WHAT TO EXPECT WHEN CLIENTS ARE EXPECTING…BABY PRODUCTS POISONOUS TO PETS!

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Did you know?

- Incidence rate of poisonous baby ingredient ingestion in small animals
- VPI Pet Insurance receives:

  **Ingestion of pacifiers, diapers, etc.**
  - # of Pets = 5,330
  - Avg. Cost per Pet = $1,121

  **Pre-natal vitamins, zinc oxide**
  - # of Pets = 31
  - Avg. Cost per Pet = $539

  **Chewable sugar-free multivitamins (Xylitol)**
  - # of Pets = 454
  - Avg. Cost per Pet = $435
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
Pet Poison Helpline

- Animal poison control
  - 24/7 availability
  - $39 one-time fee/case
  - Unlimited case follow-up
  - Access to multiple specialists
    - Board-certified veterinary toxicologists (DABVT, DABT)
    - Emergency/Critical Care (2 DACVECCs, ECC resident)
    - Internal Medicine (DACVIM)
    - Herpetology
    - PharmDs/Clinical Pharmacists
How are we different?

• Pet Poison Helpline
  • Staffed by veterinary specialists, veterinarians and veterinary professionals

• SafetyCall International
  • 24/7 human and animal poison control center
  • World’s largest industry poison control
  • Staffed by human medical staff and veterinary professionals

• Call volumes
  – 150,000+ calls/year
  – 65% of calls are animal-related
Baby products: Why do we care?

- Everyone is doing it!

- In the past 12 months, PPH managed 1100+ cases of iron supplements (including prenatal vitamins) alone!

- Daily calls about raisins and “baby meds”
Baby products

• Prenatal vitamins
• Diapers
• Talcum powder
• Diaper rash creams
• Foreign bodies
• Acetaminophen
• Teething products
• Children’s multivitamins (xylitol)
BEFORE THERE’S A BABY...
(PRE-BABY STAGE!)
Prenatal vitamins = Iron

• Essential heavy metal
• Where are they found?
  – Multivitamins
  – Prenatal vitamins
  – Iron supplements
  – Birth control pills

Check for xylitol in chewable vitamins!
Examples of available forms

- Ferrous fumarate 33% elemental iron
- Ferric hydroxide 63%
- Ferrous gluconate 12%
- Ferric phosphate 37%
- Ferrous sulfate (anhydrous) 37%
Iron calculations

- Convert to **elemental iron** to calculate the dose in mg/kg
- Example: 10 kg dog ingests five 324 mg ferrous fumarate
  - 5 \times 324 \text{ mg} = 1,620 \text{ mg}
  - Ferrous fumarate 33\% elemental iron
  - 1620 \text{ mg} \times 0.33 = 534.6 \text{ mg elemental iron/10 kgs} = 53.5 \text{ mg/kg}
Elemental Iron: Estimated range of toxicosis

- < 20 mg/kg elemental iron: low toxicity
- 20-60 mg/kg: moderate toxicity
- 60 mg/kg: severe toxicity
- > 200 mg/kg: potentially lethal
Clinical Signs

Four Stages of Toxicity

- **Stage 1**: Up to 6 hours post ingestion
  - GI signs: bloody vomiting and diarrhea
  - Mild to moderate toxicities do not progress beyond this stage

- **Stage 2**: 6-24 hours post ingestion
  - Apparent recovery phase / quiet phase
Signs of Toxicity

• **Stage 3**: 12-96 hours post ingestion
  – Lethargy
  – Continuing GI signs
  – Cardiac signs: hypotension, tachycardia, CV collapse
  – Metabolic acidosis, shock, hepatic necrosis, death
  – Seizures, coagulopathy, oliguria, anuria

• **Stage 4**: 2-6 weeks post ingestion
  – GI ulcers heal with scarring and stricture
Diagnosis

• History of exposure

• Severe GI signs

• Radiographic evidence
  – Is it radiopaque?
  – Not all! Don’t r/o based of lack of radiographic evidence
  – Radiograph emesis?

• Elevated serum iron (SI) levels (3 & 8-10 h post ingestion)
  – Normal 94-120 mcg/dL
  – Start to worry if levels > 400 mcg/dL
Treatment

• < 20 mg/kg and asymptomatic
  – Can monitor at home for GI signs

• GI meds:
  – Milk of magnesia (e.g., magnesium hydroxide)
    • Complexes iron $\rightarrow$ FeOH (less available + has a cathartic effect)
    • Dogs: 5-30 ml q 8-12 h
    • Cats: 1-5 ml q 8-12 h
  – OTC H$_2$ blocker
Treatment

- 20 – 60 mg/kg and asymptomatic
  - Emesis induction (if time frame is appropriate and patient is asymptomatic)
  - Skip activated charcoal!
  - Milk of magnesia
  - H₂ blocker
  - Sucralfate (only if truly ulcerated)
  - Monitor for GI signs
  - Treat symptomatically

AC does not bind iron
Treatment

• > 60 mg/kg
  – Emesis induction (if appropriate)
  – Radiograph abdomen after emesis to be sure pills were not left behind to form bezoar
  – Antacid
  – Consider whole bowel irrigation with GoLYTELY® (osmotically balanced PEG)
  – Antiemetics
  – GI protectants (H₂ blocker + sulcralfate if ulcerated)
  – Chelation?
To chelate or not to chelate?

- Serum iron levels > 400 mcg/dl
- If serum iron levels are unknown but patient is:
  - Symptomatic with signs of iron toxicosis
  - Dosage ingested is > 60 mg/kg
Chelation: Deferoxamine

- 40 mg/kg q 4-8 h IM (preferred route)

- Rarely given IV due to arrhythmias, hypotension and pulmonary edema.

- Most effective within the first 24 hour (before iron moves into tissues)

- Repeat as needed until urine changes from vin rose color to clear.
WELCOME HOME, BABY!
Disposable diapers

• Non-toxic...

• Contain sodium polyacrylate, a super absorbent polymer

• FBO risk
Disposable and non-disposable diapers

- Foreign body obstruction
- Stays in stomach for a long time
- GI distress
- Caution with anti-emetics?
Pacifiers!

• Coated in milk and drool...

• Foreign body obstruction

• Stays in stomach for a long time

• Caution with anti-emetics...
Baby powder—talc or corn starch

- Corn starch is generally benign

- Talc is problematic

- Inhalation hazards (0-2 yr old kids)
  - During diaper changing → potential aspiration!
    - Cough (41%)
    - Dyspnea (15%)
    - Tachypnea
    - Sneezing (15%)
    - Vomiting (18%)
    - Cyanosis (3%)

Mofenson et al, 1981
Zinc Oxide Ointment

• Sources
  – Diaper rash creams (Desitin®, 20-40%), generic “skin protectants”

• MOA: Strong gastric irritant (former emetic)

• Elemental zinc toxicity is **not** expected
Zinc Oxide Ointment

• Clinical Signs:
  – Spontaneous vomiting (very common)
    • Self-decontamination
  – +/- Diarrhea

• Treatment
  – Symptomatic and supportive care maybe indicated
    • Subcutaneous or IV fluids
    • Anti-emetic
  – Treat dehydration and vomiting if needed
  – Activated charcoal *not* recommended
Zinc Oxide Ointments: the exception!

- Case Report:
  - Elemental zinc toxicosis following *chronic* ingestion of ointment
  - 6 yo, 24.6 kg, MN Sheltie for rectal mass removal
  - Exposure:
    - Frequent application/ingestion of 40% Desitin® cream over 4 days
    - Ingestion of ¾ lbs of cream or 4,000 mg/kg of Zn
  - Clinical Signs:
    - Day 4: Lethargy, hematuria, icterus, ↑ serum Zn levels
  - Complete recovery following multiple blood transfusions and aggressive care
Vitamin D₃

- Recommended for breast fed babies
- Drops or dissolvable tablets
Calculating a dose / toxic dose

- 40,000 IU of D$_3$ = 1 mg or 1 IU = 0.000025 mg
  - > 0.1 mg/kg can result in signs
  - > 0.5 mg/kg hypercalcemia
Who’s more at risk?

- Cats, puppies, and kittens more sensitive than adults. Use 1/10th dog toxic dose

- Fat soluble vitamin, concentrates in milk; nursing kittens and puppies are at risk for toxicosis

- Animals with pre-existing liver or renal disease may show signs at much lower doses
Diagnosis / Clinical signs

- History of ingestion

- Vague signs initially
  - Anorexia
  - Lethargy/malaise
  - PU/PD

- Calcium and phosphorus ↑ in 12-72 hrs
  - Total calcium > 12.5 mg/dl
  - Ionized calcium > 5.4 mg/dl (reference range 4.5-5.4 mg/dL)
  - Ionized calcium > 1.33 mmol/L (reference range 1.13-1.33 mmol/L)

- Phosphorus level may ↑ 12 hrs before serum calcium

- ↑ in BUN/creatinine, hyposthenuria
Treatment

• Decontamination
  – Early emesis or gastric lavage
  – Activated charcoal with sorbitol X1
  – 2-3 additional doses of A/C (no sorbitol) q. 6 h

• Baseline CBC, chem, UA, USG, VBG
  – Focus on: Ca, P, BUN, creatinine
  – USG prior to fluid administration
  – Monitor elytes + renal panel q 24 hours for 96 hours
  – If calcium is normal at 96 hours, no additional tx is necessary
Treatment

• Aggressive fluid therapy:
  – 0.9% NaCl 3-4X maintenance
  – Avoid calcium containing fluids such as LRS and Ringer’s solution.
  – Maintain fluid diuresis until calcium levels have stabilized
Treatment

• Phosphate binders!
  – Amphogel®, Alternagel®, or Epakitin®

• GI support:
  – Anti-emetics (e.g., maropitant, ondansetron)
  – If azotemic → GI protectants (e.g., H₂ blocker, PPI)

• If azotemic: Low protein diet
Increase calcium excretion: If ↑ Ca

• Once patient is well hydrated:

• Furosemide
  – 4 mg/kg IV bolus followed by 0.1-1 mg/kg/hr CRI
  or
  – 2-4 mg/kg IV bolus every 8 hours depending on hydration status

• Prednisone
  – 1-2 mg/kg every 12 hours
Decrease calcium absorption: IF ↑ Ca

• **Aredia ® (pamidronate disodium):**
  – Blocks dissolution of calcium hydroxyapatite
  – Inhibits osteoclastic bone resportion
  – Serum calcium should decrease in 24-48 hours
  – Repeat in 3-4 days if hypercalcemia not responsive or rebounds
  – Dose: 1.3 – 2 mg/kg IV diluted in saline over 2 hours

• **Salmon calcitonin**
  – Dose: 4-6 IU/kg SQ q 2-3 h until serum calcium is below 12.4 mg/dl
  – Increase dose to 10-20 IU/kg if no effect
Treatment

• Once calcium levels have stabilized:
  – Calcium and phosphorus should be checked q 24 hours for 7 days, then q. 2-3 days for up to two weeks
  – Re-institute fluids and pamidronate if calcium starts to rise
  – Maintain on long term oral steroids and furosemide X weeks
  – Long-term prognosis will depend on extent of renal tubular and myocardial damage → CRF?
SICK BABY = SICK PETS
Acetaminophen: toxic doses

• Concentrations
  – Infant drops: ~80 mg/0.8 mL (100 mg/mL)
  – Children’s suspension: 160 mg/5 mL (32 mg/mL)

• Cats: 10 mg/kg - 100 mg/kg
  – Toxic dose = 0.45 mL of infant formulation in a 10 lb cat!
  – Toxic dose = 1/4 of a 325 mg tab in an 10 lb cat!

• Dogs: 100 mg/kg - 200 mg/kg
  – Toxic dose = 4.5 mL of infant formulation in a 10 lb dog (1 tsp)
  – Toxic dose = One extra strength 500 mg tab in a 10 lb dog
Acetaminophen: Clinical signs

• Cats— MetHb → then hepatic!
  • 1-2 hours after ingestion
  • *Early*: anorexia, salivation, vomiting, facial and paw edema
  • *Late*: depression, MetHb, Heinz body anemia, hemoglobinemia, hepatic failure, death
Acetaminophen: Clinical signs

• Dogs: Hepatic problems → then metHb
  • Signs develop later than with cats

• Generally include depression, anorexia, vomiting, abdominal pain, with progression to liver failure (> 1 day)

• MetHb in large doses (> 200 mg/kg)

• MetHb is unique to cats and dogs
Acetaminophen & benzococaine treatment

• Stabilize! ABC

• Decontamination?
  – Emesis induction? Don’t bother!
  – Activated charcoal (if recent ingestion)
    • Multiple doses if IV antidote
    • Single dose if oral antidote

• Baseline blood work:
  – Presence of chocolate-colored blood
  – Blood smear (Heinz bodies)
Treatment

- Oxygen therapy if dyspneic, cyanotic
- IV fluid therapy
- Blood transfusions
- Anti-emetics
- Antidotes
Acetaminophen: Treatments

• Antidote!
  – N-acetylcysteine (NAC) IV or PO
  – Start in first 8 hrs
  – Continue for 48 hours; if LFT WNL, OK TGH!

• SAMe (liver protectant) or silymarin x 2-4 weeks

• In emergency: Methylene blue (reduce MetHb)
  – Typically limited to dogs
Ibuprofen

• Common products = Motrin, Advil, PediaCare
  – Infant drops = 50 mg/1.25 mL
    • This is 40 mg/mL
  – Children’s liquid = 100 mg/5 mL
    • This is 20 mg/mL
GROWING BABIES...
Teething/pain products: benzocaine

• Gels and liquids applied to gums
  – Pain-relieving sprays

• OTC Brands: Anbesol, Hurricaine, Orajel, Baby Orajel, Orabase, and store brands

• AI: Benzocaine, up to 20% (local anesthetic)

• Risk of MetHb
Benzocaine (local anesthetic)

• Why is it used?
  – ↓sodium ion permeability in nerves → inhibiting depolarization and blocking the conduction of nerve impulses

• Why does it cause MetHb?
  – Benzocaine is metabolized to aniline → phenylhydroxylamine and nitrobenzene → oxidizes Hb → MetHb
  – Result is the inability of hemoglobin to bind or transport oxygen

• Does lidocaine cause this too? No!
Benzocaine monitoring

• Labs/monitoring
  – Drop of blood on white paper towel!
  – Venous blood gas → metabolic acidosis
  – Blood pressure and ECG monitoring (e.g., hypotension, ventricular dysrhythmias, cardiopulmonary arrest)
  – Blood smear (Heinz bodies)
  – CBC/chemistry
Benzocaine poisoning

• Rapid absorption--peak plasma level in 15-60 min

• Cats at higher risk

• Signs: vomiting, depression, cardiac arrhythmias, dyspnea, tachypnea, cyanosis and methemoglobinemia
  – Heinz body anemia in cats
Benzocaine poisoning

- Anesthetize throat = aspiration risk
- MetHg > 15% = chocolate brown blood on white paper
- MetHg > 20% = hypoxia, organ damage
Benzocaine treatment

• Stabilize ABCs!
  – Oxygen therapy
  – Crystalloid fluid boluses: 10-20 ml/kg IV

• Decontamination?

• Intravenous lipid emulsion (ILE) for cardiac arrest (human medicine)
Benzocaine treatment

- Diazepam and/or phenobarbital for seizures

- MetHb
  - Methylene blue to reduce MetHb
    - 1% solution, slowly IV
      - Dogs: 4 mg/kg
      - Cats: 1.5 mg/kg (cautiously!)
      » Risk for Heinz body anemia in cats
  - Oxyglobin (to help carry oxygen!)
  - Blood products (pRBCs, whole blood)
Grapes and raisins

• Idiosyncratic?
  – Seedless, seeded, organic all poisonous!
  – Grape seed extract OK?
  – Raisin juice? Grape juice?

• VIN:
  – Grapes: 0.7 oz/kg
  – Raisins: 0.11 oz/kg

• Who weighs these things?
  – Grapes: 10 grapes = 2 ounces
  – Raisins: 3 raisins = 0.1 ounce
Grapes and Raisins

• Clinical signs:
  – Vomiting 1-3 hours post-ingestion (intact!)
  – Diarrhea (intact!)
  – Colic
  – CNS depression
  – ARF

• Treatment:
  – Decontamination
  – ACC X 1
  – Antiemetics
  – Aggressive IV fluids X 36-48 hours
  – Monitor renal function X 48 hours
Xylitol
MOA / Species sensitivity

- Xylitol stimulates insulin release from pancreas. Dogs are a sensitive species (as are goats, cows, rabbits and baboons)

- Xylitol’s effect on insulin release and BG in cats and ferrets is unknown.
Xylitol MOA

• In dogs peak concentrations occur in about 30 minutes – absorbed rapidly and almost completely

• MOA for liver necrosis is not known.
  – Possibly related to depletion of ATP during metabolism and/or production of reactive oxygen species (ROS)
How much xylitol is toxic?

- Level of concern in healthy dogs
  - 0.075 to 0.1 g/kg for hypoglycemia
  - 0.5 g/kg for liver failure (idiosyncratic reaction possible)

- Calculations: Convert % xylitol to mg/g or mg/ml
  - 1% = 10 mg/g
Clinical signs: 30 minutes – 12 hours

- Hypoglycemia (can last > 12 hours)
- Vomiting, ataxia
- Lethargy, recumbency
- Tremors, seizures
- Hypokalemia
- Elevation in liver enzymes in 12 hours
- Acute liver failure
Xylitol

• Decontamination
  – Emesis induction – even delayed but “symptomatic?”
  – No activated charcoal

• STAT blood glucose (BG) ± chemistry
  – Treat hypoglycemia STAT

• Treatment:
  – BG
  – Dextrose supplementation, IVF, monitor BG, SAM-e, chemistry
When in doubt, call for the bad ones

- Something you’re not familiar or comfortable with
- Human drugs
- Large drug overdoses
  - Mixed drug ingestions
  - Severe clinical signs
  - Animals with preexisting disease
Did you get your “wheel of vomit”?

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Baby Products Poisonous to Pets
Speakers: Justine A. Lee, DVM, DACVECC, DABT
          Ahna G. Brutlag, DVM, MS, DABT
Date: April 9, 2013
Time: 12-1 pm CST (1-2pm EST)

Top 10 Toxins Poisonous to Small Animals
Speakers: Justine A. Lee, DVM, DACVECC, DABT
          Ahna G. Brutlag, DVM, MS, DABT
Date: October 8, 2013
Time: 12-1 pm CST (1-2pm EST)

Topical Toxins Poisonous to Pets
Speakers: Justine A. Lee, DVM, DACVECC, DABT
          Ahna G. Brutlag, DVM, MS, DABT
Date: June 4, 2013
Time: 12-1 pm CST (1-2pm EST)

Holiday Dangers Poisonous to Pets
Speakers: Justine A. Lee, DVM, DACVECC, DABT
          Ahna G. Brutlag, DVM, MS, DABT
Date: December 3, 2013
Time: 12-1 pm CST (1-2pm EST)

Register at www.petpoisonhelpline.com/veterinarians/webinars

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