ZOOLOGICAL COMPANION ANIMAL CASE STUDIES

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CASE 1: THE VOMITING FERRET

"ROSCOE"

- 5 year old MC ferret
- **Presenting complaint**: chronic, intermittent vomiting for approximately 2 weeks
- History:
  - Obtained from a pet store at ~1 year of age
  - Eats commercial dry ferret food — reluctant to eat recently
  - No change in environment, free roam in house
  - Saw referring veterinarian for episode of vomiting 2 years ago, resolved with medical therapy (unknown medications)

What other history questions do you want to know?

ADDITIONAL HISTORY QUESTIONS

- Any diarrhea? Urination/drinking normal? Exercise intolerance, lethargy?
- Coughing, sneezing, nasal discharge?
- Any other pets in the house? Any recent exposure to other animals/ferrets?
- Any known exposure to toxins? Any known foreign body ingestion? Any dietary indiscretion? Any recent diet change?
- Describe the vomiting:
  - Does it sound like regurgitation?
  - When does it occur in relationship to eating? After each meal?
  - Improving, worsening, or static? (i.e. progression)
- Have you given him any supplements or medications (including OTC meds)?

PHYSICAL EXAM

- **Wt: 861gm T: 38.1 C P: 200bpm R: sniff mm: pink CRT:** <2sec
- **GEN**: BAR, well hydrated **BCS: 8/9**
- **EENT**: Eyes clear OU, no anisocoria noted OU. Ears clean AU. No ocular-nasal discharge.
  - Oral exam: grade 1 out of 4 dental disease (mild gingivitis, mild tarter)
- **CV**: No murmurs/arrhythmias noted, strong and synchronous pulses.
- **RESP**: No crackles or wheezes noted, normal bronchovesicular sounds auscultated. Eupneic.
- **ABD**: Soft, non-painful—no masses palpated. Mild splenomegaly. Kidneys smooth and symmetrical. No preputial abnormalities noted, urinary bladder not palpable.
- **MS/I**: Ambulatory on all four limbs, no gait abnormalities or lameness noted, hair coat clean—no evidence of alopecia or ectoparasites.
- **NEURO**: Normal mentation, normal proprioception, cranial nerves intact.
- **PLN**: No enlarged lymph nodes palpable.

PROBLEM LIST

- 1. Chronic vomiting x 2 weeks
  - Usually after eating, within 1-2 hours
- 2. Mild dental disease
- 3. Mild splenomegaly

What are your top differentials for each problem?

DIAGNOSTIC PLAN

- What are ALL the possible **clinical pathologic tests** we could perform on this patient?
  - Complete blood count
  - Plasma biochemistries
  - Fecal
  - Cytology of vomitus
  - Cytology of splenic aspirate

DIAGNOSTIC PLAN

- What are ALL the possible **imaging tests** we could perform on this patient?
  - Survey whole body radiographs
    - Or separate thoracic and abdominal radiographs
  - Contrast radiographs
  - Abdominal ultrasound
  - Whole body or abdominal CT scan

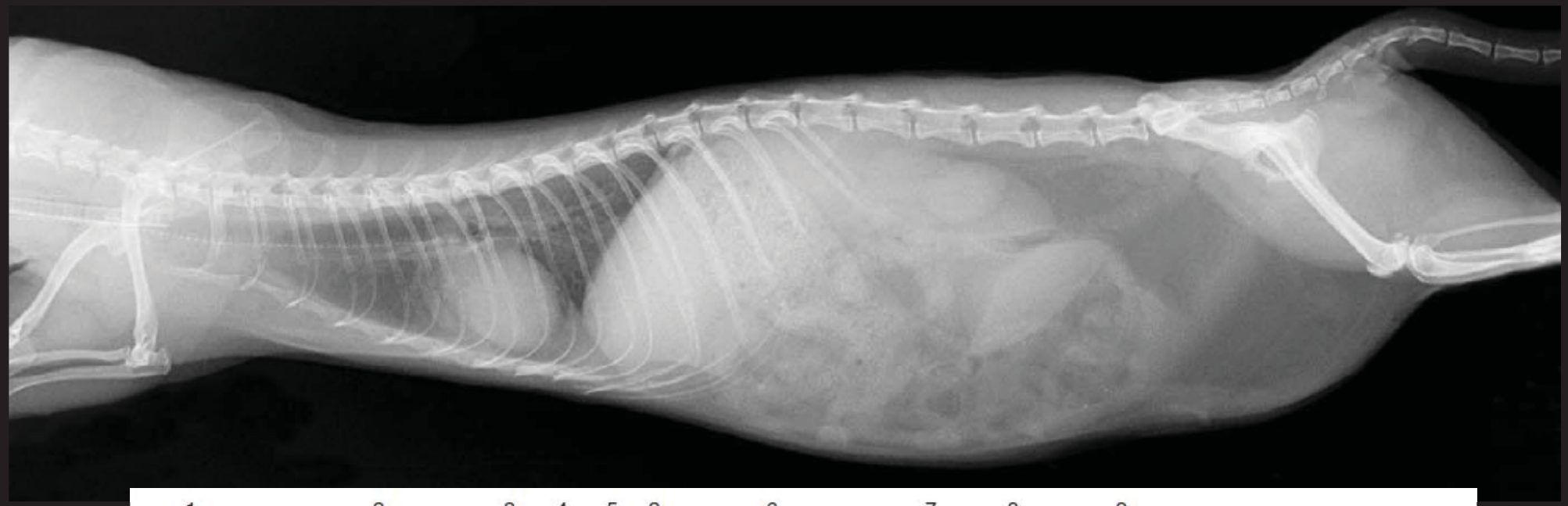
DIAGNOSTIC PLAN

- **Prioritize your TOP THREE diagnostic tests:**
  - 1. **Survey whole body radiographs**
  - 2. **Abdominal ultrasound**
  - 3. **Plasma biochemistry and CBC**

What would you like to use for sedation?

SEDATION OPTIONS FOR FERRETS

- Sensitive to sedative and respiratory depressant effects of opioids – this does NOT mean they shouldn't be used though!
- Non-painful disease: butorphanol 0.1-0.2 mg/kg IM + midazolam 0.2-0.5 mg/kg IM
  - Flumazenil 0.02 mg/kg IM for reversal
- Painful disease: hydromorphone 0.1 mg/kg IM + midazolam 0.2-0.5 mg/kg IM
  - Flumazenil 0.02 mg/kg IM for reversal
- Naughty ferret: add dexmedetomidine 0.01-0.03 mg/kg IM
  - Atipamezole 0.1-0.3 mg/kg IM



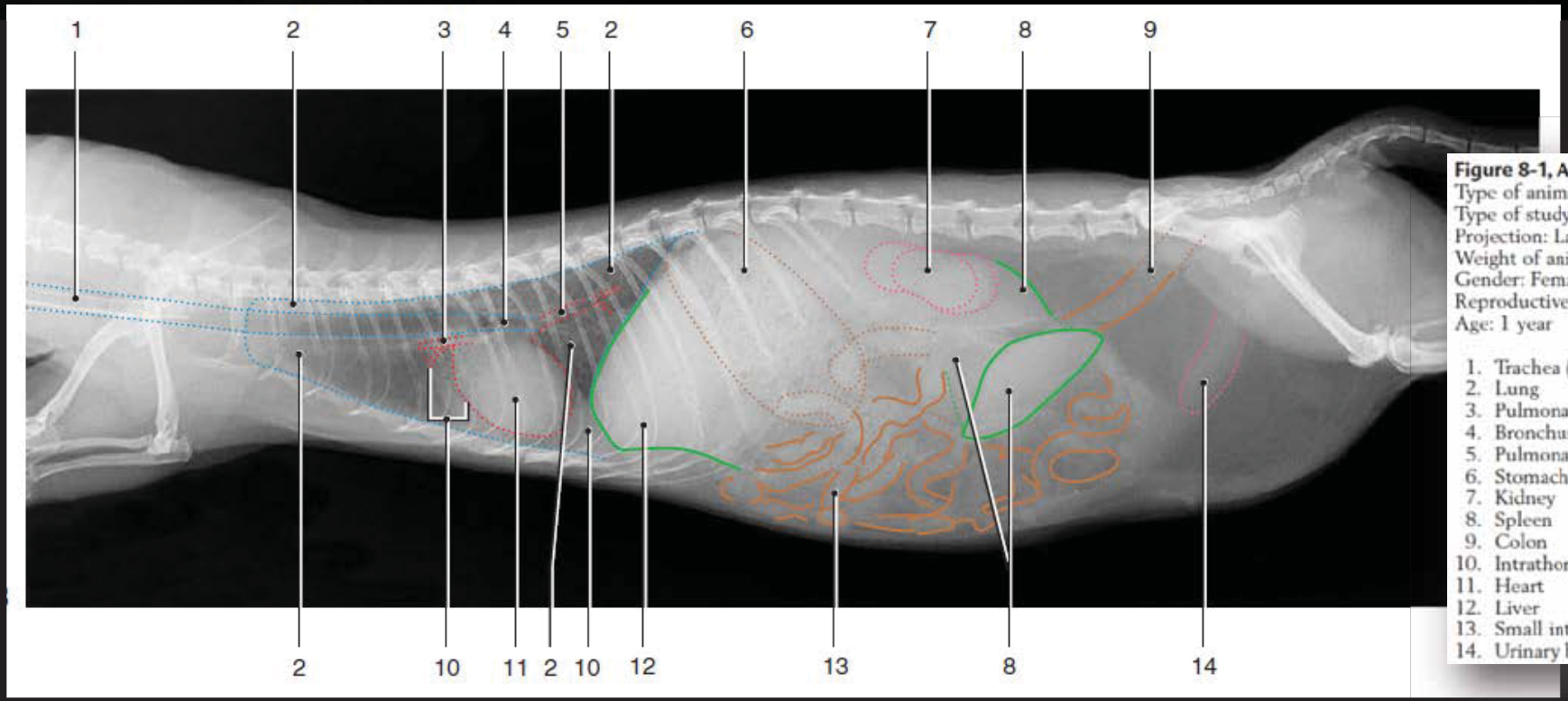


Figure 8-1, A and B
Type of animal: Ferret
Type of study: Viscera of thorax and abdomen
Projection: Laterolateral (right lateral recumbency)
Weight of animal: 900 g
Gender: Female
Reproductive status: Spayed
Age: 1 year

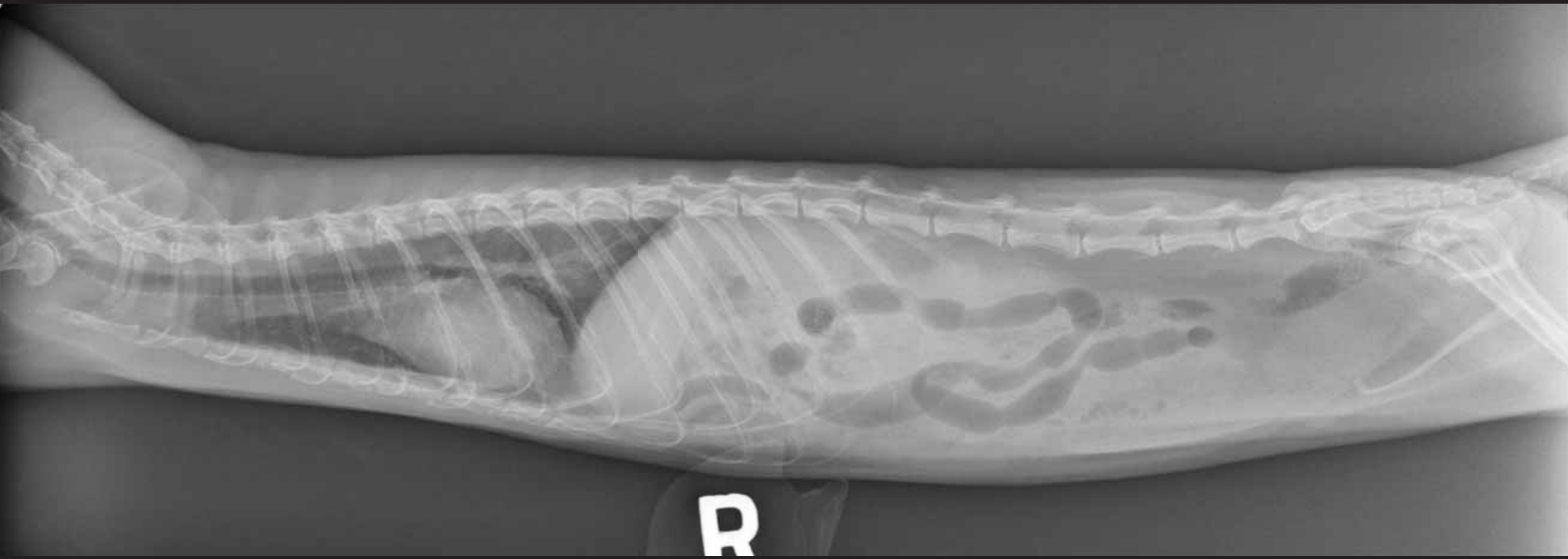
1. Trachea (endotracheal tube within lumen)
2. Lung
3. Pulmonary vasculature
4. Bronchus
5. Pulmonary vein
6. Stomach
7. Kidney
8. Spleen
9. Colon
10. Intrathoracic adipose tissue
11. Heart
12. Liver
13. Small intestine
14. Urinary bladder

Silverman, Tell.
Radiology of Rodents,
Rabbits,
and Ferrets. 2005

Silverman, Tell. Radiology of Rodents, Rabbits, and Ferrets. 2005

Figure 8-2, B
Type of animal: Ferret
Type of study: Viscera of thorax and abdomen
Projection: Ventrodorsal
Weight of animal: 900 g
Gender: Female
Reproductive status: Spayed
Age: 1 year

1. Trachea (endotracheal tube within lumen)
2. Lung
3. Cranial mediastinum
4. Left primary bronchus
5. Heart
6. Liver
7. Stomach
8. Spleen
9. Left kidney
10. Urinary bladder
11. Right primary bronchus
12. Small intestine
13. Right kidney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What is your radiographic interpretation?

Abdominal ultrasound results:
- Within normal limits

Ferret: Case 1

Test Code	Results	Expected	Units/Method
WBC	10.05		X10^3/UL/ ADV
RBC	11.37		X10^6/UL/ ADV
HGB	18.9		G/DL/ ADV
HCT	55.5		%/ ADV
MCV	48.9		FL/ ADV
MCH	16.7		PG/ ADV
MCHC	34.1		G/DL/ ADV
RDW	10.9		%/ ADV
PLATELET			X10^3/UL/ ADV
Comments -- AUTOMATED PLATELET COUNT CANNOT BE REPORTED DUE TO EXCESSIVE CLUMPING. SEE COMMENT ON "PLATELET NUMBER APPEARS" FOR MINIMUM PLATELET NUMBER.			
MPV			FL/ ADV
PCT			%/ ADV
PCV	56		%/ HEMA
PLASMA PROT	5.4		G/DL/ HEMA
Comments -- RESULTS CONFIRMED			
SEG NEUT	5.327		X10^3/UL/ HEMA
BAND NEUT	0.101		X10^3/UL/ HEMA
LYMPH	3.920		X10^3/UL/ HEMA
MONOCYTE	0.402		X10^3/UL/ HEMA
EOSINOPHIL	0.201		X10^3/UL/ HEMA
BASOPHIL			X10^3/UL/ HEMA
REACT LY	0.101		X10^3/UL/ HEMA

Ferret: Case 1

GLU		COB	MG/DL	81
BUN		COB	MG/DL	11
CREA		COB	MG/DL	0.2
PHOS		COB	MG/DL	4.9
CA		COB	MG/DL	8.1
MG		COB	MG/DL	2.3
TP		COB	G/DL	5.4
ALB		COB	G/DL	2.7
GLOB		COB	G/DL	2.7
A/G		COB		1.00
CHOL		COB	MG/DL	147
BILIT		COB	MG/DL	<0.2
ALP		COB	IU/L	28
ALT		COB	IU/L	129
AST		COB	IU/L	71
GGT		COB	IU/L	4
CK		COB	IU/L	310
NA		COB	MMOL/L	147
K		COB	MMOL/L	4.0
CL		COB	MMOL/L	102
HCO3		COB	MMOL/L	33
AGAP		COB		16.0
NA/K		COB		36.8
C-OSM		COB	MOSM/KG	289.3
AMY		COB	IU/L	18
LI		COB	IU/L	66
ICT		COB		0
HEMO		COB		8
LIPE		COB		4 (comments)

INTERPRETATION OF BLOODWORK

- **CBC:**
  - Mild leukocytosis, characterized by a neutrophilia and mild left shift
  - Mildly elevated hematocrit
- **Plasma biochemistries:**
  - Moderate hypochloridemia

What are your top differentials for each of these abnormalities?

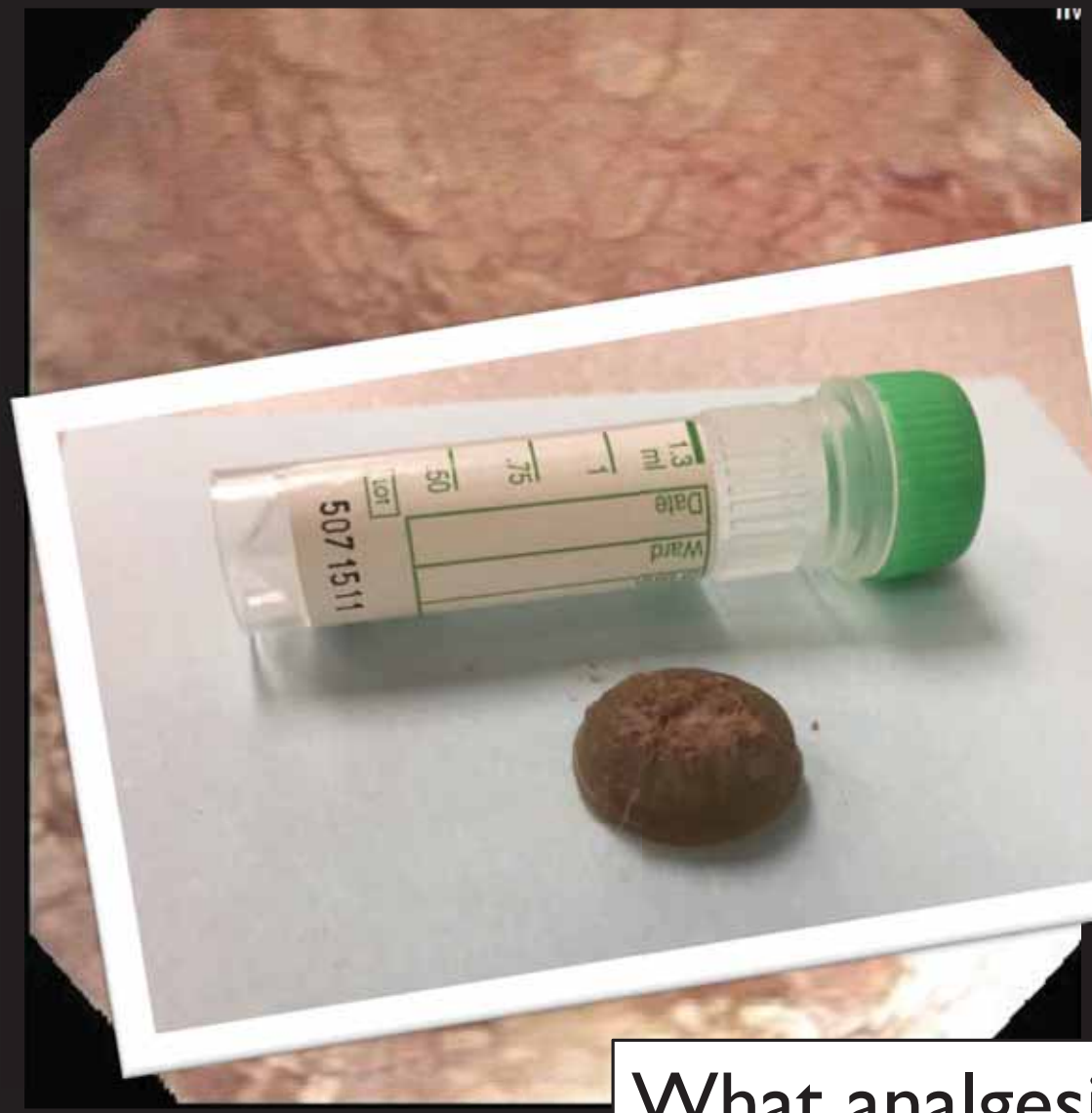
PLAN

- **Possible additional diagnostics?**
  - Upper GI endoscopy
  - Contrast esophageal study
    - Plain films, fluoroscopy
  - Whole body CT scan
- Recommended next step: upper GI endoscopy
  - Owners declined…

PLAN

- **Outpatient management plan** for this patient?
  - "Triple therapy" – similar to treatment for *Helicobacter* gastritis
    - Omeprazole, metronidazole, and amoxicillin
  - Liquid-only diet

- Recheck one week later: still vomiting…
  - Owner approved general anesthesia and endoscopy!



What analgesics would you use post-operatively?

ANALGESIC OPTIONS FOR FERRETS

- Opioids:
  - Hydromorphone 0.1 mg/kg IM or SC q 2.5 hours
  - Buprenorphine 0.03 mg/kg IM or SC q 4 hours
  - Tramadol 2-5 mg/kg PO q 12 hr
- NSAIDs:
  - Meloxicam 0.2 mg/kg PO q 24 hr

CASE 2:
THE DYSPNEIC FERRET

"PADDIE"

- 2 year old MC ferret
- **Presenting complaint:** acute onset of dyspnea and collapse

What **initial triage procedures/treatments** would you like to perform?

What questions about this animal's **history** would you like to ask?

”PADDIE”

- **Triage**:
  - Mild dyspnea, patient appears QAR, hydrated **Wt:** 975 gm **T:** 102 F **P**: 220bpm **R**: 60brpm
  - Oxygen therapy pending discussion with owner
- **History**:
  - Indoor/outdoor ferret, no exposure to other ferrets, no known exposure to other dogs
  - No coughing, sneezing, nasal discharge, vomiting, diarrhea
  - No recent change in environment, no known toxin exposure
  - No current medications or supplements
  - Diet: commercial dry ferret kibble, unknown brand – good appetite
  - No previous medical history

PHYSICAL EXAM

- **Wt: 975gm** **T: 38.8 C** **P: 220 bpm** **R: 60bpm** **mm: pink** **CRT:** <2sec
- **GEN**: QAR, hydrated **BCS: 5/9**
- **EENT**: Eyes clear OU, no anisocoria noted OU. Ears contain wax AU. No ocular-nasal discharge.
  - Oral exam: no abnormalities noted
- **CV**: Grade III/VI systolic murmur, loudest on right side. Strong and synchronous pulses.
- **RESP**: Mild dyspnea, worse with brief handling. No crackles, but reduced lung sounds ventrally.
- **ABD**: Soft, non-painful—no masses palpated. Possible fluid wave in the abdomen. No preputial abnormalities noted, urinary bladder of normal size.
- **MS/I**: Weakly ambulatory on all four limbs, no gait abnormalities or lameness noted, hair coat clean—no evidence of alopecia or ectoparasites.
- **NEURO**: Normal mentation, normal proprioception, cranial nerves intact.
- **PLN**: No enlarged lymph nodes palpable.

PROBLEM LIST

- 1. Acute onset mild dyspnea, reduced lung sounds ventrally (bilaterally)
- 2. Grade III/VI systolic heart murmur, loudest on right side
- 3. Possible ascites, fluid wave in abdomen
- 4. Cerumen AU

What are your top differentials for each problem?

PLAN

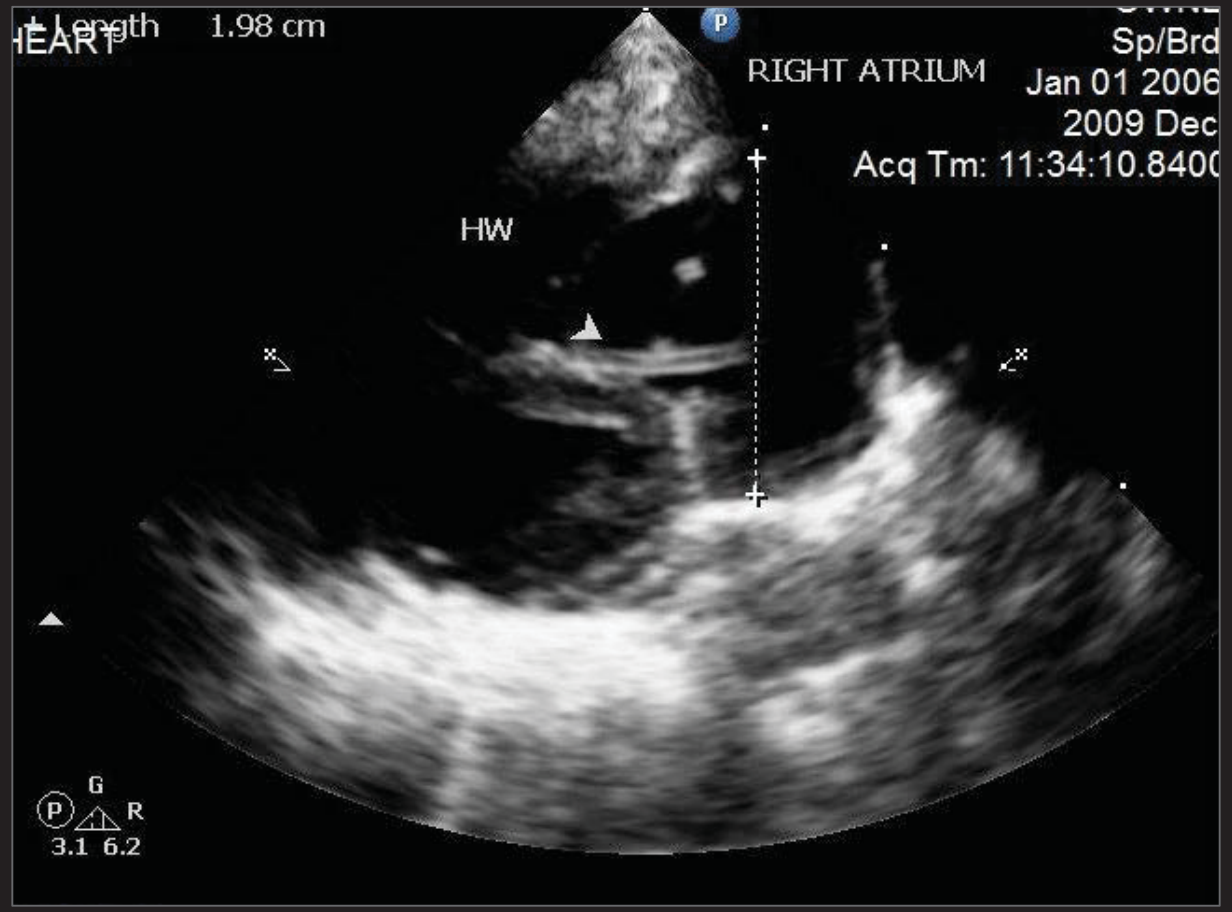
- **What is your diagnostic plan?**
  - Survey whole body radiographs
    - Ventrodorsal view (?)
    - Sedation (?)
  - Complete blood count, plasma biochemistry
- Owners approved radiographs *only*, and did NOT want this animal sedated…

What is your radiographic interpretation?

PROBLEM LIST

- **What are differentials for bicavity effusion in *any* mammal?**
  - Cardiac failure (bilateral)
  - Hypoproteinemia
  - Hemorrhage – trauma, rodenticide
  - Neoplasia – lymphoma
  - Systemic coronavirus (FIP-like syndrome)

Owners approve an echocardiogram – what sedation protocol would you use?


+ Length 1.98 cm
HEART
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Sp/Brd
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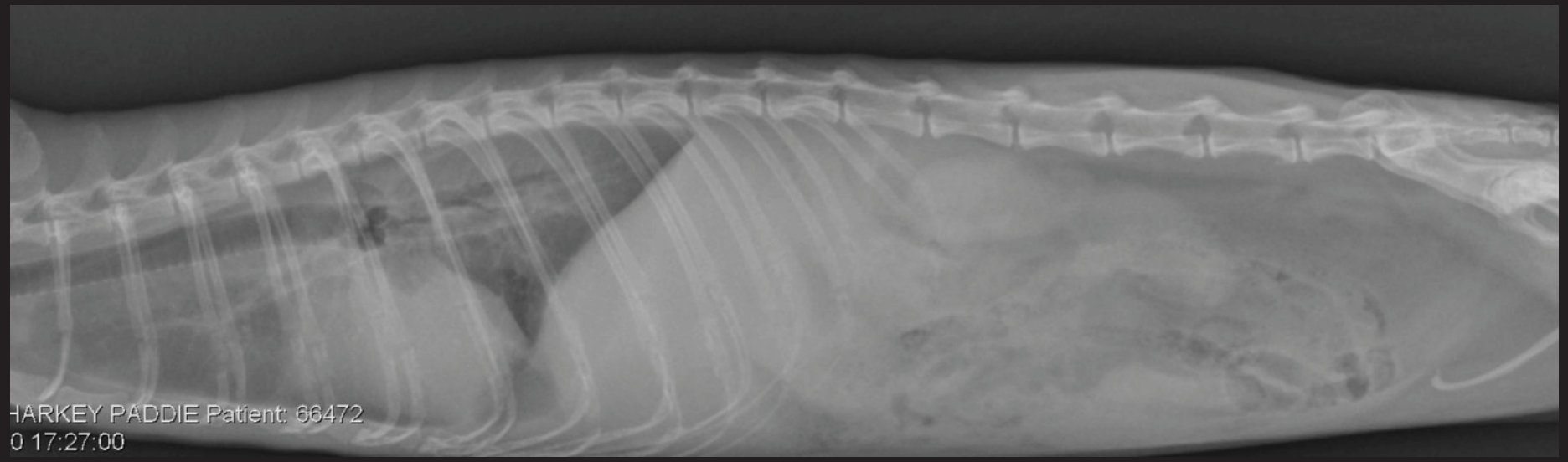
Acq Tm: 11:34:10.8400
HW
G
P
R
3.1 6.2


HEART
Jan 01
2009
RIGHT Acq Tm: 11:32:49
G
P
R
3.1 6.2

HEARTWORM INFECTION IN FERRETS

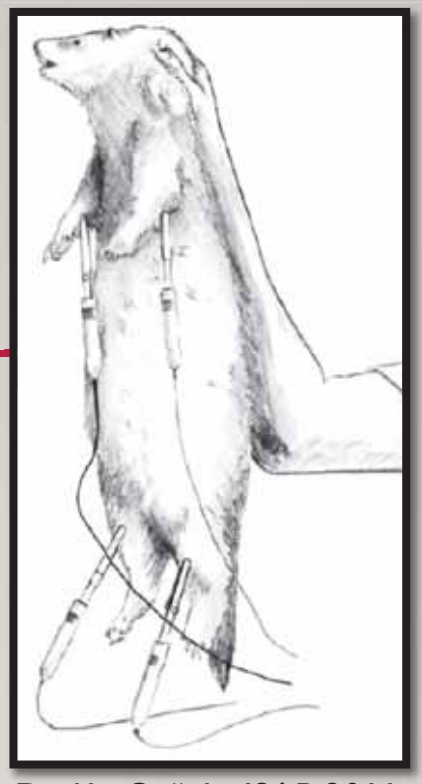
- **Clinical infections similar to cats**
  - Small adult worm burden
  - Severe clinical signs
  - Microfilaria present in 50-60% of infected animals
- **Diagnosis**:
  - Clinical signs of R-sided heart failure
  - Echocardiogram
  - Ag/Ab blood testing for *Dirofilaria immitis*
- **Treatment**:
  - Ivermectin SQ q30 days
  - Prednisone 0.5mg/kg PO q 12 hr
  - Surgical removal of heartworms has been reported

Do NOT treat ferrets with adulticide therapy!



Repeat radiographs 1 month post-treatment

HEART DISEASE IN FERRETS



Dudás-Györki, JSAP 2011

- Valvular regurgitation is most frequently identified echo abnormality (JAVMA 2012)
  - **Aortic** valve > mitral valve
- **DCM** was uncommonly diagnosed, but is **often** associated with CHF
- **AV block** was common, but there's a difference in degrees:
  - **2nd:** little clinical importance with no clinical signs
  - **3rd:** generally had signs of cardiac disease
- Proportionally higher number of **VPCs** in animals with CHF – screen any ferret with VPCs for cardiac disease
- Depending on status of ferret, can perform ECG and echo conscious (JSAP 2011)

CASE 3:
THE ANOREXIC RABBIT

"NUMBER 325"

- 1 year old MN New Zealand White rabbit
- **Presenting complaint:** lethargy, anorexia, and decreased defecation for the last 12 hours
  - Additional provided history: housed at a laboratory animal facility, this patient has been manually restrained daily for the last 5 days for saline injections as a control animal for a research project

What questions about this animal's **history** would you like to ask?

"NUMBER 325"

- **History:**
  - Housed in individual wire cages, 10 other control rabbits in the room – no new additions, no recent exposure to other rabbits, no recent change in environment
  - 12:12 hour light:dark cycle, temperature maintained at 75 F in the room at all times
  - Diet: 1 cup of timothy-based pellets daily, ad lib timothy hay. Water provided in a sipper bottle
  - Obtained from a commercial breeder at 2 months of age, *Pasturella* free herd
  - No coughing, sneezing, nasal discharge, diarrhea
  - No previous medical problems

PHYSICAL EXAM

- **Wt: 2.8kg** **T: 37.7 C** **P: 280 bpm** **R: 120bpm** **mm: pale** **CRT:** ~2sec
- **GEN**: QAR, hydrated **BCS: 4/9**
- **EENT**: Eyes clear OU, no anisocoria noted OU. Ears clean AU. No ocular-nasal discharge.
  - Oral exam: no abnormalities noted, no malocclusion noted.
- **CV**: No murmurs auscultated. Strong and synchronous pulses.
- **RESP**: No crackles or wheezes noted, normal bronchovesicular sounds auscultated. Eupneic.
- **ABD**: No masses or organomegaly palpable. Painful (splinting) on palpation. Kidneys of normal size, urinary bladder not palpable. No borborygmi auscultated.
- **MS/I**: Ambulatory on all four limbs, no gait abnormalities or lameness noted, hair coat clean—no evidence of alopecia or ectoparasites.
- **NEURO**: Normal mentation, normal proprioception, cranial nerves intact.
- **PLN**: No enlarged lymph nodes palpable.

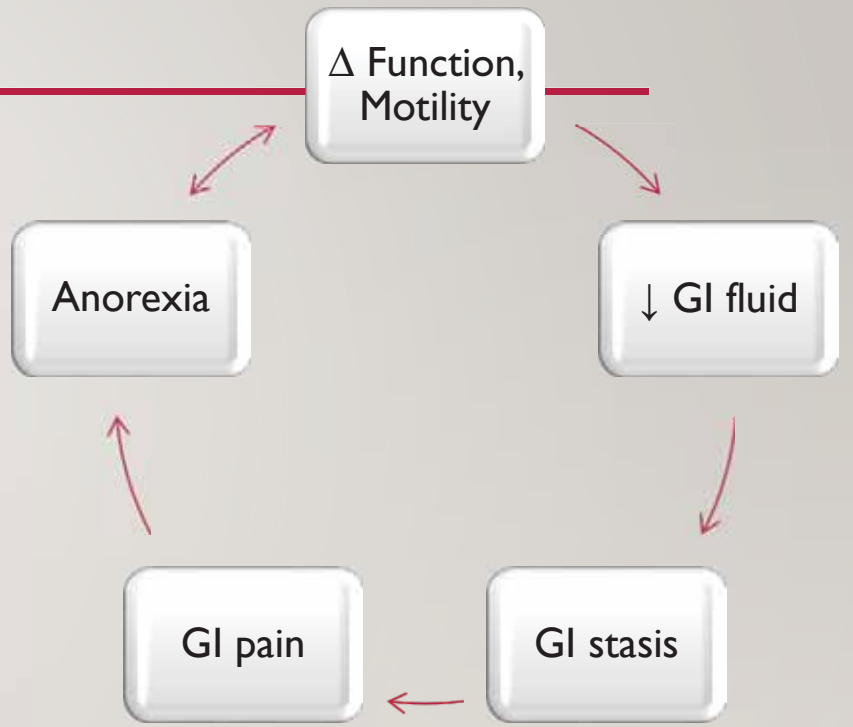
PROBLEM LIST

- 1. Decreased appetite and defecation x 12 hours
  - What is this called in a rabbit?
- 2. Abdominal pain
- 3. Pale mucous membranes

What are your top differentials for each problem?

GASTROINTESTINAL STASIS SYNDROME

- Slowed, or stopped, gastrointestinal motility
- Appetite and fecal production decrease, or cease
- Collection of clinical signs, a syndrome, **NOT** a diagnosis
- Onset triggered by disease +/- stress and pain
  - May be primary gastrointestinal disease, or may not be!



- **One of the most common presenting complaints in pet rabbits**

DIAGNOSTIC TESTING

- History and physical exam changes may provide a vague problem list – start with a **minimum database** and adjust as needed
  - Complete blood count, plasma biochemistry
  - Survey whole body radiographs
  - Abdominal ultrasound
  - Urinalysis
- Changes on these tests will **depend on the underlying cause**

What would you like to use for sedation?

SEDATION OPTIONS FOR RABBITS

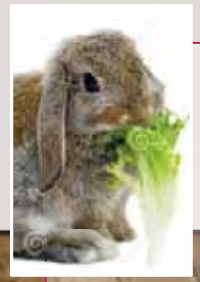
- Higher doses than dogs/cats required to get same effects – also applies for rodents
- Non-painful disease: butorphanol 1-2 mg/kg IM + midazolam 1-2 mg/kg IM
  - Not used often in rabbits with GI stasis – **why?**
  - Flumazenil 0.02 mg/kg IM for reversal
- Painful disease: hydromorphone 0.2 mg/kg IM + midazolam 1-2 mg/kg IM
  - Flumazenil 0.02 mg/kg IM for reversal
- Can also add dexmedetomidine 0.03-0.06 mg/kg IM or ketamine 1-3 mg/kg IM
  - Atipamezole 0.3-0.6 mg/kg IM

TREATMENT

- Fluid route depends on stability of patient and severity of dehydration: 100 ml/kg/day SQ/IV/IO
- Multi-modal analgesia when possible
- **1. Opioids:**
  - Hydromorphone 0.2-0.3 mg/kg SQ/IM q 4 hr
  - Buprenorphine 0.05-0.1 mg/kg SQ/IM q 6-8 hr
  - Tramadol 10-15 mg/kg PO q 8-12 hr
- **2. NSAIDs:**
  - Meloxicam 0.5 mg/kg SQ/IM/PO q 12 hr **OR** 1 mg/kg SQ/IM/PO q 24 hr
- Critical Care: 9 g/kg/day
- Antibiotics(?), prokinetics(?)
- Treat any underlying disease

Fluid resuscitation

Analgesia



Nutrition

PROBLEM LIST

- 1. Decreased appetite and defecation x 12 hours
- 2. Abdominal pain
- 3. Pale mucous membranes

PLAN

- **What is your initial diagnostic plan?**
  - Survey whole body radiographs
  - Complete blood count, plasma biochemistry
  - Urinalysis

RABBIT NORMAL ANATOMY

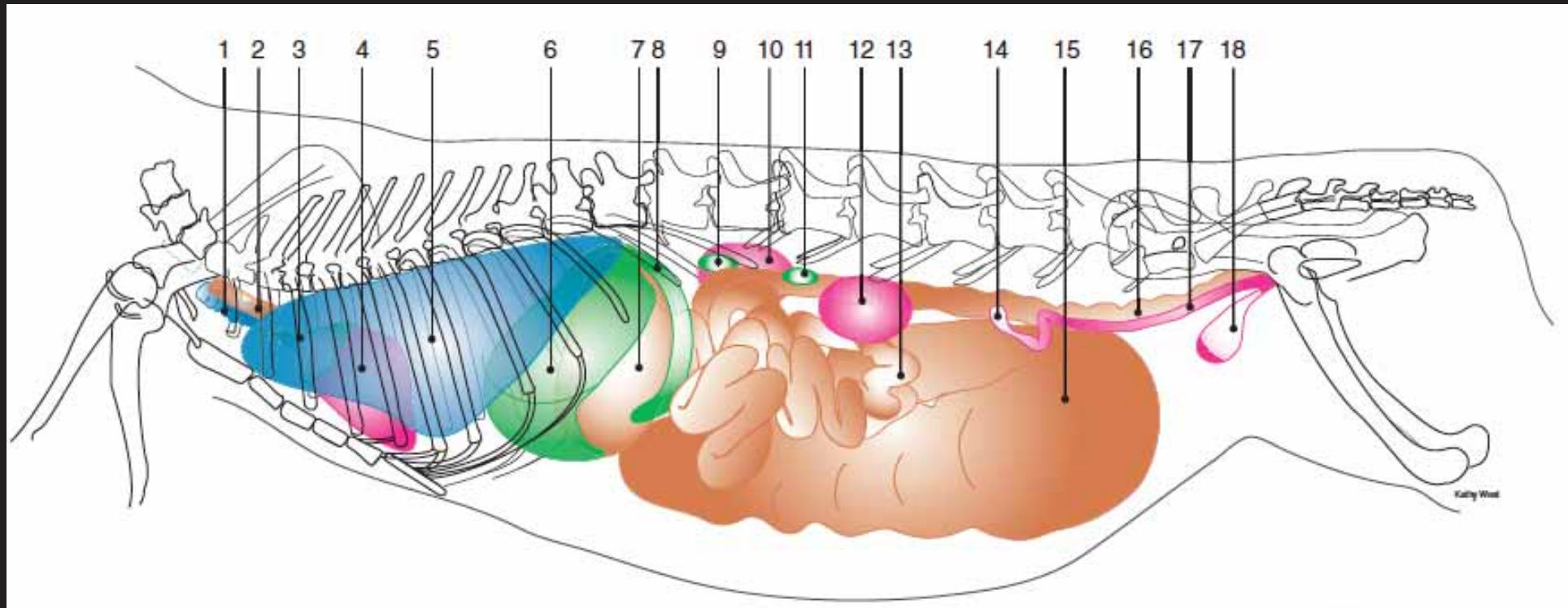


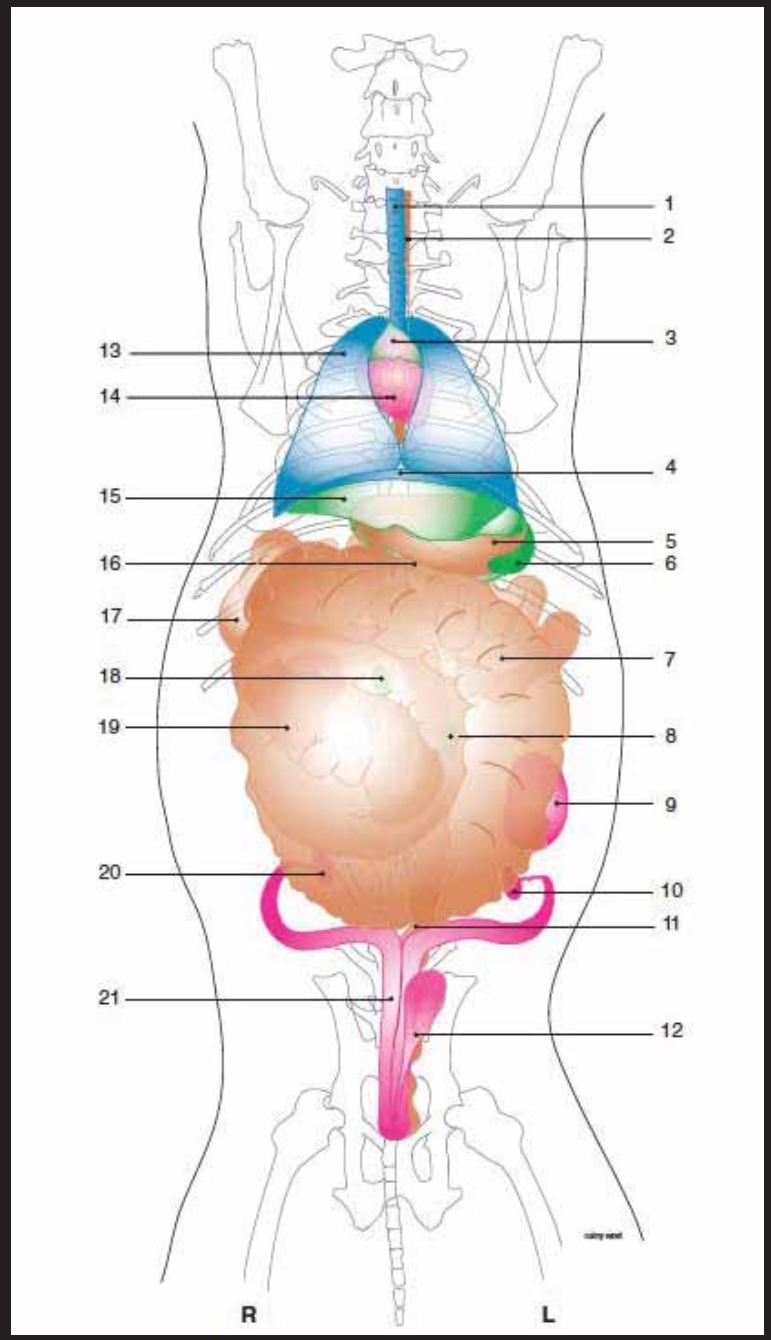
Figure 7-1, A Anatomic drawing (view of the left side) of viscera of the thorax and abdomen of an adult female rabbit.

1. Trachea
2. Esophagus
3. Thymus
4. Heart
5. Lung
6. Liver
7. Stomach
8. Spleen
9. Right adrenal gland
10. Right kidney
11. Left adrenal gland
12. Left kidney
13. Small intestine
14. Left ovary
15. Cecum
16. Descending colon
17. Left horn of uterus
18. Urinary bladder

Silverman, Tell. Radiology of Rodents, Rabbits, and Ferrets. 2005

RABBIT NORMAL ANATOMY

1. Trachea
2. Esophagus
3. Thymus
4. Diaphragm
5. Stomach
6. Spleen
7. Cecum
8. Left adrenal gland
9. Left kidney
10. Left ovary
11. Descending colon
12. Urinary bladder
13. Lung
14. Heart
15. Liver
16. Pancreas
17. Small intestine
18. Right adrenal gland
19. Right kidney
20. Right ovary
21. Right horn of uterus



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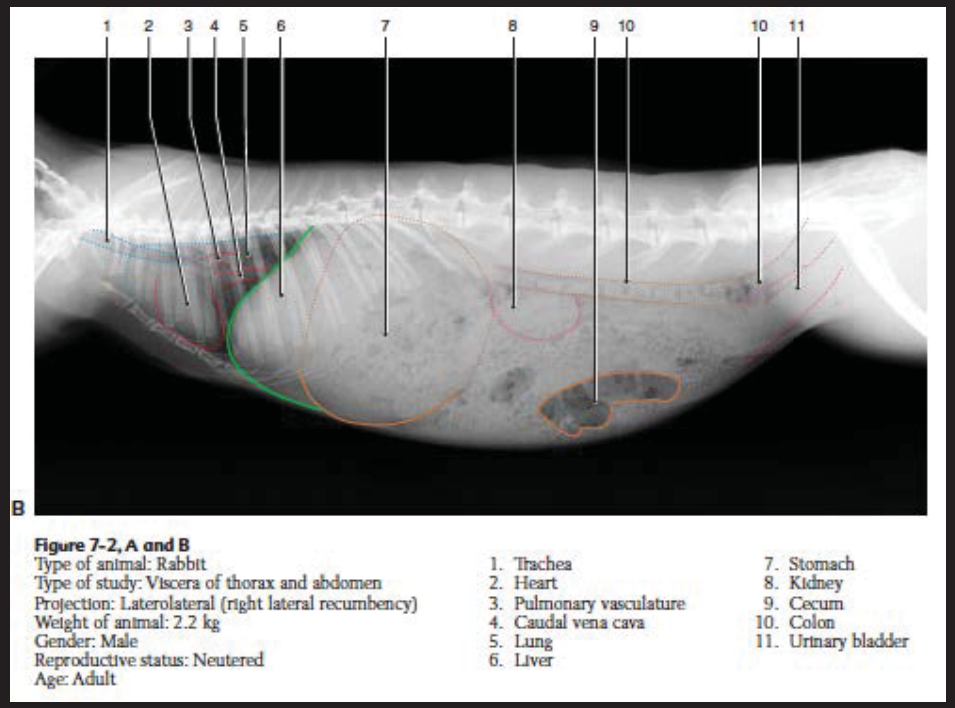


Figure 7-2, A and B
Type of animal: Rabbit
Type of study: Viscera of thorax and abdomen
Projection: Laterolateral (right lateral recumbency)
Weight of animal: 2.2 kg
Gender: Male
Reproductive status: Neutered
Age: Adult

1. Trachea
2. Heart
3. Pulmonary vasculature
4. Caudal vena cava
5. Lung
6. Liver
7. Stomach
8. Kidney
9. Cecum
10. Colon
11. Urinary bladder

Silverman, Tell. Radiology of Rodents, Rabbits, and Ferrets. 2005

Silverman, Tell. Radiology of Rodents, Rabbits, and Ferrets. 2005

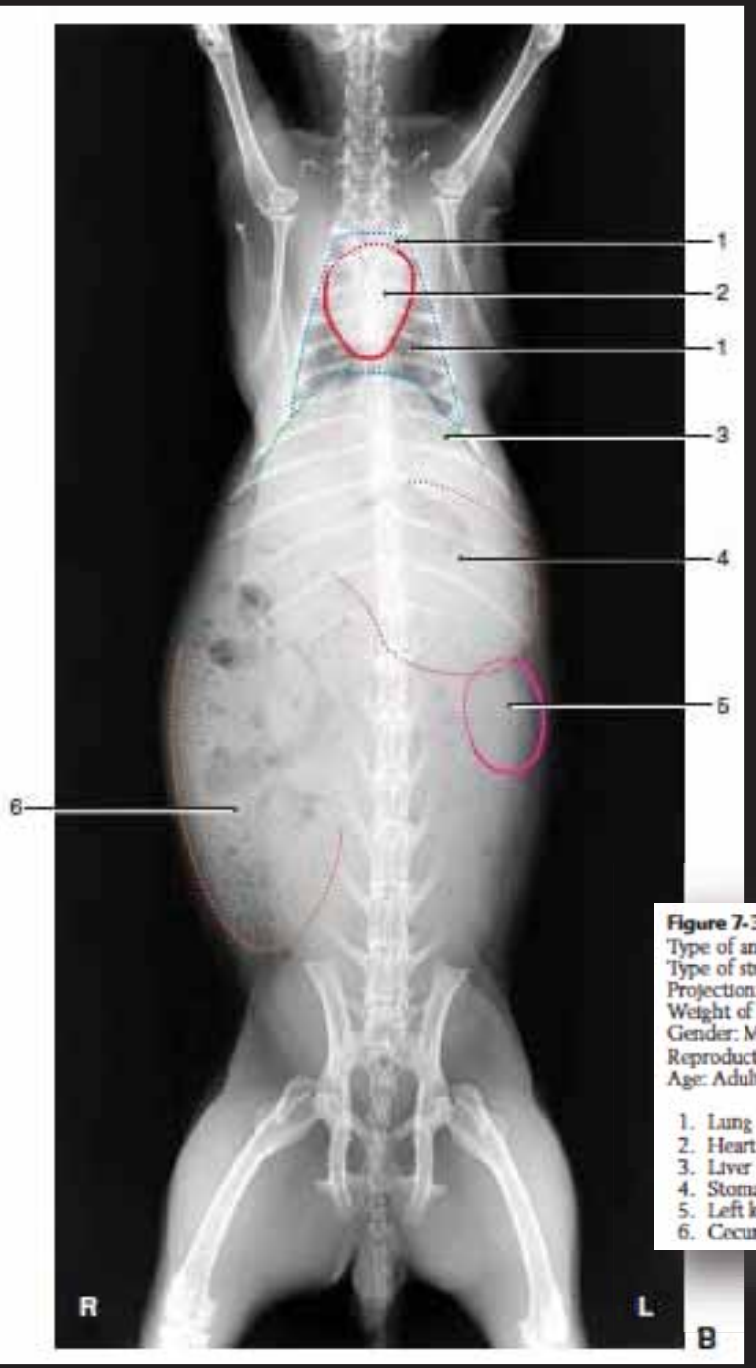
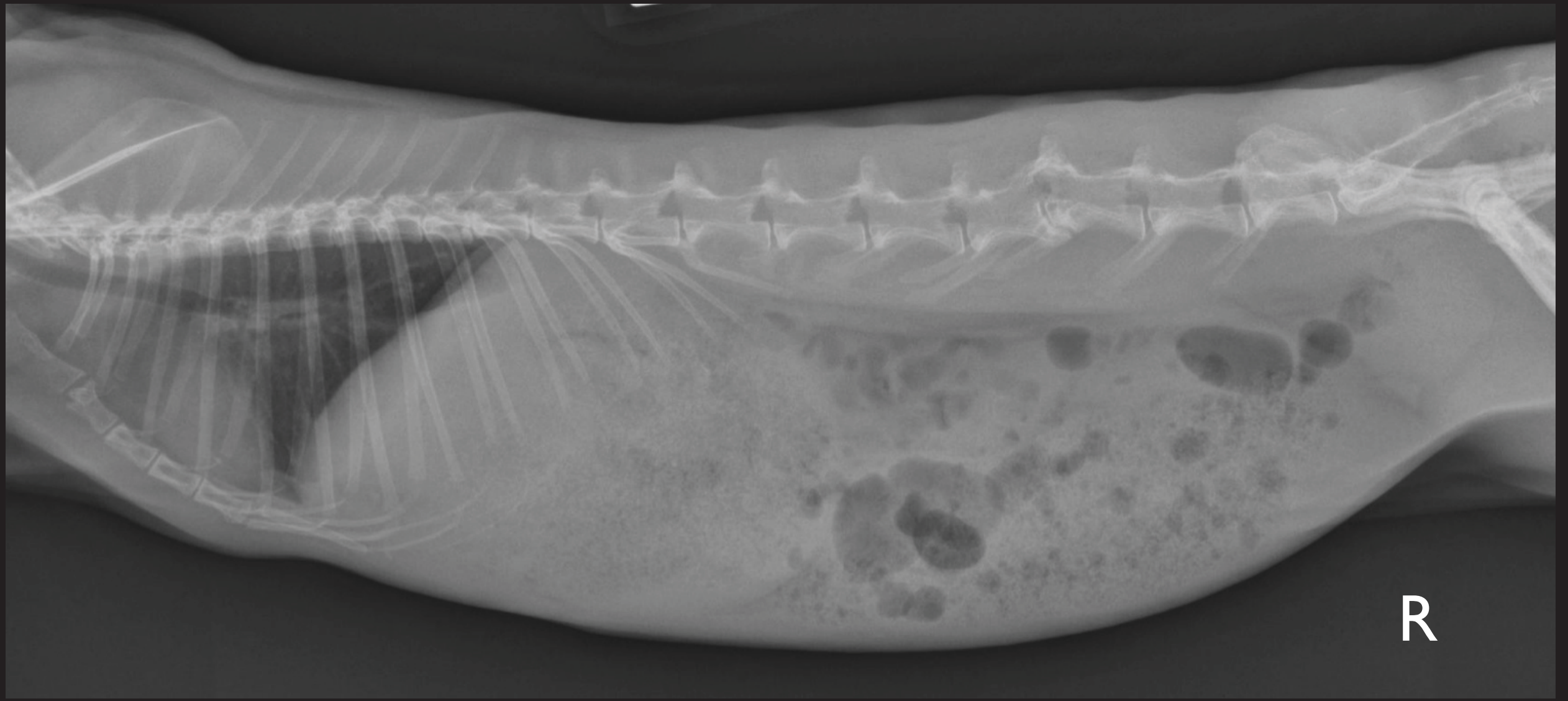


Figure 7-3, B
Type of animal: Rabbit
Type of study: Viscera of thorax and abdomen
Projection: Ventrodorsal
Weight of animal: 2.2 kg
Gender: Male
Reproductive status: Neutered
Age: Adult

1. Lung
2. Heart
3. Liver
4. Stomach
5. Left kidney
6. Cecum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What is your radiographic interpretation?

Test	Result	Reference Range
ALK. PHOSPHATASE	36	12 - 96 U/L
ALT (SGPT)	**478**	**48 - 70 U/L**
AST (SGOT)	**620**	**33 - 99 U/L**
GGT	**7**	**50 - 140 U/L**
ALBUMIN	3.1	2.7 - 3.6 g/dL
TOTAL PROTEIN	**4.7**	**4.9 - 7.1 g/dL**
GLOBULIN	**1.6**	**2.4 - 3.3 g/dL**
BUN	**50**	**17 - 24 mg/dL**
CREATININE	**2.1**	**0.8 - 1.8 mg/dL**
CHOLESTEROL	**19**	**24 - 65 mg/dL**
GLUCOSE	152	108 - 160 mg/dL
CALCIUM	10.7	8.7 - 18.4 mg/dL
PHOSPHORUS	**6.6**	**4.0 - 6.2 mg/dL**
POTASSIUM	**2.9**	**3.8 - 5.5 mEq/L**
SODIUM	141	132 - 156 mEq/L
A/G RATIO	1.9	0.7 - 1.9

Test	Result	Reference Range
WBC	8.2	5.0 - 12.0 K/uL
RBC	**3.05**	**4.0 - 7.0 M/uL**
HGB	**6.5**	**10 - 15 g/dL**
HCT	**20.3**	**36.0 - 48.0 %**
MCV	67	fL
MCH	21.3	pg
MCHC	32.0	g/dL
NEUTROPHIL	3813	/uL
LYMPHOCYTE	3887	/uL
MONOCYTE	410	/uL
EOSINOPHIL	16	/uL
BASOPHIL	74	/uL
POLYCHROMASIA	SLIGHT	
ANISOCYTOSIS	SLIGHT	

Reticulocyte count: normal (0-3%)

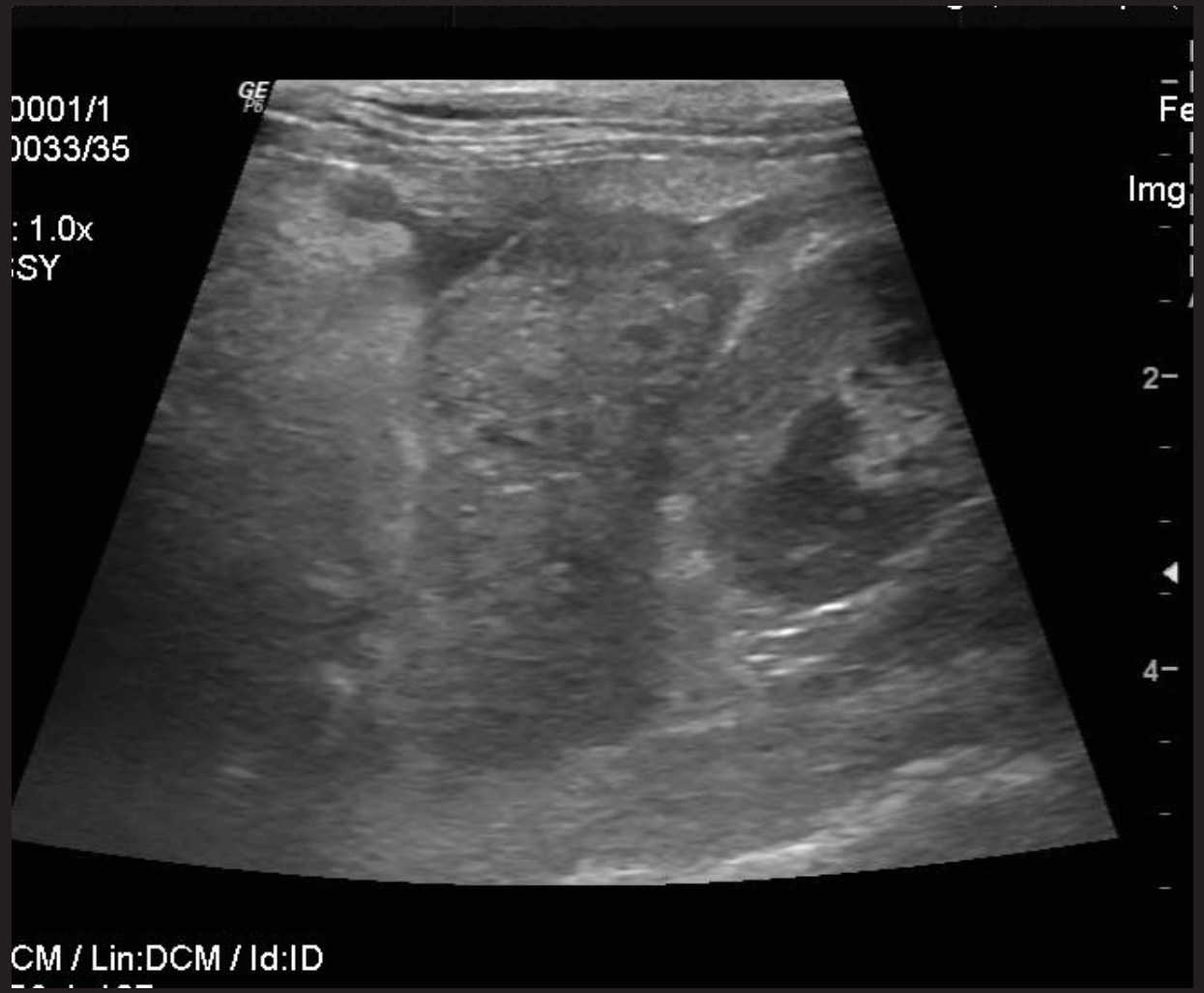
Rabbit Case 3

Test	Result	Reference Range
COLLECTION METHOD	CATHETERIZED	
COLOR	YELLOW	
CLARITY	TURBID	
SPECIFIC GRAVITY	1.011	
GLUCOSE	NEGATIVE	
BILIRUBIN	NEGATIVE	
KETONES	NEGATIVE	
BLOOD	NEGATIVE	
PH	8.0	
PROTEIN	NEGATIVE	
WBC	0-2	HPF
RBC	0-2	HPF
BACTERIA	NONE SEEN	
EPI CELL	2+ (3-5)/HPF	
MUCUS	NONE SEEN	
CASTS	NONE SEEN	
CRYSTALS	AMORPHOUS PHOSPHATES PRESENT	
OTHER	AMORPHOUS DEBRIS PRESENT	
UROBILINOGEN	NORMAL	

Rabbit Case 3

What is your interpretation of the bloodwork and urinalysis?

What diagnostic do you want to perform next?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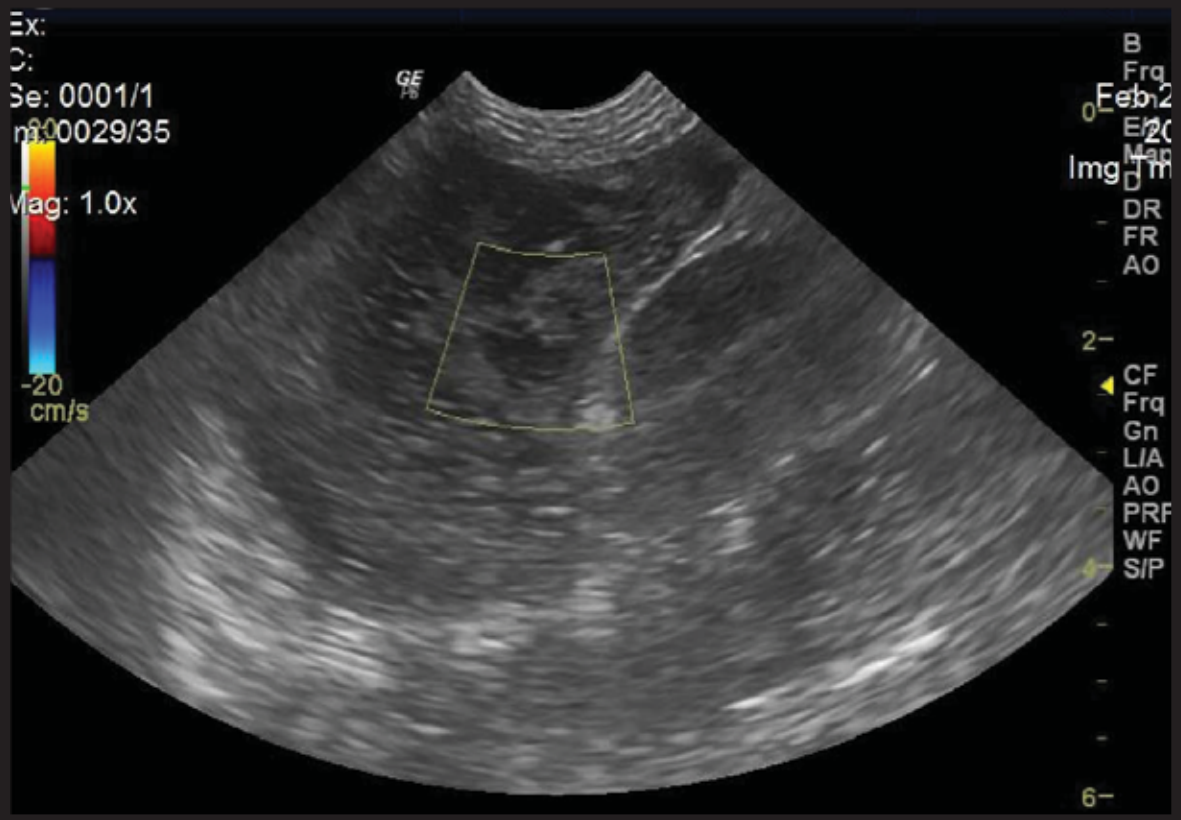
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6

Liver

LIVER LOBE TORSION IN RABBITS

- **Presenting complaint:** ”GI stasis”
- **Signalment**:
  - Median age: 5.15 years (range: 1.5-9 years)
  - No sex predilection
  - Lop breeds (mini lops) over-represented
- **Clinical signs:**
  - Median duration of signs before presentation: **1 day**
  - Most common reported signs:
    - **Anorexia** (94%), **lethargy** (56%), decreased fecal production (38%)

LIVER LOBE TORSION IN RABBITS

- **PE findings:**
  - **Abdominal pain** (75%), **dehydration** (38%), increased intestinal gas (31%), tachypnea (25%)
  - Cranial abdominal mass effect/hepatomegaly (19%)
- **Hematologic findings:**
  - Anemia (68%) – median PCV: 28.2%
  - Thrombocytopenia (44%)
- **Biochemical findings:**
  - Elevated ALT (88%), elevated ALP (69%), elevated AST (44%)
  - All *significantly* elevated (6-10x normal)
  - Some too high to read by machine, reported as "ERROR"

LIVER LOBE TORSION IN RABBITS

- **Abdominal radiographs:**
  - Increased gastric or intestinal gas (69%)
  - Rounded liver margins, hepatomegaly (19%)
  - Loss of serosal detail (19%)
- **Abdominal ultrasound:**
  - ***Diagnostic* for liver lobe torsion in ALL cases**
  - Hepatomegaly, rounded liver lobe margins
  - Color flow Doppler –lack of or decreased blood flow in affected lobe(s)
    - Present in ALL cases

LIVER LOBE TORSION IN RABBITS

- 56% had liver lobectomy
  - **ALL rabbits treated surgically survived**
- ALL rabbits that survived to discharge had **no recurrent episodes** of liver lobe torsion
- Most commonly affected lobes:
  - **Caudate lobe** (63%)

What is your analgesic plan for this patient?

POST-OPERATIVE CARE

- Was maintained on a fentanyl CRI 20 µg/kg/hr after surgery, but dislodged catheter at 5 am
  - Administered meloxicam 0.5 mg/kg SQ after surgery at 4 pm
- You arrive at 7 am and your rabbit looks like this:

Describe your interpretation of these findings

PAIN ASSESSMENT IN RABBITS

National Centre for the Replacement Refinement & Reduction of Animals in Research

- Facial grimace scale: posters/PDFs available online for rabbits, rats, and mice!
  - Components: orbital tightening, cheek flattening, nostril shape, whisker change & position, ear shape & position
- Normal rabbit:

ADJUSTED ANALGESIC PLAN

- Hydromorphone 0.2 mg/kg IM q 4 hr to start, then transitioned to SC
  - The following day, transitioned to tramadol 15 mg/kg PO q 8 hr
- Continued meloxicam 0.5 mg/kg PO q 12 hr

CASE 4:
THE LETHARGIC GREY

"BABY"

- 17-year-old unknown sex African Grey parrot
- **Presenting complaint:** possible blood in the droppings, one day history of lethargy

What **history** questions would you like to ask?

HISTORY

- No known toxin exposure
- No exposure to other birds (wild or domestic)
- Diet: chronic inappropriate diet with no recent diet changes
- "Bacterial" infection in cloaca 1-2 years prior at rDVM, treated with unknown antibiotics and improved dramatically
  - No records available

PHYSICAL EXAM

- **Wt: 405g T: not taken P: 260 bpm R: 60 bpm mm: pink CRT: <2sec**
- **GEN**: QAR, 5-7% dehydration **BCS: 5/9**
- **EENT**: Eyes clear OU, no anisocoria noted OU. Ears clean AU. No ocular-nasal discharge.
- **CV**: No murmurs/arrhythmias noted.
- **RESP**: Lung and air sacs sounds quiet. Mild increase in respiratory effort.
- **COELOM**: No masses or organomegaly palpable, non-painful, concave. Small amount of suspected frank blood in one dropping, but all others WNL.
- **MS/I**: Ambulatory, no gait abnormalities or lameness noted, mildly poor feather quality.
- **NEURO**: Normal mentation, normal proprioception, cranial nerves intact.

PROBLEM LIST

- 1. Suspected hematochezia
- 2. Chronic inappropriate diet
- 3. Mildly increased respiratory effort

PLAN

- **What is your initial diagnostic plan?**
  - Biochemistry + bile acids
  - Complete blood count
  - Hemoccult of feces, +/- Gram stain
  - Survey whole body radiographs

"BABY"

- **What really happened…**
  - Presented at ~9pm on Christmas Eve
  - Owners declined imaging – even a single-view "Bird in box" view
  - Owners approved:
    - Blood work
    - 1-2 days of supportive care and hospitalization with antibiotics because "it fixed him last time!"
- Bloodwork didn't go to the lab until the 26th…received results on the 27th
  - Other in house options?
- **Preliminary treatment:**
  - SC fluids – Normosol-R 70mL/kg/day, divided into two treatments
  - Orbifloxacin 20mg/kg PO q 24 hr
  - Continued to eat on own—no gavage feeding necessary

AVIAN COMP PROFILE : AVIAN PANEL 24 (2787)

Test	Result	Reference Range		Low / Normal / High
AST (SGOT)	156	80 - 235 U/L		
CK	5282 [1]	140 - 400 U/L	HIGH	
GGT	2	1 - 4 U/L		
AMYLASE	245	200 - 600 U/L		
ALBUMIN	0.8	1.0 - 2.0 g/dL	LOW	
TOTAL PROTEIN	3.3	2.7 - 4.5 g/dL		
GLOBULIN	2.5	1.4 - 2.8 g/dL		
BUN	7	mg/dL		
CHOLESTEROL	260	162 - 417 mg/dL		
GLUCOSE	244	186 - 308 mg/dL		
CALCIUM	8.8	8.0 - 10.0 mg/dL		
PHOSPHORUS	5.4	1.2 - 5.6 mg/dL		
CHLORIDE	111	107 - 125 mEq/L		
POTASSIUM	3.3	1.8 - 4.6 mEq/L		
SODIUM	152	148 - 160 mEq/L		
A/G RATIO	0.3	0.4 - 3.0	LOW	
URIC ACID	13.6 [2]	2.1 - 10.0 mg/dL	HIGH	
TRIGLYCERIDE	69	51 - 140 mg/dL		
NA/K RATIO	46			
CA/PHOS RATIO	1.6			

AVIAN COMP PROFILE : BILE ACIDS (2787)

Test	Result	Reference Range	Low / Normal / High
BILE ACIDS	43.9 [1]	7.0 - 95.0 umol/L	

AVIAN COMP PROFILE : AVIAN/EXOTIC CBC AND PLASMA PROTEIN (2787)

Test	Result	Reference Range		Low / Normal / High
WBC-EST	35-36	5.0 - 11.0 THOUS.		
WBC COUNT	**35.4**	**3 - 15 THOUS.**	**HIGH**	
HCT	49.0	40 - 53 %		
HETEROPHILS	**91.0**	**33 - 82 %**	**HIGH**	
% LYMPHOCYTE	**3.0**	**18 - 49 %**	**LOW**	
% MONOCYTE	**5.0**	**0 - 4 %**	**HIGH**	
% EOSINOPHIL	1.0	0 - 1 %		
ABSOLUTE HETEROPHIL	**32214**	**1000 - 12000 /uL**	**HIGH**	
LYMPHOCYTE	1062	600 - 7000 /uL		
MONOCYTE	**1770**	**0 - 600 /uL**	**HIGH**	
EOSINOPHIL	**354**	**0 - 200 /uL**	**HIGH**	
THROMBOCYTES	ADEQUATE			
BLOOD PARASITES	NO PARASITES SEEN			
REMARKS	CELLS DO NOT APPEAR TOXIC OR REACTIVE RBC MORPHOLOGY APPEARS NORMAL.			
PLASMA PROTEIN	4.7	3 - 5		

"BABY"

- **Problem list additions?**
- **Case progression:**
  - Patient remained stable, eating, and maintained weight throughout hospitalization
    - No hematochezia or melena noted
  - **December 27th**
    - Blood work results received
      - Added second antibiotic: Clavamox 125mg/kg PO q 12 hr
    - Didn't eat that morning, and seemed more lethargic
      - Gavage fed once—took well, eating that evening
  - **December 28th**
    - Anorexic overnight, progressive increased respiratory effort
    - Convinced owners to obtain **radiographs** due to declining condition

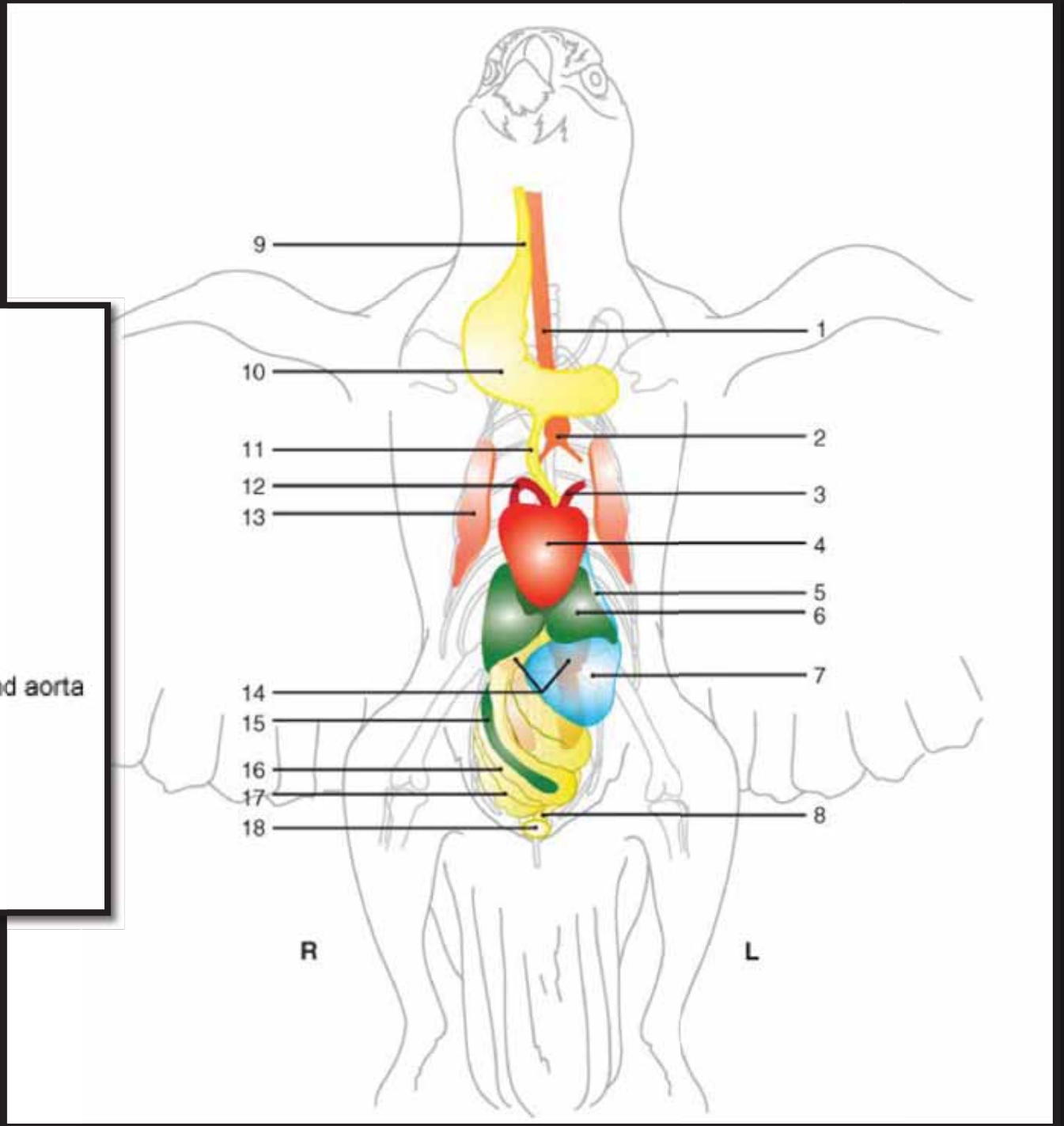
What would you like to use for sedation?

SEDATION OPTIONS FOR BIRDS

- **Psittacines (parrots):**
  - Majority κ receptors, so butorphanol appears to be most effective for analgesia
  - Butorphanol 1-2 mg/kg IM + midazolam 1-2 mg/kg IM
    - Flumazenil 0.05 mg/kg IM for reversal
- **Raptors (birds of prey):**
  - Majority μ receptors, so buprenorphine and hydromorphone most effective for analgesia
  - Hydromorphone 0.3 mg/kg IM + midazolam 1-2 mg/kg IM
- **Poultry (+/- waterfowl):**
  - Exact receptors unclear, reports of positive and negative results with κ and μ receptor agonists in analgesia studies
  - Butorphanol 2-4 mg/kg IM + midazolam 2-3 mg/kg IM +/- ketamine 2-3 mg/kg IM
  - Hydromorphone 0.3 mg/kg IM + midazolam 1-2 mg/kg IM

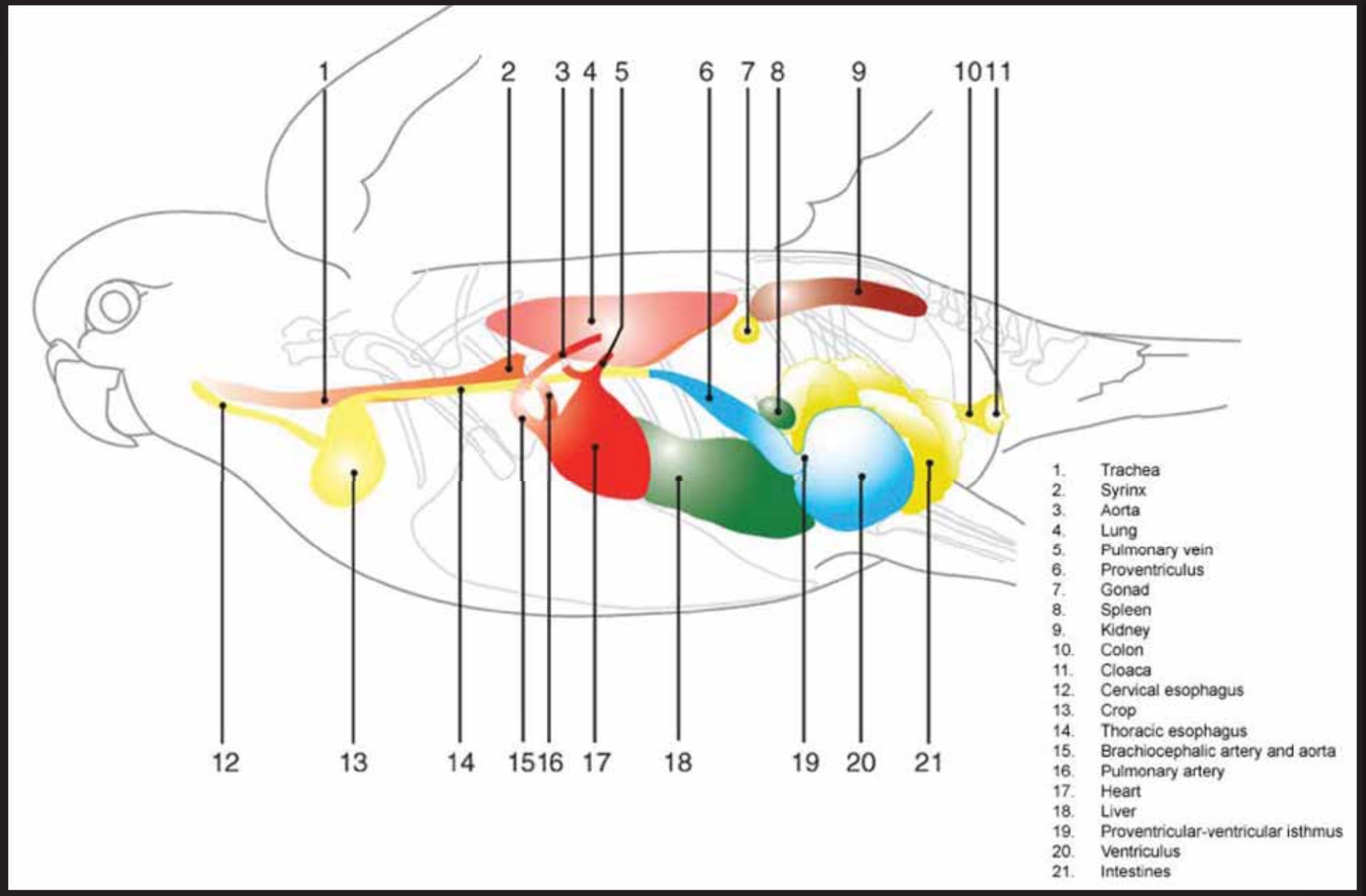
PSITTACINE NORMAL ANATOMY

1. Trachea
2. Syrinx
3. Heart base vessel
4. Heart
5. Proventriculus
6. Liver
7. Ventriculus
8. Colon
9. Cervical esophagus
10. Crop
11. Thoracic esophagus
12. Brachiocephalic artery and aorta
13. Lung
14. Kidneys
15. Pancreas
16. Duodenum
17. Intestines
18. Cloaca



Silverman, Tell. Radiology of Birds. 2000

PSITTACINE NORMAL ANATOMY



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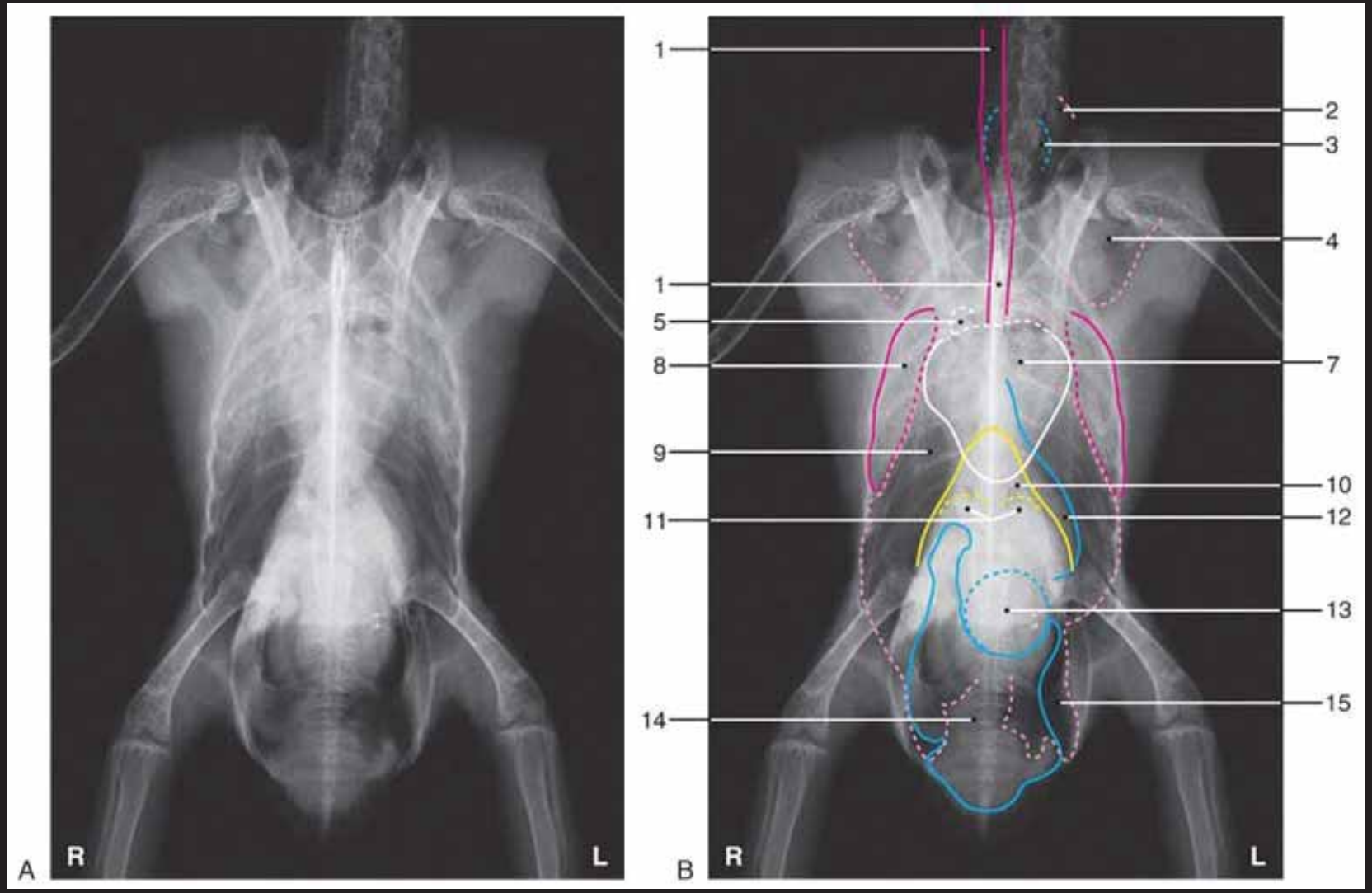
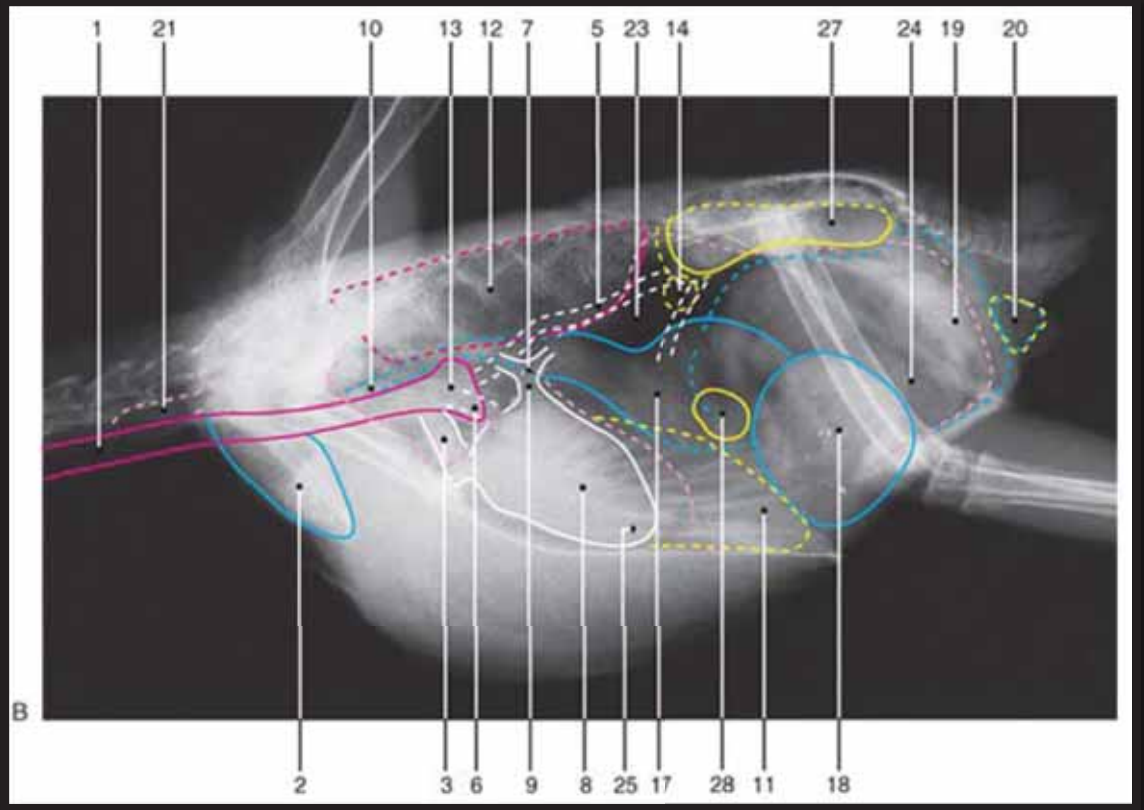


Type of Bird: African Grey Parrot
Type of Study: Viscera of the coelom
Projection: Laterolateral (right lateral recumbency)
Weight of Animal: 546 g
Gender: Unknown
Reproductive Status: Intact
Age: Adult

1. Trachea
2. Cervical air sac
3. Crop
4. Clavicular air sac
5. Brachiocephalic artery and aorta
6. (Heart base vessel)
7. Heart
8. Lung
9. Thoracic air sac
10. Liver
11. Kidneys
12. Proventriculus
13. Ventriculus
14. Intestines
15. Abdominal air sac
16. (Cloaca)

NOTE: Structures in parentheses are not labeled.

Silverman, Tell. Radiology of Birds. 2000



Type of Bird: African Grey Parrot
Type of Study: Viscera of the coelom
Projection: Laterolateral (right lateral recumbency)
Weight of Animal: 546 g
Gender: Unknown
Reproductive Status: Intact
Age: Adult

1. Trachea
2. Crop
3. Brachiocephalic artery and aorta
4. (Brachiocephalic artery)
5. (Aorta)
6. Pulmonary artery
7. Pulmonary vein
8. Heart
9. Left atrium
10. Esophagus
11. Liver
12. Lung
13. Syrinx
14. Gonad
15. (Ovary)
16. (Testes)
17. Proventriculus
18. Ventriculus
19. Intestines
20. Cloaca
21. Cervical air sac
22. (Clavicular air sac)
23. Thoracic air sac
24. Abdominal air sac
25. Apex of heart
26. (Interface between caudal thoracic and abdominal air sacs)
27. Kidneys
28. Spleen

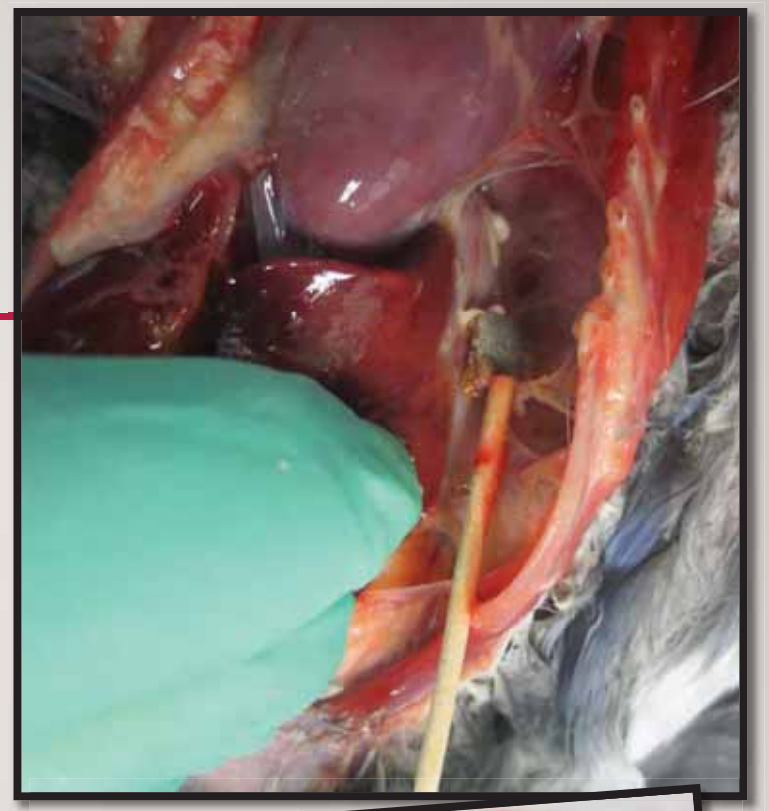
NOTE: Structures in parentheses are not labeled.

Silverman, Tell. Radiology of Birds. 2000


SLUTZKY BABY ID: 107135

What is your radiographic interpretation?

“BABY”



Video taken ~4 hours after sedation and survey radiographs

CASE 5:
THE DYSPNEIC GREY

"JAVA"

- 15-year-old DNA sexed male African Grey parrot
- **Presenting complaint:** 3 day history of respiratory difficulty and an episode of left limb paralysis

What **history** questions would you like to ask?

HISTORY

- Left limb went limb for approximately 5 minutes while he was perching, but then he rapidly returned to normal
- Respiratory signs consists of episodes of open beak "panting" that last for a few minutes at a time
- No known toxin exposure
- No exposure to other birds (wild or domestic)
- Has had for 3 years, and previous owners were smokers
- Diet: inappropriate diet with no recent diet changes

PHYSICAL EXAM

- **Wt: 420g T: not taken P: 240 bpm R: 90 bpm mm: pink CRT: <2sec**
- **GEN**: QAR, 5% dehydration **BCS: 7/9**
- **EENT**: Eyes clear OU, no anisocoria noted OU. Ears clean AU. No ocular-nasal discharge, blunted choanal papillae.
- **CV**: No murmurs/arrhythmias noted.
- **RESP**: Lung and air sacs sounds harsh. Mild increase in respiratory effort and tachypneic.
- **COELOM**: No masses or organomegaly palpable, non-painful, concave.
- **MS/I**: Ambulatory, no gait abnormalities or lameness noted, mildly poor feather quality. Grade 2/5 pododermatitis plantar aspects of both feet
- **NEURO**: Normal mentation, normal proprioception, cranial nerves intact. No evidence of neurologic deficits in any limbs

PROBLEM LIST

- 1. Harsh lung and air sac sounds with increased respiratory effort and tachypnea
- 2. Suboptimal diet
- 3. Suspect hypovitaminosis A
- 4. Episode of left pelvic limb paralysis at home
- 5. Obese (BCS 7/9)

What are your top differentials for each problem?

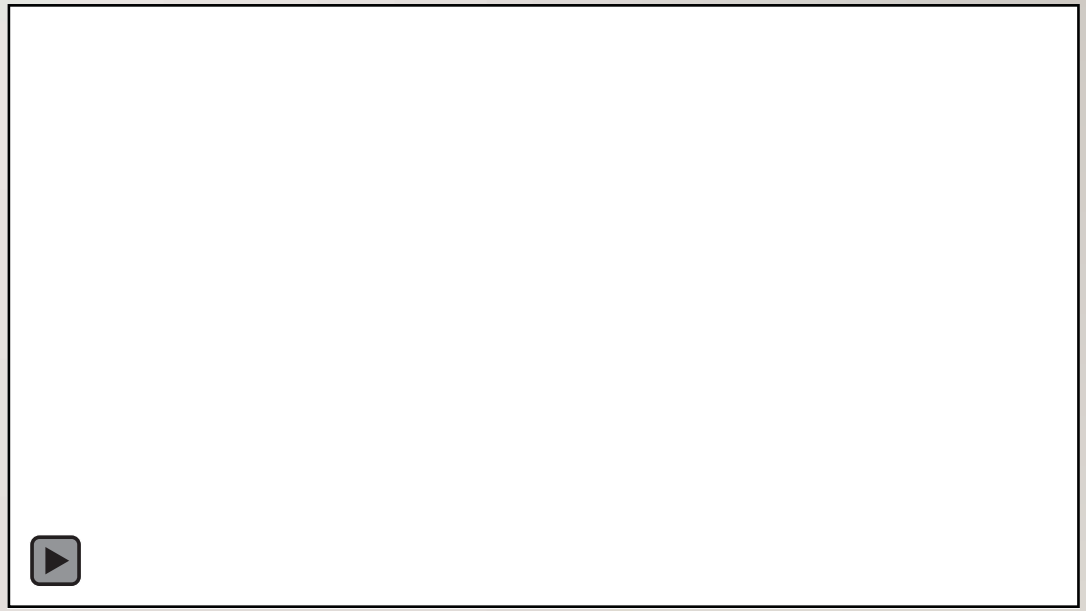
ATHEROSCLEROSIS


www.animalia-life.com

- **Most common vascular change in birds**
- Intimal accumulations of lipid, cholesterol, mineralization → cartilaginous or osseous metaplasia in lesions
  - Accumulation in underlying endothelium leads to inflammatory reactions and macrophage activation, remodeling, plaque formation, and narrowing of lumen
- Lesions start at great vessels = difficult to evaluate with cardiac evaluation
  - Predominant location = **aorta** with extension into **brachiocephalic arteries**, rarely in descending aorta
  - **Peripheral arteries less common**, but have been reported
- Risk factors: genetics, diet (seeds), husbandry, age, response to injury/infection, +/- females
- **Predisposed species** = African grey parrots, amazons, cockatiels, monk parakeets
  - Resistant species = macaws, cockatoos

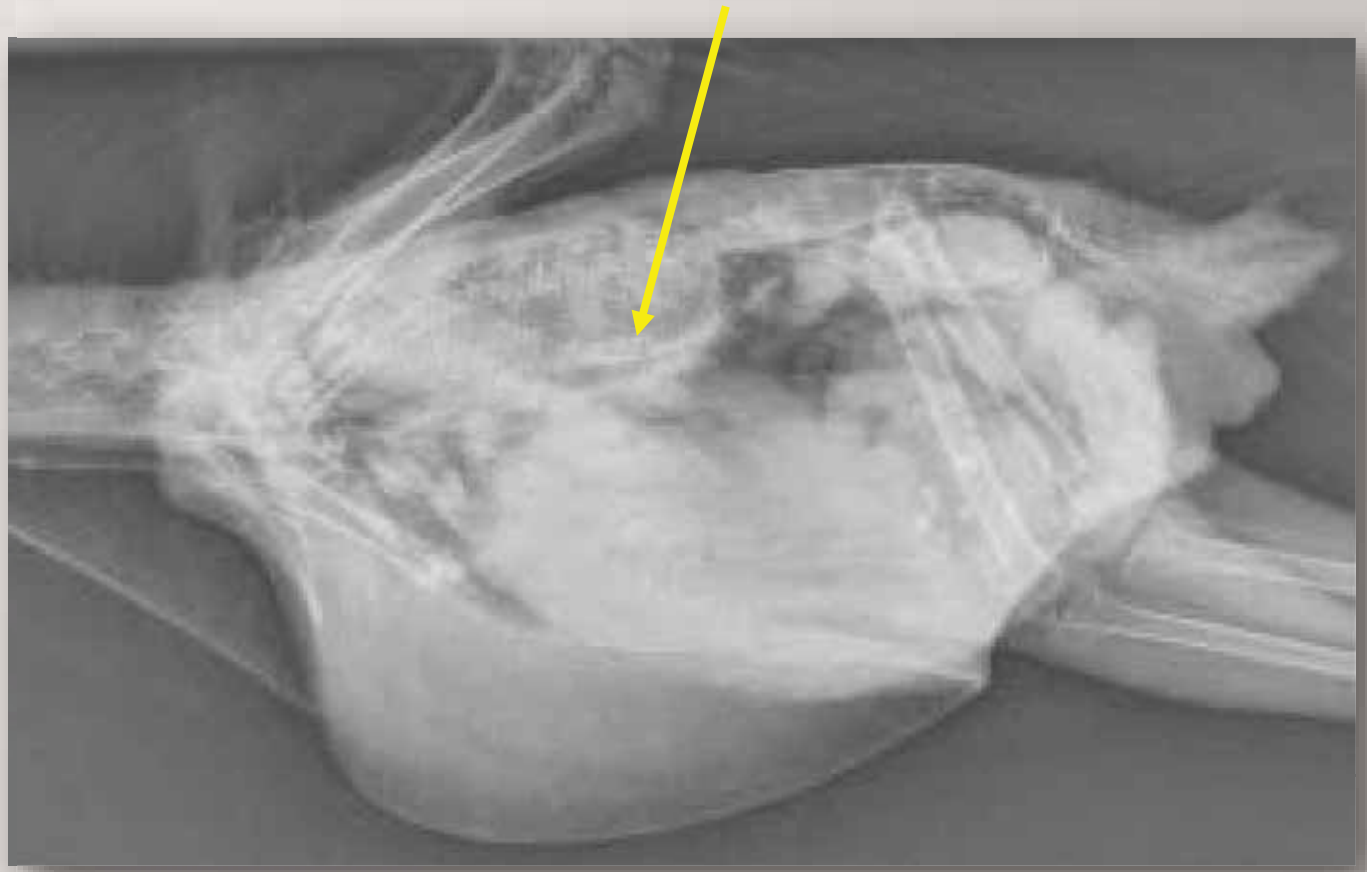
ATHEROSCLEROSIS: CLINICAL SIGNS

- Vary depending on severity and location of lesions, concurrent disease
- Most common: sudden death
- Other common: dyspnea, anorexia, difficulty perching
- Others: lethargy, disorientation, seizures, fainting, anorexia, regurgitation, pelvic limb lameness, cerebrovascular accidents, claudication



ATHEROSCLEROSIS: DIAGNOSIS

- **Difficult to diagnose antemortem**
  - Limitations in knowledge, resolution of imaging equipment, clinical pathology markers
  - Incomplete knowledge of risk factors, extreme changes in blood values of reproductively active females
- Blood pressure: chronic hypertension proven risk factor in mammals, but not reliable in birds
- ECG: changes are not well characterized
- Radiographs: major arteries → enlargement and calcification, signs of congestive heart failure
- Angiography: flow-limiting stenosis
- Echocardiography: cardiac manifestations of disease (CHF, valvular insufficiency)
- CT or MRI: cerebral complications (ischemia, hemorrhagic strokes)
- Endoscopy: interclavicular approach, may be impaired in overweight birds
- Many cases diagnosed on necropsy



ATHEROSCLEROSIS: TREATMENT

- Lifestyle changes: increase activity, decrease stress, limit dietary excesses and obesity
- Anti-hypertensive medications: ACE inhibitors, beta blockers
  - Ideally monitor blood pressure, but may not be reliable
- Medical management of CHF: pimobendan, furosemide
- Clinical signs of peripheral arterial disease: pentoxifylline, isoxuprine
- Use of statins controversial, information limited

PROBLEM LIST

- 1. Harsh lung and air sac sounds with increased respiratory effort and tachypnea
- 2. Suboptimal diet
- 3. Suspect hypovitaminosis A
- 4. Episode of left pelvic limb paralysis at home
- 5. Obese (BCS 7/9)

PLAN

- **What is your initial diagnostic plan?**
  - Biochemistry
  - Complete blood count
  - Survey whole body radiographs
  - Ionized calcium

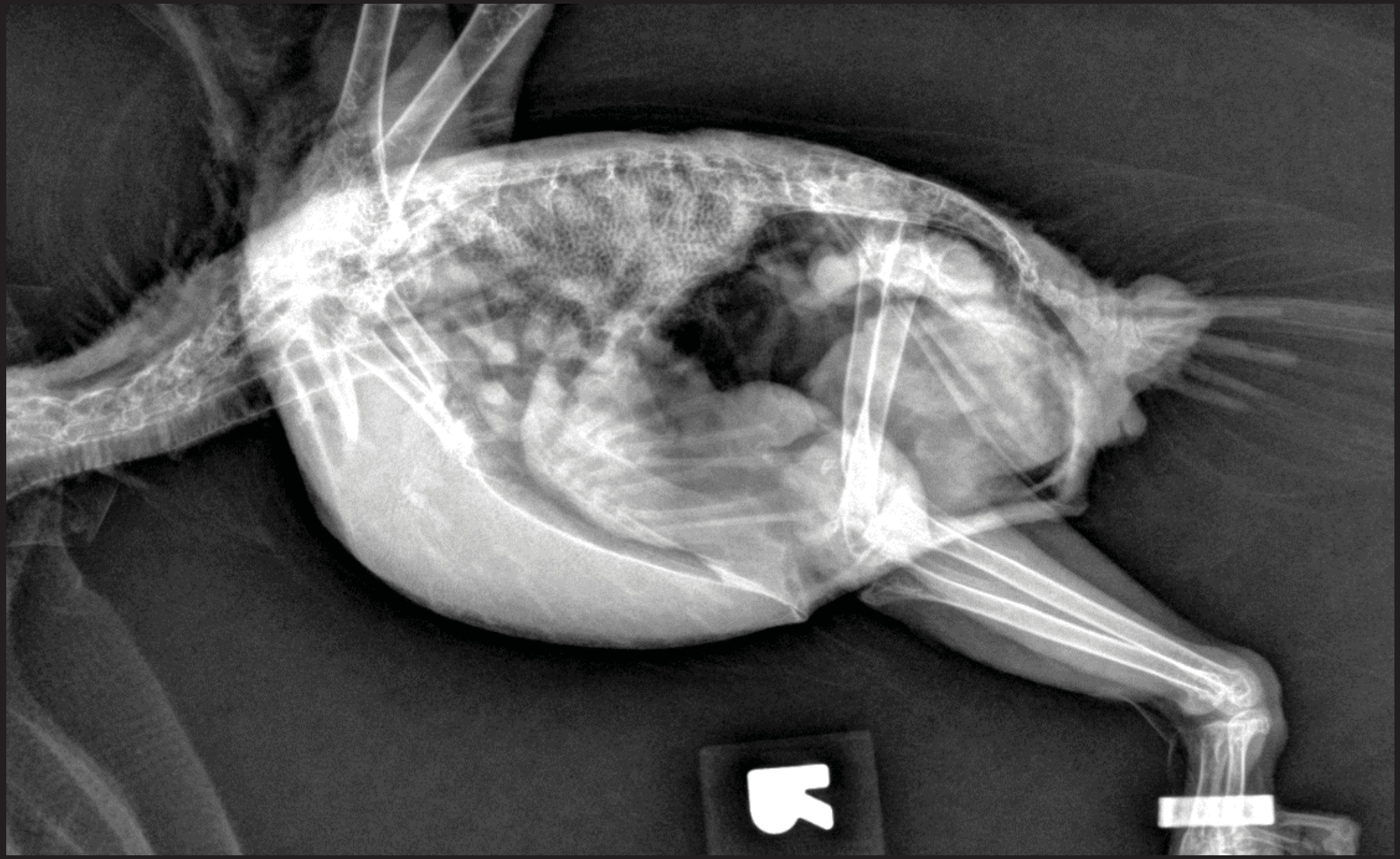
TEST	RESULT
CK	5425 U/L
AST	281 U/L
BILE ACIDS	35 µmol/L
GLUCOSE	221 mg/dL
CHOLESTEROL	239 mg/dL
URIC ACID	4.8 mg/dL
CALCIUM	8.2 mg/dL
PHOSPHORUS	3.3 mg/dL
TP	2.2 g/dL
ALBUMIN	1.7 g/dL
GLOBULUN	0.5 g/dL
SODIUM	150 mmol/L
POTASSIUM	2.9 mmol/L
CHLORIDE	111 mmol/L
iCa	1.15 mmol/L

TEST	RESULT
CK	5425 U/L
AST	281 U/L
BILE ACIDS	35 µmol/L
GLUCOSE	221 mg/dL
CHOLESTEROL	239 mg/dL
URIC ACID	4.8 mg/dL
CALCIUM	8.2 mg/dL
PHOSPHORUS	3.3 mg/dL
TP	2.2 g/dL
ALBUMIN	1.7 g/dL
GLOBULUN	0.5 g/dL
SODIUM	150 mmol/L
POTASSIUM	2.9 mmol/L
CHLORIDE	111 mmol/L
iCa	1.15 mmol/L

TEST	RESULT
PCV	53%
POLYCHROMASIA	MODERATE
WBC	8.3 x 10^3/ul
HETEROPHILS	5.6 x 10^3/ul
LYMPHOCYTES	1.7 x 10^3/ul
MONOCYTES	0.9 x 10^3/ul
BASOPHILS	0.1 x 10^3/ul
PLASMA PROTEIN	3.5 g/dL
THROMBOCYTES	ADEQUATE

TEST	RESULT
PCV	53%
POLYCHROMASIA	MODERATE
WBC	8.3 x 10^3/ul
HETEROPHILS	5.6 x 10^3/ul
LYMPHOCYTES	1.7 x 10^3/ul
MONOCYTES	0.9 x 10^3/ul
BASOPHILS	0.1 x 10^3/ul
PLASMA PROTEIN	3.5 g/dL
THROMBOCYTES	ADEQUATE

What is your sedation plan?



What is your radiographic interpretation?

UPDATED PROBLEM LIST

- 1. Harsh lung and air sac sounds with increased respiratory effort and tachypnea – peribronchial pattern and thickened air sac lines
- 2. Suboptimal diet and obesity – suspect atherosclerosis
- 3. Suspect hypovitaminosis A
- 4. Episode of left pelvic limb paralysis at home – claudication?
- 5. Osteoarthritis of stifles

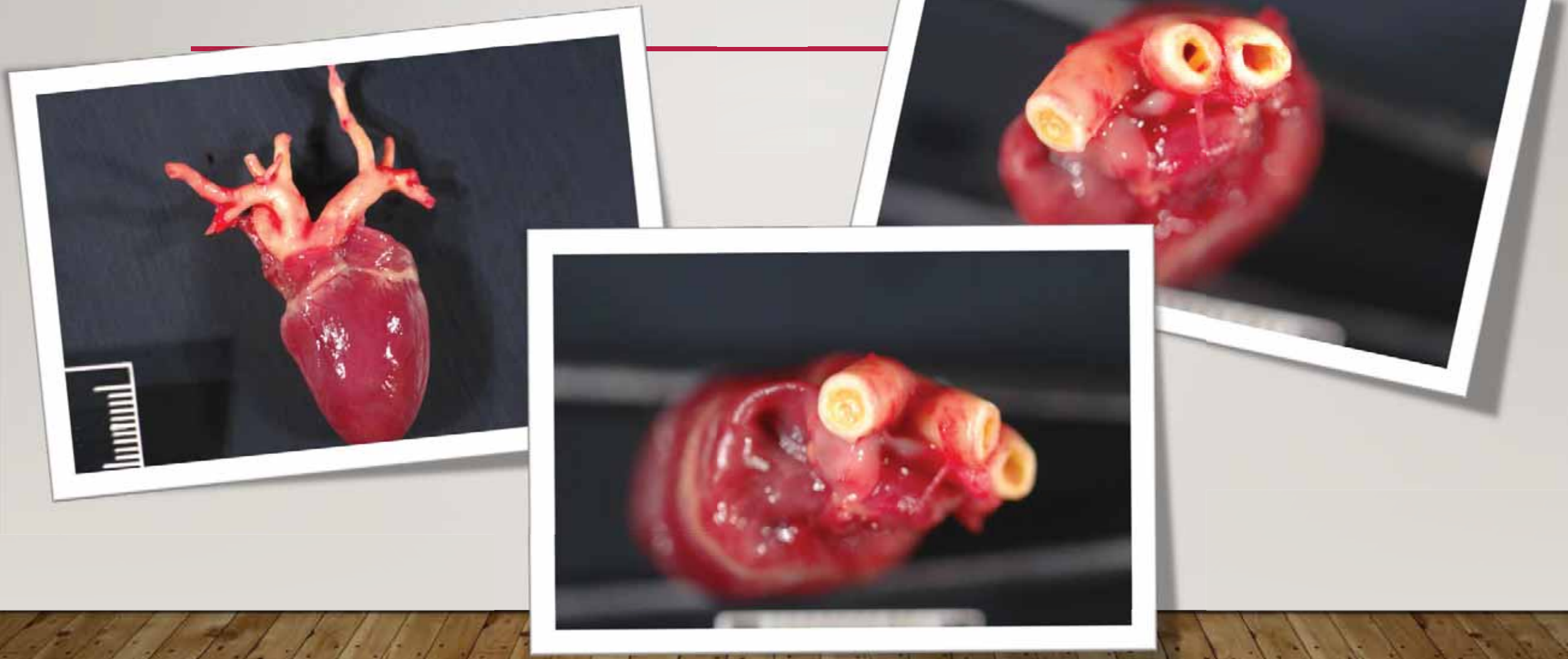
What is your treatment plan?

"JAVA" OUTCOME

- Recovered well from sedation – eating, vocalizing, and preening during the day
- Maintained in 40% oxygen cage overnight
- Normosol-R 70 ml/kg/day SC divided into two treatments
- Planned for cardiology consultation the following morning

- Died overnight, owners elected necropsy

“JAVA” NECROPSY



CASE 6: THE ANOREXIC CHAMELEON

"BILLINGSWORTH"

- 9 mo old MI Jackson's chameleon
- **Presenting complaint:** inappetance progressing to anorexia over the past 7 days, and lethargy over the past 7 days

What **history** questions would you like to ask?

HISTORY

- Obtained about 8 months ago from a pet shop
- 4'x2'x2' enclosure with glass sides and a mesh top
  - Artificial leaves and vines as cage furniture
- UVB light at the top of the cage that was purchased 8 months ago
- Temperature measured with analog thermometers – read 75-90 F
- Humidity provided by spraying the cage 8-9 times per day
- Diet: gut loaded crickets, mealworms, waxworms dusted with multivitamin, vitamin D3, and calcium

PHYSICAL EXAM

- **Wt: 40g T: not taken P: 70 bpm R: 18 bpm mm: pale pink CRT: <2sec**
- **GEN**: QAR, 8% dehydration **BCS: 3/9**
- **EENT**: Eyes clear OU, no anisocoria noted OU. Ears clean AU. No oculonasal discharge. Ropey saliva.
- **CV**: No arrhythmias noted on Doppler
- **RESP**: Appropriate respiratory rate and effort
- **COELOM**: No masses or organomegaly palpable, non-painful
- **MS/I**: Ambulatory, no gait abnormalities or lameness noted but patient appeared weak. Dysecdysis present both pelvic limbs. Prolonged skin tent.
- **NEURO**: Normal mentation, normal proprioception, cranial nerves intact. No evidence of neurologic deficits in any limbs

PROBLEM LIST

- 1. Anorexia
- 2. Thin (BCS 3/9)
- 3. Dysecdesis
- 4. Dehydration (8%)

What predisposing factors could link all of these problems together?

HUSBANDRY

- **Poikilotherms** = unable to regulate their own body temperature, and therefore depend on the environment and behavior to regulate it
- Suboptimal temperatures/husbandry is the cause, or a major contributor, to most disease presentations
- Make an **entire world** out of an enclosure
  - Species, age, sex, animal source, enclosure size, enclosure type, co-habitation with others, temperature, humidity, food source, substrate type, UVB exposure, supplementation

ENCLOSURE

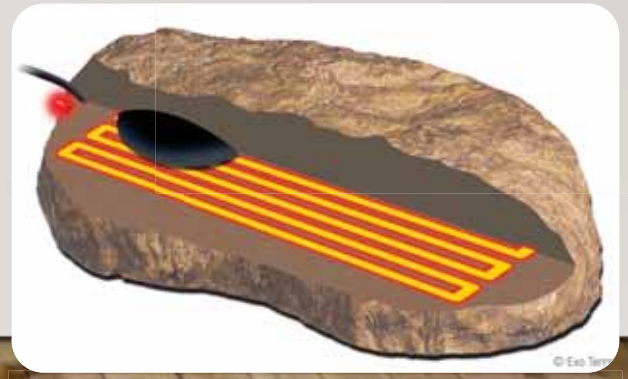
- Depends on species size and natural history
  - Terrestrial = horizontal
  - Arboreal = vertical
- No glass terrariums: chameleons and chelonians
- A note about height of enclosures and UV light

www.pinterest.com

TEMPERATURE

- Preferred optimal temperature zone (POTZ)
- Need a temperature gradient → across enclosure, day/night
- Heating sources within enclosure → not recommended due to risk of thermal burns
- Monitor using digital thermometers at the level of the reptile → each end of the enclosure
- Cage furniture centered around temperatures

www.petmountain.com



www.exo-terra.com

HUMIDITY

www.exo-terra.com

- Needs/level depends on the species → desert to tropical
- Misters, humidifiers, ultrasonic foggers required depending on species, or owner's home
- High humidity without good sanitation/ventilation leads to fungal/mold growth
- Desert species may utilize humid hides only
- They also need a water dish → ideally one that they can fit their entire bodies into it
- Monitor using digital hygrometer
- Chronic dehydration can contribute to renal insufficiency/disease and gout

www.exo-terra.com


www.mcwetboy.com

UVB LIGHT

www.gearbest.com

- Many species require UVB light for vitamin D_3 metabolism
  - Sunlight is the best source, but not always possible
  - Debated for nocturnal species, and snakes (absorb dietary sources)
- Needs to be placed within a certain distance of the reptile
- Cannot have plastic or glass between light and reptile → UV does not penetrate these
- Replace light regularly (q 4-6 months) or use a UVB reader/gun
- Most reptiles bask for heat, not ultraviolet light

www.petmountain.com

www.thatpetplace.com

SUBSTRATE

- Wood: chips and shavings
- Sand = impactions
- Coconut fiber
  - Be aware of the pica potential
- Reptile rugs
  - Beware of the felt-like types
- Newspaper

www.petmountain.com

www.petmountain.com

NUTRITION

- Carnivores: pre-killed prey recommended, feed in separate enclosure, prey must be proportional to size of predator
- Insectivores: live insects typical, gut load and dust with calcium, variety can be limited depending on availability
- Herbivores: dark leafy greens, dust with calcium → some species may also consume other vegetables and a few bits of fruit
- Omnivores: mix of protein and vegetables

www.mazuri.com

www.wag.com

PROBLEM LIST

- 1. Anorexia
- 2. Thin (BCS 3/9)
- 3. Dysecdesis
- 4. Dehydration (8%)
- 5. Suboptimal husbandry

PLAN

- **What is your initial diagnostic plan?**
  - Biochemistry
  - Complete blood count
  - Survey whole body radiographs
  - Ionized calcium

Remember this patient weighs 40 grams – prioritize!

TEST	RESULT
CK	1877 U/L
AST	173 U/L
BILE ACIDS	35 µmol/L
GLUCOSE	>700 mg/dL
URIC ACID	>50 mg/dL
CALCIUM	13.7 mg/dL
PHOSPHORUS	17.5 mg/dL
TP	5.9 g/dL
ALBUMIN	2.7 g/dL
GLOBULUN	3.2 g/dL
SODIUM	>180 mmol/L
POTASSIUM	2.9 mmol/L
iCa	1.75 mmol/L

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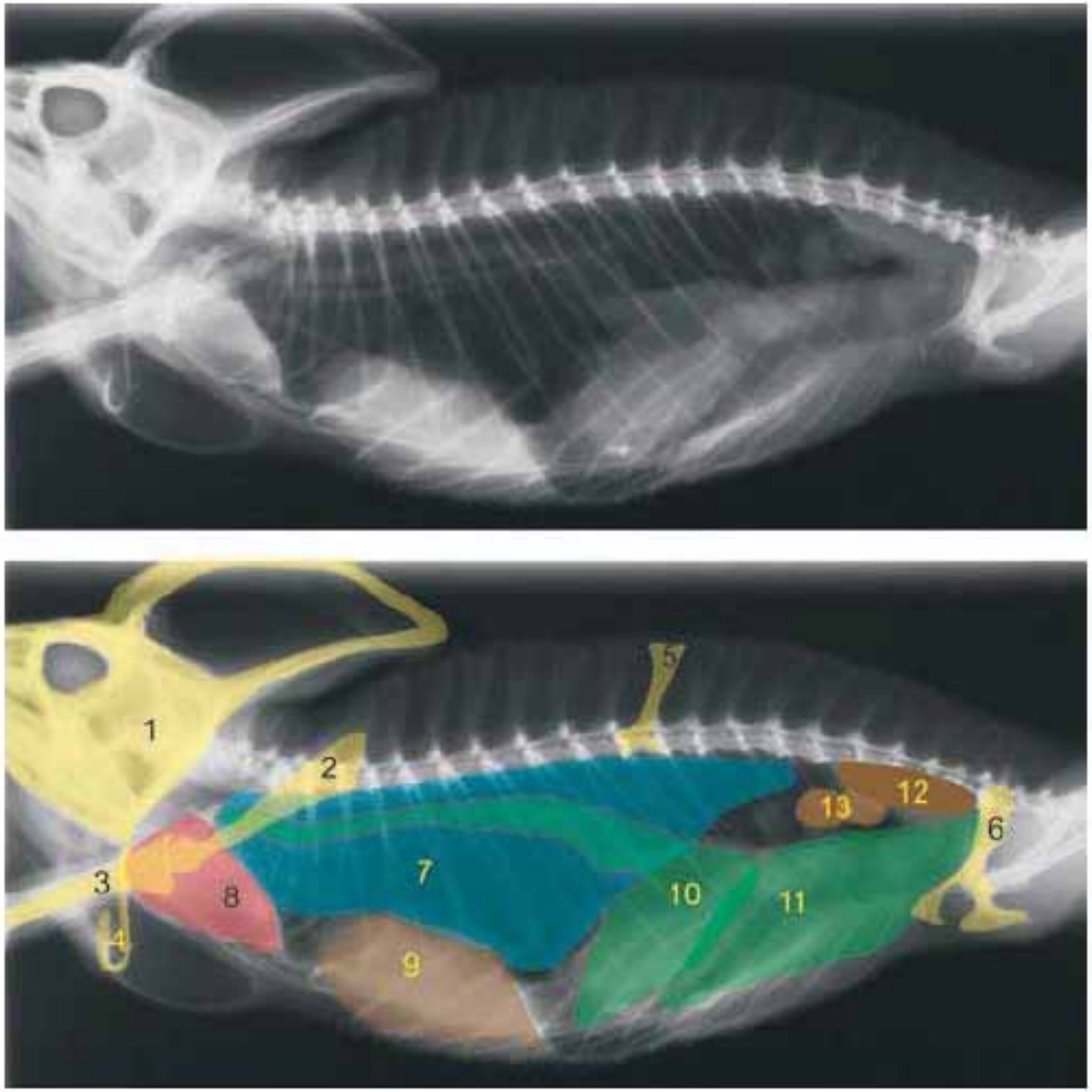
SEDATION OPTIONS IN REPTILES

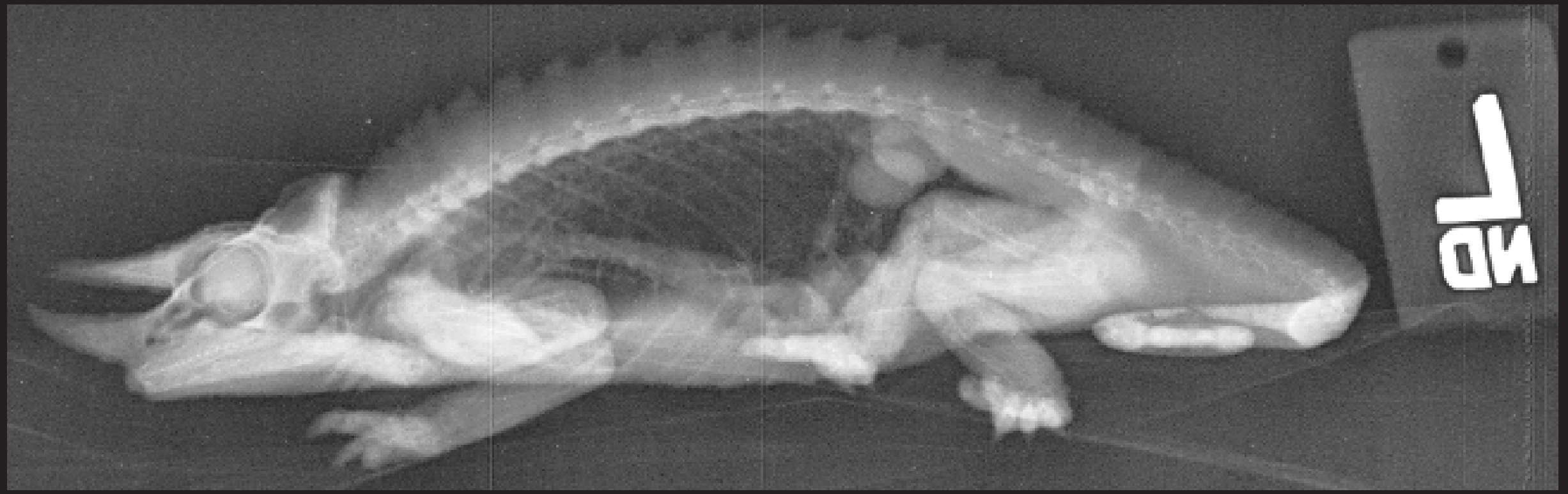
- WIDE range of options, WIDE range of dosages
- Typically includes dexmedetomidine and ketamine
  - Dexmedetomidine 0.05-0.1 mg/kg IM
  - Ketamine 1-5 mg/kg IM
- Addition of midazolam +/- an opioid can assist in decreasing dose of ketamine
  - Midazolam 1-2 mg/kg IM
  - Morphine 1-20 mg/kg IM OR hydromorphone 0.5-1 mg/kg IM for most species (NOT some snakes)
    - Watch for respiratory depression, and remember doses are very species dependent!
  - Flumazenil 0.02-0.05 mg/kg IM
- Alfaxalone: volumes often large (10-20 mg/kg), inject in multiple sites if going IM, or use SC
  - Remember this medication is NOT reversible

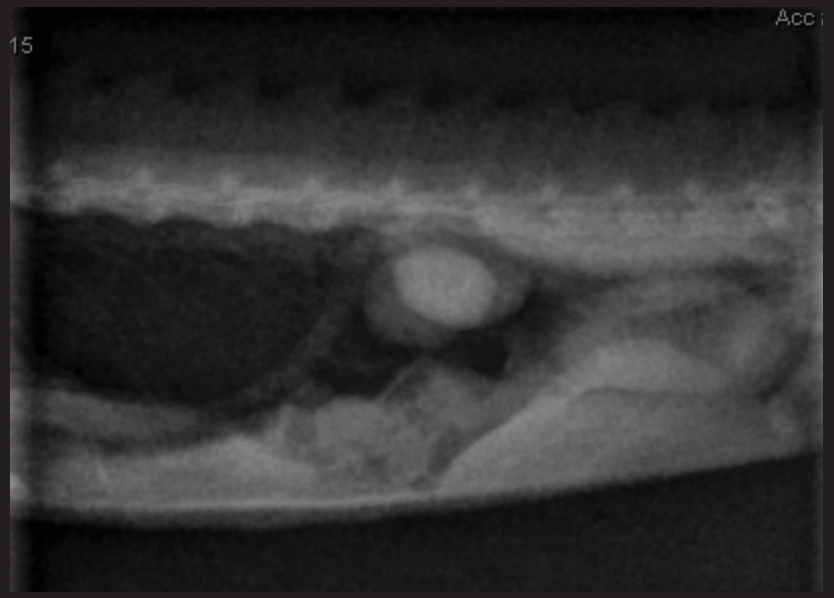


1: cranium with casque
2: scapula
3: coracoid
4: hyoid bone
5: vertebrae
6: pelvis
7: lungs
8: heart
9: liver
10: stomach
11: gastrointestinal tract
12: kidneys
13: gonads

Fig. 3-30: Total body radiographic image of a veiled chameleon (*Chamaeleo calyptratus*), lateral projection.

Diagnostic Imaging of Exotic Pets, 2010

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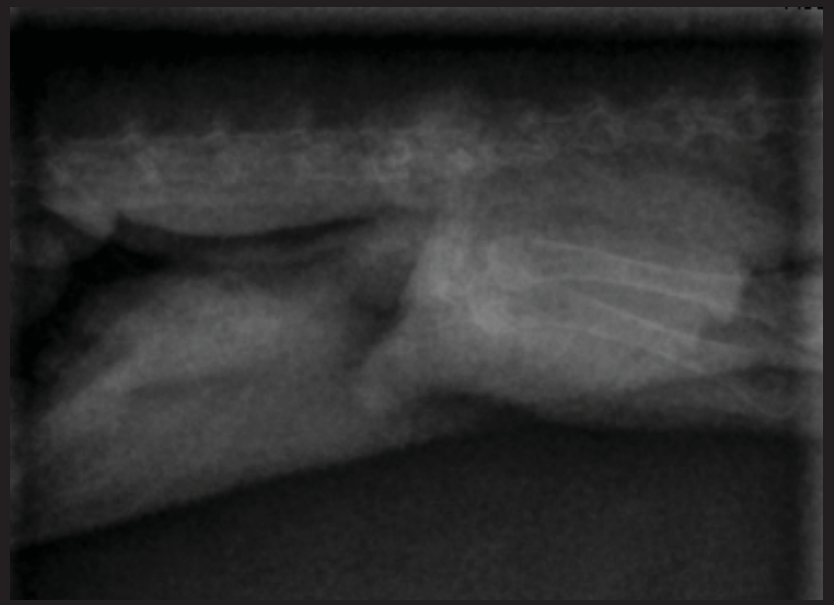


What is your radiographic interpretation?

What is your diagnosis?
What is your treatment plan?

"BILLINGSWORTH" OUTCOME

- Normosol-R 60 mL/kg/day SC divided into two treatments
- Syringe feeding Carnivore Care diet
- Aluminum hydroxide 100 mg/kg PO q 24 hr

- Patient declined in the hospital, owners elected euthanasia with necropsy

CASE 7:
THE DYSPNEIC RABBIT

"RED"

- 8-year-old FS mini-lop rabbit
- **Presenting complaint:** progressive dyspnea and exercise intolerance over the last 3 days

What **history** questions would you like to ask?

HISTORY

- Has lived with one other rabbit for the past 5 years, no change in environment, no exposure to other animals
- Obtained as a juvenile from a local shelter
- No coughing, occasional sneezing, occasional nasal discharge, no diarrhea
- No known toxin exposure
- Diet: ¼ cup timothy pellets, ad lib timothy hay, small salad daily
- Several previous episodes of anorexia/decreased defecation ("GI stasis"), but all resolved with medical management

PHYSICAL EXAM

- **Wt: 1.5kg** **T: 38.2 C** **P: 260 bpm** **R: 200 bpm** **mm: pink** **CRT:** <2sec
- **GEN**: QAR, mild dehydration **BCS: 4/9**
- **EENT**: Eyes clear OU, no anisocoria noted OU. Ears clean AU. No ocular-nasal discharge.
  - Oral exam: no abnormalities noted, no malocclusion noted.
- **CV**: Grade II/VI systolic murmur auscultated, loudest over the sternum.
- **RESP**: No crackles or wheezes noted, normal bronchovesicular sounds auscultated. Mild dyspnea.
- **ABD**: No masses or organomegaly palpable, non-painful. Kidneys of normal size, urinary bladder not palpable. Normal borborygmi auscultated.
- **MS/I**: Ambulatory on all four limbs, no gait abnormalities or lameness noted, patchy alopecia, but non-pruritic and no evidence of ectoparasites.
- **NEURO**: Normal mentation, normal proprioception, cranial nerves intact.
- **PLN**: No enlarged lymph nodes palpable.

“RED”

What is a zoonotic disease that can be similar to this presentation?

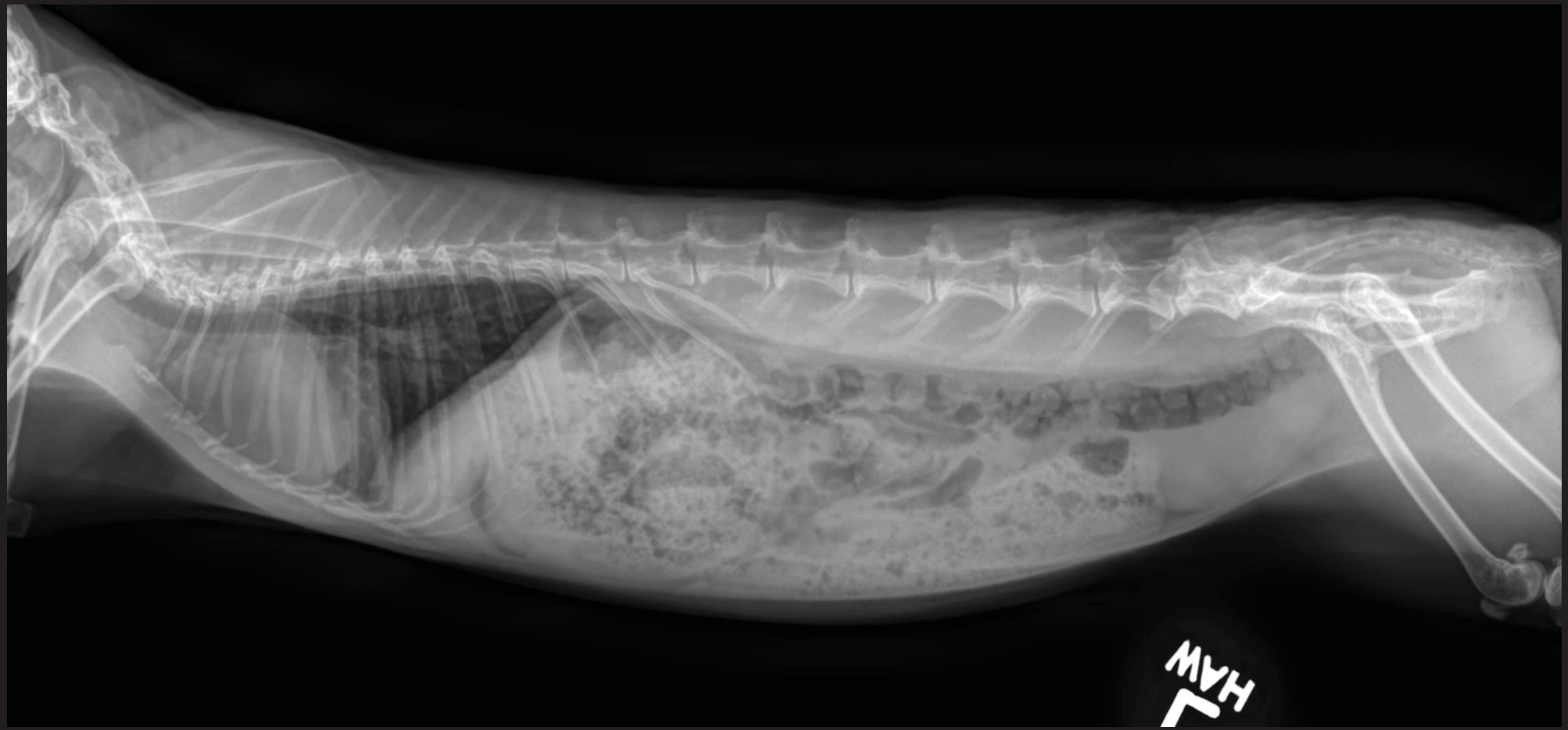
PLAN

- **What is your initial diagnostic plan?**
  - Complete blood count, plasma biochemistry
  - Whole body radiographs
  - Skin scrape/tape preparation

Rabbit Case 4

Test	Result	Reference Range
RBC	5.1	4 - 7 M/µL
Hematocrit	36.2	36.0 - 48.0 %
Hemoglobin	11.1	10 - 15 g/dL
MCV	71	fL
MCH	21.8	pg
MCHC	30.7	g/dL
WBC	**14.7**	**5 - 12 K/µL**
% Neutrophil	56.0	34 - 60 %
% Lymphocyte	**35.0**	**43 - 62 %**
% Monocyte	**8.0**	**0 - 2 %**
% Eosinophil	1.0	0 - 2 %
% Basophil	0.0	0 - 1 %
Neutrophil	8.232	K/µL
Lymphocyte	5.145	K/µL
Monocyte	1.176	K/µL
Eosinophil	0.147	K/µL
Basophil	0	K/µL
Platelet	579	K/µL
Polychromasia	SLIGHT	
Anisocytosis	SLIGHT	
Remarks	NEUTROPHILS = HETEROPHILS SLIDE REVIEWED MICROSCOPICALLY.	

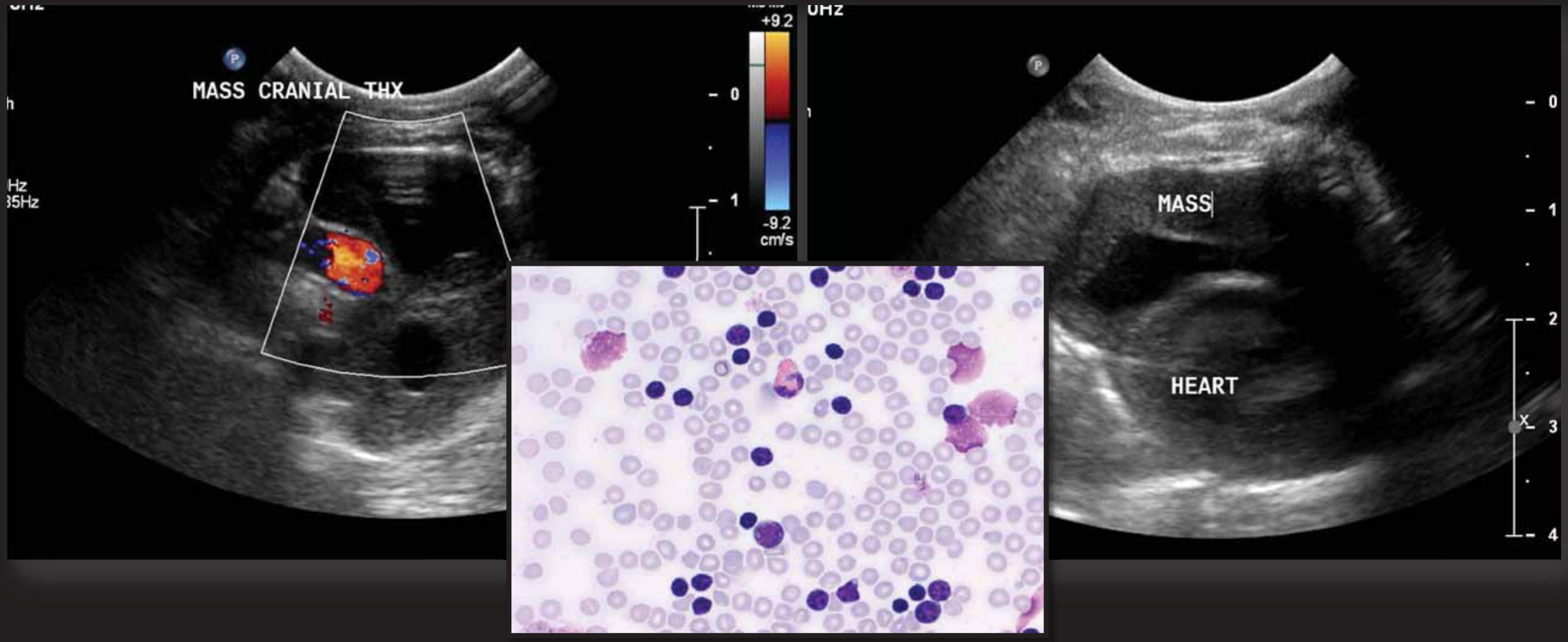
Test	Result	Reference Range
Glucose	**173**	**108 - 160 mg/dL**
Creatinine	1.3	**0.8 - 1.8 mg/dL**
BUN	19	17 - 24 mg/dL
Phosphorus	4.8	**4.0 - 6.2 mg/dL**
Calcium	[a] 17.9	8.7 - 18.4 mg/dL
Sodium	143	132 - 156 mmol/L
Potassium	4.7	3.8 - 5.5 mmol/L
Total Protein	6.7	4.9 - 7.1 g/dL
Albumin	**2.6**	**2.7 - 3.6 g/dL**
Globulin	**4.1**	**2.4 - 3.3 g/dL**
Alb:Glob Ratio	**0.6**	**0.7 - 1.9**
ALT	52	48 - 70 U/L
AST	**26**	**33 - 99 U/L**
ALP	29	12 - 96 U/L
GGT	**11**	**50 - 140 U/L**
Cholesterol	39	**24 - 65 mg/dL**
	[a] RESULT VERIFIED BY REPEAT ANALYSIS	



What is your radiographic interpretation?

What diagnostic do you want to perform next?

Thoracic/Mediastinal ultrasound

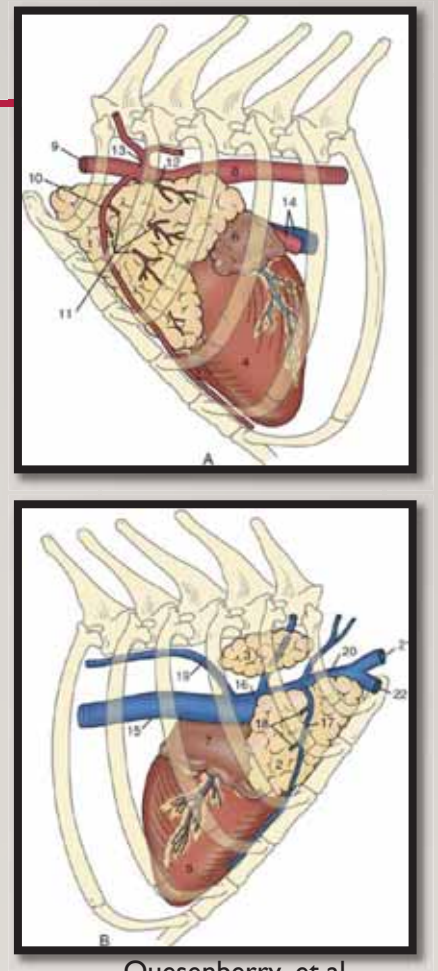


WHAT ABOUT THE ALOPECIA?

- **Sebaceous adenitis**
  - Autoimmune reaction directed at sebaceous glands
  - Often associated with thymoma
    - Specific pathophysiology unknown, "paraneoplastic syndrome"
  - Patchy alopecia, +/- pruritic, hair easily epilates

THYMOMA

- **Rabbit thymus persists into adulthood**
  - Cranioventral to the heart
  - Extends into the thoracic inlet
- Thymoma: tumor derived from epithelial components of thymus
  - Benign, but locally invasive
- Thymic lymphoma: neoplasm of T-lymphocyte origin
- Thymic carcinoma: rare



Quesenberry, et al.

THYMOMA

- **Thoracic CT scan**
  - Can also be used for radiation therapy planning

THYMOMA TREATMENT OPTIONS

- **Medical therapy**
  - Prednisolone
  - Periodic ultrasound-guided aspirates (cystic fluid)
- **Surgical therapy**
  - High risk, incomplete excision
- **Radiation therapy**
  - Current treatment of choice
  - Palliative, definitive, stereotactic options

THANK YOU FOR YOUR PARTICIPATION!

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