

EVERYDAY EMERGENCIES: The Case of the Vomiting Dog

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To hospitalize or not to hospitalize... that is the question

- ✚ Decisions for hospitalization are based on the big picture
 - History
 - Physical examination
 - Laboratory data
 - Imaging
 - Your Gut

- ✚ The history – MUST ask questions
 - Vomiting or regurgitation
 - Vomiting – active, gagging/retching, repeated contraction of abdominal muscles
 - Regurgitation – passive, clear liquid/undigested food
 - Sometimes a visual helps – I've worked hard at my version of canine and feline vomiting for assisting owners in knowing the difference
 - Efforts productive or non-productive
 - If not productive – think about GDV
 - Exposure to toxins/foreign objects
 - NSAIDs – hospitalize
 - Ingestion of food/garbage
 - Pancreatitis – can go south quickly

- ✚ Physical examination – MUST do's
 - Assess hydration and perfusion
 - Most critical effects of vomiting
 - Dehydration and hypovolemia are not the same thing – we will assess for them different AND treat them slightly differently
 - Dehydration = fluid lost from intracellular or interstitial space
 - Skin turgor, body weight, PCV/TS, electrolytes
 - Hypovolemia = fluid lost from plasma space
 - Perfusion parameters (mm/CRT), lactate, urine production
 - Hypovolemia will lead to hypoperfusion
 - Dehydration takes time; it implies chronicity
 - Fluid lost slowly – replace it slowly
 - Hypovolemia leading to hypoperfusion is an acute process
 - Fluid lost quickly – replace it quickly
 - Cats: Look under the tongue!
 - Brief systems check of the four key systems on all patients
 - Abdominal palpation
 - Be systematic – use the same method every time
 - Press gently – the harder you press the harder they press against you
 - Change patient position – standing, front end elevated, lateral recumbency

- ✚ So... hospitalize or no?
 - History
 - Known toxin exposure, e.g. NSAIDs, ethylene glycol
 - Foreign body ingestion
 - Ingestion of unusual food/garbage
 - Hematemesis
 - Physical Exam findings
 - Hypovolemia
 - Moderate to severe dehydration
 - Abdominal distention
 - Abdominal pain
 - Sublingual string

- ✚ Laboratory data and its role in acute GI signs
 - Identify life threatening problems
 - Determine extent of organ damage and overall prognosis
 - Establish trends to monitor response to therapy

- ✚ “Minimum” Database
 - Immediate quick assessment tests
 - PCV/TS, blood glucose, electrolytes, lactate, +/- blood gas
 - Within a few minutes/hour
 - CBC, chemistry, urinalysis, +/- coagulation
 - Next day okay
 - Serology work, spec cPL®/fPL®, +/- coagulation

What does our laboratory data tell us?

- ✚ PCV/TS
 - If both increased = dehydration
 - If both decreased = hemorrhage
 - BUT
 - If PCV normal or increased and TS are normal or decreased = could equal protein loss or **acute hemorrhage**
 - Example – PCV/TS = 45/5.0

- ✚ Electrolytes
 - Increased Na, Cl = dehydration
 - Increased K, normal Na = renal disease, metabolic acidemia
 - Increased K, decreased Na = hypoadrenocorticism
 - Decreased Na, Cl, K with metabolic acidosis = upper GI obstruction

- ✚ Blood glucose
 - Hyperglycemia = diabetes mellitus (DM), pancreatitis (transient DM), stress, the “death glucose”
 - Hypoglycemia = sepsis, hypoadrenocorticism, liver disease
 - Hemoconcentration may falsely lower glucometer readings
 - Check manufacturer of glucometer to determine if whole blood, plasma or serum more accurate

- ✚ Lactate
 - Produced from pyruvate during glycolysis
 - During anaerobic conditions, production of lactate exceeds metabolism (either back to pyruvate or via gluconeogenesis in liver/kidney)

- Accumulates in the blood and liberates H⁺
 - Leads to lactic acidemia/acidosis
- Normal < 1.0 mmol/L
- Consider elevated with > 2.5 mmol/L
- Increases in proportion to degree of hypoperfusion/hypoxemia
- The higher the initial value – the more severe the disease process
- Persistent or progressive increases in spite of therapy warrants a guarded-to-poor prognosis

✚ Venous blood gas

- Venous is a better assessment of tissue status than is arterial
- Metabolic alkalosis with decreased Na, Cl, K – upper GI obstruction MUST be ruled out
 - Hypochloremic metabolic alkalosis can also be seen with vomiting of lower small-intestinal contents and furosemide administration

✚ Spec cPL® Test

- Most sensitive and specific laboratory test for diagnosis of pancreatitis in the dog
- A positive test:
 - Allows treatment for pancreatitis, discuss with owners possibility of complications
 - Prevents unnecessary testing—extensive imaging (barium series)

✚ Imaging – what will make us consider hospitalization?

- Radiographs
 - GDV, obstruction (mass/foreign body), intussusception, linear foreign body, pneumoperitoneum, severe generalized ileus, free fluid
- Ultrasound
 - Pancreatitis, intussusception, small amount free fluid, cause of obstruction (radiolucent foreign body)

So, you're thinking outpatient....

✚ Outpatient if...

- No known exposure to toxin
- Normal perfusion, (near) normal hydration
- No abdominal pain/distention/hematemesis
- No string under the tongue!
- Labs and imaging normal (if done)
- Normal gut—yours

✚ Outpatient treatment

- Subcutaneous fluids
- NPO
- Gradual reintroduction of water, then bland food
- Antiemetic +/-
 - Maropitant (Cerenia®)
 - Dog: 1 mg/kg SC for up to 5 days
 - Cat: 0.5–1 mg/kg SC for up to 5 days

And what about the patient you've decide to admit?

✚ Inpatient treatment

- All seriously ill patients receive similar initial treatment regardless of underlying disease

- Treatment is administered using *goal-directed therapy*
- Goal = normalize oxygen delivery to cells
- Delivering oxygen requires:
 - Oxygen in lungs
 - Hemoglobin to pick up oxygen in lungs
 - Blood flow to deliver oxygen to cells
 - Functional heart
 - Adequate fluid volume

✚ Fluid resuscitation endpoints

- Normal TPR, CRT, mm color
- Systolic BP >100 mmHg
- Mean arterial BP >80–100 mmHg
- CVP 5–10 cmH₂O
- Lactate <2.5 mmol/L
- Urine output minimum 1–2 ml/kg/hr
- BE < 4 mmol/L

✚ Current fluid resuscitation guidelines

- Incremental
- 1/4–1/3 shock dose of fluid
- Reassess – blood pressure, lactate
- Repeat until clinical endpoints are reached
- Crystalloids are usually all you need
- Colloids if patient exhibits severe shock and/or hypoproteinemia