Small animal *Review*

Summary: In this month's Small Animal Review, we summarise three recently published papers from other veterinary journals. The papers focus on feline morbillivirus, a congenital case of canine porphyria and the role of symmetric dimethylarginine in defining renal disease.
http://doi.org/10.12968/coan.2020.0105

Bryn Tennant BVSc PhD MRCVS, Capital Diagnostics, SRUC Veterinary Services.
bryn.tennant@sac.co.uk

Feline morbillivirus

Canine distemper virus (CDV), a morbillivirus, has been associated with fatal disease in wild cats. During surveillance for the virus in wild cat populations a novel feline morbillivirus (FeMV) was identified across Asia, Europe and the Americas. It is suggested as a potential aetiological agent of tubulointerstitial nephritis, although this has yet to be definitively confirmed.

Piewbang et al (2020) conclusively identified FeMV infection in two captive black leopards with fatal tubulointerstitial nephritis. Both animals showed severe renal disease, small kidneys with multifocal areas of light tan discoloration of the renal parenchyma, diffuse tubular necrosis and moderate renal tubular degeneration. The kidneys were positive for FeMV using PCR and immunohistochemically FeMV antigen was present in renal tubular epithelial cells. Although the role of FeMV in causing renal disease in domestic cats has yet to be confirmed, the findings in these two leopards provide strong evidence that feline renal tubular epithelial cells can be infected with and support the replication of FeMV. If FeMV can be shown to be a primary aetiological agent in the development of chronic renal disease in cats, then this raises the possibility that an FeMV vaccine may be useful in reducing the prevalence of this disease.

Porphyria in a dog

Porphyria reflects disrupted haem synthesis, and clinical signs develop secondary to the cytoplasmic accumulation of the intermediates of the haem synthetic pathway. As haem can be synthesised in all tissues, the clinical presentations of porphyric syndromes are diverse. Early in the course of the disease, porphyrins accumulate only in the tissues containing the dysfunctional enzyme. Therefore, clinical effects will be specific to the affected tissue but eventually the porphyrins spread systemically. Specifically, later in the disease course they can accumulate in skin with consequent photoactivation of porphyrin intermediates and the development of a photoreactive dermatopathy. This may also develop indoors unless lights are equipped with yellow filters. The other common sequalae is the accumulation of porphyrins in hepatocytes, which ultimately results in a progressive hepatopathy with hepatic fibrosis, cirrhosis and liver failure.

A study by Kunz et al (2020) describes a case of congenital porphyria in a six-month-old male Clumber Spaniel, who presented with a small stature, recurrent dermatitis and a progressive pigmentary hepatopathy. The dog showed a hypochromic microcytosis (but was not anaemic), hypocholesterolaemia, persistently raised liver enzyme activities, and hyperbilirubinaemia. Histologically, a protoporphyric hepatopathy was diagnosed while the dermatitis reflected a protoporphyric photosensitivity. Management aimed to prevent conditions known to induce haem synthesis and catabolism, by prescribing ursodeoxycholic acid to promote bile flow and antioxidants (S-adenosylmethionine and vitamin E) and avoiding sunlight exposure.

Follow-up biopsies a couple of years later revealed a dark black liver (consistent with porphyrin accumulation), marked reduction in size with sharp margins, but an irregular surface with uniformly distributed tan pinpoint spots. Histology at this stage revealed a dissecting fibrosis encircling regenerative nodules, consistent with severe progressive hepatopathy. The authors suggest that veterinarians consider porphyric syndromes when unusual pigmentary hepatopathies are encountered, particularly in younger animals.

Symmetric dimethylarginine and renal disease

Renal dysfunction is associated with a reduced glomerular filtration rate (GFR), of which there are many potential aetiologies. Diagnosis is generally based on showing raised serum levels of creatinine and urea concentrations, with a low urine specific gravity and possible proteinuria. These parameters being abnormal relies on significant loss of function, so they are less useful for identifying early renal disease. They are useful for monitoring progression of established disease. The serum levels may also be impacted by non-renal factors, such as muscle mass, cardiac output and food ingestion.

Symmetric dimethylarginine (SDMA) is an amino acid produced in all cells, which is subsequently released into the circulation where it is primarily cleared through the kidneys. A paper by Sargent et al (2020) discusses the current level of knowledge around SDMA and its role in identifying renal disease. When serum SDMA levels rise, the GFR falls, with serum levels rising some months before creatinine. Serum values appear to be unaffected by the non-renal factors that may influence urea and creatinine. What is currently unclear is the impact of non-renal disease on SDMA concentrations. Limited studies suggest its serum concentration is unaffected by cardiac dysfunction, but it may be affected by neoplastic disorders where a large tumour burden and increased cell turnover may result in an elevated SDMA concentration. In humans, SDMA production is increased in critically ill patients, potentially impacting their serum levels, but this has yet to be comprehensively assessed in dogs.

The value of assaying SDMA to monitor the progression of renal disease is unclear, and there is currently no data that indicates it is of any benefit, over urea and creatinine, in this regard.

References

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