiograph

• Treatment:
  – Remove foreign body?
  – Administer GI protectants
  – Re-radiograph
Lithium battery vs. hotdog

Courtesy of the Arizona Poison & Drug Information Center
When in doubt, call for the bad ones:

- Something you’re not familiar or comfortable with
- ADD medications
- NSAID overdoses
- SSRIs
- Lithium batteries
Did you get your “wheel of vomit”?

info@petpoisonhelpline.com

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• Free info!
Thank you for attending!

**CE credit FAQs**

1. **When will I get my CE certificate?** We’ll email it to you within 24 hrs.

2. **I attended the webinar but wasn’t the person who logged in. Can I still get interactive CE credit?** Yes. Send your name and email address to info@petpoisonhelpline.com by 1 pm central time, Oct 9, 2013 (strict deadline).

3. **Can I watch the recorded webinar online for CE credit?** Yes. You can receive non-interactive CE credit. Go to the “For Vets” page on our website, [www.petpoisonhelpline.com](http://www.petpoisonhelpline.com) for more info.

Comments? Questions? Email us! info@petpoisonhelpline.com
Acknowledgements

Dr. Lynn Hovda
&
Dr. Justine Lee

Thank you for your contributions!
Self-study

There just wasn’t enough time to cover everything we’d hoped to get through. Below are a short selection of slides which we think you’ll benefit from. We’ve included references to other webinars which will provide more detail, as well as reference to published articles.

Enjoy!
Bulb Fertilizers

• Contain
  – Nitrogen
  – Phosphate
  – Potash
• Typically wide margin of safety
• Beware massive ingestion

• See PPH Webinar, *Plants Poisonous to Small Animals*, April 2012
  [www.petpoisonhelpline.com](http://www.petpoisonhelpline.com), For Vets page
Bone meal/blood meal:

• “Organic” but still dangerous!

• Palatable!

• Mixed in with ???
  – Organophosphate granules?
  – Spring bulbs?
Bone meal/blood meal:

• **Clinical signs:**
  - Vomiting
  - Pancreatitis
  - Foreign body obstruction

• **Treatment:**
  - Radiographs to evaluate size of bezoar (bone)
  - Gastric lavage to break up
  - Anti-emetics
  - Fluid therapy
    - IV fluids
    - SQ fluids
  - Supportive care
Silica gel packets
- Found in new shoe boxes, purses, pill bottles, etc.
- Risk of obstruction if *packet* ingested
- Non-toxic

Not the same as *oxygen absorbers*!
- Found in food packaging
- Contain iron = possible iron poisoning
  - Black or brown powder
  - Magnetic
Oxygen absorbers – risk to pets?

- Potential for iron poisoning in small dogs
  - See PPH Webinar, *Baby Products Poisonous to Pets*, April 2013 for iron poisoning detail (www.petpoisonhelpline.com)

![Oxygen Absorber](http://en.wikipedia.org/wiki/File:Oxygen_Absorber.JPG)