



MANAGING POISONING EMERGENCIES

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Be Prepared



- Poison Emergency Kit
 - Emetics
 - Apomorphine + α -agonist
 - 3% Hydrogen Peroxide
 - Activated Charcoal
 - Atropine
 - For OP/Carbamates, muscarinic mushrooms, bradycardia
 - Diazepam, Acepromazine or other sedatives
 - For seizures, agitation
 - Methocarbamol
 - For Tremors
 - Naloxone
 - Yohimbine/Atipamezole

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Poison Emergency Kit



- Vitamin K₁
- Others?
 - Methylene blue
 - Cholestyramine
 - IV lipid emulsion
 - OTC drug test kit
- Stomach tubes
- Fluid infusion sets
- IV fluids
- Liquid dish soap
- Eye wash

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Assess the Patient

- Life threatening problems first:
 - Respiratory rate?
 - Apnea/dyspnea/tachypnea
 - Heart rate?
 - Arrhythmias
 - Body temperature?
 - Hemorrhage?
 - Seizures?
 - Mucus membrane color?



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Stabilize the Patient

- Stabilization
 - Control seizures
 - Provide oxygen (as available)
 - Control hemorrhage
 - Correct cardiac arrhythmias
 - IV fluid support
 - Manage body temperature
 - +/- Administer antidote
 - "Treat the patient, not the poison"



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Brief History

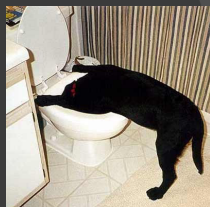
- A brief history may be obtained during triage or stabilization
 - more detailed history may be obtained later
- Dose calculations
 - When feasible
- Information sources
 - Textbooks
 - Veterinary toxicologist
 - VIN
 - Animal Poison Control Centre



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Decontamination

- Remove source of intoxication
- Always stabilize first!
- Prevent further absorption
- Consider stress factors of decontamination
 - Consider risks to patient
 - Consider risks to personnel
- Consider time frame



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Oral Decontamination—Dilution

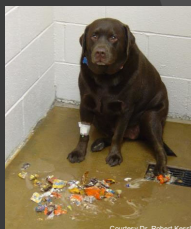
- Dilution
 - Oral irritants/corrosives, taste reactions
 - Rinse off mucosa
 - Wash irritants into stomach
 - Milk, water, broth, tuna 'juice'



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Oral Decontamination—Emesis

- For recent ingestions
 - Liquids, pills (small #)—30 to 40 min
 - Most other things—up to 2 h
 - A few other things—up to 4-8 h
 - Chocolate, grain-based rodenticides (4 h)
- Contraindications
 - Already vomited
 - Cannot protect airway (symptomatic, pre-existing health issues)
 - Emesis may trigger badness (seizure disorder, cardiac issues)
 - Ingestion of agents with rapid onset of signs (e.g. xylitol, amphetamines, etc.)
 - Ingestion of corrosives, hydrocarbons
 - Exposure to antiemetic compounds (e.g. phenothiazines)



Courtesy Dr. Robert Kessler

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Decontamination—Emesis

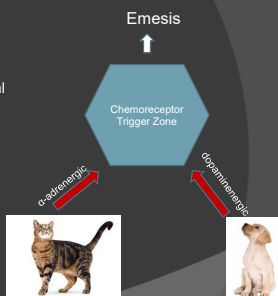
- Emesis yields 40-70% of stomach content
- Generally emetics work best if stomach isn't empty
 - Feed small amount of food if no recent meal
- Some activity after emetic administered may hasten emesis



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Decontamination—Emesis

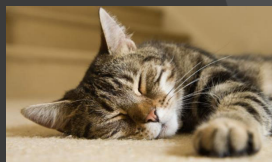
- Local vs Central stimulation of vomiting
 - Local—generally via direct mucosal irritation
 - Central—mediated largely through CRTZ in medulla oblongata
- Cats—can be challenging
 - CRTZ mediated primarily by α -adrenergic receptors
 - Use α -adrenergic agonists
- Dogs
 - CRTZ mediated primarily by dopaminergic receptors
 - Use dopaminergic agents



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Decontamination--Emesis

- α -adrenergic agonists
 - Stimulate adrenergic receptors in CRTZ to trigger emesis
 - Xylazine 44% effective in cats
 - 0.44 mg/kg IM, IV
 - Emesis within 10 min
 - Dexmedetomidine 58%-81% effective in cats
 - 3.5 mcg/kg IV; 7-40 mcg/kg IM
 - Emesis within 5 min
 - Can cause CNS sedation; reverse with atipamezole



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Decontamination--Emesis

- Apomorphine
 - Dopamine agonist (not an opioid)
 - Stimulates dopaminergic neurons in CRTZ to trigger emesis
 - Effective emetic for dogs (94%-97%)
 - Don't give acepromazine first
 - Administer IV, SC, conjunctivally
 - Can cause CNS sedation
 - 0.03-0.05 mg/kg IV, SC



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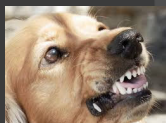
Decontamination—Emesis

- Hydrogen peroxide (3% USP)
 - Acts via direct gastric irritation
 - Effective in dogs
 - No-no for cats
 - Must be fresh (fizzy)
 - Gastritis if excessive use
 - 2.2 mL/kg; max 45 mL per dose; max 2 doses
- Sodium carbonate (washing soda) flakes
 - Acts via direct gastric irritation
 - 1-5 flakes per dog?
 - May cause protracted vomiting, gastritis



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Emetic No-No's

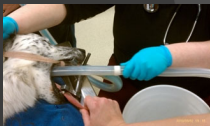


You just try putting your fingers down my throat, buster!

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Decontamination—Gastric Lavage

- Unsuccessful emesis, contraindications to emesis, pt needs anesthesia (e.g. seizure)
- Requires anesthesia
 - Cuffed ET
- Introduce body-temperature water
 - Let gravity do the work
- Tilt body head-downward to drain via gravity
- Continue until water runs clear
- Complications
 - Esophageal/gastric mucosal damage, hypothermia, aspiration of fluid



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Decontamination—Activated Charcoal

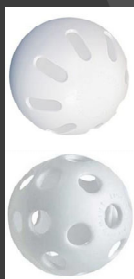
- Medicinal grade
- Peat, wood, coal, coconut hulls
- Burned to produce charcoal
- Heated to 600-900° C to develop internal pores—surface area 950-2000 m²/g
- OTC charcoal capsules—not a substitute



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Decontamination—Activated Charcoal

- Adsorbent
- Facilitates elimination via feces
- Can interrupt enterohepatic recirculation
- Will 'let go' over time
- Indications
 - Relatively recent ingestion
 - Asymptomatic pt who can protect airway
 - Pt not dehydrated or hemoconcentrated
 - Agent is adsorbed by a/c



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Decontamination—Activated Charcoal

- Contraindications
 - Pt cannot protect airway
 - Corrosives or volatile hydrocarbons
 - Salt, sodium bicarbonate, paintballs, PEG, sugar, gummy bears
 - Compounds not well adsorbed
 - Dehydration, hemoconcentration
- Dose 1-3 g/kg
- May offer in food
- May divide dose

- Poorly adsorbed by a/c:
 - Chlorates
 - Ethanol, methanol, other alcohols
 - Ethylene glycol
 - Fertilizer
 - Fluoride
 - Heavy metals
 - Iodides
 - Nitrates/nitrites
 - Sodium Chloride



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Decontamination—Activated Charcoal

- Anesthesia for symptomatic, uncooperative pt
 - Cuffed ET
 - Stomach tube
- Use with caution
 - Pt with significant vomiting
 - Pt with potential for ileus
 - Symptomatic patients
 - Ingestion of osmotically active agents



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Decontamination—Activated Charcoal

- Hypernatremia
 - A/C formulations contain osmotically active ingredients (e.g. sorbitol, glycerol)
 - A/C + OAI draw free water into GI tract → hemoconcentration & hypernatremia
 - Ataxia, tremors, seizures, death within 2-4 h of a/c administration
 - May be confused with neuro signs from ingested toxicant
- Hypernatremia
 - Baseline serum sodium, recheck in 4 h
 - Monitor 4 h after a/c administration for signs of hypernatremia
 - Provide parenteral fluids and/or free access to drinking water
 - Tx: low sodium fluids, warm water enemas

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Decontamination—Other Adsorbents

- Cholestyramine
 - Binds bile acids and prevents their reabsorption
 - Interrupts enterohepatic recirculation
- Used for
 - Blue-green algae toxins*
 - Amanitin* (hepatotoxic mushrooms)
 - Cholecalciferol
 - Amiodarone*
 - Digoxin*
 - Indomethacin,* naproxen, diclofenac, piroxicam*
 - Methotrexate*

*supported by literature



- 50–75 mg/kg PO dissolved in liquid
- Bitter taste—must mix with highly palatable food e.g. baby food, ice cream
- Give a/c first (if needed), then cholestyramine in 4 h

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Decontamination—The Other End

"This, too, shall pass!"

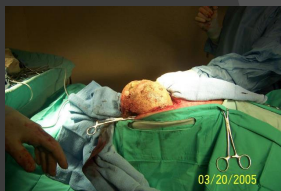
- Cathartics
 - Osmotic (sorbitol), bulk (psyllium), saline (e.g. Epsom salts)
 - Stimulate passage
- Enemas
 - Stimulate GI movement
 - Provide free water
 - Hypnatremia from Paintballs, A/C
 - Use body-temperature water



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Decontamination—Additional Measures

- Endoscopy
 - Retrieval of solid objects that are unlikely to pass
 - Pennies, lead bits & other metal items
 - Amitraz collars
 - Batteries
- Gastrotomy
 - Where endoscopy unavailable or not feasible
 - Expanding wood glues



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Decontamination—Extreme Measures

- "Through and through" lavage
 - Select toxicants (e.g. 5-fluorouracil)
 - Perform gastric lavage; keep stomach tube in place
 - Perform warm water enema
 - Tilt table so head is downward
 - Insert hose into anus; use finger pressure to prevent backflow
 - Very low water flow rate (body temperature water)
 - Water will flow from stomach tube
 - Continue until water runs clear
 - Potential complications
 - Hypothermia
 - Bowel, intestinal perforation



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Decontamination—Dermal

- Plain water—soapy things, acids, alkalis
- Liquid dish soap—icky things
 - Liquid dishwashing detergent
 - Lather, rinse, repeat
 - Watch Body Temp!
- Oily compounds—sticky things
 - Vegetable oil, mineral oil, mayonnaise, p-nut butter
 - Follow with liquid dish soap



Magic Skunk Off:
 1 qt 3% H₂O₂
 ¼ cup baking soda
 1 tsp LDWD

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Decontamination—Ocular

- Flush eyes
 - Sterile saline, water, eyewash
 - 5-30 min flush
 - Toxicant dependent
 - Break it up
 - Stain eyes as appropriate
 - Repeat in 12-24 h



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The Antidote



- Myths vs Facts
- Weigh risk:benefit
 - "Treat the patient, not the poison"
- Some may effective even after "golden" window
 - Some antivenins
 - 2-PAM for OPs

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Monitoring

- Development/return of signs
- Body T° if bathed, recumbent
- Home vs Hospital?
- Duration of monitoring



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Supportive Care

- Maintain hydration/urine flow
- Thermoregulation
- Monitor vital systems
- Manage newly developed signs
- Gastrointestinal protection



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"Mystery" Poisonings

- History essential
- Witnessed exposure to unknown toxicant
 - Where
 - Appearance?
 - Amount?
 - Best estimate
 - How long ago?
 - Signs?
 - How long to develop?



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"Mystery" Poisonings

- If no witnessed exposure...
 - When last normal?
 - Onset of signs gradual or sudden?
 - Duration of signs?
 - Any initial signs that are no longer apparent?
 - Other animals affected?



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"Mystery" Poisonings


- Location of animal in the hours prior to development of signs?
 - Indoors?
 - Outdoors?
 - Roaming or confined?



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Indoor Animals


- ◉ Always indoors?
- ◉ Off-limits areas?
- ◉ Medications, herbals, supplements?
 - Human & veterinary
 - Prescription, OTC, illicit
 - Children/teens in house
 - Recent visitors



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Indoor Animals


- ◉ Houseplants
- ◉ Recent deliveries
- ◉ Rodenticides, insecticides used
- ◉ Meds, herbals, flea or tick products used on animals in house in last 24 h



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Illicit Drug Suspects

- ◉ May take tactful questioning to obtain the desired information
- ◉ Discuss difference in diagnostic plan, duration and cost of treatment if agent is known



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Outdoor Animals--Confined

- Contents of & access to outbuildings
- Crawl spaces
- Compost piles, plants, mushrooms
- Yard or garden treatments
 - Systemic insecticides
 - Molluscicides
 - Crabgrass killers



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Free-Roaming Animals

- Greater challenge
 - Unlimited number of potentially toxic agents
 - May be more prone to malicious poisonings
- Urban, suburban, or rural environment



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Free-Roaming Animals

- Livestock nearby?
 - Access to barns, feed bins
 - Medicated feeds, fly baits, parasiticides
 - Recently dewormed
 - Recently euthanized



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Formulate Rule-out List

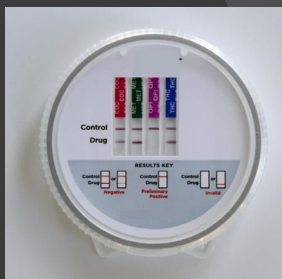
- PE, Clinical findings, response to therapy, history
- Consider potential for non-toxic etiology
- Consultation with veterinary toxicologists
 - Veterinary colleges
 - Animal Poison Control



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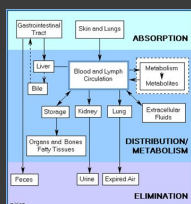
Ancillary Testing

- Ethylene glycol
 - Blacklight
 - Benchtop kits
 - Human Hospital
- OTC urine illicit drug test kits
 - Not just for Narcs
 - Pseudoephedrine, venlafaxine, etc.
- Specialty testing
 - VDL—work with toxicologists



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“Best” Samples



- Work with Toxicologists
- Peracute signs/death (w/in 2 hrs exposure)
 - Stomach content, vomitus
 - Blood (possible)
- Longer duration signs >2 hrs
 - Blood (may be transient)
 - Urine
 - Feces
 - Vitreous

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Best Samples



- Blood levels drop as drugs are metabolized
 - Fecal or urinary excretion may occur for days
 - Rumen may retain toxicant for several days
- Hair
 - Topical exposures
 - Long term oral exposures
- Dead animals
 - Complete necropsy
 - Take more than you need

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Antemortem Samples

Whole blood	5-10 ml	Heavy metals, cholinesterase levels, some insecticides
Serum	5-10 ml	Some metals, drugs, alkaloids, electrolytes
Urine	5-100 ml	Drugs, heavy metals, alkaloids
Milk	30 ml	Organochlorines, PCBs
Ingesta/feces	up to 500 g	Metals, organic compounds
Biopsy	as possible	Organic compounds, pesticides
Hair	as possible	Pesticides, some heavy metals, illicit drugs
Feed	500 g	Ionophores, mycotoxins, salt, pesticides
Water	500 mL	BG algae, pesticides, heavy metals

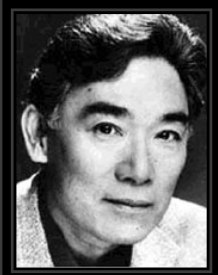
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Postmortem Samples

Two sets of samples		One frozen and one in 10% formalin
Liver	300 g	Heavy metals, pesticides, drugs, anticoag
Kidney	300 g	Heavy metals, EG, drugs, plant toxins
Brain	1/2	Sodium, cholinesterase, pesticides
Fat	100 g	Organochlorines, PCBs, bromethalin
Eye	1	Potassium, magnesium, ammonia, nitrate
Lung/spleen	100 g	Paraquat, barbiturates
Injection site	100 g	Some drugs
Blood/serum/milk		Same as antemortem

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Hollywood vs Reality




- Sam's machine from *Quincy*
- Could analyze any sample for any poison
- Sam doesn't live here anymore

Robert Ito aka Sam

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Hollywood vs Reality

- ⦿ Can't really run multiple tests on small samples
- ⦿ Turn around time
- ⦿ Must explain these things to your clients



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Diagnostic Testing

- ⦿ No one test for all toxicants
 - multiple tests for specific agents can become costly
- ⦿ Not all toxicants have tests
- ⦿ Results may take several days
 - either recovered or dead
- ⦿ Work with Dx labs, toxicologists
- ⦿ Legal cases
 - Maintain chain of custody of evidence
 - vomitus, carcasses
 - Contact law enforcement officials

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Just Because We Found It...

- Modern analytical methods are extremely sensitive
- Need to reference 'normal' background levels
 - Heavy metals, insecticides



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Just Remember....



Thanks, Doc!

- You can (and do) often successfully manage poisonings without ever knowing the cause!
- It just takes good, sound medicine.

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