

The prevalence of hyperparathyroidism in cats with azotaemic Chronic Kidney Disease has been reported to be higher than 80%. But which comes first? Azotaemia or elevated Parathyroid hormone (PTH)? This longitudinal study has followed plasma PTH concentration in 181 client-owned geriatric cats with various degrees of renal function.

One hundred and eighty-one clinically normal cats aged of at least 9 years were included and monitored during one year. For each cat, a biochemical analysis including plasma PTH concentration and variables associated with calcium homeostasis was performed, and urine specific gravity (USG) was determined at study entry and after 12 months.

Cats were retrospectively categorised into 1 of 3 groups on the basis of kidney function at the end of the 12-month observation period:

- Group 1 (n=35) : plasma creatinine concentration \leq 1.6 mg/dL,
- Group 2 (n=52) : 1.6 mg/dL < plasma creatinine concentration < 2.0 mg/dL or plasma creatinine concentration \geq 2.0 mg/dL and USG > 1.035
- Group 3 (n=31) : plasma creatinine concentration \geq 2.0 mg/dL and USG < 1.035 or persistent azotaemia.

Cats from groups 1 or 2 were considered as non-azotaemic, whereas group 3 cats were considered azotaemic.

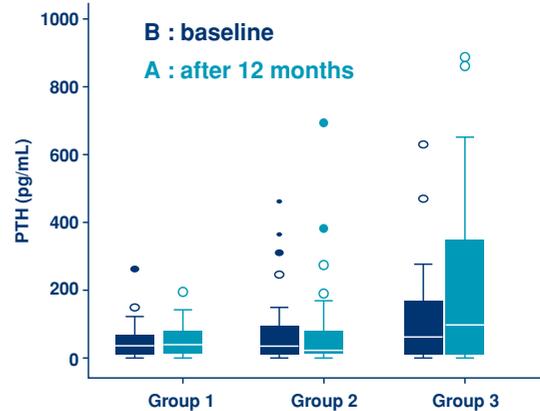
At baseline and after the 12-month period, plasma concentrations of variables associated with calcium homeostasis were compared between the 3 groups and a multivariable regression was used to identify variables that were associated with plasma PTH concentration.

At baseline, hyperparathyroidism (PTH > 265.2 mg/dL) was detected in 0% cats in group 1, 7.7% cats in group 2 and 19.4% cats in group 3. At the 12 months observation, it was diagnosed in 0% cats in group 1, 5.8% cats in group 2 and 35.5% cats in group 3.

Median plasma PTH concentration was significantly increased in cats that developed azotaemia (group 3), compared with cats that remained non-azotaemic at 12 months. At baseline, median plasma

PTH concentration was also significantly increased in azotaemic cats compared to group 1 cats. This increase of PTH concentration occurred before changes in plasma calcium and phosphate concentration were detected. In the final multivariable statistical model, PTH concentration was also found to be associated with age, plasma urea and creatinine, as well as total calcium concentrations.

PTH concentration at baseline and after 12 months



Finch N, Syme H, Elliott J. Parathyroid hormone concentration in geriatric cats with various degrees of renal function. JAVMA, Vol 241, No. 10, November 15, 2012



PTH was increased in some of the clinically normal geriatric cats that subsequently developed azotaemia within 12 months. These results suggest that renal secondary hyperparathyroidism can develop prior to azotaemia in cats. Therefore, dietary phosphorus reduction may be beneficial in cats at risk of developing chronic kidney disease, before the onset of clinical signs.

Intro

Innovation in Royal Canin: beyond the kibble!

2013

2012 is now behind us! For Royal Canin, 2012 was marked by the launch of some innovative nutritional solutions designed to support you in the long-term follow-up of your patients (like the new Veterinary Care Nutrition range for cats or Anallergenic, the new diet designed for long-term management of dogs with Adverse Food Reactions).

We will continue on the track this year... with some innovations around nutrition but also some new services designed specifically to help you bond with your clients.

As a partner of the veterinary profession, providing the best-in-class health nutrition diets is the minimum required. Being a partner means also that we have to go beyond this role and 2013 is going to be a turning point in this field!

Marie-Anne Hours (Scientific Support Manager - R&D) & Gregory Casseleux (Scientific Communication Manager - Europe)

Hepatic

Dietary intake of copper: worth being closely monitored in Labradors?

Labrador Retrievers might suffer from a heritable form of copper associated hepatitis. Apart from genetic factors, dietary intake of copper and zinc are suspected to take part in the pathogenesis. This study investigated whether dietary copper and zinc levels were associated with hepatic copper and zinc concentrations in Labrador Retrievers.

Fifty-five client-owned Labradors participated in the study, including 44 dogs that were family members of Labradors with copper associated hepatitis. All dogs were fed a single brand and type of commercial dry food for at least one year.

Dietary concentrations of copper and zinc were measured in each diet. In the 32 diets analyzed, from 7 different brands, mean dietary copper and zinc levels were 4.2 +/- 1.4 and 52.4 +/- 17.8 mg/1000 kcal, respectively.

Liver histology, and zinc and copper quantifications were performed in each dog. In this population, 51 dogs were clinically healthy, and 4 dogs showed clinical signs including icterus, polyuria/polydipsia, anorexia, vomiting and lethargy. However, in 75% of the dogs, hepatic copper concentrations were higher than 400 mg/kg of dry weight liver, ie above the upper limit of normal. In dogs with acute or chronic hepatitis (n=34), hepatic copper concentration was significantly higher than in dogs with normal histology (n=21).

High dietary copper and low dietary zinc levels were significantly associated with hepatic copper levels, but no association was found between dietary intake and hepatic concentration of zinc. Dogs fed the diet with the lowest copper content (n=8, fed Royal Canin Labrador Adult), had a significantly lower hepatic concentration compared with dogs fed any of the other diets. The estimate for an increase in hepatic copper was 14.2% with every increase of 1 mg/1000 kcal in dietary copper, and the estimate for an increase in hepatic copper was 1.5% for every decrease of 1 mg/1000 kcal in dietary zinc.



Dietary copper and zinc at current levels in commercially available dry food can influence hepatic copper and can be a risk factor for the development of copper-associated hepatitis in Labrador Retrievers with a genetic susceptibility to copper.

Fieten H, Hooijer-Nouwens BD, Biourge VC, Leegwater PAJ, Watson AJ, Van den Ingh TSGAM, Rothuizen J. Association of dietary Copper and Zinc levels with hepatic copper and zinc concentration in Labrador Retrievers. J Vet Inter Med. 2012 Nov; 26(6):1274-80

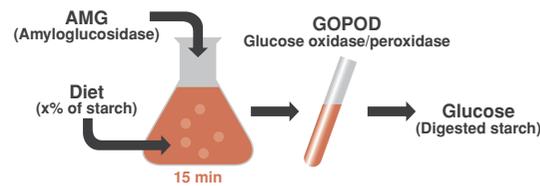
Intestinal

Influence of food processing on faecal characteristics

Large breed dogs are known to be more sensitive to diet changes than smaller ones, with a tendency to produce faeces of poorer quality. This could be due to larger amounts of indigestible residues reaching the colon and a specific microbiota leading to a higher fermentative activity. The aim of this study was to assess the effect of food processing, through the degree of starch gelatinization, on faecal characteristics in large and small breed dogs.

Five Miniature Schnauzers and 5 German Shepherds were included in this study. Three diets with identical formula, only varying in their processing efficiency, were tested. Processing efficiency was assessed by the degree of starch gelatinization (DSG), which was measured in vitro with enzymatic starch hydrolysis. In the 3 test diets, DSG was respectively 93%, 87% and 74%. Starch content in the 3 diets was 39.8% (+/-1.1) as fed.

Principle and determination of degree of starch Gelatinization (DSG)



$$\frac{\text{Digested starch}}{\text{Total starch}} = \text{DSG (\%)}$$

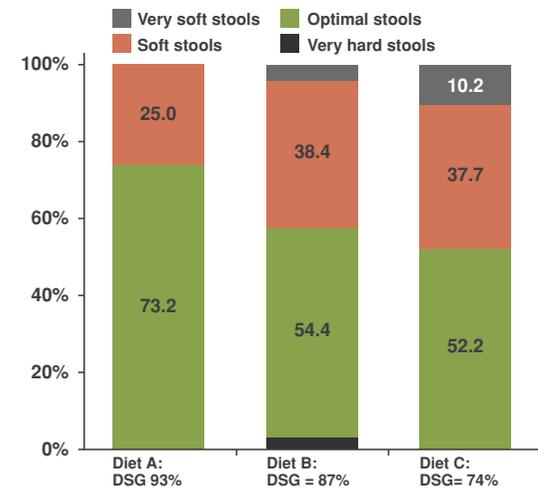
Each diet was fed for two weeks in a crossover design. Daily rations were individually adjusted to meet each dog's maintenance energy requirements. After a 1-week adaption period, fresh stools were collected for 7 days. Faecal quality was assessed daily using a 5 points scale from 1 (hard) to 5 (liquid). Faecal volume, moisture, pH, short chain fatty acid (SCFA) concentration, and nutrient digestibility were measured. Effects of diet or breed on faecal parameters were statistically tested.

In both breeds, faecal moisture was not affected by DSG variation, but lower DSG led to softer stools. A decreased DSG also led to higher fermentative end-products (SCFA and ammonia).

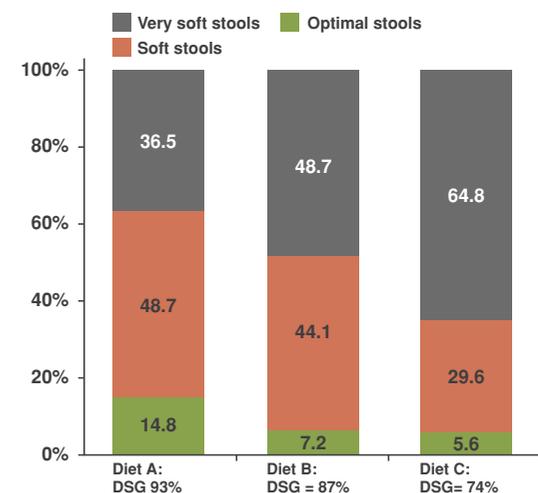
Whatever the diet, some breed effects were observed:

- In German Shepherds, stool consistency was always lower than in Miniature Schnauzer, with higher faecal moisture.
- German Shepherds presented a lower percentage of optimal stools frequency, and a higher percentage of soft or very soft stools frequency compared to Miniature Schnauzers.
- In general, fermentative end-products were found in higher concentrations in German Shepherds.

Influence of DSG on frequency of optimal stools in Miniature Schnauzers



Influence of DSG on frequency of optimal stools in German Shepherds



The efficiency of extrusion process can influence faecal consistency and fermentation products, especially on large dogs with an increased digestive sensitivity. Processing is a critical step in petfood manufacturing that must be optimized, especially for diets designed for large and sensitive breeds.

Goudez R, Weber M, Biourge V, Martin L, Leray V, Dumon H, Nguyen P. Influence of processing efficiency of a dry expanded diet on stool characteristics in dogs differing in breed. Proc. of the 16th ESVCN congress, September 2012, Bydgoszcz, Poland. p91

Urinary

Low purine diets: a benefit for dogs with Leishmaniasis

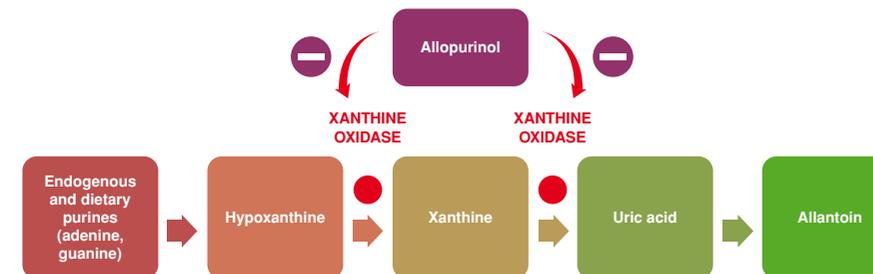
Allopurinol, which is conventionally used in the therapeutic management of canine leishmaniasis, alters purine metabolism and increases the risk of xanthine uroliths. This study assessed the influence of a low purine diet on urinary xanthine concentration in 13 dogs diagnosed with leishmaniasis and treated with allopurinol.

Allopurinol inhibits xanthine oxidase, the enzyme that converts hypoxanthine to xanthine and on to uric acid. This leads to an accumulation of hypoxanthine and xanthine in the urine that potentially increases the risk of xanthine uroliths. A previous study* showed that low purine diets can help reduce the amounts of purine end-products in urine. The aim of this trial was to evaluate the influence of a diet low in purine on the urinary concentrations of hypoxanthine and xanthine in dogs with leishmaniasis and treated with allopurinol.

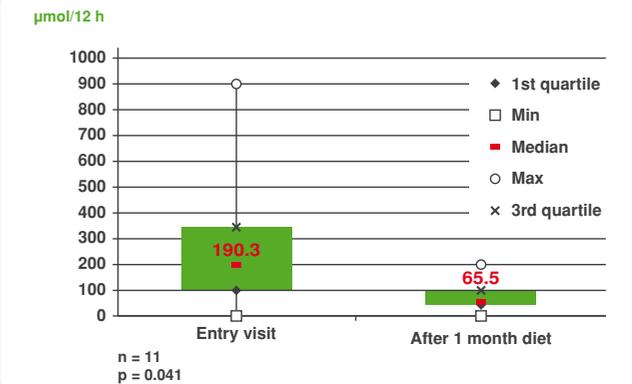
Thirteen dogs (6 females and 7 males, mean age 7.5 years) diagnosed with leishmaniasis, without liver or kidney disease, and treated with allopurinol for at least one month, were included. Dogs were fed for one month with a low purine diet (Royal Canin Urinary U/C). Urine collections of 12 hours were performed at the beginning and at the end of the trial. Urine samples were pooled and kept at 4°C, and a homogenous sample of urine was frozen below -20°C for later analysis. This analysis included the urinary concentrations of hypoxanthine, xanthine, uric acid, allantoin, creatinine and pH.

An ultrasound exam of the bladder also allowed to check for the presence of calculi in the bladder at the beginning and at the end of the study.

Purine catabolism pathway



Evolution of 12 hours xanthine excretion



Eleven dogs completed the study. Six dogs had visible stones in the bladder at the enrollment visit, but only two dogs still presented visible calculi at the ultrasound exam after one month. Urinary xanthine excretion over 12 hours significantly decreased over the month (p<0.05).

These results suggest that a low purine diet has an interest in long term dietary management of dogs treated by allopurinol without renal damage.

Mireaux M, Villaverde C, Hervera M, Roura X, Caussé E, Biourge V, Mougeot I. Canine Leishmaniasis and xanthine uroliths : interest of a reduced purine diet, preliminary study on 13 dogs. Proc. of the 16th ESVCN congress, September 2012, Bydgoszcz, Poland. p70

*Malandain, E Caussé, C Tournier, S Aladenise, A Rigolet, C Ecochard, V Biourge. Quantification of end-products of purine catabolism in dogs fed diets varying in protein and purine conten. Proc. of ACVIM Forum, San Antonio, Texas, USA, June 4-7 2008, 803-804

