VET 433A Systemic Protozoal Diseases

• Compare epidemiology and clinical manifestation of Babesia species in dogs

Babesia

- Red blood cell parasite
  - Large: *Babesia canis, B. vogeli, and B. rossi*
  - Small: *B. gibsoni, B. conradae, B. vulpes*
- Potentially tick-borne but the most common route of transmission is direct via fighting
- Transplacental transmission
- Blood transfusions

Babesia vogeli

- Least pathogenic of "large" Babesia
  - Kenneled dogs
  - Adults
  - Greyhounds
  - "Generational trauma"

Babesia gibsoni

- More pathogenic
  - Most cases are diagnosed in Pitbull and Staffordshire bull terriers
    - Fighting
    - Transplacental?

Babesia conradae

- ID in California and other states
- Transmission via fighting?

Babesia	*Babesia vogeli*	*Babesia gibsoni*	*Babesia conradae*
Location	Cosmopolitan (Everywhere)	Distributed across the world including US	California and other southern states
Vector	Rhipicephalus sanguineus	Haemaphysalis spp.	
Poster Child	Greyhounds Kenneled Dogs Adults	Pitbulls Staffordshire bull terriers	Coyotes and Pitbulls
Incubation period	10-21 days	1-2 weeks	1-2 weeks
Clinical Signs	Anemia, fever, hypotensive, shock in peracute/acute cases	Fever, anorexia, weakness Anemia, thrombocytopenia	Fever, anorexia, weakness Anemia, thrombocytopenia

	Splenomegaly and immune mediated thrombocytopenia Chronic carrier state – usually subclinical	Splenomegaly, lymphadenopathy Icterus is rarely seen	Splenomegaly, lymphadenopathy Icterus is rarely seen

Summarize pathophysiology and clinical manifestations of Cytauxzoonosis in infected cats

Cytauxzoonosis

- Schizogenous phase
  - Infected mononuclear phagocytes obstruct veins in spleen, liver, lung, lymph nodes
  - Rupture and release organisms
  - Leads to DIC, shock
- Intraerythrocytic phase
  - 1-3 days after schizonts appear
  - Hemolytic anemia, high fever
  - Ring-shaped organisms in RBCs
- Clinical signs
  - Rapidly fatal
  - Anorexia, lethargy
  - High fever
  - Dark urine, dehydrated, icterus, pallor, prolonged CRT, hypothermia
  - Death within 5 days
- Bloodwork
  - CBC: nonregenerative anemia, leukopenia, thrombocytopenia
  - Chem: hyperbilirubinemia, hyperglycemia, hypoalbuminemia, elevated ALT
  - Prolonged coagulation times
- Organism detection
  - Blood smear
  - PCR *Gold standard!
- Treatment
  - High mortality despite treatment
  - Atovaquone and azithromycin
  - Supportive care

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Discuss clinical features of canine Leishmania

- Sandfly is the vector
- Cutaneous, mucocutaneous and visceral forms
- Cutaneous
    - Cutaneous lesions form in 90% of infected dogs 1 month to 7 years post-infection
    - Hyperkeratosis and intradermal nodules
- Visceral
    - Splenomegaly
    - Lymphadenopathy
    - Polyarthritis
    - Glomerulonephritis
    - Uveitis
    - Rhinitis
    - Icterus
    - Thrombocytopenia
    - Poly- and monoclonal gammopathies
- Diagnosis
    - PCR Gold Standard!
    - Visualization of amastigotes in biopsies or aspirates
    - Serology – not great
- Treatment
    - Meglumine antimonate, sodium stibogluconate, amphotericin B, allopurinol

Formulate a plan for diagnosis and evaluate results of testing for systemic protozoal disease

- Babesia
    - PCR is the current test of choice
    - Serology: indirect IFA or ELISA, false negatives are common and cross-reactions can occur
    - Can look like IMHA

Identify cytologic features of systemic protozoal infections

- Babesia
    - Thrombocytopenia, increased MPV
    - Anemia +/- regeneration
    - Leukopenia
    - Hypoalbuminemia, hyperglobulinemia

- Detection of organisms on blood smears – degree of parasitemia varies

Create a treatment plan for canine babesiosis

- Blood transfusions
- Fluids
- Antibabesial drugs
- Imidocarb diproprionate
  - Clears large species
- Atovaquone and azithromycin for *B. gibsoni* and *B. conradae*
- Careful with steroids!

- Prevention
  - Trick control
  - Avoid splenectomy and immunosuppression
  - Screen blood donors serologically

Describe the transmission and epidemiology of toxoplasmosis

- Obligate intracellular coccidian parasite
- Definitive host Felidae
- Intermediate hosts are cats and other animals
- Asexual cycle in all warm-blooded species (bradyzoites in tissue cysts) and tachyzoites
- Sexual cycle in cats
- Routes of infection
  - Transplacental/congenital
  - Bradyzoite cyst ingestion
  - Oocyte-contaminated food, water, or soil ingestion
  - Blood product transfusion
  - Organ transplantation
  - Ingestion of infected goat milk
- Enteroepithelial cycle (sexual)
  - Bradyzoite cyst ingestion
    - Oocysts produced by 97% of cats
    - 100 million oocysts/day for 7-10 days
  - Tachyzoite / oocyst ingestion
    - Oocysts produced by 20% of naïve cats
    - Fewer oocysts shed for several weeks

  - In immune cats, the cycle is arrested and oocysts are not shed
  - Immunity can last for several years or life-long
- Extraintestinal (asexual)
  - Bradyzoites cysts in tissues

Contrast the clinical signs of toxoplasmosis in dogs vs. cats

Dogs	Cats
Similar to cats Ocular disease is less common Chronic neuromuscular disease	Enteroepithelial cycle usually subclinical Extraintestinal cycle Stillbirth, neonatal death Anorexia, lymphadenopathy, fever, dyspnea, coughing, CNS signs, vomiting, diarrhea, icterus, abdominal effusion, pancreatitis, splenomegaly, myositis Uveitis, chorioretinitis

Explain the public health significance of toxoplasmosis to pregnant and immunosuppressed humans

- Transplacental infection in naïve humans and animal infected during or just prior to pregnancy
  - Often asymptomatic at birth
  - Later show chorioretinitis and mental retardation
  - Spread to fetus is less common in early pregnancy but the disease is more severe
  - <20% of women show signs
- Placentitis and spread of tachyzoites to the fetus
- Pregnancy is not associated with bradyzoite cyst reactivation

Describe the clinical signs of Neospora in dogs

- CNS, PNS, Retina, Muscle
- Neuromuscular abnormalities and sometimes dermatologic, pulmonary, hepatic, and myocardial disease
- Ascending paralysis and muscle atrophy, stiffness in dogs <6 months of age
- Purebred dogs
- Chronically infected bitches reactivate during gestation with transplacental infection

- Successive litters affected and most pups in the litter are affected

Create a treatment and prevention plan for Toxoplasma and Neospora

- Toxoplasma
  - Treatment
    - Supportive therapy
    - Specific therapy will not clear the disease
    - Clindamycin
    - Treat the anterior uveitis: topical or systemic glucocorticoids
  - Prevention
    - Cook meat thoroughly
    - Do not let pregnant women clean out the litterbox
    - Frequently clean the litterbox to limit shed
- Neospora
  - Treatment
    - Clindamycin
    - Prednisone
  - Prevention
    - Limit access of dogs to raw meat and placental materials on farms