Assessment of renal function over 5 months in adult dogs fed a high protein dry diet

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KIDNEY

Introduction

Despite the absence of evidence of any renal deleterious effect of high-protein diets, there are still concerns regarding the renal safety of such diets in healthy dogs.

The aim of this study was to assess the impact of a high-protein dry maintenance diet on selected parameters of renal function in adult dogs, compared to diets with a lower protein content.

Animals, materials and methods

Twenty four healthy adult Beagle dogs were randomized into 3 groups. They were fed exclusively, for 5 months, one of 3 maintenance dry diets, with a high (HP), moderate (MP) or low (LP) protein content (Table 1). The daily rations were calculated to maintain the dogs' body weight. Blood samples were taken in the fasting state at the initiation of the study and then every 4 weeks. Urine samples were performed every day for 5 days at the end of the study.

Table 1: Nutritional characteristics of the tested diets

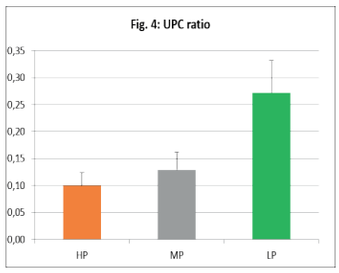
	HP diet	MP diet	LP diet
Crude protein (% ME)	38	23	15
Phosphorus (g/Mcal)	1.5	1.9	1.0
Ca/P ratio	1.6	1.3	1.5
In vivo ME (kcal/100g)	390	407	418

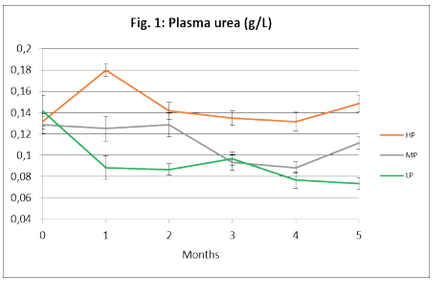
Results

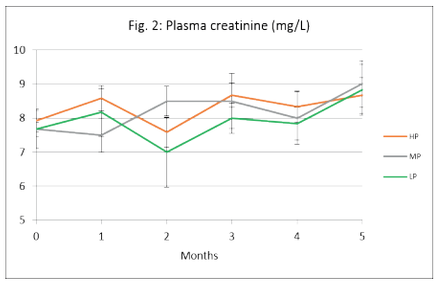
The mean dietary protein intake was 9.0±0.3, 5.0±0.2 and 3.5±0.2 g/kg BW/day with HP, MP and LP diets respectively. All plasma parameters as well as urinary protein-to-creatinine (UPC) ratios (Table 2 and Figures 1 to 4) remained in the reference ranges at each time of the study in all groups, except for the UPC ratio in the LP group. For some parameters, significant differences were noticed between the HP group and one or two of the other groups.

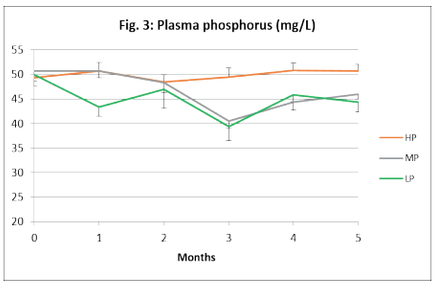
Table 2: Mean plasma values and UPC ratio in each group

	HP diet	MP diet	LP diet	ref ranges
Urea (g/L)	0.15±0.01	0.11±0.01 (p<0.05)	0.09±0.01 (p<0.01)	0.07 to 0.25
Creatinine (mg/L)	8.29±0.42	8.19±0.62 (NS)	7.92±0.60 (NS)	3 to 14
Phosphorus (mg/L)	49.9±1.5	46.8±1.8 (NS)	45.0±2.2 (p<0.01)	29 to 66
Potassium (mmol/L)	4.74±0.14	4.65±0.11 (NS)	4.66±0.15 (NS)	3.7 to 5.8
Total protein (g/L)	58.2±1.1	62.6±1.7 (p<0.05)	61.5±1.5 (p<0.05)	54 to 82
Albumin (g/L)	31.3±1.1	33.9±1.3 (NS)	33.5±1.3 (NS)	25 to 44
UPC ratio	0.10±0.02	0.13±0.03 (NS)	0.27±0.06 (p<0.01)	< 0.2









Conclusion

This preliminary study confirms that a high protein content in a balanced diet has no deleterious impact on renal function in the medium term in healthy adult dogs, as attested by the follow-up of the most common parameters.

References: Laflamme DP. Pet food safety: dietary protein. Top Companion Anim Med 2008; 23: 154-157. **Pibot P.** Contribution to a long term study about the influence of the proteic level of the diet on biochemical and hematological parameters in Beagle dog. Thèse de Doctorat Vétérinaire, Nantes, 1988. **Finco DR et al.** Effects of aging and dietary protein intake on uninephrectomized geriatric dogs. Am J Vet Res 1994; 55: 1282-1290. **Bovee KC.** Influence of dietary protein on renal function in dogs. J Nutr 1991; 121: S128-S139.

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KIDNEY

Introduction

Despite the absence of evidence of any renal deleterious effect of high-protein diets, there are still concerns regarding the renal safety of such diets in healthy cats.

The aim of this study was to assess the impact of a dry maintenance high-protein diet on renal function in adult cats, compared to diets with a lower protein content.

Animals, materials and methods

Twenty four healthy adult European cats were randomized into 3 groups. They were fed exclusively, for 5 months, one of 3 maintenance dry diets, with a high (HP), a moderate (MP) or a low (LP) protein content (Table 1). The daily rations were calculated to maintain the cats' body weight. Blood samples were taken in the fasting state at the initiation of the study and then every 4 weeks. Urine samples were performed every day for the 2 last weeks of the study.

Table 1: Nutritional characteristics of the tested diets

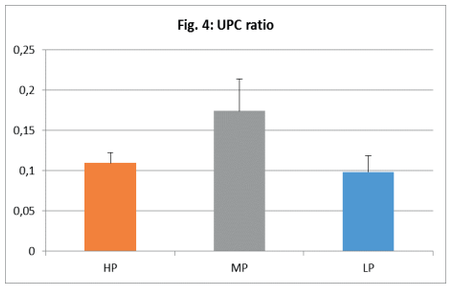
	HP diet	MP diet	LP diet
Crude protein (% ME)	48	31	27
Phosphorus (g/Mcal)	4.0	1.7	4.3
Ca/P ratio	1.1	1.0	1.0
In vivo ME (kcal/100g)	328	359	323

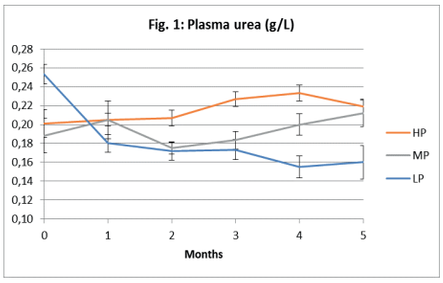
Results

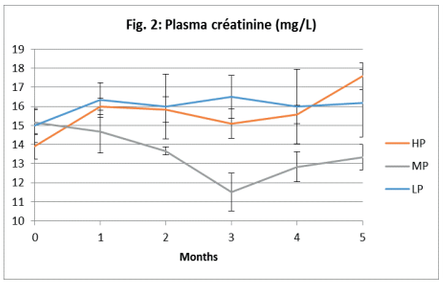
The mean dietary protein intake was 7.2±0.6, 4.6±0.3 and 4.0±0.2 g/kg BW/day with HP, MP and LP diets respectively. All plasma parameters as well as urinary protein-to-creatinine (UPC) ratios (Table 2 and Figures 1 to 4) remained in the reference ranges over the course of the study with no significant difference between the groups.

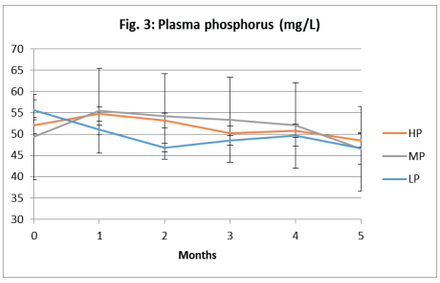
Table 2: Mean plasma values and UPC ratio in each group

	HP diet	MP diet	LP diet	reference ranges
Urea (g/L)	0.22±0.01	0.19±0.01	0.18±0.01	0.1 to 0.3
Creatinine (mg/L)	15.7±0.6	13.5±0.7	16.0±1.4	3 to 21
Phosphorus (mg/L)	51.6±1.7	51.8±2.1	49.7±1.9	34 to 85
Potassium (mmol/L)	4.0±0.2	4.1±0.2	4.1±0.3	3.7 to 5.8
Total protein (g/L)	73.3±1.3	68.0±1.6	69.0±1.1	54 to 82
Albumin (g/L)	36.4±0.7	32.5±1.1	36.3±1.0	22 to 44
UPC ratio	0.11±0.01	0.17±0.04	0.10±0.02	< 0.2









Conclusion

These results confirm that a high protein content in a balanced diet has no impact on renal function in the medium term in healthy adult cats.

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