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BLASTOMYCOSIS IN DOGS

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Blastomyces: Blastomycosis is a systemic mycosis caused by the thermally dimorphic organism *Blastomyces dermatitis*. In the environment, *B. dermatitis* exists as the infective conidial phase, which is present in moist, acidic soil rich in organic matter (decaying vegetation and/or animal feces). At body temperature, transformation to the yeast phase occurs, which is an 8-12 um thick-walled structure that may exhibit broad based budding.

Blastomycosis is geographically limited, with endemic areas that are centered on the Ohio, Missouri and Mississippi river drainage. Most infections occur east of the 100th parallel. In Canada, blastomycosis has been documented in Ontario, Quebec and Manitoba. Risk factors for development of blastomycosis include close proximity to water (most infections occur within 400m) and excavation of soil. Direct access to infected earth is not required as the conidia become aerosolized.

Blastomycosis develops after inhalation of infective conidiospores. In the alveoli, the conidia are phagocytized by pulmonary macrophages, after which there is transformation into the yeast phase and resultant local infection of the pulmonary interstitium. From here, the organism spreads hematogenously or via the lymphatics. The extent of systemic spread reflects the number of organisms inhaled and the cell-mediated immunity of the infected individual.

Clinical signs: The symptoms of blastomycosis reflect the route of entry and the hematogenous systemic spread. Respiratory disease occurs in up to 75% of dogs and a dry hacking cough is the most common presenting complaint. Thoracic radiographs usually reveal interstitial or nodular disease, or alveolar disease in severe cases. Fever is present in 45-62% of cases. Skin lesions including papules, pustules and draining tracts are present in 20-50% of cases. Other common clinical findings include fungal osteomyelitis and ocular disease. Central nervous system, urogenital and cardiac involvement has been reported but are relatively uncommon presentations.

Diagnosis: As with other infections, serology for Blastomycosis indicates exposure rather than infection, and organism identification is the diagnostic gold standard. The most commonly used serological test has been the AGID (agar gel immunodiffusion) test which detects antibodies to *B. dermatitis*. The sensitivity of this test is approximately 40%, making false negatives likely, particularly early in the course of disease (prior to antibody production). An antigen test for cell wall polysaccharide is currently available from MiraVista diagnostics which can be performed on serum or urine though urine sensitivity is higher (94% as compared to 87%).

Cytological evaluation of fine needle aspiration of enlarged lymph nodes or impression smears of draining skin lesions are positive approximately 50% of the time. If negative, bronchoalveolar lavage or fine needle aspiration if the lung may be required in an attempt to harvest organisms.

Treatment: The treatment of choice for Blastomycosis is itraconazole. Important considerations when using this drug include variable absorption, which is improved when administered with a meal, and requirement for acid pH, making antacid therapy relatively contraindicated. Deterioration of respiratory signs may occur after initiation of therapy due to the inflammation associated with organism death and possibly pulmonary thromboembolism. Some of these patients require hospitalization for management of hypoxemia, and the addition of anti-inflammatory doses of corticosteroids to antifungal therapy may be required. There is debate regarding the best treatment regime for severe cases; some authors suggest that Amphotericin B followed by itraconazole may be more effective than itraconazole alone, but no data to support this statement is available at this time. Treatment should be continued for a minimum of 60 days or 30 days beyond resolution of clinical disease. Some authors suggest a treatment course of 4-6 months, especially in severe cases. Itraconazole has poor penetration into the CNS and eye in the absence of inflammation and tailoring of drug therapy is required in these individuals.

Prognosis and outcome: The prognosis for canine blastomycosis is 70-75% when treated with itraconazole. Negative prognostic indicators include intracranial or ocular disease, or severe pulmonary changes. Relapse occurs in 25% of dogs. Relapse typically occurs with in the first year after treatment, but may be up to 2-3 years after the initial infection. The urine antigen test decreases during treatment and is likely to be a convenient method of monitoring for relapse in patients after they have completed their initial therapeutic course.

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