Hypereosinophilic Syndrome (HES)

Primarily a disease of cats
Persistent eosinophilia (25-30,000/ul)
• 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/ul
  - 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
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
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
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
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
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%)
Short Axis – Ao/RVOT

• AoS – 20.2 (normal)

• LAD – 27.8 (n 19.0-20.5)

• LA/Ao – 27.8/20.2 = 1.38 (n 0.8-1.3)

• Aortic valve leaflets are hyperechoic
Long Axis – 4 Chamber

- LA appeared mildly enlarged
- IVS bowed anteriorly toward RV
- No evidence of mitral endocarditis or endocardiosis
- Vegetation on aortic valve
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)
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/μl
  – Mild anemia – PCV 35.5%
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, Pimobandan

• Added Spironolactone – 25 mg PO BID
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
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® - filgastrim, 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)
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