Hot Topics in Toxicology:
Marijuana, Xylitol, & Laundry Pods

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Whole Pet from Nationwide
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Chief Veterinary Officer
February 2016

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It's a new day for pet insurance. Whole Pet with Wellness is a true industry game-changer. If you examine it, prescribe it or administer it, we’ll cover it.

Clients get back 90% on everything from Bordetella to bilateral ACL surgeries; from dental cleanings to dysplasias. It's serious coverage—which means serious business for you.

Quite frankly, it's the best pet insurance plan ever made. And it's only from Nationwide.
Introducing Whole Pet with Wellness!

Coverage Highlights:

- One annual deductible—not per incident
- 90% reimbursement on veterinary expenses
- All veterinary exams including specialty and emergency visits
- All hospitalization and surgeries including preventive and elective procedures
- All injuries, illnesses, and cancer including hereditary and congenital conditions
- All diagnostic testing including x-rays, MRIs, CAT scans and ultrasounds
- All prescribed medications, nutritional supplements and therapeutic diets
- All preventive care including vaccinations, teeth cleaning and spay/neuter

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

- Pre-existing conditions
- Boarding
- Grooming
- Tax
- Waste

Speaker Introduction

Ahna G. Brutlag, DVM, MS, DABT, DABVT
Associate Director of Veterinary Services
Pet Poison Helpline
Minneapolis, Minnesota
What is Pet Poison Helpline?

• 24/7 animal poison control center
  – Affiliated with University of Minnesota
• Veterinary & human expertise
  – 30 DVMs, 35 CVTs
  – DABVT, DABT
  – DACVECC
  – DACVIM
  – 7 PharmDs
• Case fee of $49 includes
  – Unlimited consultation
  – Fax or email of case report
  – 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

Marijuana Trends at PPH

• 330% increase in cases over 5 yrs
• Sources
  – Food ("medibles") = 66%
    – Of food, 71% contain chocolate
  – Dried plant = 19%
  – Medical = 9%*
    – Likely under-represented
  – Unknown = 5%
• Increase in severity?

“Medibles”

• #1 source of PPH marijuana cases
• Common sources
  – Brownies & cookies
  – Cholate bars/choc covered fruit
  – Gummi bears
  – Butter/coconut oil
• Risk
  – High concentration THC
  – Better bioavailability (butter/oil)
  – Co-ingestants
Dried plants

- #2 source at PPH
- Not your parent’s plants...
  - Up to 20% THC
  - Joint = 15-30 mg THC
- Tend to see more vomiting

Mature plant courtesy of Dr. Laura Bultman, Minnesota Medical Solutions (cannabis manufacturer)

THC Concentrates

- 50-90% THC
- Smoked or “vaped”
- High risk

Medical Cannabis

**THC**
- Psychoactive
- Binds CB1 & CB2
- Indications (people)
  - Weight loss/wasting
  - Decreased appetite
  - Nausea
  - Anxiety
  - Insomnia
  - Pain

**Cannabidiol (CBD)**
- Not psychoactive
- Augments endogenous cannabinoids
- Indications (people)
  - Seizures
  - Pain
  - Inflammation
  - Immune mediated disease

http://honestmarijuana.com/trichomes/
Endocannabinoids

- Naturally-occurring substances that act within the same signaling system as exogenous cannabinoids
- Two main “endocannabinoids”
  - Anandamide = N-arachidonoyl ethanolamine = AEA
  - 2-arachidonoylglycerol = 2-AG

Endocannabinoids

- Produced on-demand in response to stress
- Largely inhibit neurotransmitter release

Medical Cannabis
The MinnMed Formulary Spectrum
(available in MN only)

Risk to Pets?
• Concerning
  – Large doses
  – High THC concentrates (butter-based, medical)
  – Co-ingestants (i.e. chocolate)
• Less concerning
  – CBD alone
• Other risks
  – Concomitant disease
  – Bowel obstruction (packaging, pill bottle)
  – Additives in liquid formulations (alcohol, etc.)

Xylitol:
There’s much more to it than gum!
Speaker Introduction

Renee Schmid, DVM
Associate Veterinarian, Clinical Toxicology
Pet Poison Helpline
Minneapolis, Minnesota

What is Xylitol

- Naturally occurring sugar alcohol found in hardwoods such as birch.
  - Xylan from bark is hydrolyzed and processed to produce xylitol
- Produced using corn cob remnants from ethanol plants
- Discovered in 1891
- Approved by the FDA in 1986 as a food additive and has unlimited restrictions regarding its safety
- Used in over 35 countries

Characteristics of Xylitol

- Sweetener
- Anticariogenic
- Antimicrobial for oral bacteria
- Low glycemic index, ideal for diabetics
- Cooling effect in oral and nasal cavities
- Humectant
- Prevents fermentation and molding
Recent studies

- Ear infections
- Wound bandaging
- Return of post-operative intestinal motility
- Study in rats to ameliorate type-2 diabetes

Where is Xylitol Found

- Low levels in fruits and vegetables
  - strawberries, raspberries, plums, lettuce and many others
- Available in granular form
- Sugar-Free food products
  - Gum
  - Candies
  - Peanut butter
  - Pudding
  - Specialty ice creams
  - Many others
- Weight loss foods/Energy bars/Protein Powder

Newer products containing xylitol

- Prescription medications
  - Liquid and chewable formulations
  - Compounded drugs
- OTC products
  - Toothpastes/Mouth rinse
  - Nasal sprays
  - Chewable and liquid products
    - Dietary supplements
    - Vitamins
    - Children's supplements and medications
    - Weight loss products
- Deodorants
- Make-up remover
- Skin gel/Lotions
- More...
Xylitol in Dogs

- Rapidly absorbed in the stomach
- Metabolism occurs primarily in the liver
  - Most is rapidly converted to glucose
- Causes stimulation of pancreatic islet cells
  - Results in insulin release
  - Dose dependent increase in plasma insulin concentration
- Contrast from humans as it is metabolized independently of insulin

Xylitol Toxicity

- Very species dependent
- Species showing toxicity:
  - Dogs
  - Rabbits
  - Cows
  - Baboons
  - Goats
  - Horses (slight)
- No toxicity reported to date
  - Cats
  - Ferrets

Xylitol Toxicity in dogs

- 0.1g/kg: Hypoglycemia
- 0.5g/kg: Acute hepatic necrosis
- Hypoglycemia may be seen within 30 minutes
  - Due to insulin release
- +/- Hypokalemia
- Acute hepatic necrosis may be seen in less than 24 hours for large ingestions
  - Two theories for MOA
  - ALT rises within 12 hours, peaks within 1-2 days
Xylitol Toxicity Calculations

- Common standard xylitol amount calculations
  - Use CAUTIOUSLY
  - 0.3g/piece if xylitol is not the first sugar alcohol
  - 1g/piece if xylitol is the first sugar alcohol
- Why doesn’t a standard calculation for gum work?
- Xylitol amounts can range from approx. 2mg-1.15gm or more per piece!

Xylitol Toxicity Calculations

- Example: 20kg dog ingesting 14 pieces of gum with xylitol NOT listed as first sugar alcohol
  - 14 pcs x 0.3g = 4.2g/20kg = 0.21g/kg
    - TOXIC/Hypoglycemia
  - 14 pcs x 75mg = 1.05g/20kg = 0.052g/kg
    - SUB-TOXIC

Xylitol Calculation Misconceptions

Neither of these gums Contain 0.3g xylitol per piece!
Xylitol Calculation Misconceptions

Xylitol first sugar alcohol

This gum contains <1g/piece xylitol

This gum contains >1g/piece xylitol

Xylitol Toxicity Treatment

- Call Pet Poison Helpline First!!
  - A more accurate ingested dose can be calculated to avoid over/under treating patient
- Toxic Ingestions
  - >0.1g/kg-<0.5g/kg
    - Induce emesis if blood glucose normal
    - Activated charcoal? NO!
    - Monitor blood glucose for 12 hours
    - Dextrose supplementation, if hypoglycemia develops, for 12-48 hours
    - Patient should maintain euglycemia for 6 hours without supplementation before discharge

Xylitol Toxicity Treatment

- Toxic Ingestions
  - >0.5g/kg
    - Same initial therapy as for lower ingestions
    - +/- Pre-emptive dextrose supplementation for hepatic support
    - Electrolytes (Hypokalemia)
    - Liver values
      - Baseline and recheck q 12 hours for 48 hours and again at 72 hours
    - Hepatoprotectant
      - Sam-E x 2 weeks

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Xylitol Toxicity Treatment

• Toxic Ingestions
  — >0.5g/kg WITH Liver elevations
    • IV fluids with 2.5-5% dextrose supplementation
    • Monitor blood glucose
    • NAC x 17 doses
    • Sam-E x 4 weeks
    • Monitor for development of secondary coagulopathy
    • FFP and vitamin K1 if coagulopathy occurs
    • Continue to monitor for stabilization and improvement in liver values

Xylitol Toxicity Treatment

• Long-term monitoring
  — Recheck liver values at 1, 2 and 4 weeks to ensure values are returning to normal
  — Hepatoprotectants and monitoring liver enzymes past 4 weeks not generally necessary
    • Exception for patients with underlying liver disease prior to toxicity
  — No reports to date of chronic hepatic dysfunction
Speaker Introduction
Heather Handley, DVM
Senior Consulting Veterinarian,
Clinical Toxicology
Pet Poison Helpline
Minneapolis, Minnesota

Laundry Detergent Pods
- Individual packet filled with the concentrated liquid detergent for one load of laundry.
- Use in Europe since 2001.
- First marketed in the United States in 2012.
- Contain ionic and non-ionic surfactants
Surfactants

- Non-Ionic & Anionic

Why are these pods so dangerous?

- Thin, dissolvable membrane under pressure from concentrated liquid soap
- After being punctured, pressure on the pack causes a fountain of soap to come out

Non-ionic & Anionic Surfactant Symptoms

Reported effects:
- Most common effects: skin, mucosal, and eye irritation.
- Vomiting and diarrhea may occur, usually self-limiting.
- Aspiration can cause upper airway irritation and respiratory distress, most often in young children.
- Rarely, ingestion can cause caustic injury to the GI tract.
- Significant corneal injury is rare, but has been reported after ocular exposure.
Pediatric Pod Exposures

- Vomiting
- Coughing
- Loss of consciousness
- Airway compromise (rare)
- Esophageal perforation (rare)

PPH Data on Laundry Detergent Pods

- 319 PPH cases from March 1, 2012 – March 1, 2015
- 244 patients (76.5%) developed symptoms
- Vomiting = 197 (80.7%)
- Cough = 63 (25.8%)
- Lethargy = 43 (17.6%)
- Nasal discharge = 35 (14.3%)
- Dyspnea, wheezing, or other respiratory irritation = 39 (16%)
- Vomiting preceded respiratory signs in the majority of cases

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>POD</th>
<th>NON-POD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vomiting</td>
<td>197 (80.7%)</td>
<td>73 (19.68%)</td>
</tr>
<tr>
<td>Cough</td>
<td>63 (25.8%)</td>
<td>26 (7%)</td>
</tr>
<tr>
<td>Lethargy</td>
<td>43 (17.6%)</td>
<td>28 (7.55%)</td>
</tr>
<tr>
<td>Nasal discharge</td>
<td>35 (14.3%)</td>
<td>4 (1.08%)</td>
</tr>
<tr>
<td>Dyspnea, wheezing, or other respiratory irritation</td>
<td>39 (16%)</td>
<td>46 (12.38%)</td>
</tr>
<tr>
<td>Any</td>
<td>244 (76.5%)</td>
<td>147 (62.8%)</td>
</tr>
</tbody>
</table>
What’s the Prognosis?

- Three deaths reported (1%).
- No necropsies performed.
- One puppy was euthanized after presenting with shock and hypoglycemia 16h after exposure to 2 PODS.
- One cat died after developing a T = 108 °F (42.2°C); clinician notes that the cat was suspected to have been in the dryer.
- No surgeries or endoscopies were reported to have been performed, but follow-up is limited.
- Although significant symptoms are commonly seen, our information is that they typically do well with supportive care. This is similar to the human data.
- Published statistics are scarce.

Treatment Do’s & Don’ts

- Do not induce emesis.
- Do not give charcoal.
- Encourage dilution
  - Be careful not to increase aspiration risk
  - Dilution may be controversial in humans
- If the animal is vomiting, give an anti-emetic and monitor for signs of aspiration pneumonia
  - Radiographic evidence may be delayed

Symptomatic and Supportive Care

- Maintain hydration with balanced crystalloid
- Provide humidified oxygen
- Antibiotics for respiratory signs
- Steroid is indicated if there is severe oropharyngeal inflammation
- Analgesia
- GI protectants (?)
When in doubt, call
800-213-6680

- Something you’re not familiar or comfortable with
- Odd clinical signs
- Animals with preexisting disease

PET POISON HELPLINE

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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