Oral presentations

Renal lipids and Chronic Kidney Disease in cats

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OBJECTIVES

CKD, characterised by chronic interstitial nephritis (CIN), is more prevalent in cats than dogs. Feline kidneys are also unusual in having an abundance of cytoplasmic lipid droplets in proximal tubule epithelial cells, from early adulthood. Intracytoplasmic lipid released into the renal interstitium can trigger inflammation, thus CIN. Here, for the first time, we extracted renal cytoplasmic lipid from cats, dogs and wildcats for quantification and identification.

METHODS

Lipid was quantified in all kidneys (domestic cats, n = 21; dogs, n = 22 and Scottish wildcats, n = 8) using Image J

computer software after Oil Red O staining. Statistical significance of effects of species, CIN, gender (ANOVA), age and neutered status (linear mixed models) on renal lipid content was accepted at $P < 0.05$. Cytoplasmic lipid droplets were extracted using a modified Folch (1957) method, separated using thin layer chromatography (TLC) alongside known lipid standards and bands identified by LC-MS/MS.

RESULTS

Cat kidneys (domestic and wild) contained significantly more lipid than dogs (median [IQR]: 18.48 [9.069, 25.66] % vs. 1.002 [0.0917, 13.63] %; $P = 0.018$), with males having more than females (mean: 16.14% vs. 6.40%; $P = 0.006$). Neutered status had no effect. Renal lipid content decreased with increasing age and severity of CIN, similarly in cats and dogs. Feline, but not canine, TLC profiles all had an additional band corresponding to a branched-chain ether lipid. Precise identification is ongoing.

STATEMENT (CONCLUSIONS)

Cat kidneys contain more lipid, some of differing species, than dog kidneys. Accumulation of specific lipids in cats may contribute to their predisposition to CKD.

The efficacy of potassium chloride in decreasing calcium oxalate relative supersaturation in dogs and cats

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OBJECTIVES

In dogs and cats, increased dietary sodium chloride (NaCl) decreases the urinary concentration of CaOx precursors and CaOx relative supersaturation (RSS), an index of crystallisation risk. Potassium chloride (KCl) is used as a salt-substitute for humans with sodium sensitivity. This study aimed to evaluate the efficacy of increased dietary KCl compared to NaCl on CaOx RSS in healthy dogs and cats.

METHODS

Two dry extruded maintenance diets differing only in KCl and NaCl were manufactured. Contents of sodium, potassium and chloride were 2.8, 1.3 and 4.0 g/Mcal respectively in diet A, and 1.0, 3.6 and 3.2 g/Mcal in diet B. Macronutrients and other minerals were similar between diets. Eleven cats and 15 dogs were fed each diet for 7 days, followed by 3 days of urine collection. Urinary ions were measured on the pooled urine sample using ionic chromatography. CaOx RSS was calculated using SUPERSAT software. CaOx RSS values were compared between diets using paired t-tests and presented as mean difference, 95% confidence interval (CI).

RESULTS

For dogs, mean difference in CaOx RSS between diets was -0.95 , 95% CI, $-2.33, 0.44$ (ns), and in cats -0.03 , 95% CI $-0.53, 0.47$ (ns).

STATEMENT (CONCLUSIONS)

The results of this study indicate that dietary KCl is as good as NaCl to decrease CaOx RSS, and can be used as a strategy to reduce crystallization risk. This is of particular interest for ageing animals at increased risk of disease that would benefit from low sodium diets, such as chronic kidney disease and heart disease.

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