



Hypereosinophilic Syndrome (HES)

- Primarily a disease of cats
- Persistent eosinophilia (25-30,000/uI)
- Organ infiltration with eosinophils
 - Bone marrow, Spleen, Liver
 - Lymph nodes (often mesenteric)
 - Gut
 - skin
- Clinical Signs
 - Diarrhea, vomiting
 - Anorexia, weight loss
 - Intermittent, recurring fever
 - Pruritus, lymphadenopathy



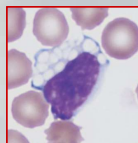
Hypereosinophilic Syndrome (HES)

- Abdominal masses are possible
- Eventually causes organ failure and death
- Difficult to distinguish from eosinophilic leukemia (EL)
 - May be two forms of the same disease
 - More immature eos in circulation with EL
- Treatment
 - No known effective treatment
 - Corticosteroids – immunosuppressive
 - Hydroxyurea
 - Alpha interferon
 - Gleevec® (imatinib) has been used in people (Palladia®??)



Pippin

- 4 month old female snowshoe – 4.2 lbs
- Had 2 generalized seizures this week
- Exam, neurologic exam – normal
- CBC – vacuolated lymphocytes
- Panel – SAP 436, ALT 383
- Tx – start Zonisamide 15 mg PO SID



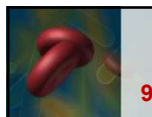
Pippin

- Over the next 30 days
 - Seizures become more frequent
 - 2-3 per week
- Zonisamide level – 15 ug/ml
- Titrated zonisamide dose up until level 38 ug/ml (target 10-14 ug/ml)
 - Having 5-10 seizures per week.
- Toxoplasma paired sera – IgM, IgG negative
- FeLV neg, FIV neg
- CSF tap – mononuclear cells with vacuoles, increased microprotein
- eye exam – central corneal precipitates, fundic exam normal



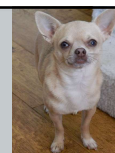
Pippin

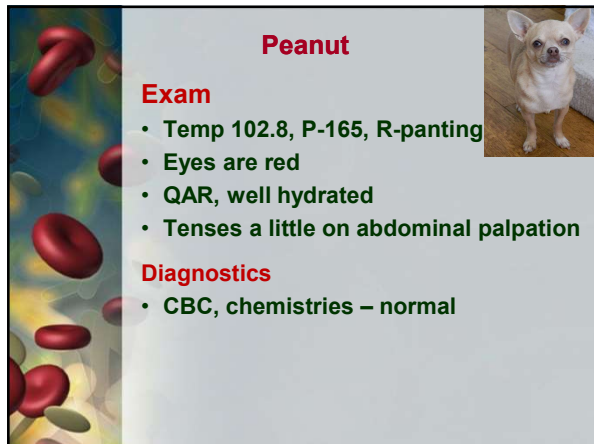
- Added phenobarbital – 5 mg PO BID
 - Still having 5-10 seizures per week
- Phenobarbital level – 35 ug/ml
- Added prednisone 5 mg PO SID
- Seizures eventually became uncontrollable and Pippin was euthanized at 6 months old
- Necropsy – lysosomal storage disease



Peanut

- 9 year old female Chihuahua
- Has not been feeling well for about a week
- Decreased appetite – still eating some
- No vomiting or diarrhea, no coughing
- Current on preventative health
- Never goes outside – uses puppy pads
- Saw your associate a few days ago, and she is not any better on Clavamox
 - CBC – neutrophils 28K/uI
 - Chemistries – no abnormalities
 - UA – bacteriuria, pyuria
 - Dilated loops of bowel on ultrasound





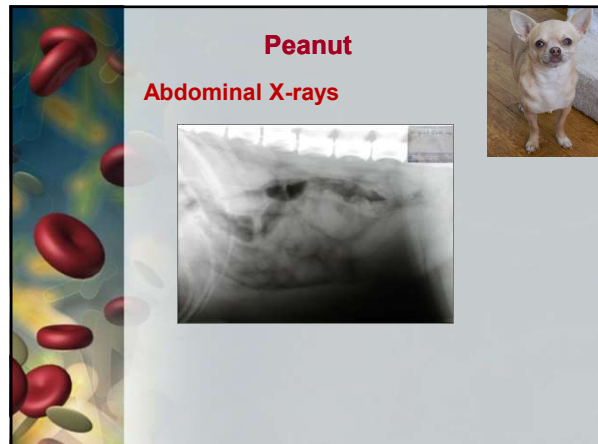
Peanut

Exam

- Temp 102.8, P-165, R-panting
- Eyes are red
- QAR, well hydrated
- Tenses a little on abdominal palpation


Diagnostics

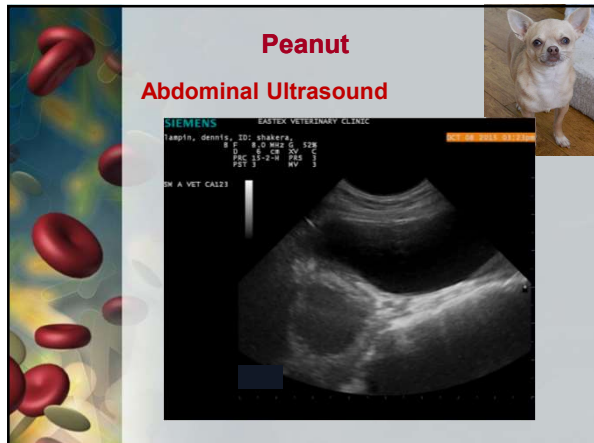
- CBC, chemistries – normal



Peanut


Abdominal X-rays

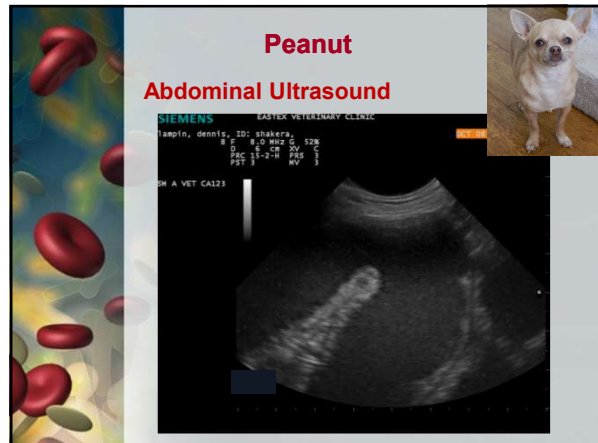




Peanut


Abdominal Ultrasound

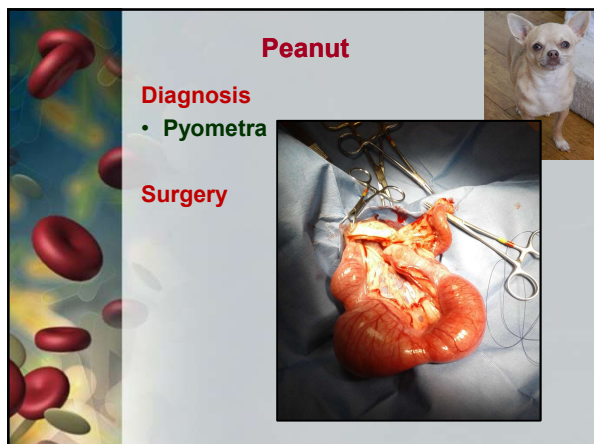




Peanut

Abdominal Ultrasound



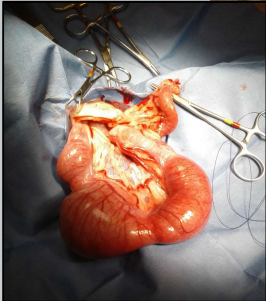


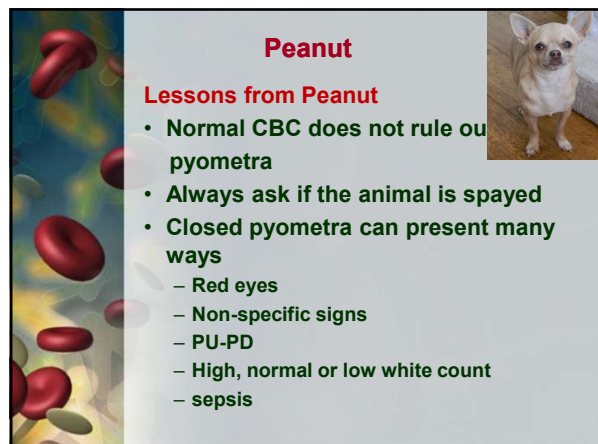
Peanut

Diagnosis

- Pyometra

Surgery





Peanut

Lessons from Peanut

- Normal CBC does not rule out pyometra
- Always ask if the animal is spayed
- Closed pyometra can present many ways
 - Red eyes
 - Non-specific signs
 - PU-PD
 - High, normal or low white count
 - sepsis



Trip



Signalment

- 2 year old castrated male border collie

Chief Complaint/History

- Productive Cough, weight loss for 2 months
- Breathing hard for a 2 days
- Energy good; did well in agility 4 days ago
- Owner thinks has had lifelong PU-PD
- Has wanted to be in AC this summer – unlike last summer when he enjoyed being outside



Trip



Exam

- T 102.2, P 168, R 42, CRT 3 sec
- BCS 2.5
- BP 100
- Bounding pulses, notable in dorsal pedal artery
- Precordial – exaggerated left apical heave
- Lung sounds clear



Trip



Exam

- 3 murmurs:
 1. PMI left base ([audio](#))
 - To-and-fro murmur 3/6
 - **aortic stenosis in systole, regurg in diastole**
 2. PMI left apex, but heard all over chest ([link](#))
 - Holosystolic murmur 3/6
 - **Mitral regurgitation due to LHF**
 3. PMI Carotid artery ([audio](#))
 - 2/6 ejection murmur
 - **aortic stenosis**



Trip



Differential Diagnoses

- Aortic endocarditis
- SAS with aortic regurgitation
- Mitral regurgitation (endocarditis?)

Diagnostic Plan

- Thoracic radiographs
- EKG
- Echocardiography



Trip

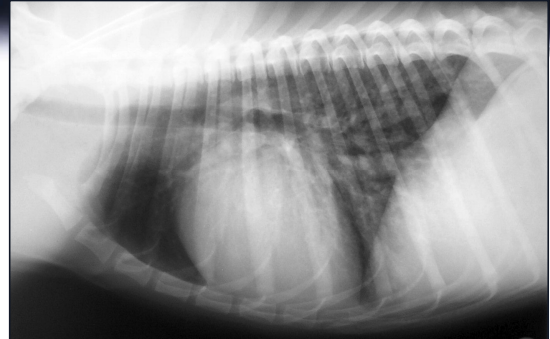


EKG

- Normal sinus rhythm for 10 minutes



Trip





Trip



EKG

- Normal sinus rhythm for 10 minutes

Thoracic Radiographs

- Interstitial pattern caudal lung fields
- Vertebral heart score 10.5
- Enlarged cranial pulmonary lobar vein
- Mildly enlarged left atrium
- **Early left congestive heart failure**

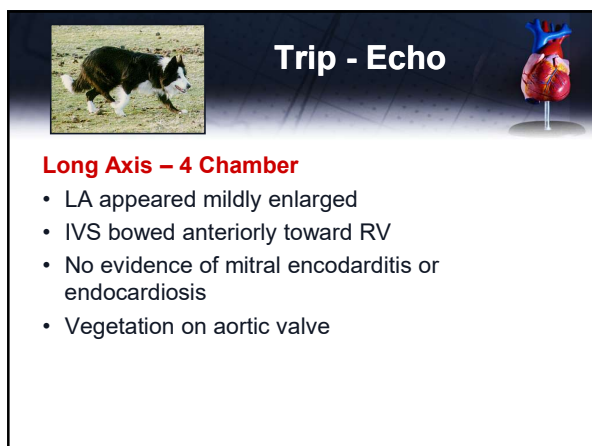


Trip - Echo



Short Axis – LV PM

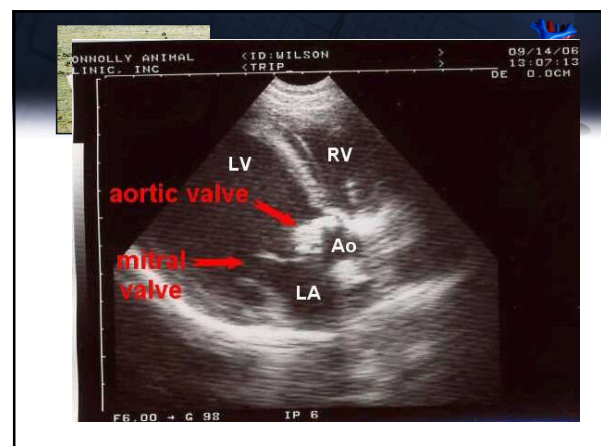
- **LVIDD** – 57.3 (n 31.3-34)
- **IVSTS** – 15.5 mm (n 12.6-13.7)
- **LVIDS** – 41.1 mm (18.8-20.7)
- **FS** = $(57.3 - 41.1) / 57.3 = 28\%$ (n 30-46%)
- **EF** = 54% (n >70%)



Trip - Echo

Long Axis – 4 Chamber

- LA appeared mildly enlarged
- IVS bowed anteriorly toward RV
- No evidence of mitral endocarditis or endocardiosis
- Vegetation on aortic valve





Trip - Echo



Long Axis – LVOT (video)

- Hyperechoic thickened aortic valve leaflets

Diagnosis

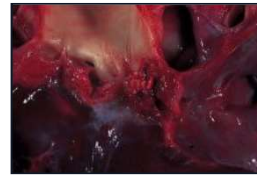
- Aortic endocarditis

Therapeutic Plan

- Elected euthanasia due to poor prognosis



Trip



Valvular Endocarditis



Treatment

- Based on urine and blood culture and sensitivity, Bartonella PCR
- Antibiotics
 - IV 3-5 days – broad spectrum until culture results
 - SC/IM 3-5 days
 - Then PO long term – often for life
- Treat Heart failure (severe)
- Treat ventricular arrhythmia if present
- Watch for and treat bacterial embolization of abdominal organs, skin, IVDiscs, CNS, joints, etc.
- Watch for and treat immune complex disease

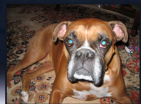
Valvular Endocarditis



Prognosis

- <20% survival
- Antibiotic therapy often required for life
- Median survival is 6 days from diagnosis for aortic endocarditis
- Survival is longer for mitral endocarditis
 - LHF due to MR not as severe as AoR

(Client Handout)



Maximus



18 month old male Boxer

Chief Complaint

- Drastic and rapid weight loss
- Not eating well
- Coughing up blood tinged fluid since yesterday

Exam, Chest rads, ECG

- Similar to Trip, except temp 103.8
- And BCS 2



Maximus



Diagnostics

- Blood culture
 - negative (2 samples 2 hours apart)
- Urine culture
 - Enterobacter susceptible to all
- CBC
 - neutrophilia 23,100/ul
 - Mild anemia – PCV 35.5%



Maximus



Diagnostics

- **General Health Profile, electrolytes**
 - BUN – 55 (n 10-29)
 - ALT – 225 (n 10-120)
 - Albumin – 2.2 (n 2.3-3.7)
- **Urinalysis**
 - USG – 1.045
 - WBC 7-10/hpf, rare bacteria seen

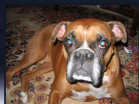


Maximus



Treatment (58 lbs, BCS 2, RR 66)

- **Antibiotics**
 - **IV** - ampicillin 750 mg TID, Baytril 150 mg BID x 3 days
 - **IM** – ampicillin 750 mg BID, Baytril 150 mg x 3 days
 - **PO** – ampicillin 750 mg BID, Baytril 136 mg PO for life
- **Furosemide**
 - 100 mg IV TID the first day - RR down to 28
 - Then 75 mg PO BID
- **Enalapril** – 15 mg PO BID
- **Pimobendan** – 5 mg PO BID



Maximus



Treatment – Day 3 – RR 30, eating well

- **Chest x-rays**
 - Pulmonary edema much improved, but mild amount still present
- Continue Furosemide, Enalapril, Pimobendan
- Added Spironolactone – 25 mg PO BID

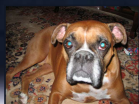


Maximus



Diagnostics – Day 5 – RR 36, BP 150

- **Chest x-rays** - No change
 - **BUN** – 43
 - **Electrolytes** - normal
- ### Treatment – Day 5
- Continue Furosemide, Enalapril, Pimobendan
 - **Spironolactone** – increased to 50 mg PO BID
 - Added Hydralazine – 12.5 mg PO BID



Maximus



Diagnostics – Day 10

RR 30, BP 135, Wt 61.8, Temp 103

- **Chest x-rays** – perihilar edema resolved
- **BUN** – 11, albumin 2.3
- **Electrolytes** – normal
- **CBC** – neutrophilia 23,000/ul

Continued this treatment for the rest of Max's life – 3 months



Nikki

4 year old neutered male poodle – 15 lbs

CC: fever & not feeling well, low white count
Responds temporarily to antibiotics, then relapses – 30 day duration

- Referred for further evaluation
- Exam:** T 101.9°F, RR pant, P 154 bpm
- Hyperdynamic pulses, injected mucous membranes

GlobalFAST® ultrasound

- **VetBLUE®** dry lungs all 4 points
- **TFAST®** no pleural effusion, no pneumothorax, normal echo views
- **AFAST®** normal GB, normal cava, AFS=0



Nikki

CBC: HCT 32%, WBC 800/ul

Panel: SAP 282 U/L

UA: no abnormalities, USG 1.035

Occult HW: negative – current

Fecal flotation & direct smear: negative

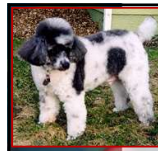
Thoracic & Abdominal Radiographs: normal

Complete Abdominal ultrasound: normal

Urine culture: negative

Bone Marrow Cytology: M:E ratio 1:5

- Myeloblasts, promyelocytes and myelocytes in normal pyramid of maturation
- Very few metamyelocytes, bands or segs
- Increased iron stores



Nikki

Bone Marrow Histopath: no neoplasia

DDx:

Granulocytic maturation arrest

- Immune mediated neutropenia

Dx: mild anemia of chronic inflammatory dz

Tx:

- Neupogen® - filgrastim, GCSF 35 ug SC daily
- Amoxicillin 150 mg PO BID
- Enrofloxacin 34 mg PO SID

Recheck 7 days: Exam normal, doing well

- **CBC:** HCT 32%, segs 750/ul

• **Bone Marrow Cytology:** no change

• **Blood culture with ARD:** negative



Nikki

Tx:

Prednisone 20 mg PO SID

Amoxicillin 150 mg PO BID

- Enrofloxacin 34 mg PO SID

Recheck 7 days: Exam normal, doing well

- **CBC:** HCT 32%, segs 22,550/ul

Tx:

- Prednisone 15 mg PO SID x 2 weeks

Recheck 7 days: Exam normal, doing well

- **CBC:** normal

Dx:

- Immune mediated neutropenia



Nikki

Tx:

Prednisone 10 mg PO SID x 30 days

- Prednisone 7.5 mg PO SID x 30 days
- Prednisone 5 mg PO SID x 30 days
- Prednisone 2.5 mg PO SID x 30 days

Recheck CBC 1 and 3 weeks after each medication reduction

Neutropenia resolved and did not recur

Cyclic Neutropenia



Aka gray collie syndrome, cyclic hematopoiesis

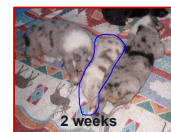
- Autosomal recessive in gray collies
- Neutropenia as low as 200/ul every 10-12 days
- Puppies usually smaller than littermates and show signs of infection by 8-12 weeks of age
 - Fever, diarrhea, joint pain, pneumonia, pyoderma
- Untreated, will eventually die of sepsis
- All cell lines affected, but because cycle is short, RBC and platelet decreases are less clinically significant
- Can be seen with longer cycle in FeLV+ cats and after cyclophosphamide treatment in some dogs

Cyclic Neutropenia



Aka grey collie syndrome, cyclic hematopoiesis

- Gray merle and sable merle collies, not blue merle or tricolor merle collies (dilute -- no black)
- Gray/brown nose rather than black nose - pathognomonic
- A few have responded well to gene therapy
- Several doses lentivirus coded with GCSF (WSU)



Cyclic Neutropenia



Sugar

- Treated at WSU as a puppy and then returned to owner
- No further treatment until time of death
- Died of liver cancer at 5 years old

