Cases from the Trenches

Teaching Moments in Toxicology

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Introduction

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Did you know?

- The incidence rate of food-related poisonings
- Includes chocolate, nuts, grapes, onions, xylitol, mold, etc.
- In 2013 VPI Pet Insurance received

![Graph showing statistics](image)
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 60% more on veterinary care than those without pet insurance
VPI® and Pet Poison Helpline® working together

- Providing veterinary reviewed pet health information online
  - www.petpoisonhelpline.com/owners
  - 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
Today’s teaching cases

• Why won’t this dog stop coughing?

• The Christmas cookie killer

• A mysterious case of the shakes
WHY WON’T THIS DOG STOP COUGHING?!
History/PE

- 3 yo, 40 kg, male, intact German Shepherd dog
- 24 hr history of “coughing”
- PE
  - Mildly increased lung sounds
  - Temp, pulse, resp rate WNL
Case progression

• Jugular draw for CBC/chem
• Sent home with oral antibiotics

• 2 hr later…lump on the neck!

• Seen in ER…
• PE:
  – Pale, dyspneic, tachypnea, muffled heart sounds, mild tachycardia
  – All else WNL

• Your recommendations? (type into chat)
Labs

- PT = “off the charts”
- PCV ~20%
- Plts = 140K
Rads

Courtesy of Dr. Jacinda Christie, Pet Poison Helpline
Diagnosis

• Presumptive diagnosis?
LAAC: Clinical Signs

- Dyspnea (57%)
- Lethargy (48%)
- Coughing/hemoptysis (30%)
- Pallor (26%)
- Epistaxis (17%)
- Vomiting (17%)
- Melena (17%)
- Hematochezia (13%)
- Lameness (13%)
- Hematoma (15.9%)
- Ecchymoses (13%)
- Hematuria (2.9%)
- Gingival bleeding (9%)
- Collapse (2.9%)
- Anorexia (1.4%)
- Abdominal distension (1.4%)
- Abdominal pain (1.4%)
- Shaking (1.4%)
- **Cats**: Otic hemorrhage


Another victim

Courtesy of Dr. Jacinda Christie, Pet Poison Helpline
Introduction

Katie Peterson, DVM, DACVECC

Pet Poison Helpline
&
Blue Pearl Veterinary Partners in Minnesota
What was in the garbage?!?
Signalment and history

• Great Dane
  – 5 month old
  – Male intact
  – 21 kgs (47 lbs)

• History (first call from eDVM):
  – Got into garbage 24 hours prior to call
  – 3 hr afterward, PU/PD and anorectic at home
  – Unknown initial PE at primary DVM

• rDVM treatment
  – Norm- R at 2.5X maintenance for 10-12 hr prior to transfer
  – Initial labs: Na > 180 and Cl 155
Physical exam and blood work

• Current PE
  – Adequate hydration
  – Retching and gagging
  – Head pressing
  – Circling
  – Ataxia
  – Vocalization
  – Obtunded

• eDVM labs
  – NA >180mmol/L (141-159)
  – Cl 121 mmol/L (100-118)
  – PCV 41% (35-55%)
  – TPP 6.8g/dL (5.0-7.5)
Hypernatremia

• Rule outs
  – Salt intake
    • Table salt
    • Baking soda
    • Deicers/rock salt
    • Water softeners
    • Sea water
    • Homemade dough (ornamental, play-doh)
    • Administration of sodium bicarbonate, hypertonic saline
Hypernatremia

– Free water loss
  • Activated charcoal +/- cathartic
  • Go-lytely/PEG
  • Paintball ingestion
  • Diuretics
  • Systemic disease: diabetes mellitus, diabetes insipidus, fever, burns, heatstroke, vomiting, diarrhea, renal failure

– Water deprivation
Hypernatremia

• How much sodium is in this?
  – 1 tablespoon table salt = 17.85 grams
  – 1 cup table salt = 285.6 grams
  – Homemade play dough = 8 grams/tablesppoon

• Toxic doses (dogs):
  – Clinical signs at serum Na >170 mEq/L
  – 2-3 g/kg table salt = clinical signs...approximately ½ tsp/kg
  – 4 g/kg table salt = lethal
  – 1.9 g/kg homemade play dough
Hypernatremia – Clinical Signs

• In the first 3 hours...
  – Polydipsic
  – Vomiting
  – Diarrhea
  – Anorexia

• Followed by...
  – Ataxia
  – Tremors
  – Seizures
  – Coma

Direct GI irritant effects

Fluid shifts out of cells
  • Hyposmolality
  • Cell shrinkage/dehydration
  • Hemorrhage
Treatment for **acute** hypernatremia

- **Decontamination**
  - Emesis or gastric lavage
  - No activated charcoal
  - +/- Enemas

- **Correct dehydration**
  - % based on PE, PCV/TP
  - Balanced crystalloid
  - \( \frac{(Na^{+}_{\text{fluids}} - Na^{+}_{\text{patient}})}{[(\text{wt in kg} \times 0.6) - 1]} = \text{decrease Na/L} \)
  - Fluid amt = Rate of decrease per day ÷ change in Na/L
  - If unsure or chronic: formulate IV fluid Na to match patient
Treatment for acute hypernatremia

• Calculate free water deficit
  – \[0.6 \times \text{BW kg}\] \times [(\text{current Na/desired Na}) - 1] = \text{L of water deficit}

• Correct deficit
  – If acute increase, drop sodium acutely
  – OK to correct faster Na\(^+\) than 0.5-1 mEq/L/hr
  – Give up to \(\frac{1}{2}\) deficit over 1-2 hrs, remainder over 4-6 hrs
  – 3.7 mL/kg/hr of D5W lowers Na by 1 mEq/L/hr
Treatment for acute hypernatremia

• Recheck Na q 2-3 hrs and adjust fluid plan
• Goal: Treat until neurologic signs resolve
• Other treatment
  – Anti-emetics
  – Anticonvulsants (e.g., diazepam, phenobarbital, propofol)
  – Oxygen
  – If fluid overload/over hydrated: diuretics
  – If correct too quickly: treat for cerebral edema
Case treatment recommendations

- Bolus crystalloloids to correct dehydration prn
- Start D5W at 4ml/kg/hr to decrease Na
- Furosemide 2.2 mg/kg once IV
- Diazepam for agitation
- Antiemetic for vomiting

- What was in the garbage?!?
What was in the garbage?!?

Homemade ornaments!

- 1 Cup Flour
- \( \frac{1}{2} \) Cup Salt \( = 142.8 \text{g} \)
- \( \frac{1}{2} \) Cup Water

=6.7g/kg !!!
Repeat PE and labs

• 32 hours post garbage exposure
  – PE:
    • More obtunded
    • Circling to the left
    • Paddling
    • Tremoring
    • Pupils are not responsive with strabismus
  – Labs
    • PCV up to 56% (from 41%)
    • TP up to 7g/dL (from 6.8)
    • Na still >180 mmol/L (141-159)
    • Cl up to 141 mmol/L (from 121)
Ornament intoxication

• Treatment recommendations
  – Rehydrate with crystalloids (1L for 5%)
  – Calculate free water deficit and replace with D5W
    • \[0.6 \times \text{BW in kgs}] \times [(\text{current Na/desired Na}) – 1] = \text{L of water}\n    • This dog = 2-3L free water deficit
  – Consider NE tube to increase water intake
  – Repeat electrolytes in 2-3 hours
  – Radiographs to determine stomach contents
Ornament intoxication

- Radiographs
  - Confirmed large amount of material present in GIT
    - Ornaments?
    - Suspect continued NaCl absorption
- Patient condition poor for gastrostomy
- Na remains >180 mmol/L
- Owners elect for euthanasia
Good reads...

• Pouzot, C et al. Successful treatment of severe salt intoxication in a dog. JVECC 17 (3) 2007, 294-298.
A MYSTERIOUS CASE OF THE SHAKES
“Wigging out!”

• 2 dogs
  – 2-3 yo, adult large breed dogs
  – Colorado
  – March (mild spring)

• Presentation
  – Owned by couple in their late 50’s with 15 yo foster son
  – 1-2 of “shaking” and “acting funny”
  – Vomit found at home
  – No known exposures
“Wigging out!”

- PE
  - Generalized mild-moderate tremors
  - Very unsteady gate
  - Hyperexcitable
  - Mydriasis
  - Mild tachycardia

- “Wigging out!”
“Wigging out!”

• What’s your next step? (type in chat field)
“Wigging out!”

• No one is “fessing up”
• Treat supportively
  – Poor response to Valium
  – Better response to acepromazine and Torb
  – IVF
• Signs abate in <12-24 hours and dogs go home
What do we test for?

• Samples available
  – Blood
  – Vomitus

• What would you test for?
What do we test for?

- Tested vomitus and...

**NICOTINE!**

- Wait, what??
Let’s do that again...

• Re-test the vomitus looking for a “tremorgenic culprit”

**Penitrem A!**
Tremorgenic mycotoxins: Penitrem A

- Produced by common food mold (e.g., *Penicillium crustosum*)

- MOA:
  - Cross the BBB
  - Inhibition of glycine and GABA
  - Cerebellar sensitivity?

- Toxic dose = unknown but small
  - 1 piece of bread
  - 7 oz dog food
  - 1 pack of cream cheese

- Reported sources
  - Cream cheese
  - Pasta
  - Bread
  - Walnuts, peanuts
  - Rice
  - Compost
  - Canned soup
  - Apples
  - Stored grains
  - Pet food
Tremorgenic mycotoxins: Penitrem A

- Clinical signs
  - Hypersalivation
  - Agitation
  - Vomiting, diarrhea
  - Hypersensitivity to external stimuli
  - Tachycardia
  - Ataxia
  - Nystagmus, mydriasis
  - Tremors (intention) → hyperthermia
  - Seizures → hyperthermia

- Note the cerebellar signs (red)
Penitrem A: Treatment

- Stop the tremor/seizure!

- IV access → methocarbamol
  - Methocarbamol: 50-200 mg/kg IV to effect!
  - +/- Valium (doesn’t work as well)
  - Phenobarbital (load up to 16 mg/kg IV)

- Anti-emetics:
  - Maropitant: 1 mg/kg SQ q. 24
  - Metoclopramide: 0.1-0.4 mg/kg q. 6 SC, IM or 1-2 mg/kg/day CRI
  - Dolasetron: 0.6 mg/kg IV q. 24
When in doubt, call for the bad ones

- Something you’re not familiar or comfortable with!
- Odd clinical signs
- Animals with preexisting disease
- Multiple food/drug ingestions
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