SAVING PETS' LIVES, 24 HOURS A DAY, 7 DAYS A WEEK
PET POISON HELPLINE

Nationwide

There's no place like the ER for the holidays: Emergency care for Holiday Toxins

November 15, 2016



Katie Peterson, DVM, DACVECC
Emergency and Critical Care Specialist
Pet Poison Helpline

www.petpoisonhelpline.com | 3600 American Blvd. W., #725 Bloomington, MN 55431 | Pet Poison Helpline ©2016

What is Pet Poison Helpline?

- 24/7 animal poison control center
- Veterinary & human expertise
  - 20 DVMs, 35 CVTs
    - DABVT, DABT
    - DACVECC
    - DACVIM
  - 7 PharmDs
- Case fee of $49 includes
  - Unlimited per case consultation
  - Fax or email of case report
- Educational center
  - Free webinars (archived)
  - Tox tools
    - Wheel of Vomit
    - Pot of Poisons (toxic plants)
  - Textbook
  - iPhone app
  - Newsletters for vet professionals
  - Free resources for clinics
    - Videos
    - Electronic material
    - Clings

Email us for info!

SAVING PETS' LIVES, 24 HOURS A DAY, 7 DAYS A WEEK
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Carol McConnell, DVM, MBA
Chief Veterinary Officer
November 2016



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Coverage Highlights:

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It's easier to tell you what we don't cover:

- Pre-existing conditions
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- Grooming
- Tax
- Waste

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Speaker Introduction



Katie Peterson, DVM, DACVECC

Emergency and Critical Care Specialist
Pet Poison Helpline
Minneapolis, Minnesota

Common holiday toxins

- Holiday décor
  - Poinsettia
  - Holly
  - Mistletoe
  - Yew
  - Liquid potpourri
  - Homemade ornaments
- Holiday chocolate plus…
- The infamous baggie of meds
  - Cholesterol
  - Blood pressure
  - Anti-depressants



Holiday décor!



Question

- Your mother in-law brings decorations over and the cat is seen chewing on the wreath. What component of the wreath is most toxic?
  a. Poinsettia
  b. Japanese Yew
  c. Mistletoe
  d. Holly

Poinsettia

- Poinsettia (*Euphorbia pulcherrima*)
  - Overrated!
  - Milky white sap: Diterpenoid euphorbol esters and steroids with saponin-like properties (detergent-like)
  - Clinical signs: contact irritation, pruritus, hypersalivation, vomiting
  - Self-limiting signs





Mistletoe & Christmas cactus



- Mistletoe (*Phoradendrom* spp.)
  - Overrated!
  - European more toxic than American mistletoe
  - Clinical signs: GI upset, vomiting, diarrhea
    - Rarely: depression, hypotension, ataxia, seizures, cardiac disturbances
- Christmas cactus (*Schlumbergera truncata*)
  - Overrated!
  - Clinical signs: GI irritation, vomiting, diarrhea, depression, anorexia



Holly & Amaryllis



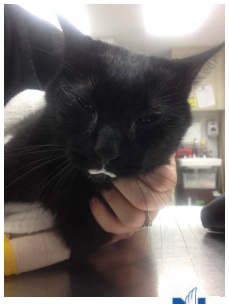
- English holly (*Ilex aquifolium)*
  - Overrated!
  - Mechanical injury, GI obstruction
  - Saponins, methylxanthines, cyanogens
  - Clinical signs: Hypersalivation, head shaking, lip smacking, mild to moderate GI distress



- Amaryllis (*Hippeastrum*)
  - Contain alkaloids (lycorine and tazetine)
  - Concentrated in bulb and leaves (up to 0.5%)
  - Vomiting, diarrhea (+/- blood), anorexia, hypersalivation
    - Rarely: restlessness, tremors, dyspnea, hypotension, seizures

Emergency treatment recommendations

- None if small amount and signs are mild
- Antiemetic
- Fluids (SQ or IV)
- Antacid
- If large quantities (amaryllis or mistletoe) consider:
  - Emesis
  - 1 dose of AC
  - Monitoring



Japanese Yew (*Taxus* cuspidate)

- Evergreen shrub "Tree of Death"
- Most toxic in winter and dried plant retains toxin
- Toxin: Taxines A & B = Cardiotoxins
  - AV conduction delay
  - Negative inotrope
  - Directly block myocardial Ca and Na channels= SA and AV nodal conduction
- Canine minimum lethal dose is 2.3g leaves/kg
- Equine and livestock risk if wreath hung in stable or discarded in pasture
  - Toxic doses:
    - 0.1% body weight in horse
    - 0.5% body weight in ruminant



Japanese Yew







All parts, including the seed, are toxic except flesh of the aril (fruit).

Clinical signs

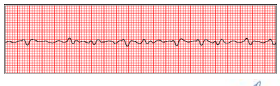
- Sudden death ☹
- Nausea
- Vomiting
- Diarrhea
- Trembling
- Dyspnea
- Neurologic signs
  - Mydriasis
  - Aggression
  - Seizures
- Heart rate changes
  - Typically bradycardia
  - Tachycardia
  - Arrhythmias
- Hypotension
- Signs of poor perfusion
  - Pale gums
  - Prolonged CRT
  - Weak pulses
  - Dull mentation
  - Cold body/limb temp

ECG changes

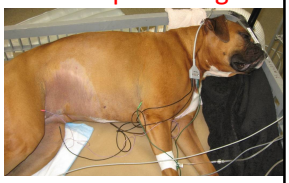
- Bradycardia
- Prolonged QRS duration
- Absent p-waves
- Ventricular tachycardia
- Fibrillation







Emergency treatment for Yew poisoning



- Emesis
- Activated charcoal
- IV crystalloids
- Cardiovascular
  - ECG monitoring
  - BP monitoring q2-4 hrs
  - Bradycardia: Atropine 0.02 – 0.04 mg/kg IV or IM
  - Ventricular tachycardia: lidocaine 2mg/kg IV slow bolus +/ CRI
  - Antiarrhythmics and vasopressors
- Supportive
  - Anti-emetics, anticonvulsants, oxygen
- Lipids?

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Liquid potpourri

- Species of concern: Cats
  - Lack of glucuronyl transferase enzyme may increase susceptibility
- Products contain
  - Cationic detergents
  - Essential oils
  - Phenol or phenolic compounds
  - May not be listed on label!
- Clinical signs from essential oils
  - Oral and GI irritation & ulceration (46 hrs)
  - CNS depression
  - Dyspnea/ARDs
  - Hyperthermia
  - Possible hepatotoxicity



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Liquid potpourri emergency treatment

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- Treatment:
  - No emesis or activated charcoal
  - Bathe well with degreasing soap
  - Baseline liver enzymes and recheck q24-48 hrs
  - SQ or IV fluids
  - Sucralfate slurry (250 mg PO TID X 3-5 days)
  - Chest radiographs
  - Supportive measures as needed
    - Pain control (no NSAIDs)
    - Feeding tube
    - Antibiotics
    - Liver protectants



Question

- What electrolyte is a concern with ingestion of homemade ornaments?
  a. Potassium
  b. Sodium
  c. Calcium
  d. Magnesium

Homemade ornaments

Recipe:

1 cup salt

1 cup water

½ cup flour





Homemade ornament toxicity

- How much sodium is in this?
  - 1 cup table salt = 285.6 grams salt
  - Homemade ornament dough = 8 grams salt per tablespoon
- Toxic doses (dogs):
  - 1.9 g/kg homemade play dough
  - 2-3 g/kg table salt = clinical signs
  - 4 g/kg table salt = lethal
- Clinical signs noted at serum Na > 170mEq/L

Hypernatremia – Clinical Signs

- In the first 2-4 hours…
  - Vomiting
  - Diarrhea
  - Anorexia
  - Polyuria

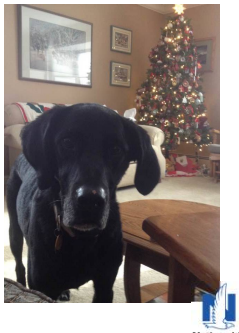
→ Direct GI irritant effects & hypernatremia

- Followed by…
  - Ataxia
  - Tremors
  - Seizures
  - Coma

→ Due to fluid shift in CNS
- Cell shrinkage/dehydration
- Intracellular hyperosmolality
- Hemorrhage

Emergency treatment for ornament ingestion

- Induce vomiting
- NO activated charcoal
- Start IV crystalloids
- Antiemetic
- Check baseline Na and recheck q 2-6 hours
- If Na normal after 6-8 hours, OK to go home



Emergency treatment for acute hypernatremia/salt toxicity

- Start rehydration
  - Crystalloids or match fluid Na to serum Na
- Calculate free water deficit
  - [0.6 x BW (kgs)] x [(current Na/desired Na)– 1] = L water deficit
- Correct deficit (use caution!)
  - Give up to ½ deficit over 1-2 hrs, remainder over 6-8 hrs
  - OK to correct faster Na+ than 0.5-1 mEq/L/hr (acute only)
- When short on time:
  - 3.7 mL/kg/hr of D5W lowers Na by 1 mEq/L/hr

Emergency treatment for acute hypernatremia/salt toxicity

- Example: 10kg dog with Na 185, ingestion was 4 hrs ago, vomiting, ataxic, mild muscle tremors but well hydrated
- Calculate free water deficit
  - [0.6 x 10kgs] x [(185/165) – 1] = 0.73 L (730ml)
- Correct free water deficit with D5W
  - 120 ml/hr over 2 hours then 70 ml/hr for 8 hours
  - Check Na level q 2-4 hours
- Quick calculation
  - 37 mL/hr of D5W lowers Na by 1 mEq/L /hr over 20 hours.

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Emergency treatment for acute hypernatremia/salt toxicity

- Why can't we use crystalloids to drop the Na?
- For 10kg dog, using plasmalyte/Norm-R it would take 2200 ml to decrease the Na from 185-165.
- Fluid rate 278ml/hr for 8 hours!

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Emergency treatment for acute hypernatremia/salt toxicity

- Methocarbamol
- Anti-convulsants
- +/- tx for cerebral edema if Na drops too rapidly and neuro signs worsen
  - Furosemide
  - Mannitol
  - Oxygen
  - Head elevation

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What's in that chocolate?



Chocolate plus toxicity

- Theobromine and caffeine
- Coffee or additional caffeine
- Macadamia nuts
- Grapes/raisins/currants
- Xylitol (sugar free)
- Marijuana



Chocolate toxicity

Theobromine content:
Unsweetened > semi-sweet > dark > milk > white

- Clinical signs
  - Vomiting
  - Diarrhea
  - Agitation
  - Tachycardia
  - Hypertension
  - Tremors
  - Seizures
- Treatment
  - Emesis
  - Antiemetic
  - Activated charcoal, +/- multi-dose
  - IV fluids
  - Monitoring HR, BP, CNS status for 8-12 hours

Emergency treatment for chocolate toxicity

- Beta blockers or anti-arrhythmic if persistent HR > 180
- Sedation (acepromazine 0.02-0.04 mg/kg, butorphanol 0.2-0.4mg/kg IV)
- Primary anti-hypertensive consider if systolic BP > 180 mmHg (rare)
- Methocarbamol 55-220mg/kg IV to effect for tremors
- Benzodiazepine or other anticonvulsant for seizures
- Frequent walks or urinary catheterization

Chocolate plus Macadamia nuts



- Toxic dose: > 2 grams/kg
  - 1 nut = 2-3 grams
- The toxic mechanism is unknown
- Clinical signs:
  - 3-6 hours: Lethargy, vomiting, and hyperthermia
  - 6-12 hours: Hind limb weakness, ataxia, tremors, recumbency
  - May also see signs of abdominal pain, lameness, joint stiffness, pale mucus membranes

Chocolate plus Macadamia nuts

- Time to onset of symptoms: <12 hours
- Duration of symptoms : Generally < 48 hours
- Treatment:
  - None beyond chocolate toxicity
  - Monitor temperature more closely
  - Risk for pancreatitis



Chocolate plus raisins



- Toxic dose and mechanism: unknown
- Clinical signs:
  - Within 24 hours: vomiting, abdominal pain
  - 24-72 hours: pu/pd, azotemia, isosthenuria
- Treatment:
  - Fluid therapy for minimum of 48 hours at 2X maintenance
  - Monitor kidney values q 24 hours for 48-72 hours
  - If no changes after 48 hours, unlikely to be a further concern

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Chocolate plus xylitol

- Toxic dose
  - 0.1 g/kg risk for hypoglycemia
  - 0.5 g/kg risk for hepatotoxicity
- The toxic mechanism
  - Stimulates insulin release
  - Liver toxicity mechanism is unknown
- Clinical signs:
  - Vomiting, signs of hypoglycemia (ataxia, depressed, tremors, seizures)
  - Elevated liver enzymes, jaudice, coagulopathy

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Chocolate plus xylitol

- Time to onset of symptoms: Rapid!
  - Hypoglycemia within 1hour, **BG may be normal on presentation**
  - Liver failure may develop over 24-48 hours
- Treatment:
  - Check BG stat on presentation
  - Supplement dextrose in fluids even with normal BG
  - Monitor BG q 2-6 hours depending on patient status and dose
  - Monitor liver enzymes q 24 hours for 48-72 hours
  - Start liver protectants for 7 days
  - Consider N-acetylcysteine if liver enzymes are elevating
  - Treatment for coagulopathy if indicated on blood work

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Chocolate plus marijuana

- Toxic dose: Minimum lethal oral dose 3 g/kg , signs occur at much lower doses
- The toxic principle: tetrahydrocannabinol (THC)
  - **Can be very concentrated in medicinal products or homemade oils/butters**
- Clinical signs:
  - Vomiting, ataxia, hyperesthesia, urinary incontinence, sedation or agitation, hypothermia
  - Severe cases- comatose, respiratory depression, bradycardia, hypotension

Chocolate plus marijuana

- Time to onset: 1-3 hrs, up to 12 hrs
- May be a bigger toxicity concern than the chocolate!
- Treatment:
  - Typically, no additional therapy
  - In severe cases, IV lipid emulsion



The infamous baggie of meds



What's in the baggie of meds?

- Call the pharmacy
- Check for any pill codes
- Ask what the medications are for
- Call the physician

- "Ummm…I take one for cholesterol, a blood pressure medication, and one for my mood."

Cholesterol medications

- Statins
  - Atorvastatin (Lipitor)
  - Fluvastatin (Lescol)
  - Lovastatin (Mevacor)
  - Pitavastatin (Livalo)
  - Pravastatin (Pravachol)
  - Rosuvastatin (Crestor)
  - Simvastatin (Zocor)
- Typically non-toxic
- Clinical signs
  - Vomiting
  - Diarrhea
  - Flatulance
  - Liver changes (chronic)
- Emergency treatment
  - Emesis if large tablet #
  - AC not indicated
  - Symptomatic GI care

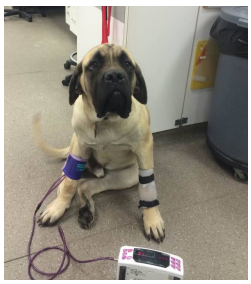
Question

All blood pressure medications are life threatening.

- True
- False

Blood pressure medications

- Diuretics
- ACE inhibitors
- Beta blockers
- Calcium channel blockers



Blood pressure medications

- Diuretics
  - Furosemide
  - Torsemide
  - Hydrochlorothiazide
  - Spironolactone
  - Triamterine
- ACE inhibitors
  - Enalapril
  - Benazepril
  - Captopril
  - Ramipril
  - Lisinopril
- Signs with large doses
  - Vomiting
  - Hypotension
  - Electrolyte changes
  - Azotemia
  - Pu/pd (diuretics)
- Treatment for large doses
  - Emesis
  - Activated charcoal
  - IV fluids
  - Monitoring electrolytes

Blood pressure medications

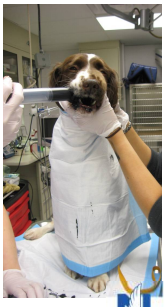
- Beta blocker
  - Metoprolol (Lopressor, Toprol)
  - Propranolol (Inderal)
  - Atenolol (Tenormin)
  - Carvedilol (Coreg)
  - Labetalol (Normodyne)
  - Bisoprolol (Zebeta)
  - Nadolol (Corgard)
- Ca channel blockers
  - Amlodipine (Norvasc)
  - Nicardipine (Cardene)
  - Nifedipine (Procardia®)
  - Verapamil and Diltiazem typically used for anti-arrhythmics

Beta blocker and Ca channel blockers

- May come in immediate, extended or sustained release
- Relatively narrow margin of safety
- 2-3X therapeutic dose
- Clinical signs: Bradycardia, hypotension
- Hypoglycemia and electrolyte changes (esp K)
- Rarely neurologic signs

Emergency treatment for "blocker" toxicity

- Asymptomatic
  - Emesis
  - Activated charcoal, repeat if XR or SR
  - Start IV fluids
  - Monitoring ECG/HR, BP for 8-12 hours
- If asymptomatic after 12 hours, OK to go home
- If symptoms develop, can persist for 36-48 hrs



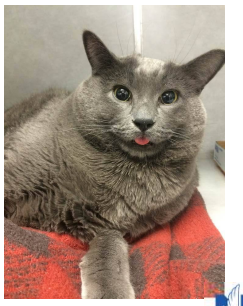
Emergency treatment for "blocker" toxicity

- Hypotension
  - Fluid bolus 15-30 ml/kg crystalloids
  - Fluid bolus 3-5 ml/kg vetstarch
- Bradycardia: Atropine 0.02-0.04mg/kg IV
- IV calcium (0.5-1.5ml/kg 10% Ca gluconate slowly)
- IV lipid emulsion
- High dose insulin/dextrose therapy
- Vasopressors
- Pacemaker

"Mood stabilizers"

- SSRIs
- SSNRI
- TCA
- MAOI
- Tryptophan, 5-HTP
- Amphetamines

- SEROTONIN!



Serotonin syndrome clinical signs

- Vomiting, diarrhea, salivation
- Mydriasis
- Agitation, vocalization
- Tachycardia, hypertension
- Tremors
- Seizures

Serotonin syndrome emergency treatment

- Emesis if asymptomatic
- Activated charcoal with sorbitol, may repeat in 6-8 hours with XR formula
- Monitor HR/ECG, BP, CNS status in the clinic for 8-12 hours
- If asymptomatic after 12 hours, typically OK to go home
- But…if symptoms develop they can persist for 24-48 hours

Serotonin syndrome emergency treatment

- Acepromazine 0.04mg/kg IV for BP > 180 or for agitation
- Add butorphanol 0.4mg/kg Iv q 6-8 hours for agitation
- Beta blockers (propranolol 0.02-0.06mg/kg Iv to effect) for persistent tachycardia (HR > 180) despite sedation
- Primary anti-hypertensive medications needed if BP > 180mmHg
- Cyproheptadine 1.1mg/kg PO or rectally q 4-6 hours
- Methocarbamol 55-220 mg/kg IV to effect for tremors
- Anticonvulsants for seizures (avoid benzodiazepines)

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Questions?



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PET POISON HELPLINE

When in doubt, call 1-800-213-6680

- Something you're not familiar or comfortable with
- Human drugs
- Corrosive injuries



- Mixed drug ingestions
- Severe clinical signs
- Animals with preexisting disease

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Acknowledgements

Dr. Ahna Brutlag
Thank you for your contributions!

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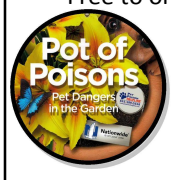


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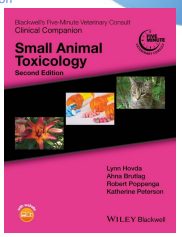
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Blackwell's Five-Minute Veterinary Consult Clinical Companion:

Small Animal Toxicology
2nd Edition

Drs. Lynn Hovda, Ahna Brutlag, Robert Poppenga, Katherine Peterson

- Provides concise, bulleted information focused on the most important facts needed when treating a poisoned cat or dog
- Carefully organized for ease of use in an emergency, with important toxicants arranged alphabetically within categories
- Details clinically relevant information on the most common toxicants encountered by small animals
- Presents a wealth of color photographs to aid in plant identification
- Includes 14 new topics to this edition covering cyclosporine A, sleep aids, tacrolimus, bath salts, synthetic marijuana, poisonous lizards, imidacloprid, spring bulbs, and sodium monofluoroacetate



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Adverse Childhood Experiences, Moral Stress, and Veterinary Mental Health
Thursday, December 8, 2016
12:00pm – 1:00pm Central Time

Neural-integration and the Reversal of Poor Wellbeing in Veterinary Medicine
Thursday, January 26, 2017
12:00pm – 1:00pm Central Time



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Thank you for attending!

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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 1pm central time on November 16, 2016 (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 for more info.

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