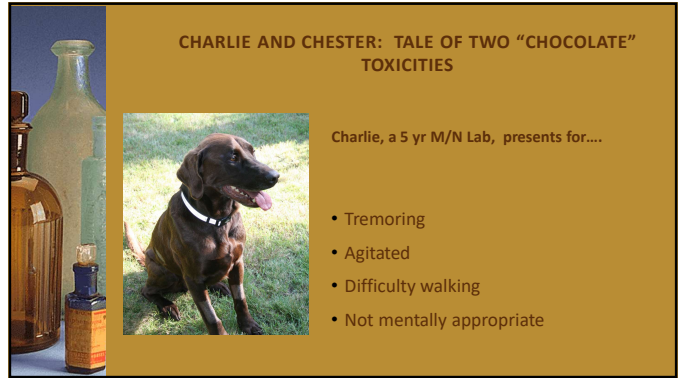




The (Pet) Poisoner's Handbook

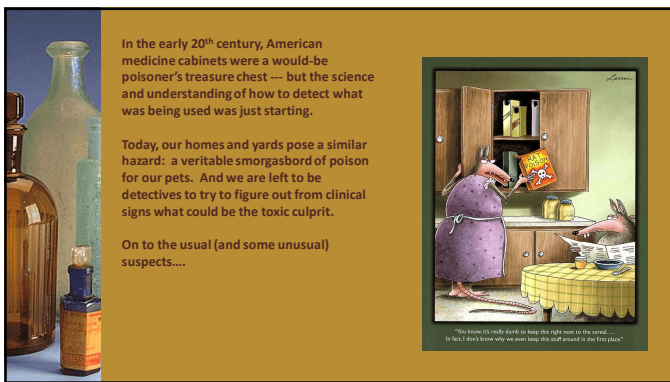
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VCA NORTHWEST VETERINARY SPECIALISTS
WINTERFEST 2024



CHARLIE AND CHESTER: TALE OF TWO "CHOCOLATE" TOXICITIES

Charlie, a 5 yr M/N Lab, presents for....

- Tremoring
- Agitated
- Difficulty walking
- Not mentally appropriate

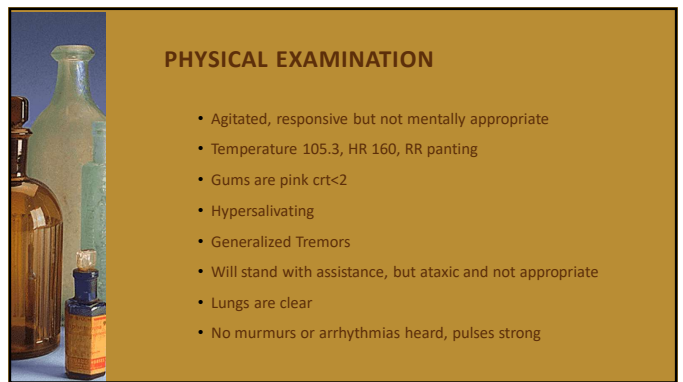


In the early 20th century, American medicine cabinets were a would-be poisoner's treasure chest --- but the science and understanding of how to detect what was being used was just starting.

Today, our homes and yards pose a similar hazard: a veritable smorgasbord of poison for our pets. And we are left to be detectives to try to figure out from clinical signs what could be the toxic culprit.

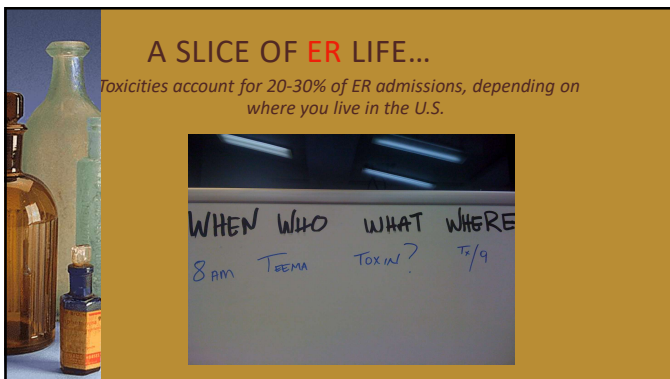
On to the usual (and some unusual) suspects....

"You know it's really hard to keep the right next to the same... In fact, I don't know why we even keep the stuff around in our lives!"



PHYSICAL EXAMINATION

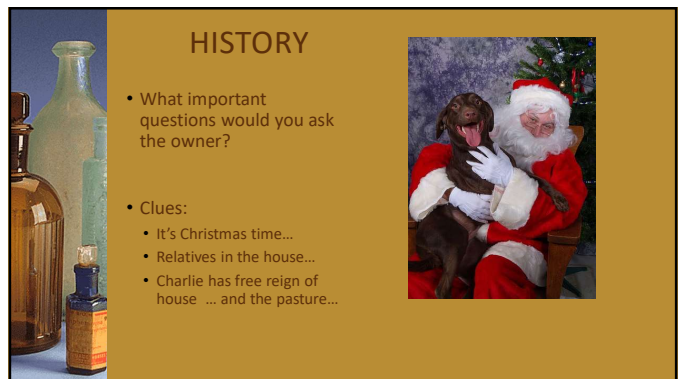
- Agitated, responsive but not mentally appropriate
- Temperature 105.3, HR 160, RR panting
- Gums are pink crt<2
- Hypersalivating
- Generalized Tremors
- Will stand with assistance, but ataxic and not appropriate
- Lungs are clear
- No murmurs or arrhythmias heard, pulses strong



A SLICE OF ER LIFE...

Toxicities account for 20-30% of ER admissions, depending on where you live in the U.S.

WHEN	WHO	WHAT	WHERE
8 AM	TRAMA	Toxin?	Tx/9



HISTORY

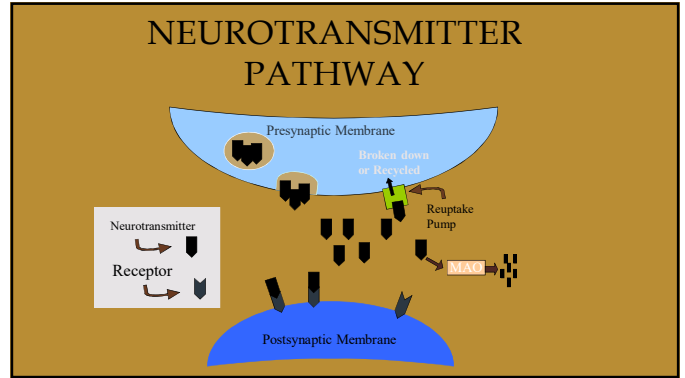
- What important questions would you ask the owner?
- Clues:
 - It's Christmas time...
 - Relatives in the house...
 - Charlie has free reign of house ... and the pasture...

TENTATIVE DIAGNOSIS?

- Antidepressant Ingestion


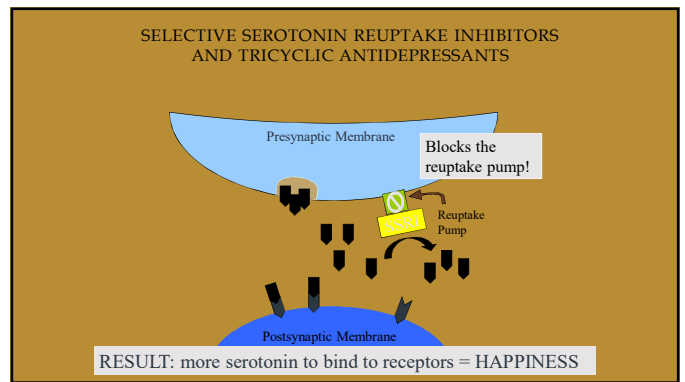


But why is it making him sick?



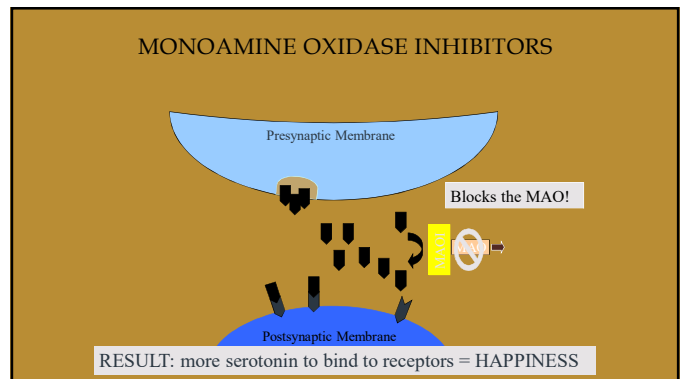
FOUR TYPES OF ANTIDEPRESSANTS:

- Tricyclic Antidepressants (TCA)
 - Amitriptyline, Clomipramine
- Selective Serotonin Reuptake Inhibitors (SSRI)
 - Prozac (fluoxetine)
 - Paxil (paroxetine)
 - Zoloft (sertraline)
- Monoamine Oxidase Inhibitors (MAOI)
 - Selegiline (Anipryl),
 - Phenelzine (Nardil)
- Atypical Antidepressants

HOW DO ANTIDEPRESSANTS WORK?

- Affect the levels of neurotransmitters in the brain
- Neurotransmitters carry information between cells of the neurologic system
- Examples
 - Serotonin
 - Dopamine
 - Norepinephrine
 - Epinephrine



BACK TO CHARLIE...



- SSRI overdose
- Neurologic and GI signs
- So what is making him sick?

Answer:
Too much serotonin!

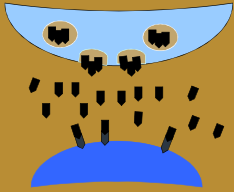
CLINICAL SIGNS OF SEROTONIN SYNDROME

In General: Neurologic and GI signs

- Hyperexcitability, Vomiting -- most common
- Ataxia, Lethargy, Muscle Tremors
- Bradycardia or Tachycardia
- Hypotension or Hypertension
- Seizures, Hyperthermia

SEROTONIN SYNDROME

- Drug induced condition caused by having too much serotonin



TREATMENT: DECONTAMINATION

- Induce Vomiting
 - Effective up to 1 (maybe 2 hours) after ingestion
 - Is the patient awake and aware enough for vomiting?
- Gastric Lavage
 - Under general anesthesia
 - High risk of aspiration
- Activated Charcoal
 - First dose of charcoal should have a cathartic (sorbital)
 - Sometimes repeated doses of charcoal are needed
 - TCA: enterohepatic circulation
 - Extended release formulas

WAYS SEROTONIN SYNDROME CAN OCCUR:

- Make more serotonin
 - Tryptophan
- Cause more serotonin to be released
 - Amphetamines, Cocaine
- Block the reuptake pump
 - SSRIs, TCAs
- Block the breakdown of serotonin
 - MAOIs
- Drugs that act on the serotonin receptor
 - LSD

TREATMENT: SYMPTOMATIC AND SUPPORTIVE

- Vomiting
 - Antacids, Antiemetics, Fluids
- Hyperthermia
 - IV fluids, cooling measures
- Seizures/Tremors
 - Diazepam bolus or Diazepam CRI
 - Phenobarbital for refractive seizures
- Tachycardia
 - Propranolol (beta-blocker)
 - Serotonin blocking properties

SPECIFIC TREATMENTS

- Hyperexcitability/Seizures/Agitation
 - Cyproheptadine
 - Serotonin receptor antagonist
 - Dose 1.1 mg/kg in dogs 2-4 mg/kg in cats
 - If unable to give orally; crush and give rectally

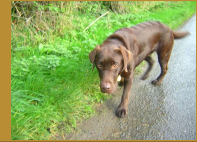


"CHOCOLATE BOY #2: CHESTER 8 YEAR OLD M/N CHOCOLATE LAB

Presented on Emergency for...



- Ataxia
- Disorientation
- Hypersalivation
- Tremors
- Owner uncertain how long Chester has been ill



BACK TO CHARLIE...

- Placed a catheter
- Injection of valium
- Started on IV fluids
- Given cyproheptadine crushed, mixed with saline rectally – twice



PHYSICAL EXAMINATION:

- Progressively worsening tremors
- Temperature 106, HR 150, panting
- Injected "brick red" gums
- Thick, dry saliva
- Increased lung sounds bilaterally
- No murmurs or arrhythmias heard
- Rapid, thready pulses



On history, the important question:
"What could Chester have ingested?"...

OUTCOME:

- Clinical signs resolved overnight and he was discharged the following day to spend Christmas with his family!
- Prognosis in General
 - Minimal Clinical Signs: Good
 - Severe Clinical Signs: Guarded



NARROWING THE TREMOROGENIC TOXIN SUSPECT LIST...

Chester lives on a small commercial ginseng farm within city limits.

Owners also grow vegetables (which they compost and use as their own fertilizer).

Chester has access to yard, house, garage, ginseng patch, vegetables, neighbor's yard, car, street, restaurant next door.....

"we hate to pen him up, everyone loves him and he is the neighborhood mascot"

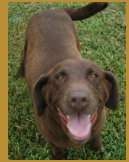
TREMOROGENIC MYCOTOXINS

- Mycotoxins are secondary metabolites that are produced by several fungal species and are toxic to animals.
 - Moldy nuts, grains, pasta, and dairy foods are common sources.
- Penetrim A and roquefortine C are the most common neurotoxins.
- Clinical signs: hyperthermia, hypersalivation, vomiting, ataxia, tachycardia, tremors and seizures.



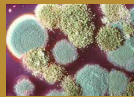
TREATMENT OF METALDEHYDE TOXICOSIS

- Treatment similar to tremorogenic mycotoxins:
 - GI decontamination, IV fluid support, methocarbamol, diazepam, barbiturates. Treat hyperthermia and acid-base imbalances.
- In addition:
 - Frequent enemas have been shown to hasten the elimination of metaldehyde & decrease its reabsorption from the colon.
 - Avoid barbiturates unless the seizures can not be controlled with diazepam.
- Prognosis good if early decontamination and aggressive supportive care.
- **However...**
 - If in respiratory failure from slugbait or if a deep plane of anesthesia is needed to control tremors/seizures, intubate and ventilate.



TREATMENT OF TREMOROGENIC MYCOTOXICOSIS

- Treatment goals:
 - decontaminate the patient (emesis/charcoal)
 - supportive care and stabilize vital signs (especially hyperthermia associated with tremors)
 - Cool baths
 - IV fluids
 - control tremors and seizures
 - Diazepam
 - Methocarbamol
 - Barbiturates
 - Monitor acid-base status and address



BACK TO CHESTER...

- Cool water baths
- Methocarbamol 330mg/kg/day IV divided q 6-8 hours
- Diazepam PRN
- Normosol R IV fluids
- Intubated, toxiban via orogastric tube
- Colonic lavage – large amount of vegetative and granular material
- Bloodwork: acidosis, elevated ALT/ALP/T. bili
- Tremors worsened to become seizures:
 - valium CRI did not control
 - placed on a barbiturate drip
 - Had to be maintained on a high barbiturate drip to control seizures
- Respiratory:
 - Radiographs showed patchy alveolar-interstitial pattern
 - poor oxygenation on blood gas

METALDEHYDE TOXICOSIS

- Metaldehyde is the most common form of slug/snailbait; alters neurotransmitter levels in the brain.
- Baits can be liquid, granules or pellets.
- Most are sweet-tasting.
- Less than a teaspoon per 10 pounds of body weight can be toxic.



- Clinical signs w/in an hour of ingestion:
 - vomiting, hypersalivation, tremors, hyperthermia, tonic/clonic convulsions.
 - Worse case scenario: severe metabolic acidosis, acute or delayed onset liver failure, respiratory failure, death.

METALDEHYDE TOXICOSIS: THE WORST CASE SCENARIO

- Chester placed on a ventilator...



THE REST OF THE CHESTER STORY...

- Long story ...short:
 - Mechanical ventilation for 3 days, slowly weaned off barbiturate drip over 24-36 hours and no further seizures.
 - Continued oxygen support, IV fluids, antibiotics, liver supportive meds for further 4 days in hospital.
 - He still had intermittent minor tremors and was ataxic but started to eat and drink once off the barbiturate drip.
- Discharged:
 - SAM-e, Methocarbamol, Clavamox
- Fast Forward:
 - Readmitted 3 more times over the following 2 years for "eating something unknown". All cases resolved within 24 hours with supportive care.

A CASE OF ARSENIC AND OLD LACE

In a lovely old Victorian home in Mt. Tabor lived "Prince" and his fairy godmother "Mrs. Cabot"




MORAL OF THE STORY?

- As the beloved Taylor Swift would say: "Eaters gonna Eat"
- Relatives visiting should know that they are your guests, the dog is family.
- Know your fertilizer ... and how it affects your pets as well as your crops...
- Keep your friends close...and your pet-loving friends closer

Prince was an 8 year old, well-behaved but curious fellow and his owner brought him in when he brought home this "treasure" from the neighbor's yard...

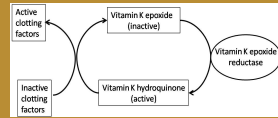


On to the next case --- with bleeding cases, sometimes you get a pretty good idea why they are bleeding from the physical exam (and sometimes not)...



Anticoagulant rodenticides bind to this enzyme and prevent the used vitamin K from being recycled back to its useful form.

This means the small amount of vitamin K in the body is quickly used up and vitamin K-dependent functions will stop until the body receives more of the vitamin.



Because the synthesis of clotting factors requires vitamin K, the inability to recycle this vitamin means that new clotting factors cannot be made and the body loses its ability to stop bleeding.

PRINCE'S TREATMENT PLAN:

- Recommended baseline PT and PTT (normal)
- GI decontamination
 - Apomorphine-induced Emesis
 - Activated Charcoal – Toxiban
- Vitamin K 1 Supplementation for 4 weeks



"WHEN THE JOB WENT WRONG HE WENT BACK TO THE BEGINNING. WELL, THIS IS WHERE WE GOT THE JOB, SO IT'S THE BEGINNING..."



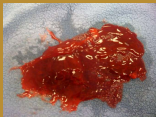
The beginning includes a thorough review of the history...

NOT THE LAST WE HAVE SEEN OF "PRINCE" CABOT ...

His owner brought him back into the ER ten days later.

She was very upset: she was giving Vitamin K twice a day and yet "we hadn't fixed the problem caused by the neighbor's rat bait".

Even worse: he vomited THIS on her pajamas...



AND his gums looked like this...

THE MYSTERY IS... HISTORY:

ICU technician and the owner were in the lobby together. When technician noted that Prince was a bit stiff getting upthe owner replied:

" oh yes, my Prince usually gets an aspirin or two during the day – when I take mine –if he seems a bit stiff or when he seems to need a little pick me up. But he is not on any regular medication prescribed by the doctor".



WHAT IS GOING ON?


- Full physical exam:
 - No bruising (ecchymosis) seen
 - Normal TPR
 - Uncomfortable in cranial abdomen but no fluid wave
 - On rectal, melena
 - Gets up stiffly from sitting position
- Labwork
 - CBC: PCV/TS = 29%/4.8 (mild anemia)
 - Chemistry: Normal
 - Platelet Count: 120,000 (slightly decreased)
 - PT: 12 seconds (normal)
 - PTT: 75 seconds (normal)
 - BMBT: **6 minutes (prolonged)** -- * signifies altered platelet function or number

ASPIRIN AND PLATELETS

Aspirin is a COX-1/COX-2 irreversible inhibitor: This means it inhibits the cyclooxygenase enzymes which catalyze a key step in the synthesis of prostaglandins.


- COX-1 makes prostaglandins that are necessary for the synthesis of protective gastric mucus in the stomach and a prostaglandin necessary for platelet cell functioning (i.e., platelet aggregation)
- COX-2 makes prostaglandins that are involved in inflammation, pain, and fever.

So, while Mrs. Cabot was decreasing Prince's inflammation with aspirin, she was also irritating his stomach lining and decreased his platelets' ability to form a fragile platelet plug.



PRINCE'S HAPPILY EVER AFTER PLAN:


- Recommended Scoping – owner declined and opted for medical therapy at home:
 - Sucralfate (Carafate): 0.5 – 1 g total dose PO q6-8hr.
 - Famotidine (Pepcid): 0.5 mg/kg PO, IM or SQ q12-24hr.
 - Misoprostil 1-3 µg/kg q6-8h. This synthetic prostaglandin E1 may assist healing of gastric ulcerations.
 - Vitamin K1.....still to be continued @ 2.5 mg/kg BID.
 - Recheck exam and bloodwork in two days, then repeated weekly thereafter.



RULE OUTS? :



- Toxins:
 - Antifreeze (ethylene glycol)
 - Alcohol
 - Methanol
 - Opioids
 - Marijuana
 - Xylitol

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MORAL (S) OF THE STORY...


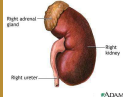

- Never make the assumption that everyone views the words "regular" or "medication" in the same way.
- Never stop asking questions – the only silly question is the unasked one.
- "Polka-Dots" never lie...

A QUICK BUT IMPORTANT DIGRESSION...

Ethylene glycol / Antifreeze

- sweet-tasting, odorless, and often colorless liquid found in antifreeze.
- Rapidly metabolized and causes metabolic acidosis, GI irritation, CNS disturbance and renal failure.
- DX: history, clinical signs, in-clinic kits and send-out testing to human laboratories.
- TX: In order to be effective, antidote must be administered before toxic metabolites generated – within 8 hours.
- TX: Supportive care should also include fluid therapy, correction of electrolyte imbalances, GI protectants.
- Prognosis: Guarded if azotemia present. Poor to grave if patient is oliguric or anuric.


MILLIE: 6 YEAR OLD CHOCOLATE LAB

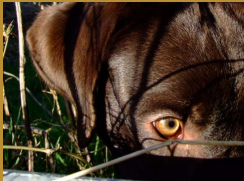
Presented on Emergency for :

- Weak
- Stumbling
- Ataxia
- Sedation
- Disorientation
- Hypersalivation



MILLIE'S PHYSICAL EXAM

- Injected conjunctiva
- Hyperthermia (104)
- Heart rate 80
- Panting
- Dribbling urine.
- Bloodwork normal
- Decreased reflexes on neuro exam
- No pain on palpation of neck, spine, limbs
- Will walk a few steps with assistance
- Sensitive to noise



MARIJUANA INTOXICATION

- Marijuana's active ingredient is delta 9-tetrahydrocannabinol (THC)
 - THC targets the brain— interacts with central neurotransmitters (norepinephrine, dopamine, serotonin, acetylcholine)
- Diagnosis is typically made based on suspicious clinical signs combined with history of exposure.
 - Owners are not always willing to discuss the presence of certain drugs in their home—or they may be unaware. Owner notes pet is acting strange, is depressed, or exhibits an acute onset of ataxia
- THC can be detected on a urine drug screen
 - OTC kits are similar to tests done in human hospital
 - More likely false negative than false positive
 - Different metabolite in canines?



MORAL OF MILLIE'S STORY?

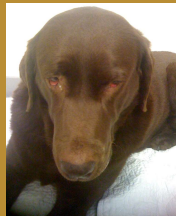
- What feels good for the goose does not necessarily feel good for the gander...
- Keep all your "goodies" up and out of the way of dogs and kids
- Do NOT assume humans and dogs view "fun" the same way...



MARIJUANA INTOXICATION

Prognosis : typically good

- THC has a large therapeutic index: a reported minimal lethal oral dose of d-THC in the dog is > 3 g.
- THC is absorbed rapidly and eliminated slowly
- Forewarn owners that clinical signs (and the treatment required to treat them) can last several days



Clinical Signs:
 depression ataxia tremors
 weakness vomiting seizures
 tachycardia/ bradycardia,
 coma

Questions?



CHILLIN' WITH MILLIE

- Hospitalized and placed in quiet/darkened run
- IV catheter and twice maintenance fluids
- Administered activated charcoal TID for 24 hours
- Administered valium PRN for "paranoia", anxiety and hypersensitivity to noise
- 72 hours in hospital – improved neuro status, eating, discharged

