

Case 8

Pneumocystis-associated pneumonia in a cavalier King Charles spaniel dog

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Signalment and History: A 3-year-old female spayed cavalier King Charles spaniel dog had a greater than 1 month history of progressive respiratory disease characterized by persistent tachypnea and dyspnea. Thoracic radiographs revealed a diffuse interstitial pulmonary pattern. Clinical signs did not improve following medical management including antibiotics, and euthanasia was elected.

Gross Findings: The lungs were diffusely rubbery to firm, non-collapsed, and had distinct rib impressions. All lobes were mottled pink to red and were extensively stippled by numerous pinpoint to 1 mm, minimally raised tan foci. There is a large volume of foam throughout the trachea.

Histopathologic Findings: Throughout the lungs, there is extensive filling of alveolar spaces by abundant eosinophilic flocculent proteinaceous material and numerous large foamy alveolar macrophages. Alveoli are lined by plump cuboidal type II pneumocytes. Septae are markedly expanded by fibrosis, edema fluid, fibrin, and multifocal aggregates of lymphocytes, fewer plasma cells, and occasional degenerate neutrophils. Peribronchial lymphoid aggregates are prominent. Pleural surfaces are mildly expanded by fibrin, additional loose aggregates of lymphocytes, and dilated lymphatic vessels. Within the mediastinal lymph nodes, sinuses are expanded by moderate numbers of foamy macrophages, fewer neutrophils, and edema fluid.

Additional Testing: Additional sections stained with Grocott-Gömöri's methenamine silver (GMS) stain highlight the thick wall of myriad 5-8 µm in diameter intracellular and extracellular ovoid fungal cysts within alveoli.

Comments: The gross and histologic findings including the histologic identification of GMS-positive intra-alveolar fungal cysts were consistent with pulmonary pneumocystosis in this dog. *Pneumocystis* spp. are yeast-like ascomycete fungi which classically produce pneumonia in immunocompromised people and animals. The binomial name *P. carinii* is frequently over-applied in veterinary medicine to any case of pneumocystosis. *Pneumocystis* spp. are stenoxenous organisms, and five species have been formally characterized to date in humans and rodents. In addition to its pulmonary form, extrapulmonary pneumocystosis affecting a variety of organs has been reported in humans as well as in one dog. Several breeds of dog, including the cavalier King Charles spaniel (CKCS), appear predisposed. Hereditary deficiencies in immunoglobulin levels have been described in CKCS which suggest a breed-specific humoral impairment predisposes these animals to spontaneous infection by several pathologic organisms.

References:

1. Aliouat-Denis CM, Chabé M, Demanche C, et al. *Pneumocystis* species, co-evolution and pathogenic power. Infect Genet Evol 2008;8:708-726.
2. Sukura A, Saari S, Järvinen A, et al. *Pneumocystis carinii* pneumonia in dogs: a diagnostic challenge. J Vet Diagn Invest 1996;8:124-130.
3. Watson PJ, Wotton P, Eastwood J, et al. Immunoglobulin Deficiency in Cavalier King Charles Spaniels with *Pneumocystis* Pneumonia. J Vet Intern Med 2006;20:523-527.