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Histoplasmosis

Issue Description

*Histoplasmosis is a disease that affects many mammals including dogs, cats, and humans. It is caused by the dimorphic fungus *Histoplasma capsulatum*, which is endemic in many temperate and subtropical regions of the world. This organism has been isolated from the soil in 31 of the continental United States; however, most clinical cases of disease occur in the Mississippi, Missouri, and Ohio River areas. *H. capsulatum* lives in the soil and thrives in moist and humid environments. It is present in particularly high concentrations where birds and bats congregate due to the high nitrogen concentration in their feces.*

Histoplasmosis is not contagious from animal to animal. Exposure to the mycelial stage of development in the soil is required for fungal infection to occur. While most cases of histoplasmosis are subclinical, the fungus can replicate and cause severe local or disseminated infection. There is no sex predilection and it affects animals of all ages, however animals under the age of four are most commonly affected with severe disease. Immunodeficiency has been identified as a predisposing factor for severe infection since T-cell immunity is critical to clear the disease, yet in cats there has been no correlation to date between feline leukemia virus associated immunosuppression and histoplasmosis. There appears to be no breed predilection in cats, but one canine study found Pointers, Weimaraners and Brittany spaniels to be at increased risk. Exposure of young animals with immature immune systems and exposure to large amounts of the fungus are the most common predisposing factors.

Symptoms

In dogs, respiratory signs of histoplasmosis include dyspnea, coughing, and abnormal lung sounds. Disseminated histoplasmosis may be accompanied by fever (which is unresponsive to antibiotic treatment), weight loss, depression, and inappetence. Fungal infection of the small intestine may result in the production of large amounts of watery stool, which may be accompanied by protein-losing enteropathy. Colonic involvement is associated tenesmus, mucus, and fresh blood in the feces. Pale mucous membranes are common in dogs with gastrointestinal blood loss or bone marrow involvement (myelophthisic disease). Other common clinical findings include splenomegaly, hepatomegaly, visceral lymphadenomegaly, icterus, and ascites. Ocular and cutaneous lesions, lameness from osteomyelitis, vomiting, peripheral lymphadenomegaly, and neurologic signs are rare.

Diagnosis

A definitive diagnosis of histoplasmosis is made by identifying the organism in tissue samples obtained for cytologic or histologic evaluation. Histoplasmosis causes extensive granulomatous inflammation. Macrophages frequently contain yeasts of *H. capsulatum* that appear as "clusters of grapes" in the cytoplasm of these cells. Organisms also may be scattered in the background of cytologic preparations. The organism is most easily identified in cytologic aspirates of lung, liver, lymph nodes, spleen, and bone marrow that are stained with Romanowsky stains (Wright, Giemsa, or Leishman stains). The yeasts are 2-4 μm in diameter with a round body, basophilic center, and surrounding halo caused by shrinkage of the organism during staining. Rectal scrapings and imprints of colonic biopsies also are useful in diagnosing histoplasmosis in dogs.

Infrequently, *H. capsulatum* also may be identified in macrophages, monocytes, or neutrophils in smears of blood, body cavity effusion fluid, and transtracheal wash or bronchoalveolar lavage fluid.

Granulomatous inflammation and the proliferation of yeasts results in organomegaly and organ failure. Tissue biopsies may be necessary to demonstrate *H. capsulatum* if cytologic studies are equivocal. Histologic sections can be stained by the Periodic Acid-Schiff, Gomori's methenamine silver (GMS), or Gridley techniques to demonstrate the organism more effectively, especially if low numbers of yeasts are present.

Fungal isolation can be done using fine-needle aspirates, tissue biopsies, blood, or body cavity fluids. However, fungal isolation is not recommended in routine veterinary practice because the organism is highly pathogenic when

grown in culture.

Treatment

Various oral antifungal drugs have been used to treat histoplasmosis. The pulmonary form of disease is often self-limiting. Disseminated histoplasmosis can be difficult to treat, requiring a long course of combination drug therapy. Prevention of disease is based upon avoidance of areas with heavy bird and bat fecal contamination. Small areas of fungal contamination can be disinfected with 3% formalin solution.

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