Effect of phosphorus excess on renal function in cats

A. Demmel, E. Kienzle, B. Dobenecker

Chair of Animal Nutrition and Dietetics, Department of Animal Science, Ludwig Maximilians University Munich, Germany

Dobenecker@lmu.de

Introduction: Chronic renal insufficiency (CRI) is a common problem and a main cause of death in cats. A large number of cats develop clinical signs of CRI in the course of their life (>20% of cats above 12 years, Kraft 2000) while the reasons mostly remain unclear. Pastoor (1993) reported of reduced endogenous creatinine clearance rates in cats after 28d of selective P excess (900mg/kg bw/d; Ca/P ratio 0.4/1). The aim of the present study was the verification of these findings.

Materials and methods: Altogether 20 healthy adult cats (10m/10f, 1 to 8 years) were available for the study. Groups of 6 and 7 cats, respectively, received a P excess of the same magnitude as in the study of Pastoor (1993; ~870mg/MJ ME) for 28 days with I) a Ca/P-ratio in the recommended range (1.3/1); II) an inverse Ca/P ratio of 0.4/1 and III) a high Na and marginal K supply as well as an inverse Ca/P ratio (0.4/1) parallel to a control group. Selected clinical parameters of renal health including endogenous creatinine clearance, serum chemistry, urine analysis as well as faecal and renal mineral excretion were determined. Statistical analysis: Student’s t-test, paired t-test; ANOVA.

Results and Discussion: In both trials with inverse Ca/P ratio the endogenous creatinine clearance was significantly reduced which confirmed the findings of Pastoor (1993). Effects were even more marked in case of low K and high Na supply. Other parameters such as renal protein and glucose excretion also indicated an impaired renal function. When the Ca/P ratio was 1.3/1, no effect of P excess on renal function was observed in the trial period of 28 days.

Conclusions: Taking into account the short duration of the trials, the findings necessitate a formulation of a safe upper limit for P in combination with cofactors such as the Ca/P ratio in cats to reduce the risks of detrimental dietary effects on renal health. Further research work is needed to determine the co-factors of the effects of P excess on the renal health of cats.

Literature:

This study was financially supported by FEDIAF