Effect of phosphorus excess on renal function in cats

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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:

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