Abbey Veterinary Services
DIAGNOSTIC PATHOLOGY SERVICES

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CASE OF INTEREST

A Case of Suspected Pneumocystis carinii Pneumonia in a Cavalier King Charles Spaniel.

By Richard Fox, Veterinary Pathologist.
Case from Malcolm Silkstone

A male neutered 6-years-old Cavalier King Charles Spaniel presented with a 5 day history of increased respiratory effort. Radiographic examination revealed a marked bilateral and diffuse interstitial pattern. The dog was anaethetised and a bronchoalveolar lavage was performed from both the right and left lung fields. The sample was sent for cytological examination.

Cytospin and direct preparations were made of both samples and stained with a Rapid Romanowsky Stain. Degenerate neutrophils , small lymphocytes and infrequent erythrocytes (Figure 1) were prevelant. There were also several extracellular colonies of monomorphic short bacilliary bacteria exhibiting bipolar staining. Occasional neutrophils appeared to contain similar bacteria within their cytoplasm.

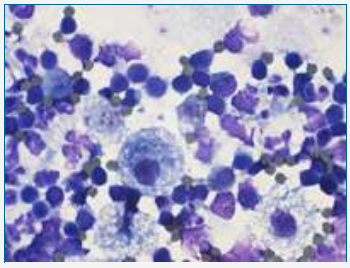

Figure 1. Photomicrograph showing frequent foamy macrophages, variably degenerate neutrophils and small lymphocytes and infrequent erythrocytes. Rapid Romanowsky Stain. x40 obj.

The smear of BAL fluid from the right side revealed a more cellular harvest than that of the left side but its cellularity was qualitatively similar. However, there were multiple organisms present dissimilar to the bacteria previously noted. A few extracellular basophilic bodies were present. Most were approximately 3-4 um in diameter, homogenous basophilic staining associated with a background of flocculant basophilic material. Infrequently however there were similarly sized organisms with 8 spindle shaped deeply basophilic structures (8-10 um diameter) (Figure 2 & inset). These organisms, given the breed and presence of numerous foamy macrophages were considered compatible with Pneumocystis trophozoites. Also a few septate fungal hyphae and pleomorphic bacteria were noted in the BAL from the right side.

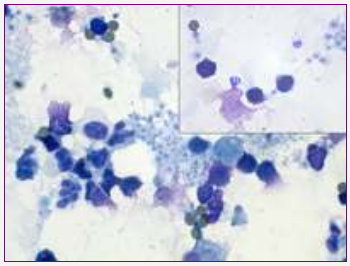

Figure 2. Photomicrograph of of fungal yeast-like organisms. Inset contains multinucleted cystic structures. Rapid Romanowsky Stain. x40 obj.

Grocott's Methenamine silver stain was performed on an additional cytospin preparation of fluid from the right lung field (Figure 3). Numerous darkly staining spherical organisms (in addition to the fungal hyphae) were noted. Closer examination of less darkly stained structures reveiled a typical yeast like structure (inset). Pneumocystoisis was then suspected but identifying a convenient laboratory which would perform PCR testing was not possible at the time of diagnosis.

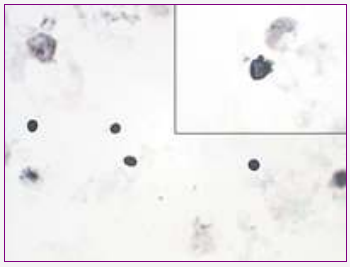

Figure 3. Photomicrograph of positively organisms . Grocott's Methanamine Silver Stain. X100 obj.

Pneumocystis carinii is a sporadic cause of acute or chronic dyspnea, usually without fever, in pigs, foals, dogs, and other domestic animals.

Clinical disease due to Pneumocystis is unlikely without underlying immunosuppression; identified causes include corticosteroid or other immunosuppressive therapy; common variable immunodeficiency of Miniature Dachshunds, demodicosis, or canine distemper in dogs. CKCS and Miniature Dachshunds appear to be predisposed to infection due to a suspected immunodeficient condition.

In this issue:

JOURNAL Articles (with links)

1. Reversible encephalopathy secondary to thiamine deficiency in 3 cats ingesting commercial diets. Marks SL, Lipsitz D, Vernau KM, Dickinson PJ, Draper W, Larsen JA, Fascetti AJ. J Vet Intern Med. 2011 Jul-Aug;25(4):949-53. Link

In summary, thiamine deficiency is a readily reversible neurological disorder that warrants consideration in any cat manifesting compatible clinical and neurological signs. The differential diagnoses for the multifocal intracranial disease suspected in all cats based on their neurological examinations included toxic and metabolic disease. It is noteworthy that thiamine deficiency was only strongly considered once the MR images were reviewed, and these findings underscore the importance of considering thiamine deficiency in seizuring cats or those manifesting multifocal intracranial signs. This study was limited by the relatively short follow-up in 1 of the 3 cats and our inability to repeat MRIs to follow resolution of the cats' intracranial lesions. Veterinarians should be cognizant that thiamine deficiency is not necessarily associated with the ingestion of diets associated with pet food recalls or large outbreaks, as the diets that were fed to 2 of the 3 cats in this series were commercially available diets formulated for maintenance that had not been associated with any diet recalls to date. Foods should also be evaluated for their adequacy as the sole or primary diet, as many unbalanced canned products are widely available and are marketed and labeled similarly to complete diets. Further studies assessing thiamine content of canned feline diets are warranted.

2. Levien AS, Baines SJ. Histological examination of the intestine from dogs and cats with intussusception.J Small Anim Pract. 2011 Nov;52(11):599-606. Link

A study to review the histological findings in the intestine from dogs and cats with intussusception.
Medical records and histopathology reports of dogs and cats with intussusception were reviewed retrospectively.
Fourty-nine animals (31 dogs and 18 cats) were identified for inclusion. Tissues examined comprised the intussusception alone in 29 animals (16 dogs and 13 cats), and the intussusception with additional intestinal biopsies in 20 animals (15 dogs and 5 cats). Twenty-eight of 49 (57·1%) animals, comprising 19 of 31 (61·3%) dogs and 9 of 18 cats (50%) had

Although previously considered a protozoan, molecular analyses have conclusively determined that P. carinii is a fungus, probably in the class Ascomycetes. Isolates from different host species should be considered distinct species or subspecies, and there is little evidence that the fungus is of zoonotic importance.

The life cycle is based only on morphologic evaluation, but involves a 1-4 um diameter, thin-walled, uninucleate, trophic form that replicates by binary fission; and a 5-8 um diameter, thick-walled, multinucleate cyst form that develops eight intracystic bodies, which may be daughter forms that are products of sexual replication. The latter are released, attach to type I pneumocytes, and presumably develop into trophic forms. The cell wall is composed of mannose-rich polysaccharides and the major surface glycoprotein. This glycoprotein A is the immunodominant antigen and mediates binding of Pneumocystis to type I pneumocytes and macrophages, surfactant proteins, and fibronectin. Both macrophages and cell-mediated immune responses are essential for controlling Pneumocystis; hence, clinical disease implies that there has been impairment of macrophage function or cell-mediated immune responses. In addition to the space-occupying effect of the fungus.

Pneumocystis may alter lung function by interfering with surfactant homeostasis. Gross lesions of Pneumocystis pneumonia are diffuse or patchy, red to yellow-brown regions of rubbery firmness or consolidation.The characteristic histologic finding is foamy or "honeycomb" material filling alveoli, due to the presence of numerous intra- and extracellular, 8-1um-diameter, round or crescent-shaped, clear fungal bodies, each containing one or more 0.5-1um-diameter, lightly basophilic bodies. The diagnosis is made by identifying the fungi in histologic sections. They are easily overlooked on hematoxylin and eosin-stained sections, but the wall of the cyst forms stains with methenamine silver or PAS.

Pneumocystis cannot be cultured using conventional techniques, but novel cell culture systems have recently been described. A PCR test has been developed however.

Bibliography

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abnormalities detected on histological examination of tissue. Eleven of 29 (46·9%) cases where only the intussusception was submitted achieved a histological diagnosis, compared to 17 of 20 (85%) where additional biopsies were submitted (P=0·003). Cats (median age 36 months, range 2 to 174) were significantly older than dogs (median age 7·5 months, range 1 to 125 months, P=0·010) and were significantly more likely to have underlying neoplasia (5 of 9; 55·6%) compared to dogs who were more likely to have inflammatory causes (17 of 19; 89·5%, P=0·020). There was no association between histological diagnosis and location of the intussusception (P=1·000).
Histological abnormalities were detected in more than half of the animals. Diagnosis of intestinal disease in animals with intussusception may be improved by submission of additional biopsy samples. Cats with intussusception are more likely to be older and have underlying neoplasia than dogs which are more likely to have inflammatory disease.

LATEST NEWS

TGen-led study suggests origins of MRSA strain in food animals

A strain of the potentially deadly antibiotic-resistant bacterium known as MRSA has jumped from food animals to humans, according to a new study led by the Translational Genomics Research Institute (TGen).

The study published today in the online journal mBio focuses on MRSA CC398, a strain of methicillin-resistant Staphylococcus aureus. The study suggests that MRSA CC398 probably started as a non-resistant (antibiotic-susceptible) strain in humans before it spread to food animals where it subsequently became resistant to several antibiotics.

They believe that the transfer of the Staph, from humans to livestock, was responsible for the bacterium becoming resistant to antibiotics, specifically tetracycline, then methicillin - two of the most common drugs used to treat Staph infections.

http://www.tgen.org/news/index.cfm?newsid=2044

SIDE STORY

Pulmonary Angiocentric Lymphoma (Lymphomatoid Granulomatosis) in a Donkey by Lucy Oldroyd

A 36-year-old donkey developed dyspnoea, pyrexia, hypoalbuminaemia and oedema. Following continued clinical deterioration the donkey was humanely destroyed. Grossly, there were numerous nodules (5e10 mm) scattered throughout the lung. Microscopically, the lung was infiltrated by an angiocentric and bronchocentric to diffuse mixed population of small mature and atypical lymphocytes, histiocytes, plasma cells and fewer eosinophils. The infiltrate was composed of numerous small mature and fewer atypical CD3+T lymphocytes.

Low numbers of CD20+ and CD79a+ B cells, some atypical, accompanied the T cells. These infiltrates were consistent with an angiocentric lymphoma and resembled lymphomatoid granulomatosis, an Epstein-Barr virus (EBV)-associated human tumour. Immunohistochemistry for EBV latent membrane protein and polymerase chain reaction analysis for equine gamma herpesvirus DNA were negative. To the authors' knowledge this is the first case of angiocentric lymphoma reported in a donkey and the first case of lymphomatoid granulomatosis-type disease in an animal in which possible concurrent infection with a gamma herpesvirus has been investigated.

http://www.sciencedirect.com/science/article/pii/S0021997511000375

CYTOLOGY TIPS

Submitting Cytology: HISTORY IS MOST IMPORTANT

- Rapid or slow onset
- Location (focal, multifocal, diffuse and areas affected)
- "Abdominal" - intra- or skin! Be specific.
- Appearance - colour, raised, ulcerated.
- Tumor, rubor, calor, and dolor = inflammation
    - Morphology
    - Firm/soft
    - Demarcation
    - Mobility
    - Position - Epidermis, Dermis, subcutis
- Compile a DDx list before aspiration

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Where we are: Multimap Link

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- Submission Forms
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SIGNUP

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