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Renal hyperparathyroidism and survival in dogs affected by chronic kidney disease

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Renal secondary hyperparathyroidism (RHPT) is a known consequence of chronic kidney disease (CKD) in dogs. However, its role as a prognostic factor has not been clarified yet, both in human and veterinary medicine.

The aim of this study was to evaluate the impact of parathyroid hormone (PTH) serum concentration on survival times in dogs with CKD.

Eighty-nine privately owned dogs affected by CKD undergoing physical examination, blood works, and urinalysis for diagnostic purposes from January 2019 to December 2021 were included in the study. All the dogs were staged according to International Renal Interest Society (IRIS) guidelines. PTH was measured on left-over samples by an immunoenzymatic method validated for dogs (ST AIA-PACK® Intact PTH, Tosoh Bioscience, Tessenderlo, Belgium). Data obtained during their first examination were analyzed and a telephonic follow-up was obtained by the owner. JMP14 (SAS Inc., Cary, USA) and MedCalc (MedCalc Software Ltd, Ostend, Belgium) were used for statistical analysis.

According to the IRIS CKD staging system, dogs were distributed as follows: 24 (27%) in stage 1, 36 (40.4%) in stage 2, 12 (13.5%) in stage 3, and 17 (19.1%) in stage 4. RHPT was identified in 36% of dogs in stage 1, 44.1% in stage 2, 77.8% in stage 3, and 91.7% in stage 4. RHPT was found in 78.9% of the dead and 29.3% of the alive dogs, respectively. Kruskal-Wallis test showed a significant difference ($p<0.01$) between PTH assessment in the different IRIS stages, except between stage 1 and stage 2. At the end of the investigation, 41 (46.1%) dogs were alive, 38 (42.7%) were dead due to CKD and 10 (11.2%) were lost at the follow-up. Wilcoxon test showed that PTH values were significantly different between dead and alive dogs ($p<0.05$).

Survival curves were calculated with Kaplan-Meier analysis. Log-rank test was used to compare curves. PTH values were previously categorized into 3 groups (<53.6 pg/mL; 53.6-107.9 pg/mL; >107.9 pg/mL), according to the upper values measured in stages 2 and 3 of CKD. Survival times were significantly different between the groups ($p<0.05$) and the median survival time was 681, 99, and 6 days, respectively. In the third group, the risk of death was 21.2 and 6.5 times higher than in the first and second group, respectively.

Although different survival times could be related to the disease severity associated with RHPT, serum concentration of PTH has to be considered a factor affecting survival in dogs with CKD.

Disclosures

No disclosures to report

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Prospective testing of a model to predict development of chronic kidney disease in aged cats attending routine veterinarian consultations.

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Chronic kidney disease (CKD) is a common cause of death in senior cats, but early diagnosis is challenging. Previously, models that use three clinical variables (plasma creatinine, BUN and urine specific gravity [USG]) at a single timepoint to predict the development of CKD in aged cats within different time periods were developed and retrospectively validated. This study aimed to test one of these models prospectively – the 12-month model – in a blinded, multinational trial conducted in primary clinical practices. Client-owned healthy cats aged ≥7 years with no prior diagnosis of CKD, kidney injury or significant chronic conditions were recruited. Model variables at baseline were used to predict CKD status at Month 12. Serum symmetric dimethylarginine (SDMA) was also measured at baseline and Month 18. Practitioners, unaware of the model predictions or SDMA concentrations, assessed clinical and laboratory variables at baseline and Month 12, and determined CKD status, making their clinical diagnoses at Month 12. The performance of the model was measured by sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and area under the receiver operator curve (AUC ROC). As PPV and NPV depend upon prevalence, they were also evaluated *post hoc* for a fixed, hypothetical CKD prevalence of 15%.

The study enrolled 182 cats: median [range] age was 10.1 [7.0–18.5] years; 103 were female (102 neutered) and 79 were male (78 neutered); median body weight was 4.8 [2.5–11.3] kg. Over 12 months, five cats (2.7%) were diagnosed with CKD. The model's sensitivity, specificity, PPV and NPV were 60% (95% confidence interval 20–100%), 97% (94–99%), 43% (10%–77%) and 99% (97–100%), respectively. The AUC ROC was 0.79. When prevalence of CKD was normalized to 15% (more typical of an aged cat population), PPV increased to 80% and NPV decreased to 93%. In a secondary analysis, baseline SDMA concentrations of ≥15 µg/dL correctly predicted only one CKD-positive cat over 18 months.

We have prospectively tested an existing model for predicting the development of CKD within 12 months using serum creatinine, BUN and USG values at a single visit. The unexpectedly low number of cats developing CKD, probably driven by the relatively low median age of 10 years, reduced the study's power to test the model's PPV. The results indicate that the model retains good accuracy and high NPV under field conditions, making this an effective renal health screening test.

Disclosures

Disclosures to report, please report below