

## In the spotlight: Management of chronic kidney disease in cats and dogs

### Search strategy

Database: CAB Abstracts <2000 to 2018 Week 13>

Search Strategy:

- ```
-----
1  (Cats or dogs or canine* or feline*).mp.
2  ("chronic renal*" or "chronic kidney*" or CKD).mp.
3  (diagnos* or biomarker* or stage or staging or treat* or therap* or nutrition* or diet* or manag*).mp.
4  1 and 2 and 3
5  limit 4 to yr="2008 -Current"
```

\*\*\*\*\*

[mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]

### A selection of references retrieved from CAB Abstracts

<1>

Accession Number

20183109493

Author

Tumer, K. C.; Issi, M.

Title

Chronic renal failure associated with polycystic kidney disease in a Persian cat.

Source

Saglik Bilimleri Tip Dergisi, Frat Universitesi; 2017. 31(3):265-267. 19 ref.

Publisher

Saglik Bilimleri Enstitusu, Firat Universitesi

Location of Publisher

Elazig

Country of Publication

Turkey

Abstract

Feline polycystic kidney disease is a hereditary disease that effect especially Persian and Persian related cats. In this case report, it is aimed that presenting of the clinical, hematological, biochemical and ultrasonographic findings of chronic renal insufficiency associated with polycystic kidney disease in a Persian cat. A 3 years old, 1.8 kg male Persian cat was presented to Firat University Animal Hospital with a history of 2 week duration polyuria, polydipsia, severe weight loss and vomiting. Chronic renal failure associated with polycystic kidney disease was diagnosed. The supportive treatment was initiated but the cat died after 2 weeks. The necropsy was not performed because of cat's owner didn't allow. In conclusion, polycystic kidney disease should be considered in Persian cats that is brought with complaints of vomiting, weight loss, polyuria and polydipsia and it is thought that it may be useful to determine the prevalence of polycystic kidney disease in Persian and other egzotic cats in Turkey.

Publication Type

Journal article.

<2>

Accession Number

20183097855

Author

Chen, C. N.; Chou, C. C.; Tsai, P. S. J.; Lee, Y. J.

Title

Plasma indoxyl sulfate concentration predicts progression of chronic kidney disease in dogs and cats.

Source

Veterinary Journal; 2018. 232:33-39. 32 ref.

Publisher

Elsevier Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Indoxyl sulfate is a protein-bound uremic toxin that increases as the severity of impaired renal function increases in humans, laboratory animals, dogs and cats. An elevation of indoxyl sulfate is related to prognosis among people with chronic kidney disease. However, whether indoxyl sulfate is able to predict the progression of chronic kidney disease in dogs and cats has not been previously studied. In the present study, 58 cats and 36 dogs with chronic kidney disease were enrolled. Plasma indoxyl sulfate was measured by high performance liquid chromatography. Renal progression was defined as an increase by one International Renal Interest Society (IRIS) stage and/or a rise in serum creatinine concentration of 0.5 mg/dL during the same stage within a 3-month period. Compared with the non-progression groups, across different stages of renal failure, the baseline plasma indoxyl sulfate concentration was increased in the renal progression group ( $P < 0.05$ ), especially for IRIS stages 2 and 3 animals. The area under the receiver operator characteristic curves of indoxyl sulfate, when predicting renal progression, was above 0.75 for both dogs and cats. Indoxyl sulfate concentrations were also correlated with the increase of blood urea nitrogen, serum creatinine, and phosphate and the decrease of hematocrit among cats; while in dogs, concentrations were only correlated with the increase of phosphate concentrations. Indoxyl sulfate served as a biomarker of progression risk in dogs and cats with chronic kidney disease.

Publication Type

Journal article.

<3>

Accession Number

20183095492

Author

Stock, E.; Daminet, S.; Paepe, D.; Buresova, E.; Vandermeulen, E.; Smets, P.; Duchateau, L.; Saunders, J. H.; Vanderperren, K.

Title

Evaluation of renal perfusion in hyperthyroid cats before and after radioiodine treatment.

Source

Journal of Veterinary Internal Medicine; 2017. 31(6):1658-1663. 36 ref.

Publisher

Wiley

Location of Publisher

Boston

Country of Publication

USA

## Abstract

**Background:** Hyperthyroidism and chronic kidney disease (CKD) are common in elderly cats. Consequently, both diseases often occur concurrently. Furthermore, renal function is affected by thyroid status. Because changes in renal perfusion play an important role in functional renal changes in hyperthyroid cats, investigation of renal perfusion may provide novel insights. **Objectives:** To evaluate renal perfusion in hyperthyroid cats with contrast-enhanced ultrasound (CEUS). **Animals:** A total of 42 hyperthyroid cats was included and evaluated before and 1 month after radioiodine treatment. **Methods:** Prospective intrasubject clinical trial of contrast-enhanced ultrasound using a commercial contrast agent (SonoVue) to evaluate renal perfusion. Time-intensity curves were created, and perfusion parameters were calculated by off-line software. A linear mixed model was used to examine differences between pre- and post-treatment perfusion parameters. **Results:** An increase in several time-related perfusion parameters was observed after radioiodine treatment, indicating a decreased blood velocity upon resolution of the hyperthyroid state. Furthermore, a small post-treatment decrease in peak enhancement was present in the renal medulla, suggesting a lower medullary blood volume. **Conclusions and Clinical Importance:** Contrast-enhanced ultrasound indicated a higher cortical and medullary blood velocity and higher medullary blood volume in hyperthyroid cats before radioactive treatment in comparison with 1-month post-treatment control.

**Publication Type**

Journal article.

<4>

**Accession Number**

20183087077

**Author**

Galvao, A. B.; Carvalho, M. B.; Batalhao, L. G.; Silva, J. C. B.; Batalhao, M.; Carnio, E. C.

**Title**

Increased nitric oxide plasma concentration in dogs with naturally acquired chronic renal disease.

**Source**

Pesquisa Veterinaria Brasileira; 2017. 37(8):847-852. 21 ref.

**Publisher**

Colegio Brasileiro de Patologia Animal

**Location of Publisher**

Rio de Janeiro

**Country of Publication**

Brazil

**Abstract**

This study aimed to determine the amount of plasma nitric oxide in clinically stable dogs at different stages of chronic kidney disease (CKD). Five groups of dogs were studied, aged from 4 to 18, comprising of a control group composed of healthy animals (control n=17), group CKD stage 1 (DRC-1, n=12), group CKD stage 2 (CKD-2, n=10) group, CKD stages 3 (CRD-3, n=13) and Group CKD stage 4 (DRC-4, n=10). Dogs with CKD were clinically stable and received no treatment. Two blood samples were collected at 24 hours intervals (repeated measures) to obtain serum and plasma. The serum creatinine values were used to classify dogs as CG, CKD-1, CKD-2, CKD-3 and CKD-4, and were (1.02±0.02 mg/dL), (1.07±0.04 mg/dL), (1.81±0.03 mg/dL), (3.40±0.15 mg/dL) and (6.00±0.20 mg/dL) respectively. The determination of nitric oxide (NO) was performed by dosing nitrate/nitrite indirectly, and used for measurement of nitrate according to the NO/ozone chemiluminescence. The data were submitted to ANOVA for nonparametric analysis (Kruskal-Wallis) (P<0.05). The concentration of plasmatic NO did not differ significantly among GC (10.81±0.51± micro M), CKD-1 (15.49±0.97 micro M) and CKD-2 (19.83±0.33 micro M) groups. The plasma concentration of CKD-3 (17.02±0.73 micro M) and CKD-4 (83.56±0.13.63 micro M) was significantly higher compared with healthy dogs. In conclusion, the NO plasma concentration can increase in dogs with CKD and become significantly higher in stage 3 and 4 dogs.

**Publication Type**

Journal article.

<5>

Accession Number

20183085564

Author

Bragato, N.; Borges, N. C.; Fioravanti, M. C. S.

Title

B-mode and Doppler ultrasound of chronic kidney disease in dogs and cats.

Source

Veterinary Research Communications; 2017. 41(4):307-315. 46 ref.

Publisher

Springer

Location of Publisher

Dordrecht

Country of Publication

Netherlands

Abstract

Ultrasound is the imaging test of choice for renal evaluation, because it provides information about the position, size, shape, internal architecture and hemodynamics of the kidneys without harming the patient. In chronic kidney disease, the main findings observed in B-mode ultrasound images are increased cortical echogenicity, loss of corticomedullary differentiation, reduced renal volume and irregular renal contour, and when these changes are associated, they are indicative of end-stage renal disease. However, the cause of kidney disease cannot be determined by ultrasonography, but must be confirmed by means of biopsy, although the presence of ultrasonographic changes indicative of the end-stage of the disease may contraindicate this procedure. The Doppler ultrasound test complements the ultrasonic B-mode examination and enables the assessment of renal perfusion based on a calculation of the hemodynamic indices, which are increased in cases of chronic kidney lesions, with higher values in the most severe cases. Thus, ultrasound examinations are not only useful in diagnostics but also play an important role in defining the prognosis of patients with chronic kidney disease.

Publication Type

Journal article.

<6>

Accession Number

20183074288

Title

Gastric pH and gastrin levels in chronic renal disease in cats.

Source

Advances in Small Animal Medicine and Surgery; 2018. 31(2):6.

Publisher

Elsevier Inc.

Location of Publisher

Philadelphia

Country of Publication

USA

Publication Type

Journal article.

<7>

Accession Number

20183029795

Author

Mleonard, C. A.

Title

Are adult cats fed on wet maintenance diets less at risk of developing chronic kidney disease compared to adult cats fed on dry maintenance diets?

Source

Veterinary Evidence; 2017. 2(4):130. 8 ref.

Publisher

RCVS Knowledge

Location of Publisher

London

Country of Publication

UK

Abstract

A comprehensive search of the available veterinary literature found three studies which assess whether feeding wet or dry maintenance diets place cats at an increased risk of chronic kidney disease (CKD). None of the three studies found any significant benefit of feeding either diet in reducing the risk of CKD. However, the criteria used to diagnose CKD was not standardized among the three studies. There is currently insufficient evidence that feeding a wet maintenance diet will help to reduce the risk of CKD, but further studies are needed to assess whether diet can play some role in reducing the risk of CKD diagnosis.

Publication Type

Journal article.

<8>

Accession Number

20183029130

Author

Caney, S.

Title

Managing concurrent CKD and hyperthyroidism in geriatric cats.

Source

Veterinary Times; 2018. 48(3):6, 8. 7 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Publication Type

Journal article.

<9>

Accession Number

20183051825

Author

Ograin, V.

Title

Innovations in nutritional therapy for cats with chronic kidney disease.

Source

The Veterinary Nurse; 2017. 8(10):534-541.

Publisher

MA Healthcare Limited

Location of Publisher

London

Country of Publication

UK

Abstract

Kidney disease is the second most common cause of death in cats. The management of chronic kidney disease (CKD) has evolved with nutrition playing a prominent role in the management. A new test has been developed that can detect kidney disease sooner than traditional tests: SDMA (symmetric dimethylarginine). Earlier diagnosis using SDMA and the International Renal Interest Society (IRIS) guidelines may allow earlier nutritional intervention in cats with CKD. The goal for a cat is to provide adequate nutrition, which will lead to improved quality and length of life. The overarching goals of CKD management are to: control clinical signs of uraemia; maintain adequate fluid, electrolyte, and acid-base balance; provide adequate nutrition; and minimise progression of kidney disease. Nutritional management plays a role in each goal and is the cornerstone of treatment for cats with CKD.

Publication Type

Journal article.

<10>

Accession Number

20183032599

Author

Caney, S. M. A.

Title

An online survey of dietary and phosphate binder practices of owners of cats with chronic kidney disease.

Source

Journal of Feline Medicine and Surgery; 2017. 19(10):1040-1047. 20 ref.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

Objectives: The objective of this study was to learn about owner experiences of chronic kidney disease (CKD), focusing on use of therapeutic renal diets (TRDs) and intestinal phosphate binders (IPBs). Methods: An online survey was promoted to UK-based cat owners. Results: In total, 859 owners participated. Most cats (n=620; 72.18%) had two or more clinical signs at the time of their CKD diagnosis. Most common were polydipsia (n=462; 53.78%) and weight loss (n=426; 49.59%). In 94 cats (10.94%) CKD was only diagnosed as a result of wellness screening. In total, 371 participants (43.19%) reported that their cat's blood pressure had been measured; 100 of these (26.95% of those where blood pressure had been measured) subsequently received anti-hypertensive medication. In total, 90.80% of all participating owners had received

a recommendation to feed a TRD. Five hundred and seventy-one owners (66.47%) reported that they were feeding a TRD as a component of their cat's diet. The most common reason for not feeding a TRD was that the cat did not like it (n=123; 59.13%). Where a veterinary recommendation to feed a TRD had been received, 564 owners (72.31%) reported feeding a TRD as a component of their cat's diet vs seven owners (7.04%) who had not received a veterinary recommendation to feed a TRD. IPBs had been recommended to 321 owners (37.81%) and for 72 owners (8.38%) the recommendation came from a source other than a veterinary professional. Where used, IPBs were commonly added to a TRD (n=136; 49.28%) and were generally accepted within 4 weeks (n=178; 73.86%). Conclusions and relevance: Awareness of TRDs was high but much lower for IPBs. A veterinary recommendation to feed a TRD was associated with higher compliance.

Publication Type  
Journal article.

<11>

Accession Number  
20183023494

Author

Lippi, I.; Perondi, F.; Ceccherini, G.; Marchetti, V.; Guidi, G.

Title

Effects of probiotic VSL#3 on glomerular filtration rate in dogs affected by chronic kidney disease: a pilot study.

Source

Canadian Veterinary Journal; 2017. 58(12):1301-1305. 20 ref.

Publisher

Canadian Veterinary Medical Association

Location of Publisher

Ottawa

Country of Publication

Canada

Abstract

The aim of this study was to evaluate the effects of probiotic VSL#3 on glomerular filtration rate (GFR) in dogs affected by chronic kidney disease (CKD). The treatment group (n=30) received prescription renal diet and probiotic VSL#3 (112 to 225x10<sup>9</sup> lyophilized bacteria per 10 kg body weight, PO, q24h for 2 months); the control group (n=30) received prescription renal diet and standard therapy. All dogs underwent GFR measurement at the beginning of the study (T0) and were re-evaluated by GFR measurement after 2 months (T1). The GFR was significantly higher (P=0.0001) in the treatment group compared to the control group at T1. In the treatment group, the GFR was significantly higher (P=0.0008) at T1 compared to T0. In the control group, the GFR was significantly lower (P=0.001) at T1 compared to T0. VSL#3 supplementation seemed to be efficient in reducing deterioration of GFR over time in dogs affected by CKD.

Publication Type

Journal article.

<12>

Accession Number  
20183023492

Author

Zatelli, A.; D'Ippolito, P.; Roura, X.; Zini, E.

Title



Short-term effects of dietary supplementation with amino acids in dogs with proteinuric chronic kidney disease.

Source

Canadian Veterinary Journal; 2017. 58(12):1287-1293. 26 ref.

Publisher

Canadian Veterinary Medical Association

Location of Publisher

Ottawa

Country of Publication

Canada

Abstract

This retrospective study investigated the impact of amino acid supplementation on body weight, serum albumin, creatinine and urea concentrations, and urine protein-to-creatinine (UPC) ratio in proteinuric dogs with chronic kidney disease (CKD). Forty-six client-owned azotemic dogs with spontaneous proteinuric CKD already on a renal diet and in therapy with enalapril were included. After approximately 1 month of treatment (baseline), 29 dogs received oral amino acid supplementation daily (group A) and 17 dogs did not (group B). The parameters under investigation were determined at baseline and after 4 to 8 weeks in both groups. Compared to baseline, body weight and serum albumin increased ( $P < 0.01$ ,  $P < 0.05$ , respectively) at follow-up in group A, but did not change in group B. Serum creatinine concentration did not change in both groups; urea concentration ( $P < 0.05$ ) and UPC ratio ( $P < 0.01$ ) decreased in group B, but not in group A. Supplementation with amino acids increased body weight and serum albumin concentration in these dogs but it might have prevented a decrease in proteinuria and urea concentration.

Publication Type

Journal article.

<13>

Accession Number

20173377574

Author

Martorelli, C. R.

Title

Sequential evaluation of calcium and phosphorus metabolism with emphasis on measurement of fibroblast growth factor 23 (FGF-23) and urinary fractional excretion of phosphorus (uFEP) in dogs with chronic kidney disease treated with mesenchymal stem cell. [Portuguese]

Source

Avaliacao sequencial do metabolismo de calcio e fosforo com enfase na determinacao do fator de crescimento de fibroblastos 23 (FGF-23) e da excrecao fracionada de fosforo urinaria (uFEP) de caes com doenca renal cronica submetidos a terapia com celulas-tronco mesenquimal; 2016. :155 pp. 125 ref.

Publisher

Universidade de Sao Paulo, Faculdade de Medicina Veterinaria e Zootecnia

Location of Publisher

Sao Paulo

Country of Publication

Brazil

Abstract

Hyperphosphatemia is associated with renal secondary hyperparathyroidism (SRHP) and chronic kidney disease (CKD) progression. Phosphorus retention stimulates the synthesis of fibroblast growth factor 23 (FGF-23), which promotes phosphaturia in order to avoid the onset of hyperphosphatemia. Conservative treatment of CKD is currently available and new strategies are needed and welcome to avoid the progression of renal injury. Recent studies have shown the role of mesenchymal stem cell (MSC) in minimizing inflammatory and immunological mechanisms known as mediators of CKD progression. Therefore, it was hypothesized that MSCs could avoid or control the progression to HPTSR, assessed by serum phosphorus



(sP), FGF-23, total and ionized calcium and fractional excretion of phosphorus (uFEP) in CKD dogs in Stages 2 (Group A) and 3 (Group B), also was investigated whether high values of FGF-23 could be associated with shorter survival time. Prospective, double-blind, randomized and longitudinal study was conducted enrolling 22 dogs with CKD treated with saline solution (SS) or MSC, which were evaluated every 30 to 45 days in 12 moments (T0 to T12). In Group A (n=9; SF: n=6, CTM: n=3) all dogs were normophosphatemic at the beginning of the follow-up (T0) and high levels of FGF-23 were already detected in 33.3% of dogs (3 of 9), as well as increased in uFEP (33.3%; 3 of 9). The mean  $\pm$  SEM of serum FGF-23 in Group A was 481.50 $\pm$ 75.23 pg/mL. In Group B (n=13; SS: n=6, MSC: n=7), all dogs showed high concentrations of serum FGF-23 since T0 (mean $\pm$ SEM of 12744 $\pm$ 6979 pg/mL), and normophosphatemia detected in 53.8% of them. The mean $\pm$ SEM of serum phosphorus at T0, T6 and T12 or death in Group A and B was 3.74 $\pm$ 0.13 mg/dL and 6.40 $\pm$ 0.54 mg/dL. Hyperphosphatemia developed during the follow-up in only 11.1% of the dogs of Group A and 84.6% of the dogs of Group B. Group B (SS and MSC) had higher levels of FGF-23 than Group A (SS and MSC), and difference between those groups detected. The uFEP in dogs of Groups A and B at T0, T6 and T12 or death obtained mean $\pm$ SEM of 20.93 $\pm$ 3.92% and 24.05 $\pm$ 2.22%, respectively. Furthermore, the survival rate was lower in Group B, which was associated with severe hyperphosphatemia, high values of serum FGF-23 and decreased uFEP. Therefore in normophosphatemic CKD dogs, the increased in uFEP and high levels of FGF-23 may act as an early marker of SRHP. However, in later stages of CKD, increased levels of serum FGF-23 associated with decreased uFEP and hyperphosphatemia may indicate poor prognosis. Regarding to the MSC therapy in dogs with CKD, the number of dogs involved and also according to the results, it still has not allowed to conclude the effect of therapy with mesenchymal stem cell in spontaneous chronic kidney disease; however, the results obtained raised important questions such as the time or the stage of CKD that could be more suitable for the use of stem cell therapy in order to get its beneficial effects. Therefore, further studies are needed, including greater number of dogs with CKD and then to evaluate the effect or action of MSC to avoid disturbances in mineral metabolism as well as the progression of CKD in dogs.

Publication Type

Thesis.

<14>

Accession Number

20183018903

Author

Almond, S.

Title

Pathophysiology of chronic kidney disease and the nursing care of cats.

Source

The Veterinary Nurse; 2017. 8(9):500-505.

Publisher

MA Healthcare Limited

Location of Publisher

London

Country of Publication

UK

Abstract

Chronic kidney disease due to a progressive loss of kidney function is a condition regularly seen in the veterinary hospital with signs not only being polyuria and polydipsia, but anorexia, mucosal ulcers and dehydration. Understanding the pathophysiology of chronic kidney disease allows nursing care to be tailored not only for the condition, but to the individual patient encouraging a holistic approach and quality client care.

Publication Type

Journal article.

<16>

Accession Number

20173379746

Author

Bertrand, A.; Lazard, M.; Fusellier-Tesson, M.

Title

Constipation in an elderly dog with chronic kidney disease. [French]

Source

Point Veterinaire; 2017. 48(381 (Part 1)):11-12. 3 ref.

Publisher

Newsmed

Location of Publisher

Paris

Country of Publication

France

Abstract

The clinical signs and diagnosis of aortic calcifications (calcinosis circumscripta) in a 10-year-old dog in France [date not given] are described.

Publication Type

Journal article.

<17>

Accession Number

20183004938

Author

Hall, J. A.; Brockman, J. A.; Davidson, S. J.; MacLeay, J. M.; Jewell, D. E.

Title

Increased dietary long-chain polyunsaturated fatty acids alter serum fatty acid concentrations and lower risk of urine stone formation in cats.

Source

PLoS ONE; 2017. 12(10):e0187133. 41 ref.

Publisher

Public Library of Sciences (PLoS)

Location of Publisher

San Francisco

Country of Publication

USA

Abstract

The lifespan of cats with non-obstructive kidney stones is shortened compared with healthy cats indicating a need to reduce stone formation and minimize chronic kidney disease. The purpose of this study was to investigate the effects of increasing dietary polyunsaturated fatty acids (PUFA) on urine characteristics. Domestic-short-hair cats (n=12; mean age 5.6 years) were randomized into two groups and fed one of two dry-cat foods in a cross-over study design. For one week before study initiation, all cats consumed control food that contained 0.07% arachidonic acid (AA), but no eicosapentaenoic acid (EPA) or docosahexaenoic acid (DHA). Group 1 continued eating control food for 56 days. Group 2 was fed test food for 56 days, which was control food plus fish oil and high-AA oil. Test food contained 0.17% AA, 0.09% EPA and 0.18% DHA. After 56 days, cats were fed the opposite food for another 56 days. At baseline and after each feeding period, serum was analyzed for fatty acid concentrations, and urine for specific gravity, calcium

concentration, relative-super-saturation for struvite crystals, and a calcium-oxalate-titrimetric test was performed. After consuming test food, cats had increased (all  $P < 0.001$ ) serum concentrations of EPA (173%), DHA (61%), and AA (35%); decreased urine specific gravity ( $P = 0.02$ ); decreased urine calcium concentration ( $P = 0.06$ ); decreased relative-super-saturation for struvite crystals ( $P = 0.03$ ); and increased resistance to oxalate crystal formation ( $P = 0.06$ ) compared with cats consuming control food. Oxalate crystal formation was correlated with serum calcium concentration ( $r = 0.41$ ;  $P < 0.01$ ). These data show benefits for reducing urine stone formation in cats by increasing dietary PUFA.

Publication Type  
Journal article.

<18>

Accession Number  
20183004839

Author  
Williams, T. L.; Elliott, J.; Syme, H. M.; Archer, J.

Title  
Investigation of the association between serum protein concentrations and concurrent chronic kidney disease in hyperthyroid cats.

Source  
Research in Veterinary Science; 2017. 115:412-417. 24 ref.

Publisher  
Elsevier Ltd  
Location of Publisher  
Oxford

Country of Publication  
UK

Abstract

Our objective was to identify if changes in serum protein concentrations occur in hyperthyroidism and to assess their association with the development of azotaemia following treatment. Initially non-azotaemic hyperthyroid cats and healthy older cats were included. Serum concentrations of protein fractions were determined by agarose gel electrophoresis and compared between; hyperthyroid and control cats, initially non-azotaemic hyperthyroid cats which developed azotaemia in a 4 month follow up period (masked-azotaemic) and those which remained non-azotaemic, and hyperthyroid cats before and at the time of restoration of euthyroidism. Data are presented as median [25th, 75th percentiles]. Hyperthyroid cats ( $n = 56$ ) had higher serum alpha 2 globulin concentrations (12.5 [10.9, 13.1] g/L vs. 9.8 [3.0, 11.4] g/L;  $P < 0.001$ ) and lower serum gamma globulin concentrations (11.4 [9.1, 13.3] g/L vs. 14.0 [12.4, 16.8] g/L;  $P = 0.001$ ) than control cats ( $n = 26$ ). Following treatment, serum total globulin concentration increased (from 38.6 [35.4, 42.8] g/L to 42.3 [39.0, 45.7] g/L;  $P < 0.001$ ), serum alpha 2 globulin concentration decreased (from 12.5 [10.9, 13.9] g/L to 11.5 [10.1, 12.6] g/L;  $P < 0.001$ ) and serum gamma globulin concentration increased (from 11.4 [9.0, 13.3] g/L to 14.0 [12.4, 16.8] g/L;  $P < 0.001$ ). Serum concentrations of total globulin or globulin fractions were not significantly different between masked-azotaemic and non azotaemic groups. In conclusion, hyperthyroidism is associated with altered serum concentrations of the alpha 2 and gamma globulin fractions, however these changes were not associated with the development of azotaemic chronic kidney disease following treatment.

Publication Type  
Journal article.

<19>

Accession Number

20173363943

Author

Serrano Soto, A. M.

Title

Monoclonal antibodies (MAB) as a new therapeutic option, a new horizon in veterinary medicine. [Spanish]

Source

Argos - Informativo Veterinario; 2017. (193):8-9. 4 ref.

Publisher

ASIS Biomedica s.l.

Location of Publisher

Zaragoza

Country of Publication

Spain

Abstract

The development and application of monoclonal antibody-based therapies and its use vs. conventional pharmacological treatments in canine atopic dermatitis, osteoarthritis, chronic kidney disease, neoplasms and heart diseases are described.

Publication Type

Journal article.

<20>

Accession Number

20173355994

Author

Vitalaru, A. B.; Stefanescu, A.

Title

Treatment protocols of anemia in dogs with chronic kidney disease by stimulating erythropoiesis using erythropoietin beta.

Source

Lucrari Stiintifice - Universitatea de Stiinte Agricole a Banatului Timisoara, Medicina Veterinara; 2017. 50(2):302-305. 5 ref.

Publisher

Facultatea de Medicina Veterinara

Location of Publisher

Timisoara

Country of Publication

Romania

Abstract

The study was conducted on 12 client-owned dogs of different ages, from different races with naturally occurring CKD, including 8 with comorbidities. Determination of renal parameters was performed every week in all cases and their progress was closely correlated with the evolution of hemoglobin. All dogs received daily iron supplements, copper, vitamin C, folic acid, vitamin B12, 50 micrograms per kg orally. We created two groups of 6 dogs each: group A received 50 units of Erythropoietin beta per kg three times per week and group B received 100 units of Erythropoietin beta per kg three times per week. The study was conducted for six months and after this period we collected the information. Response to treatment was defined as achieving hemoglobin higher than 12 g/dl. 2 of 6 dogs in group A (33.33%) achieved hemoglobin higher than 12 g/dl and 5 of 6 dogs in group B (83.33%) achieved hemoglobin higher than 12 g/dl. Median time to achieve hemoglobin higher than 12 g/dl was 45 days in group A and 30 days in group B. Potential adverse events included increased blood pressure requiring treatment (n=10), seizures (n=1), vomiting (n=2), diarrhea (n=2) and possible pure red cell aplasia (PRCA) (n=1). Erythropoietin beta is an effective treatment for anemia secondary to CKD in dogs. The most efficient dosage is 100 units per kg three times per week,

associated with iron supplements, copper, vitamin C, folic acid, vitamin B12. PRCA was a possible adverse event in 1 of 12 dogs (8.33%).

Publication Type

Journal article.

<21>

Accession Number

20173380376

Author

Quimby, J. M.; Dowers, K.; Herndon, A. K.; Randall, E. K.

Title

Renal pelvic and ureteral ultrasonographic characteristics of cats with chronic kidney disease in comparison with normal cats, and cats with pyelonephritis or ureteral obstruction.

Source

Journal of Feline Medicine and Surgery; 2017. 19(8):784-790. 7 ref.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

**Objectives:** The objective was to describe ultrasonographic characteristics of cats with stable chronic kidney disease (CKD) and determine if these were significantly different from cats with pyelonephritis (Pyelo) and ureteral obstruction (UO), to aid in clinical assessment during uremic crisis. **Methods:** Sixty-six cats with stable CKD were prospectively enrolled, as well as normal control cats (n=10), cats with a clinical diagnosis of Pyelo (n=13) and cats with UO confirmed by surgical resolution (n=11). Renal ultrasound was performed and routine still images and cine loops were obtained. Analysis included degree of pelvic dilation, and presence and degree of ureteral dilation. Measurements were compared between groups using non-parametric one-way ANOVA with Dunn's post-hoc analysis. **Results:** In total, 66.6% of CKD cats had measurable renal pelvic dilation compared with 30.0% of normal cats, 84.6% of Pyelo cats and 100% of UO cats. There was no statistically significant difference in renal pelvic widths between CKD cats and normal cats, or CKD cats and Pyelo cats. On almost all measurement categories, UO cats had significantly greater renal pelvic widths compared with CKD cats and normal cats ( $P<0.05$ ) but not Pyelo cats. Six percent of stable CKD cats had measurable proximal ureteral dilation on one or both sides vs 46.2% of Pyelo cats and 81.8% of UO cats. There was no statistically significant difference in proximal ureteral width between normal and CKD cats, or between Pyelo and UO cats. There was a statistically significant difference in proximal ureteral width between CKD and Pyelo cats, CKD and UO cats, normal and UO cats, and normal and Pyelo cats. **Conclusions and relevance:** No significant difference in renal pelvic widths between CKD cats and Pyelo cats was seen. These data suggest CKD cats should have a baseline ultrasonography performed so that abnormalities documented during a uremic crisis can be better interpreted.

Publication Type

Journal article.

<22>

Accession Number

20173370476

Author

King, J. N.; Font, A.; Rousselot, J. F.; Ash, R. A.; Bonfanti, U.; Brovida, C.; Crowe, I. D.; Lanore, D.; Pechereau, D.; Seewald, W.; Strehlau, G.

Title

Effects of benazepril on survival of dogs with chronic kidney disease: a multicenter, randomized, blinded, placebo-controlled clinical trial.

Source

Journal of Veterinary Internal Medicine; 2017. 31(4):1113-1122. 26 ref.

Publisher

Wiley

Location of Publisher

Boston

Country of Publication

USA

Abstract

**Background:** Chronic kidney disease (CKD) is an important cause of morbidity and mortality in dogs. **Objective:** To evaluate the efficacy in prolonging survival and safety of benazepril administration to dogs with CKD. **Animals:** Forty-nine client-owned dogs with CKD. **Methods:** Dogs were randomized to benazepril (0.25 to <0.5 mg/kg) or placebo once daily for up to 2 years in a prospective, multicenter, blinded clinical trial. The primary endpoint variable was the renal survival time, defined as the time from inclusion in the study to the treatment failure endpoint of death or euthanasia or need for administration of parenteral fluids related to renal failure. **Results:** No benefit of benazepril versus placebo was detected for renal survival time in all dogs; median (95% confidence interval (CI)) survival times were 305 (53-575) days in the benazepril group and 287 (152-not available) in the placebo group ( $P = .53$ ). Renal survival times were not significantly longer with benazepril compared to placebo for subgroups: hazard ratios (95% CI) were 0.50 (0.21-1.22) with  $P = .12$  for initial urine protein-to-creatinine ratio (UPC)  $>0.5$ , and 0.38 (0.12-1.19) with  $P = .080$  for initial UPC  $>0.5$  plus plasma creatinine  $\leq 440$   $\mu\text{mol/L}$ . Proteinuria, assessed from the UPC, was significantly ( $P = .0032$ ) lower after treatment with benazepril compared to placebo. There were no significant differences between groups for clinical signs or frequencies of adverse events. **Conclusions and Clinical Relevance:** Benazepril significantly reduced proteinuria in dogs with CKD. Insufficient numbers of dogs were recruited to allow conclusions on survival time.

Publication Type

Journal article.

<23>

Accession Number

20173369852

Author

Geraldes, S. S.; Ribeiro, J. F. A.; Vieira, A. N. L.; Porto, L. P.; Melchert, A.; Barretti, P.; Padovani, C. R.; Guimaraes-Okamoto, P. T. C.

Title

Sepsis in a dog with chronic kidney disease submitted to peritoneal dialysis.

Source

Veterinaria e Zootecnia; 2017. 24(3):499-503. 10 ref.

Publisher

Faculdade de Medicina Veterinaria e Zootecnia, Universidade Estadual Paulista

Location of Publisher

Botucatu

Country of Publication

Brazil

Abstract

This study aims to report the continuous ambulatory peritoneal dialysis (CAPD) in a chronic kidney disease (CKD) dog, not responsive to conservative therapy. The animal had high levels of urea, but after three cycles

of dialysis, there were decreased levels of urea. Due to the advanced stage of chronic kidney disease, the animal died and the necropsy findings were consistent with sepsis. Further studies needed in Veterinary Medicine regarding the choice of catheters, indication and type of peritoneal dialysis in order to avoid complications and achieve better results.

Publication Type  
Journal article.

<24>

Accession Number  
20173346849

Author  
Decome, M.

Title  
Use of benazepril in chronic renal disease in dogs. [French]

Source  
Point Veterinaire; 2017. 48(380 (Part 1)):48-49. 10 ref.

Publisher  
Newsmed

Location of Publisher  
Paris

Country of Publication  
France

Abstract  
The efficacy and pharmacodynamics of benazepril treatment in dogs with chronic kidney disease are described.

Publication Type  
Journal article.

<25>

Accession Number  
20173367884

Author  
Galvao, A. L. B.; Carvalho, M. B.

Title  
Staging of dogs with chronic renal disease at a veterinary hospital in the year of 2013. [Portuguese]

Source  
Science and Animal Health; 2017. 5(2):83-100. many ref.

Publisher  
Universidade Federal de Pelotas

Location of Publisher  
Capao do Leao

Country of Publication  
Brazil

Abstract  
The International Renal Interest Society (IRIS) has developed a classification for chronic kidney disease (CKD) in dogs. Patients with diseases that predispose to CKD, without clinical and laboratory abnormalities, are considered at stage 0. At stage 1, serum creatinine is below 1.4 mg/dL, polyuria and polydipsia may be present, as well as the inability to concentrate urine. Serum creatinine levels between 1.4 mg/dL and 2.0



mg/dL, with clinical manifestations of polyuria and polydipsia, are characteristic of stage 2. At stage 3 serum creatinine ranges from 2.1 mg/dL to 5.0 mg/dL, with moderate clinical manifestations of uremic syndrome. At stage 4, serum creatinine is greater than 5.0 mg/dL, with severe clinical manifestations of uremic syndrome. This paper aims to establish the CKD staging in clinically stable dogs attended in the Nephrology and Urology service at the "Governador Laudo Natel" Veterinarian Hospital, in the year of 2013. Concerning the 62 studied dogs, 17 were healthy (27%) and 45 presented the CKD (73%). Regarding the 45 dogs with CKD, 12 dogs (27%) were identified as stage 1, 10 dogs (22%) stage 2, 13 dogs (29%) stage 3, and 10 dogs (22%) were stage 4. In conclusion, CKD consists of an old dogs' disease (dogs over 7 years), with no breed or sexual preference. Systemic arterial hypertension and proteinuria may be present at any stage of the disease.

Publication Type  
Journal article.

<26>

Accession Number  
20173366015

Author  
Dittmer, K. E.; Perera, K. C.; Elder, P. A.

Title  
Serum fibroblast growth factor 23 concentrations in dogs with chronic kidney disease.

Source  
Research in Veterinary Science; 2017. 114:348-350. 12 ref.

Publisher  
Elsevier Ltd

Location of Publisher  
Oxford

Country of Publication  
UK

Abstract

The aim of this study was to determine if serum fibroblast growth factor (FGF23) concentrations were increased in dogs with chronic kidney disease (CKD). Serum samples submitted to a commercial laboratory were collected over a 15-month period, 14 samples were from dogs with a history of polyuria/polydipsia, azotaemia and low urine specific gravity, 20 samples were from non-azotaemic dogs. Serum FGF23, parathyroid hormone, total calcium and phosphorus, urea and creatinine were measured. Mann-Whitney test was used to determine differences between non-azotaemic and CKD groups; a one-way ANOVA with Tukey pairwise comparisons was used to determine any differences between International Renal Interest Society stages; and regression models were used to determine predictors of International Renal Interest Society stage, serum phosphorus and FGF23 concentrations. The median serum FGF23 concentration of dogs with CKD was 5194.6 pg/mL, which was significantly greater ( $P<0.001$ ) than the median serum FGF23 concentration of non-azotaemic dogs (259.2 pg/mL). Log serum FGF23 and age were significantly associated with IRIS stage ( $P=0.027$  and  $P=0.032$  respectively), while log serum phosphorus concentration ( $P<0.001$ ) was significantly associated with log serum FGF23 concentration. In summary, serum FGF23 concentration is increased in dogs with CKD, and is associated with serum phosphorus concentration. This phosphatonin pathway may be a useful target for the development of future treatments to control plasma phosphorus concentrations in chronic kidney disease.

Publication Type  
Journal article.

<27>

Accession Number

20173354339

Author

Inatullaeva, L. B.; Vatnikov, Y. A.; Sahno, N. V.

Title

Cats' kidney fibrosis in chronic renal failure of stage III. [Russian]

Source

Russian Journal of Agricultural and Socio-Economic Sciences; 2017. 7(67):298-302. 14 ref.

Publisher

Russian Journal of Agricultural and Socio-Economic Sciences

Location of Publisher

Orel City

Country of Publication

Russia

Abstract

The work is devoted to the study of structural changes in renal tissue, in particular, the deposition of fibrin, in chronic renal failure in cats. Studies of pathological material of the kidneys in the dead or euthanized have been carried out, in the anamnesis of which, there was diagnosed chronic kidney disease. In all investigated samples of the pathological material, the general characteristic changes in the kidney tissues are revealed: dystrophic changes in the tubular epithelium, inflammatory cell infiltrates, widening or narrowing of the lumen of the renal tubules, atrophy and fibrosis of the glomeruli, necrotic tissue changes, vascular sclerosis, cystic formations. Fibrinoid swelling is accompanied by a deep destruction of the main substance of the connective tissue and its fibrillar structures.

Publication Type

Journal article.

<28>

Accession Number

20173343838

Author

Martino-Costa, A. L.; Malhao, F.; Lopes, C.; Dias-Pereira, P.

Title

Renal interstitial lipid accumulation in cats with chronic kidney disease.

Source

Journal of Comparative Pathology; 2017. 157(2/3):75-79. 17 ref.

Publisher

Elsevier Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Chronic kidney disease (CKD) is a common progressive condition described in dogs and cats, involving several non-specific morphological and histological lesions. Recently, renal interstitial lipid accumulation was reported in cats with CKD; however, to date, little is known about this condition and its pathogenesis. The aim of this study was to investigate the occurrence and to characterize renal interstitial lipid deposits in dogs and cats. A total of 49 animals (27 cats and 22 dogs) with CKD were included in the study. Interstitial lipid accumulation was found exclusively in cats, affecting both males and females. In 55.6% of the cases, the extent of the lesion was not equally distributed in right and left kidneys. The lesion was always found in the cortical region, associated with an inflammatory reaction. Lipid macrovacuoles were also observed in the tubular epithelium, as well as in areas of tubulorrhexis. The amount of lipid deposited was variable, being

more extensive in older animals. Data from this study suggest that interstitial lipid accumulation may be related to tubular lipidosis (typical of feline kidneys) associated with epithelial degeneration and lysis, and to tubular basement membrane fragmentation. Extended studies on this condition are necessary, as it appears to be involved in the progression of CKD and may, therefore, have repercussion in the clinical management of the disease and in the development of new approaches to delay its advance.

Publication Type  
Journal article.

<29>

Accession Number  
20173343510

Author  
Quimby, J. M.

Title  
The thin cat with chronic kidney disease.

Source  
Veterinary Focus; 2017. 27(2):2-9. 28 ref.

Publisher  
Royal Canin Ltd (UK and Ireland)

Location of Publisher  
Castle Cary

Country of Publication  
UK

Abstract  
This article discusses the body condition, diagnosis, age predisposition, diet assessment, nutrition management, and drug therapy for dysrexia and nausea of old, thin cats affected with chronic kidney disease.

Publication Type  
Journal article.

<30>

Accession Number  
20173343367

Author  
Cooley, C.; Caney, S.; Sieberg, L.; Quimby, J.

Title  
Survey of subcutaneous fluid practices in cats with chronic kidney disease.

Source  
41st World Small Animal Veterinary Association Congress, Cartagena, Colombia, 27-30 September 2016; 2016. :827.

Publisher  
World Small Animal Veterinary Association

Location of Publisher  
Cartagena

Country of Publication  
Colombia

Publication Type  
Conference paper.

<31>

Accession Number

20173343130

Author

Moreno, J. A.

Title

Renal dysfunction in geriatric patient; prevention and early detection.

Source

41st World Small Animal Veterinary Association Congress, Cartagena, Colombia, 27-30 September 2016; 2016. :389-390. 7 ref.

Publisher

World Small Animal Veterinary Association

Location of Publisher

Cartagena

Country of Publication

Colombia

Publication Type

Conference paper.

<32>

Accession Number

20173343106

Author

Villaverde, C.; Quimby, J. M.

Title

Feline CKD and diet.

Source

41st World Small Animal Veterinary Association Congress, Cartagena, Colombia, 27-30 September 2016; 2016. :334-335. 9 ref.

Publisher

World Small Animal Veterinary Association

Location of Publisher

Cartagena

Country of Publication

Colombia

Publication Type

Conference paper.

<33>

Accession Number

20173343061

Author

Syme, H.

Title

State of the art lecture: hyperthyroidism and CKD - a tricky combination.

Source

41st World Small Animal Veterinary Association Congress, Cartagena, Colombia, 27-30 September 2016; 2016. :239-241. 10 ref.

Publisher

World Small Animal Veterinary Association

Location of Publisher

Cartagena

Country of Publication

Colombia

Publication Type

Conference paper.

<34>

Accession Number

20173343060

Author

Syme, H.

Title

Management of feline CKD.

Source

41st World Small Animal Veterinary Association Congress, Cartagena, Colombia, 27-30 September 2016; 2016. :236-238. 10 ref.

Publisher

World Small Animal Veterinary Association

Location of Publisher

Cartagena

Country of Publication

Colombia

Publication Type

Conference paper.

<35>

Accession Number

20173343013

Author

Paepe, D.

Title

State of the art lecture: screening for feline CKD - why, when and how?

Source

41st World Small Animal Veterinary Association Congress, Cartagena, Colombia, 27-30 September 2016; 2016. :120-121. 10 ref.

Publisher

World Small Animal Veterinary Association

Location of Publisher

Cartagena

Country of Publication

Colombia  
Publication Type  
Conference paper.

<36>

Accession Number  
20173343011

Author  
Quimby, J.

Title  
Role of erythropoietin and calcitriol in feline CKD.

Source  
41st World Small Animal Veterinary Association Congress, Cartagena, Colombia, 27-30 September 2016;  
2016. :116-117. 4 ref.

Publisher  
World Small Animal Veterinary Association

Location of Publisher  
Cartagena

Country of Publication  
Colombia

Publication Type  
Conference paper.

<37>

Accession Number  
20173343010

Author  
Quimby, J.

Title  
Control of nausea, vomiting and appetite in feline CKD.

Source  
41st World Small Animal Veterinary Association Congress, Cartagena, Colombia, 27-30 September 2016;  
2016. :114-115. 10 ref.

Publisher  
World Small Animal Veterinary Association

Location of Publisher  
Cartagena

Country of Publication  
Colombia

Publication Type  
Conference paper.

<38>

Accession Number

20173343009

Author

Paepe, D.

Title

Proteinuria in feline CKD - assessment and control.

Source

41st World Small Animal Veterinary Association Congress, Cartagena, Colombia, 27-30 September 2016; 2016. :112-113. 10 ref.

Publisher

World Small Animal Veterinary Association

Location of Publisher

Cartagena

Country of Publication

Colombia

Publication Type

Conference paper.

<39>

Accession Number

20173343008

Author

Paepe, D.

Title

Measurement of GFR in feline CKD.

Source

41st World Small Animal Veterinary Association Congress, Cartagena, Colombia, 27-30 September 2016; 2016. :110-111. 7 ref.

Publisher

World Small Animal Veterinary Association

Location of Publisher

Cartagena

Country of Publication

Colombia

Publication Type

Conference paper.

<40>

Accession Number

20173343007

Author

Quimby, J.

Title

Medical management of feline CKD.

Source

41st World Small Animal Veterinary Association Congress, Cartagena, Colombia, 27-30 September 2016; 2016. :107-109. 10 ref.

Publisher

World Small Animal Veterinary Association



Location of Publisher  
Cartagena  
Country of Publication  
Colombia  
Publication Type  
Conference paper.

<41>

Accession Number  
20173343006

Author  
Paepe, D.

Title  
New biomarkers in assessment and staging of CKD.

Source  
41st World Small Animal Veterinary Association Congress, Cartagena, Colombia, 27-30 September 2016;  
2016. :105-106. 10 ref.

Publisher  
World Small Animal Veterinary Association

Location of Publisher  
Cartagena

Country of Publication  
Colombia

Publication Type  
Conference paper.

<42>

Accession Number  
20173343005

Author  
Paepe, D.

Title  
Staging of feline CKD.

Source  
41st World Small Animal Veterinary Association Congress, Cartagena, Colombia, 27-30 September 2016;  
2016. :103-104. 9 ref.

Publisher  
World Small Animal Veterinary Association

Location of Publisher  
Cartagena

Country of Publication  
Colombia

Publication Type  
Conference paper.

<43>

Accession Number

20173343004

Author

Quimby, J.

Title

Pathogenesis of feline CKD.

Source

41st World Small Animal Veterinary Association Congress, Cartagena, Colombia, 27-30 September 2016; 2016. :101-102. 10 ref.

Publisher

World Small Animal Veterinary Association

Location of Publisher

Cartagena

Country of Publication

Colombia

Publication Type

Conference paper.

<44>

Accession Number

20173337438

Author

Lee SoRa; Choi HyunJi; Lee HanByul; Jo SungMin; Mun JiHye; Son WooChan

Title

Renal oncocytoma in a cat with chronic renal failure.

Source

Journal of Feline Medicine and Surgery Open Reports; 2017. 3(1):2055116917693491. 16 ref.

Publisher

Sage Publications Ltd

Location of Publisher

London

Country of Publication

UK

Abstract

A 9-year-old male neutered domestic shorthair cat presented with anorexia. Ultrasonography showed an irregularly shaped hypoechoic mass in the cranial pole of the right kidney. Ultrasound-guided fine-needle aspiration of the renal mass was performed. Cytology revealed moderate cellularity smears composed of epithelial cell clusters, which consisted of an exclusive population of oncocytic cells seen in sheets and papillary clusters along with abundant single cells. A moderate-to-abundant amount of densely stained granular cytoplasm with round nuclei and indistinct nucleoli was seen. The cytological diagnosis was renal oncocytic neoplasm. CT and surgical resection revealed a firm tan mass in the right kidney. A final diagnosis of renal oncocytoma was made on the basis of histology, immunohistochemical staining profile (positive for cytokeratin, and negative for chromogranin A, neuron-specific enolase and vimentin) of neoplastic cells, together with the electronic microscopy results. Relevance and novel information: We believe that this is the first report of the cytological features of feline renal oncocytoma.

Publication Type

Journal article.

<45>

Accession Number

20173324135

Author

Lippi, I.; Perondi, F.; Meucci, V.; Mannarini, C.; Intorre, L.; Guidi, G.

Title

Plasma alpha-tocopherol determined by HPLC in dogs at different stages of chronic kidney disease: a retrospective study.

Source

Veterinary Research Communications; 2017. 41(3):195-199. 14 ref.

Publisher

Springer

Location of Publisher

Dordrecht

Country of Publication

Netherlands

Abstract

The aim of the present study was to investigate retrospectively the plasma concentration of alpha-tocopherol in dogs with naturally acquired chronic kidney disease (CKD), at different stages of severity. Forty dogs (CKD group) with different stages of CKD (IRIS 1 n=12, IRIS 2 n=8, IRIS 3 n=11, IRIS 4 n=9) and 20 clinically healthy dogs were considered. Plasma alpha-tocopherol was assessed in both groups through high performance liquid chromatography (HPLC). Dogs of CKD group showed significantly lower ( $p=0.0002$ ) levels of plasma alpha-tocopherol compared with clinically healthy dogs. A significant difference ( $p<0.04$ ) in the number of patients with plasma alpha-tocopherol  $>$  or  $\leq 21.5$  ppm was found in CKD patients at different stages of severity. No significant correlation between plasma levels of alpha-tocopherol and plasma creatinine was found. In the present study, dogs affected by spontaneous CKD showed significantly lower plasma concentrations of alpha-tocopherol compared with clinically healthy dogs. Plasma alpha-tocopherol deficiency seems to be more severe in IRIS stage 1 and 4, compared with IRIS stage 2 and 3. The finding of marked alpha-tocopherol deficiency in patients in IRIS stage 1 should encourage further studies on the early use of prescription renal diet and antioxidant in this group of patients.

Publication Type

Journal article.

<46>

Accession Number

20173281725

Author

Khin San Maw

Title

Diagnostic approach to chronic renal failure.

Source

Proceedings, Annual Meeting of Myanmar Veterinary Association, 27-28 December 2014, Mandalay, Myanmar; 2014. :30-37. 11 ref.

Publisher

Myanmar Veterinary Association

Location of Publisher

Yangon

Country of Publication

Myanmar

Abstract

Seven patients, two dogs and five cats, were diagnosed as Chronic Renal Failure (CRF) and non-regenerative anaemia, and treated accordingly. Both dogs were in advanced stages of renal failure but one of them also had liver failure. Feline cases were of severe CRF associated by non-regenerative anaemia. Laboratory results at different stages were accompanied for the justification of therapeutic and/or recuperative process.

Publication Type

Conference paper.

<47>

Accession Number

20173312456

Author

Das, M. R.; Patra, R. C.; Senapati, S. K.; Rath, P. K.

Title

Haemato-biochemical alterations in the geriatric dogs with chronic kidney disease.

Source

Indian Veterinary Journal; 2017. 94(7):21-23. 10 ref.

Publisher

Indian Veterinary Association

Location of Publisher

Chennai

Country of Publication

India

Abstract

A survey was undertaken for screening the geriatric dogs suffering with chronic kidney diseases (CKD) based on typical clinical signs related to urinary system problem. A total of 248 dogs screened with a prevalence of 11.6% (33) diagnosed with CKD. Detailed hematology of the dogs suffered with CKD showed significant decrease in Hb, PCV, and TEC and significant increase in TLC, neutrophil and eosinophil counts. Serum biochemical alterations revealed significant increase in glucose, creatinine, BUN, phosphorus and protein, creatinine and decrease in albumin. The minor alterations in rest of the parameters were recorded to be non-significant.

Publication Type

Journal article.

<48>

Accession Number

20173299940

Author

Pelander, L.; Haggstrom, J.; Ley, C. J.; Ljungvall, I.

Title

Cardiac troponin I and amino-terminal pro B-type natriuretic peptide in dogs with stable chronic kidney disease.

Source

Journal of Veterinary Internal Medicine; 2017. 31(3):805-813. 82 ref.

Publisher

Wiley

Location of Publisher

Boston

Country of Publication

USA

Abstract

**Background:** Increased concentrations of N-terminal pro B-type natriuretic peptide (NT-proBNP) and cardiac troponin I (cTnI) in dogs with azotemia have been documented. Knowledge of mechanisms behind increased concentrations of cardiac biomarkers in dogs with azotemia is warranted for correct interpretation of test results. **Objectives:** The aim of the article was to investigate possible associations between plasma concentrations of cTnI and NT-proBNP, respectively, and patient characteristics, glomerular filtration rate (GFR), a plasma volume factor (PVF) derived from scintigraphic examination (PVf), systolic blood pressure (SBP), selected hematologic and biochemical variables, and echocardiographic measurements in dogs with stable chronic kidney disease (CKD) and in healthy dogs. **Animals:** Fifty student-, staff-, and client-owned dogs were included. Twenty-three of the dogs were healthy and 27 were diagnosed with CKD. **Methods:** In this cross-sectional observational study, dogs with a previous diagnosis of CKD and healthy control dogs were included. At inclusion, all dogs were characterized by physical examination, repeated blood pressure measurements, complete urinalysis, hematology and biochemistry panel, echocardiography, abdominal ultrasound examination of the entire urinary tract, and scintigraphic examination for measurement of GFR. **Results:** Plasma volume factor and PCV were independently associated with NT-proBNP ( $R^2=0.42$ ;  $P<.0001$ ). Age, body weight (BW), and SBP were independently associated with cTnI ( $R^2=0.50$ ;  $P<.0001$ ). **Conclusions and Clinical Importance:** Neither NT-proBNP nor cTnI concentrations were independently associated with measured GFR. Thus, findings were not suggestive of passive accumulation of either marker, suggesting that increased circulating concentrations of cTnI and NT-proBNP can be interpreted similarly in dogs with stable CKD as in dogs without CKD.

Publication Type

Journal article.

<49>

Accession Number

20173299939

Author

Dahlem, D. P.; Neiger, R.; Schweighauser, A.; Francey, T.; Yerramilli, M.; Obare, E.; Steinbach, S. M. L.

Title

Plasma symmetric dimethylarginine concentration in dogs with acute kidney injury and chronic kidney disease.

Source

Journal of Veterinary Internal Medicine; 2017. 31(3):799-804. 26 ref.

Publisher

Wiley

Location of Publisher

Boston

Country of Publication

USA

Abstract

**Background:** Symmetric dimethylarginine (SDMA) is considered a biomarker for early detection of renal dysfunction in human patients with acute kidney injury (AKI). At present, no studies exist analyzing the relevance of SDMA in dogs with AKI. **Hypothesis/objectives:** SDMA would correctly identify dogs with renal disease but would not be able to differentiate between AKI and CKD. **Animals:** Eighteen healthy control dogs, 48 dogs with AKI, and 29 dogs with CKD. **Methods:** Prospective study. Dogs with kidney disease were categorized as having AKI or CKD according to the history, clinical signs, laboratory findings, and results of diagnostic imaging. Plasma SDMA concentration was measured by IDEXX Laboratories. SDMA/creatinine ratio was calculated in dogs with AKI or CKD. **Results:** Median SDMA concentrations were 8.5 micro g/dL (6-12 micro g/dL), 39.5 micro g/dL (8->100 micro g/dL), and 35 micro g/dL (12->100 micro g/dL), in healthy, AKI, and CKD, respectively. SDMA concentrations were significantly higher in dogs with AKI ( $P<.0001$ ) or

CKD ( $P < .0001$ ) in comparison with healthy dogs. Median SDMA/creatinine ratio in dogs with AKI and CKD was 6.5 (1.7-20.9) and 10 (2.4-33.9) ( $P = .0004$ ), respectively. Although there was overlap of the SDMA/creatinine ratio in dogs with AKI or CKD, it was significantly higher in dogs with CKD compared to dogs with AKI ( $P = .0004$ ). Conclusions and Clinical Importance: In this population, SDMA was suitable for identifying dogs affected by AKI or CKD, but could not differentiate between them.

Publication Type  
Journal article.

<50>

Accession Number  
20173299938

Author

Parker, V. J.; Harjes, L. M.; Dembek, K.; Young, G. S.; Chew, D. J.; Toribio, R. E.

Title

Association of vitamin D metabolites with parathyroid hormone, fibroblast growth factor-23, calcium, and phosphorus in dogs with various stages of chronic kidney disease.

Source

Journal of Veterinary Internal Medicine; 2017. 31(3):791-798. 44 ref.

Publisher

Wiley

Location of Publisher

Boston

Country of Publication

USA

Abstract

Background: Hypovitaminosis D is associated with progression of renal disease, development of renal secondary hyperparathyroidism (RHPT), chronic kidney disease-mineral bone disorder (CKD-MBD), and increased mortality in people with CKD. Despite what is known regarding vitamin D dysregulation in humans with CKD, little is known about vitamin D metabolism in dogs with CKD. Objectives: The purpose of our study was to further elucidate vitamin D status in dogs with different stages of CKD and to relate it to factors that affect the development of CKD-MBD, including parathyroid hormone (PTH), fibroblast growth factor-23 (FGF-23), calcium, and phosphorus concentrations. Methods: Thirty-seven dogs with naturally occurring CKD were compared to 10 healthy dogs. Serum 25-hydroxyvitamin D [25(OH)D], 1,25-dihydroxyvitamin D [1,25(OH)2D], and 24,25-dihydroxyvitamin D [24,25(OH)2D], and PTH and FGF-23 concentrations were measured. Their association with serum calcium and phosphorus concentrations and IRIS stage was determined. Results: Compared to healthy dogs, all vitamin D metabolite concentrations were significantly lower in dogs with International Renal Interest Society (IRIS) stages 3 and 4 CKD ( $r$  [creatinine]: -0.49 to -0.60;  $P < .05$ ) but not different in dogs with stages 1 and 2 CKD. All vitamin D metabolites were negatively correlated with PTH, FGF-23, and phosphorus concentrations ( $r$ : -0.39 to -0.64;  $P < .01$ ). Conclusions and Clinical Importance: CKD in dogs is associated with decreases in all vitamin D metabolites evaluated suggesting that multiple mechanisms, in addition to decreased renal mass, affect their metabolism. This information could have prognostic and therapeutic implications.

Publication Type

Journal article.

<51>

Accession Number  
20173299937

Author

Harjes, L. M.; Parker, V. J.; Dembek, K.; Young, G. S.; Giovaninni, L. H.; Kogika, M. M.; Chew, D. J.; Toribio, R. E.

Title

Fibroblast growth factor-23 concentration in dogs with chronic kidney disease.

Source

Journal of Veterinary Internal Medicine; 2017. 31(3):784-790. 27 ref.

Publisher

Wiley

Location of Publisher

Boston

Country of Publication

USA

Abstract

**Background:** Chronic kidney disease (CKD) is associated with hyperphosphatemia, decreased vitamin D metabolite concentrations, and hyperparathyroidism. This syndrome is known as CKD-mineral bone disorder (CKD-MBD). Recently, it has been shown that an increase in fibroblast growth factor-23 (FGF-23) concentration is an early biomarker of CKD in people. It is an independent risk factor for both progression of renal disease and survival time in humans and cats with CKD. Information about FGF-23 in healthy dogs and those with CKD is lacking. **Objectives:** To measure FGF-23 concentration in dogs with different stages of CKD and determine its association with factors involved in CKD-MBD, including serum phosphorus and parathyroid hormone (PTH) concentrations. A secondary aim was to validate an ELISA for measurement of plasma FGF-23 concentration in dogs. **Animals:** Thirty-two client-owned dogs with naturally occurring CKD and 10 healthy control dogs. **Methods:** Prospective cross-sectional study. An FGF-23 ELISA was used to measure plasma FGF-23 concentration in dogs and their association with serum creatinine, phosphorus, calcium, and PTH concentrations. **Results:** Plasma FGF-23 concentrations increased with severity of CKD and were significantly different between IRIS stages 1 and 2 versus stages 3 and 4 ( $P < .0001$ ). Increases in FGF-23 concentrations were more frequent than hyperparathyroidism or hyperphosphatemia in this cohort. Serum creatinine and phosphorus concentrations were the strongest independent predictors of FGF-23 concentration. **Conclusions and clinical importance:** Plasma FGF-23 concentrations increase in dogs with CKD as disease progresses. Plasma FGF-23 concentrations appear to be useful for further study of the pathophysiology of CKD-MBD in dogs.

Publication Type

Journal article.

<52>

Accession Number

20173299918

Author

Bijsmans, E. S.; Jepson, R. E.; Wheeler, C.; Syme, H. M.; Elliott, J.

Title

Plasma N-terminal probrain natriuretic peptide, vascular endothelial growth factor, and cardiac troponin I as novel biomarkers of hypertensive disease and target organ damage in cats.

Source

Journal of Veterinary Internal Medicine; 2017. 31(3):650-660. 60 ref.

Publisher

Wiley

Location of Publisher

Boston

Country of Publication

USA

Abstract



**Background:** In the absence of ocular target organ damage (ocular-TOD), diagnosis of hypertension is challenging in cats. Biomarkers would provide additional support for the diagnosis of hypertension. Hypothesis Vascular endothelial growth factor (VEGF), N-terminal probrain natriuretic peptide (NT-proBNP), cardiac troponin I (cTnI), and urine protein-to-creatinine ratio (UPC) are predictors of systemic hypertension, will be increased in cats with hypertension with or without ocular-TOD, and will decrease with antihypertensive treatment. **Methods:** Plasma VEGF, NT-proBNP, and cTnI concentrations and UPC were determined in healthy geriatric cats, normotensive cats with chronic kidney disease (CKD), hypertensive cats with evidence of hypertensive retinopathy (HT-ocular-TOD), and hypertensive cats without hypertensive ocular-TOD (HT-noTOD). Comparisons among groups were performed. Multivariable binary logistic regression models were built to identify independent biomarkers of hypertension and ocular-TOD. Receiver operator characteristic (ROC) curves were drawn to assess clinical use. **Results:** Cats with HT-ocular-TOD had significantly higher VEGF than all other groups ( $P<.05$ ) and significantly higher NT-proBNP than healthy cats ( $P<.001$ ). Healthy cats had significantly lower cTnI than all other groups ( $P<.05$ ). No differences were found among groups for UPC ( $P=.08$ ). Cardiac troponin I and VEGF were independent predictors of hypertension ( $P<.05$ ), but none of the biomarkers were independent predictors of ocular-TOD. N-terminal probrain natriuretic peptide concentrations decreased with antihypertensive treatment ( $P<.001$ ). The ROC curves indicated that none of the biomarkers met the criteria to function as diagnostic tests for the diagnosis of hypertension or associated ocular-TOD. **Conclusions and Clinical Significance:** Despite statistical significance and changes with ocular-TOD, antihypertensive treatment, or both, VEGF, NT-proBNP, and cTnI did not function as useful diagnostic tests for hypertension. Persistently increased systolic blood pressure (SBP) measurements in combination with fundoscopy remains the preferred method for diagnosis of feline hypertension.

Publication Type

Journal article.

<53>

Accession Number

20173261130

Author

Biasato, I.; Vergnano, D.; Capucchio, M. T.; Biasibetti, E.; Bruni, N.; Cocca, T.

Title

Chronic kidney disease in dogs: tolerability and efficacy of a nutritional supplement.

Source

Joint meeting, LXX Convegno SISVet, REEV-Med, XVI Convegno SICV, XIV Convegno SIRA, XIII Convegno AIPVet, XIII Giornata Studio SoFiVet, III Convegno RNIV, Palermo, Italy, 13-16 June 2016. Atti 2016; 2016. :549-550. 5 ref.

Publisher

Societa Italiana delle Scienze Veterinarie (SISVet)

Location of Publisher

Palermo

Country of Publication

Italy

Publication Type

Conference paper.

<54>

Accession Number

20173261129

Author

Vergnano, D.; Biasato, I.; Capucchio, M. T.; Bruni, N.; Cocca, T.

Title

Efficacy of dietary supplementation in cats with advanced chronic kidney disease.

Source

Joint meeting, LXX Convegno SISVet, REEV-Med, XVI Convegno SICV, XIV Convegno SIRA, XIII Convegno AIPVet, XIII Giornata Studio SoFiVet, III Convegno RNIV, Palermo, Italy, 13-16 June 2016. Atti 2016; 2016. :547-548. 3 ref.

Publisher

Societa Italiana delle Scienze Veterinarie (SISVet)

Location of Publisher

Palermo

Country of Publication

Italy

Publication Type

Conference paper.

<55>

Accession Number

20173288952

Author

Vatnikov, Y. A.; Sakhno, N. V.; Kulikov, E. V.; Byakhova, V. M.; Voronina, Y. Y.

Title

The method of correction of chronic renal failure in cats. [Russian]

Source

Russian Journal of Agricultural and Socio-Economic Sciences; 2017. 5(65):310-315. 14 ref.

Publisher

Russian Journal of Agricultural and Socio-Economic Sciences

Location of Publisher

Orel City

Country of Publication

Russia

Abstract

The paper presents methods for the correction of chronic renal failure in cats. For the study were selected 20 spontaneously infected cats of various breeds aged between 9 and 14 years of age, body weight up to 6.0 kg, which according to the results of biochemical research has been diagnosed with chronic renal failure III degree of IRIS classification. It was found that the best result in the correction of phosphatemia, creatininemia, azotemia and correction of electrolyte imbalance showed the method of joint application of drugs of three different groups of phosphate-binders.

Publication Type

Journal article.

<56>

Accession Number

20173285479

Author

Leclerc, A.; Trehieu-Sechi, E.; Greunz, E. M.; Damoiseaux, C.; Bouvard, J.; Chetboul, V.

Title

Systemic arterial hypertension secondary to chronic kidney disease in two captive-born large felids.

Source

Journal of Veterinary Cardiology; 2017. 19(3):308-316.

Publisher

Elsevier Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Systemic arterial hypertension (SHT) has been widely described in the domestic cat (*Felis catus*). In these feline patients, SHT is considered as the most common vascular disorder of middle-aged to older animals, and secondary SHT related to chronic kidney disease (CKD) represents the most common form of the disease. We describe here the first two cases of spontaneous SHT in large felids, i.e. one 18-year old, 34.4 kg, male North-Chinese leopard (*Panthera pardus japonensis*, case #1) and one 20-year old, 28.7 kg, female snow leopard (*Panthera uncia*, case #2), both captive-bred and previously diagnosed with CKD. Both animals underwent complete echocardiographic examination under general anesthesia due to abnormal cardiac auscultation (heart murmur and/or gallop sound), and recurrent lethargy in case #1. The combination of left ventricular remodeling with moderate aortic regurgitation of high velocity was highly suggestive of SHT, which was confirmed by indirect blood pressure measurement (systolic arterial blood pressure of 183 mmHg for case #1 and 180 mmHg for case #2). Amlodipine was prescribed (0.35-0.70 mg/kg/day orally) for 31 and 6 months respectively after the initial diagnosis. In case #1, concurrent amlodipine and benazepril treatment was associated with decreased heart murmur grade and reduced aortic insufficiency severity. These reports illustrate that, similarly to domestic cats, SHT should be suspected in old large felids with CKD and that amlodipine is a well-tolerated antihypertensive drug in these species.

Publication Type

Journal article.

<57>

Accession Number

20173011736

Author

Caney, S. M. A.

Title

The diagnosis and treatment of chronic kidney disease in cats. [Dutch]

Source

Dier en Arts; 2016. 31(12):330-335.

Publisher

Uitgeverij Libre B.V.

Location of Publisher

Leeuwarden

Country of Publication

Netherlands

Abstract

The importance of early diagnosis of chronic kidney disease is discussed. Measures to slow down its quick progress are outlined including reducing phosphate intake and reducing the activation of the renin-angiotensin-aldosterone system (RAAS). How to support the cat owner during long-term treatment is described.

Publication Type

Journal article.

<58>

Accession Number

20173254076

Author

Kovarikova, S.

Title

Nutritional management of chronic kidney disease in cats and dogs: current topics. [Czech]

Source

Veterinarstvi; 2017. 67(7):527-534. 73 ref.

Publisher

Profi Press, s.r.o.

Location of Publisher

Praha 2

Country of Publication

Czech Republic

Abstract

Chronic kidney disease (CKD, chronic kidney disease) is a frequent disorder in canine and feline practice. The dietary management is the mainstay of the treatment. This article summarizes actual topics, current recommendations in appetite stimulation and available information on selected dietary supplements for dogs and cats with CKD.

Publication Type

Journal article.

<59>

Accession Number

20173263776

Author

Bruchim, Y.; Avital, Y.; Horowitz, M.; Mazaki-Tovi, M.; Aroch, I.; Segev, G.

Title

Urinary heat shock protein 72 as a biomarker of acute kidney injury in dogs.

Source

Veterinary Journal; 2017. 225:32-34. 9 ref.

Publisher

Elsevier Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Early recognition of acute kidney injury (AKI) is important, as therapy is potentially more efficacious if instituted early in the course of disease. Urinary heat shock protein-72 to urinary creatinine ratio (uHSP72/uCr) was assessed as a diagnostic and prognostic marker in AKI in dogs. Fifty-three dogs were enrolled in five groups: healthy controls (n=11), urinary tract infection (n=10), chronic kidney disease (CKD; n=11), AKI (n=13), and acute decompensating CKD (n=8). Urinary heat shock protein-72 to urinary creatinine ratio was highest in the AKI group ( $P<0.001$  when compared to the control and urinary tract infection groups, individually;  $P>0.05$  compared to each of the other two groups). The area under the curve (AUC) for the receiver operator characteristic (ROC) analysis of uHSP72/uCr to predict AKI, compared to the control group, was 0.97. A cutoff value of 0.20 ng/mg corresponded to sensitivity and specificity of 100% and 82%, respectively. Urinary heat shock protein-72 to urinary creatinine ratio was significantly lower in dogs

categorized as survivors vs. non-survivors of AKI; ROC AUC, 0.91 (95% confidence intervals, 0.74-1.0). Urinary heat shock protein-72 to urinary creatinine ratio is a potentially useful diagnostic and prognostic biomarker of AKI in dogs.

Publication Type  
Journal article.

<60>

Accession Number  
20173261362

Title

Neutrophil gelatinase-associated lipocalin in cats with chronic renal disease.

Source

Advances in Small Animal Medicine and Surgery; 2017. 30(8):5-6.

Publisher

Elsevier Inc.

Location of Publisher

Philadelphia

Country of Publication

USA

Publication Type  
Journal article.

<61>

Accession Number  
20173261359

Title

Occult GI bleeding, a common finding in dogs with chronic kidney disease.

Source

Advances in Small Animal Medicine and Surgery; 2017. 30(8):3-4.

Publisher

Elsevier Inc.

Location of Publisher

Philadelphia

Country of Publication

USA

Publication Type  
Journal article.

<62>

Accession Number  
20173256438

Author

Lee SiHeon; Hong SungKyun; Kim HyeJin; Oh DaYoung; Kim SeungJi; Choen SangKyung; Choi MinCheol; Yoon JungHee

Title

Ultrasonographic evaluation of renal cortex and outer medulla thickness in dogs with chronic kidney disease.

Source

Journal of Veterinary Clinics; 2017. 34(3):208-212. 19 ref.

Publisher

Korean Society of Veterinary Clinics

Location of Publisher

Seoul

Country of Publication

Korea Republic

Abstract

This study was performed to retrospectively pursue any correlation between renal cortex thickness (RCT), outer medulla thickness (OMT) on ultrasonography (US) and chronic kidney disease (CKD) with International Renal Interest Society (IRIS) stage. Medical records and US findings of the dogs diagnosed CKD were reviewed for comparing to those of the clinically healthy dogs from March. 2015 through June. 2016. To evaluate the correlation about normal and CKD patients, RCT and the OMT were measured on US images. RCT and OMT were adjusted by dividing body surface area for standardization (RCTS, OMTS). Also the ratio of RCT/OMT were calculated and these indices were evaluated to investigate any tendency between 5 groups (normal and 4 IRIS stages) using Jonckheere-Terpstra trend test (J-T test). The RCTS showed a declining tendency ( $p < 0.02$ ) and the OMTS showed an inclining tendency from normal through each IRIS stage ( $p < 0.01$ ). The RCT/OMT showed also declining tendency ( $p < 0.01$ ). Although the gold standard for renal function including GFR is lack, it is thought that differentiation between normal and CKD patients could be possible on US measurement of renal cortex and outer medulla thickness, which could be an alternative index for kidney function in diagnostic imaging.

Publication Type

Journal article.

<63>

Accession Number

20173223150

Author

Pasquini, A.; Guidi, G.; Marchetti, V.; Tozzi, F.; Biagi, G.; Lippi, I.

Title

Evaluation of glutathione peroxidase (GPX) in canine CKD.

Source

LXVII Convegno Nazionale S.I.S.Vet (Societa Italiana delle Scienze Veterinarie), Joint Meeting 2 degrees Convegno REEV, Reseau des Etablissements D'Enseignement Veterinaire de la Mediterranee, Brescia, Italia, 17-19 Settembre 2013. Abstracts; 2013. :168. 5 ref.

Publisher

Societa Italiana delle Scienze Veterinarie (SISVet)

Location of Publisher

Brescia

Country of Publication

Italy

Publication Type

Conference paper.

<64>

Accession Number

20173223135

Author

Lubas, G.; Guidi, G.; Domenichelli, C.; Meucci, V.; Marchetti, V.

Title

Assessment of the complete blood count in the chronic kidney disease (CKD) of dogs and cats.

Source

LXVII Convegno Nazionale S.I.S.Vet (Societa Italiana delle Scienze Veterinarie), Joint Meeting 2 degrees Convegno REEV, Reseau des Etablissements D'Enseignement Veterinaire de la Mediterranee, Brescia, Italia, 17-19 Settembre 2013. Abstracts; 2013. :152. 4 ref.

Publisher

Societa Italiana delle Science Veterinarie (SISVet)

Location of Publisher

Brescia

Country of Publication

Italy

Publication Type

Conference paper.

<65>

Accession Number

20173246719

Author

Xavier Junior, F. A. F.; Morais, G. B. de; Barroso, I. C.; Freitas, V. M. de L.; Barbosa, K. D. da S. M.; Viana, D. de A.; Evangelista, J. S. A. M.

Title

Clinical monitoring therapeutic a cat with a chronic kidney disease positive for a viral immunodeficiency and urinary infection. [Portuguese]

Source

Ciencia Animal; 2016. 26(2):27-34. 13 ref.

Publisher

Universidade Estadual do Ceara, Faculdade de Veterinaria

Location of Publisher

Ceara

Country of Publication

Brazil

Abstract

Kidney chronic disease is the most frequently diagnosed disease in companion animals and it is the second cause of death in cats. Major clinical signs in cats are weight loss, anorexia/loss of appetite, dehydration, depression, polydipsia, polyuria, vomiting, weakness, and constipation. Obtaining an accurate diagnosis and improving management and prognosis of renal ill is easier accomplished by a careful medical history and use of complementary tests such as hematological, biochemical, imaging, and urinary. Therapeutic approach is performed according to the stages of CKD determined by IRIS. The treatment should be adapted for each patient. The serial monitoring of these patients is ideal and treatment should be adapted according to their response to the treatment. Based on the assumption, we aimed to describe a case report of a cat with CKD, positive for FIV associated with urinary tract infection. The patient showed anorexia, dehydration, and gingivitis with dental plaque. During palpation was noticed reactive lymph nodes and small fibrotic kidney. The diagnosis was confirmed by complete blood count, clinical chemistry, urinalysis and abdominal ultrasound. The chosen therapy was according to the guidelines of IRIS: fluid therapy, renal diet, chelation and use sodium bicarbonate. Urinary tract infection was treated with antibiotic administration and it provided a clinical improvement and increased quality of life. performed according to the stages of CKD determined by



IRIS. The treatment should be adapted for each patient. The serial monitoring of these patients is ideal and treatment should be adapted according to their response to the treatment. Based on the assumption, we aimed to describe a case report of a cat with CKD, positive for FIV associated with urinary tract infection. The patient showed anorexia, dehydration, and gingivitis with dental plaque. During palpation was noticed reactive lymph nodes and small fibrotic kidney. The diagnosis was confirmed by complete blood count, clinical chemistry, urinalysis and abdominal ultrasound. The chosen therapy was according to the guidelines of IRIS: fluid therapy, renal diet, chelation and use sodium bicarbonate. Urinary tract infection was treated with antibiotic administration and it provided a clinical improvement and increased quality of life.

Publication Type

Journal article.

<66>

Accession Number

20173235021

Author

Piyarungsri, K.; Pusoonthornthum, R.

Title

Risk and protective factors for cats with naturally occurring chronic kidney disease.

Source

Journal of Feline Medicine and Surgery; 2017. 19(4):358-363. 28 ref.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

**Objectives:** Chronic kidney disease (CKD) is a significant disease in cats. Identifying risk and protective factors may help to prevent this significant disease. **Methods:** An age-matched case-control study was performed to determine the risk factors in cats with naturally occurring CKD. Twenty-nine clinically normal cats aged  $\geq 5$  years and 101 cats with naturally occurring CKD were studied. Risk factors were determined by interviewing cat owners from the Small Animal Hospital, Faculty of Veterinary Science, Chulalongkorn University, and veterinary hospitals in the Bangkok Metropolitan area, through questionnaires completed between June 2004 and November 2014. Univariable and multivariable analyses were performed using two independent proportional test methods and logistic regression analysis with backward elimination. **Results:** Male sex (odds ratios [OR] 2.80, 95% confidence interval [CI] 1.02-8.87;  $P=0.02$ ), tap water (OR 3.43, 95% CI 1.08-11.45;  $P=0.03$ ) and an outdoor lifestyle (OR 3.77, 95% CI 1.03-17.99;  $P=0.04$ ) were associated with an increased risk for CKD. Commercial dry cat food (OR 0.06, 95% CI 0.02-0.17;  $P=0.00$ ), filtered water (OR 0.13, 95% CI 0.03-0.52;  $P=0.01$ ) and an indoor lifestyle (OR 0.28, 95% CI 0.07-0.98;  $P=0.02$ ) were associated with a decreased risk. Logistic regression analysis using backward elimination demonstrated that cats fed commercial dry cat food (OR 0.042, 95% CI 0.01-0.17;  $P=0.00$ ) had a decreased risk for CKD compared with cats on other types of diet. **Conclusions and relevance:** Multivariable analysis found only feeding commercial dry cat food to be significant, suggesting that commercial dry cat food may be a potential protective factor for CKD in cats.

Publication Type

Journal article.

<67>

Accession Number

20173207245

Author

Rooney, H.

Title

Chronic kidney disease - dietary management role in dogs.

Source

VN Times; 2017. 17(7):6-8. 7 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Abstract

Nutrient manipulation is increasingly an important element of palliative care for many chronic diseases in dogs, and is no more important than in the management of chronic kidney disease. Here, diet plays a key role in slowing disease progression and improving clinical signs. This article aims to explain the key evidence-based nutrient modifications employed in therapeutic renal diets and their specific benefits to these patients. While clear evidence supports feeding therapeutic renal diets, this can be challenging to achieve in patients where the pathophysiology causes anorexia through multiple mechanisms, with patients often presenting as cachexia. This article will also discuss the longer-term nutritional support that can be provided to these patients.

Publication Type

Journal article.

<68>

Accession Number

20173226991

Author

Vidane, A. S.; Pinheiro, A. O.; Casals, J. B.; Passarelli, D.; Hage, M. C. F. N. S.; Bueno, R. S.; Martins, D. S.; Ambrosio, C. E.

Title

Transplantation of amniotic membrane-derived multipotent cells ameliorates and delays the progression of chronic kidney disease in cats.

Source

Reproduction in Domestic Animals; 2017. 52(s2):316-326. 46 ref.

Publisher

Wiley

Location of Publisher

Berlin

Country of Publication

Germany

Abstract

Chronic kidney disease (CKD) is a common clinical condition in domestic cats, characterized by tubulointerstitial, vascular and glomerular inflammation and severe fibrosis. Studies in rodent model of induced CKD have shown a decrease and stabilization of the clinical condition. In this study was evaluated the safety and effect of intrarenal and intravenous infusion of allogeneic mesenchymal stem cells (AMSCs) derived from feline amniotic membrane in cats with naturally occurring CKD. Cat AMSCs were harvested after mechanical and enzymatic digestion of amnion. A healthy cat received intrarenal injection of AMSCs guided by ultrasound in both kidneys ( $5 \times 10^5$  cells/kidney). Nine cats with CDK received repeated intravenous infusions of AMSCs ( $2 \times 10^6$  cells x 2 treatments). The clinical parameters of healthy cat did not

change, but sedation and general anaesthesia was required. The number of interventions stressed the animal, and he developed transient haematuria after AMSC injection. Cats with CDK registered a significant improvement of renal function (decrease in serum creatinine and urine protein concentrations and increase in urine specific gravity). The kidney architecture and morphology did not change following the treatment. The feline AMSCs have a renoprotective effect and improve renal function in cats with naturally occurring CKD, stabilizing the clinical condition and disease progression. Thus, intravenous injection of AMSCs may be an important tool to provide welfare in cats with chronic kidney disease.

Publication Type

Journal article

Conference paper.

<69>

Accession Number

20173218443

Author

Fiocchi, E. H.; Cowgill, L. D.; Brown, D. C.; Markovich, J. E.; Tucker, S.; Labato, M. A.; Callan, M. B.

Title

The use of darbepoetin to stimulate erythropoiesis in the treatment of anemia of chronic kidney disease in dogs.

Source

Journal of Veterinary Internal Medicine; 2017. 31(2):476-485. 29 ref.

Publisher

Wiley

Location of Publisher

Boston

Country of Publication

USA

Abstract

Background: Darbepoetin alfa (darbepoetin) is an erythropoiesis-stimulating agent used for the treatment of anemia secondary to chronic kidney disease (CKD) in dogs, but reports describing response are lacking. Hypothesis/Objectives: To evaluate the effectiveness of darbepoetin in dogs with anemia secondary to CKD, dosing protocols, and adverse events. Animals: Thirty-three client-owned dogs with naturally occurring CKD, including 26 with comorbidities. Methods: Multi-institutional retrospective study. Results: The median starting dosage and highest dosage of darbepoetin administered were 0.5 and 0.8 micro g/kg SC once weekly, respectively. Response to treatment was defined as achieving a packed cell volume (PCV)  $\geq 30\%$  or an increase in PCV  $\geq 10\%$ . Twenty-eight of 33 dogs (85%) achieved a PCV  $\geq 30\%$  and 22 of 33 (67%) dogs achieved an increase in PCV  $\geq 10\%$ . Median time to achieve a PCV  $\geq 30\%$  was 29 days. A higher starting dosage was associated with achieving an increase in PCV  $\geq 10\%$  ( $P=.01$ ). No dog sustained a response at a dosing interval  $> q21d$ . Potential adverse events included increased blood pressure requiring treatment ( $n=12$ ), seizures ( $n=5$ ), vomiting ( $n=3$ ), diarrhea ( $n=3$ ), and possible pure red cell aplasia (PRCA) ( $n=2$ ). Conclusions and Clinical Importance: Darbepoetin, when combined with treatment of comorbidities, is an effective treatment for anemia secondary to CKD in dogs. A dosing interval  $> q21d$  was ineffective at maintaining a response to treatment. PRCA was a possible adverse event in 2 of 33 dogs (6%).

Publication Type

Journal article.

<70>

Accession Number

20173218442

Author

Broek, D. H. N. van den; Chang, Y. M.; Elliott, J.; Jepson, R. E.

Title

Chronic kidney disease in cats and the risk of total hypercalcemia.

Source

Journal of Veterinary Internal Medicine; 2017. 31(2):465-475. 68 ref.

Publisher

Wiley

Location of Publisher

Boston

Country of Publication

USA

Abstract

Background: Chronic kidney disease (CKD) is a common comorbidity in cats with hypercalcemia, but whether CKD is a risk factor for hypercalcemia is unclear. Hypercalcemia often is diagnosed based on total calcium concentration (tCa), which tends to underestimate the ionized calcium concentration (iCa) in cats. Objectives: Assessment of the performance of tCa for the diagnosis of ionized hypercalcemia, and exploration of factors influencing the relationship between iCa and tCa. Determination of risk factors for incident total hypercalcemia (ie, the development of hypercalcemia based on tCa during follow-up). Animals: Records of a cross-section (n=477) and observational cohort (n=367) of client-owned cats with and without azotemic CKD from first opinion practice. Methods: Retrospective cross-sectional and retrospective cohort study. The diagnostic accuracy of tCa as an index test for ionized hypercalcemia was evaluated, and risk factors for underestimation were explored by binary logistic and linear regression in a cross-section of cats with and without azotemic CKD. Chronic kidney disease and clinicopathological variables were assessed as predictors of incident total hypercalcemia by both time-invariant and time-dependent Cox regression in a cohort of cats. Results: Specificity of tCa for identification of ionized hypercalcemia was high (100%), but sensitivity was low. Underestimation was associated with lower venous bicarbonate concentrations. Cats with CKD had increased risk for incident total hypercalcemia (hazard ratio, 4.29; 95% confidence interval, 1.96-9.37;  $P<.001$ ). Higher tCa predicted incident total hypercalcemia in both azotemic and nonazotemic cats ( $P<.001$ ). Conclusions and Clinical Importance: Chronic kidney disease is a risk factor for incident total hypercalcemia, and most cats with increased tCa had concurrent ionized hypercalcemia. Higher baseline tCa predicts incident total hypercalcemia. Prospective studies assessing changes in iCa are warranted.

Publication Type

Journal article.

<71>

Accession Number

20173218441

Author

Javard, R.; Grimes, C.; Bau-Gaudreault, L.; Dunn, M.

Title

Acute-phase proteins and iron status in cats with chronic kidney disease.

Source

Journal of Veterinary Internal Medicine; 2017. 31(2):457-464. 37 ref.

Publisher

Wiley

Location of Publisher

Boston

Country of Publication

USA

Abstract

**Background:** The role of inflammation in the development and progression of chronic kidney disease (CKD) in cats is not well characterized. Hepcidin is a recently discovered acute-phase protein (APP) that plays an important role in iron metabolism and contributes to the development of anemia in humans with CKD.

**Objectives:** To compare serum APP concentrations, iron status, and erythropoietin (EPO) concentrations in healthy cats and cats with naturally occurring CKD. **Animals:** A total of 18 healthy control cats and 38 cats with CKD. **Methods:** Prospective study. After complete physical examination and routine blood analysis, the following tests were performed: serum amyloid A (SAA), haptoglobin (HAP), EPO, serum iron and ferritin concentration as well as total iron-binding capacity (TIBC). Serum hepcidin-25 concentration was measured by ELISA kit designed for use in humans. **Results:** Mean SAA and hepcidin concentrations were significantly higher and mean total iron and TIBC were significantly lower in the CKD group ( $P < .05$ ). There was a significant positive correlation between serum creatinine concentration (CRT) and 2 of the APPs (SAA and hepcidin;  $P < .05$ ). Increases in SAA and hepcidin were associated with decreases in TIBC and hematocrit in the CKD group. Fourteen (37%) of the cats with CKD were anemic, and these cats had significantly lower TIBC ( $P < .05$ ), suggesting a functional iron deficiency. There was no association between survival time and APP, iron status, or EPO concentrations. **Conclusions:** Our data suggest that CKD in cats is associated with systemic inflammation and altered iron metabolism. With further validation in cats, hepcidin assays may help better characterize these relationships.

**Publication Type**

Journal article.

<72>

**Accession Number**

20173218440

**Author**

Whitehouse, W.; Quimby, J.; Wan, S.; Monaghan, K.; Robbins, R.; Trepanier, L. A.

**Title**

Urinary F2-isoprostanes in cats with international renal interest society stage 1-4 chronic kidney disease.

**Source**

Journal of Veterinary Internal Medicine; 2017. 31(2):449-456. 45 ref.

**Publisher**

Wiley

**Location of Publisher**

Boston

**Country of Publication**

USA

**Abstract**

**Background:** F2-isoprostanes, a biomarker of oxidant injury, increase with advancing chronic kidney disease (CKD) in humans. In cats, the relationship between CKD and oxidative stress is poorly understood.

**Objectives:** To determine whether cats with advancing CKD have increasing urinary F2-isoprostanes.

**Animals:** Control cats without evidence of CKD ( $\geq 6$  years old;  $n=11$ ), and cats with IRIS stage 1 ( $n=8$ ), 2

( $n=38$ ), 3 ( $n=21$ ), and 4 ( $n=10$ ) CKD. **Methods:** This was a prospective observational study. Urinary F2-

isoprostanes (specifically free 15-F2t-isoprostanes) normalized to urine creatinine (IsoPs) were compared among groups and tested for correlations with blood pressure, proteinuria, serum creatinine concentration, and urine specific gravity. The IsoPs also were compared between cats with and without hypertension or proteinuria, and in cats fed predominantly standard versus renal diets. **Results:** Urinary IsoPs were

increased, but not significantly, in cats with stage 1 CKD (median 263 pg/mg creatinine; range, 211-380) compared to controls (182 pg/mg; range, 80-348) and decreased significantly from stage 1 through advancing CKD (stage 2, 144 pg/mg; range, 49-608; stage 3, 102 pg/mg; range, 25-158; stage 4, 67 pg/mg; range, 26-117;  $P < .01$ ). Urinary IsoPs were inversely correlated with serum creatinine ( $r = -0.66$ ,  $P < .0001$ ).

**Conclusion and Clinical Importance:** Urinary IsoPs are significantly higher in early CKD (stage 1) compared to cats with more advanced CKD. Additional studies are warranted to characterize oxidative stress in cats

with stage 1 CKD and determine whether early antioxidant treatments have a protective effect on CKD progression.

Publication Type  
Journal article.

<73>

Accession Number  
20173197142

Author  
Thornton, C.

Title  
Supporting quality of life in feline patients with chronic kidney disease.

Source  
The Veterinary Nurse; 2017. 8(4):200-206.

Publisher  
MA Healthcare Limited

Location of Publisher  
London

Country of Publication  
UK

Abstract

Chronic kidney disease (CKD) is a progressive terminal disease that is commonly seen in cats in small animal veterinary practices. Veterinary nurses will be involved in caring for these patients during the diagnostic and treatment phases including providing end-of-life care when symptoms increase and the patient either dies a natural death or is euthanased. Palliative or hospice care will be provided by owners in the home environment. Veterinary nurses have a role in supporting owners to deliver high quality care to their pet and when making difficult decisions about their pet's death.

Publication Type  
Journal article.

<74>

Accession Number  
20173197121

Author  
Senior, D. F.

Title  
Chronic kidney disease staging in dogs & cats.

Source  
NAVCA Clinician's Brief; 2017. (June):74-76, 87, 90. 25 ref.

Publisher  
Educational Concepts LLC

Location of Publisher  
Tulsa

Country of Publication  
USA

Publication Type  
Journal article.

<75>

Accession Number

20173195027

Author

Taylor, S. S.; Sparkes, A. H.; Briscoe, K.; Carter, J.; Sala, S. C.; Jepson, R. E.; Reynolds, B. S.; Scansen, B. A.

Title

ISFM consensus guidelines on the diagnosis and management of hypertension in cats.

Source

Journal of Feline Medicine and Surgery; 2017. 19(3):288-303. 119 ref.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

Practical relevance: Feline hypertension is a common disease in older cats that is frequently diagnosed in association with other diseases such as chronic kidney disease and hyperthyroidism (so-called secondary hypertension), although some cases of apparent primary hypertension are also reported. The clinical consequences of hypertension can be severe, related to 'target organ damage' (eye, heart and vasculature, brain and kidneys), and early diagnosis followed by appropriate therapeutic management should help reduce the morbidity associated with this condition. Clinical challenges: Despite being a common disease, routine blood pressure (BP) monitoring is generally performed infrequently, probably leading to underdiagnosis of feline hypertension in clinical practice. There is a need to: (i) ensure BP is measured as accurately as possible with a reproducible technique; (ii) identify and monitor patients at risk of developing hypertension; (iii) establish appropriate criteria for therapeutic intervention; and (iv) establish appropriate therapeutic targets. Based on current data, amlodipine besylate is the treatment of choice to manage feline hypertension and is effective in the majority of cats, but the dose needed to successfully manage hypertension varies between individuals. Some cats require long-term adjuvant therapy and, occasionally, additional therapy is necessary for emergency management of hypertensive crises. Evidence base: These Guidelines from the International Society of Feline Medicine (ISFM) are based on a comprehensive review of the currently available literature, and are aimed at providing practical recommendations to address the challenges of feline hypertension for veterinarians. There are many areas where more data is required which, in the future, will serve to confirm or modify some of the recommendations in these Guidelines.

Publication Type

Journal article.

<76>

Accession Number

20173006079

Author

Chacar, F. C.; Caragelasco, D. S.; Martorelli, C. R.; Mori, C.; Kogika, M. M.

Title

Serum cystatin C as early biomarker of chronic kidney disease in dogs.

Source

Online Journal of Veterinary Research; 2016. 20(11):704-711.

Publisher



Online Journal of Veterinary Research

Location of Publisher

Toowoomba

Country of Publication

Australia

Abstract

In dogs, changes in creatinine concentrations are observed only when 75% of renal mass is lost, affecting early diagnosis of chronic kidney disease (CKD). Serum cystatin C may increase before serum creatinine in CDK dogs allowing earlier diagnosis. Changes in serum cystatin C levels in 3 groups of 5 dogs each with stage 1, 2 and 3 IRIS of CKD are described. Clinical data were recorded every 30 days for 2-5 months. Spot samples from 14 healthy dogs were used as controls. Mean serum cystatin C (+or-SEM) in stage 1 dogs was 0.23+or-0.01 mg/L (min=0.12, max=0.46), stage 2 0.29+or-0.02 mg/L (min=0.10, max=0.44) and stage 3 0.57+or-0.04 mg/L (min=0.31, max=0.93). In control dogs, cystatin C concentration was 0.18+or-0.01 mg/L (min=0.07, max=0.25). Significant differences between control and stage 3 ( $P<0.0001$ ), stage 1 and 3 ( $P<0.0001$ ), and stage 2 and 3 dogs ( $P<0.0001$ ) occurred. Serum cystatin C correlated with creatinine values in stage 3 dogs ( $r=0.63$ ,  $p=0.005$ ). Dogs with stage 1 CKD had increased cystatin C at some point but no change in creatinine. In stage 2, ~50% dogs had high cystatin C despite slight azotemia, with 2/5 dogs progressing to stage 3. Cystatin C increased in all dogs with stage 3 CKD and poor prognosis. Cystatin C values had high intra individual variability compared with creatinine. The findings suggest serum cystatin C may be an early marker of kidney impairment in dogs at stages 1 and 2 of CDK, but not renal function. Serum cystatin C offers no advantage in testing latter stages of CKD compared with creatinine.

Publication Type

Journal article.

<77>

Accession Number

20163393334

Author

Danks, L.

Title

The nutritional management of feline chronic kidney disease. [Italian]

Source

Summa, Animali da Compagnia; 2016. 33(9):55-60. 21 ref.

Publisher

Point Veterinaire Italie s.r.l.

Location of Publisher

Milano

Country of Publication

Italy

Abstract

Chronic kidney disease (CKD) is a frequent disease seen in older cats and while it is a progressive condition, the veterinary practice team can play a key role in delaying the inevitable. Dietary modifications are key to slowing the progression of renal disease and alleviating its metabolic consequences. There are four main objectives of nutritional management. These are: (a) provide sufficient energy to maintain a good body condition; (b) alleviate the clinical manifestations of uraemia; (c) minimise fluid, electrolyte and acid-base disturbances; and (d) slow disease progression. This article reviews the nutritional concepts employed in the management of CKD, and demonstrates why a renal diet should be implemented early in the disease to maximise both its benefits and acceptance by the feline patient.

Publication Type

Journal article.



<78>

Accession Number

20173037067

Author

Yabuki, A.; Miyazaki, A.; Ichii, O.; Kohyama, M.; Sawa, M.; Yamato, O.

Title

Low expression of cyclooxygenase-2 in chronic kidney disease in young dogs.

Source

Research in Veterinary Science; 2016. 109:71-73. 8 ref.

Publisher

Elsevier Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Chronic kidney disease (CKD) often results in end-stage renal failure in young dogs; however, the pathogenesis of this disease is not established. This study investigated renal expression of cyclooxygenase (COX)-1 and COX-2 proteins in three dogs with chronic kidney disease by immunohistochemistry. Histopathology showed asynchronous differentiation of renal tissues, including immature glomeruli. COX-1 signals were not detected in diseased or normal kidneys. COX-2 signals were low or undetectable in diseased kidneys, while normal kidneys showed clear positive signals in the macula densa (MD). Quantitative scores of COX-2 in diseased kidneys were significantly lower than those in normal kidneys. These findings demonstrate low renal COX-2 expression in CKD in young dogs, but whether this is correlated with disease pathogenesis remains unclear.

Publication Type

Journal article.

<79>

Accession Number

20173005413

Author

Baciero, G.

Title

Importance of nutritional management in chronic renal disease. [Spanish]

Source

Argos - Informativo Veterinario; 2016. (184):52.

Publisher

ASIS Biomedica s.l.

Location of Publisher

Zaragoza

Country of Publication

Spain

Publication Type

Journal article.

<80>

Accession Number

20173038921

Author

Grauer, G. F.

Title

Treatment guidelines for chronic kidney disease in dogs & cats: international renal interest society recommendations.

Source

Today's Veterinary Practice; 2017. 7(1):40-48, 50, 53. 20 ref.

Publisher

Eastern States Veterinary Association, Inc (NAVCA)

Location of Publisher

Glen Mills

Country of Publication

USA

Abstract

Understanding the diagnostic and therapeutic priorities based on the stage of CKD facilitates appropriate management of dogs and cats with CKD. Identification and correction of any primary or complicating diseases are most important in Stage 1 and 2 patients. Renoprotective treatments are most important in Stage 2 and 3 patients. Symptomatic patient therapy to improve quality of life is most important in Stage 4 patients.

Publication Type

Journal article.

<81>

Accession Number

20173011724

Author

Queau, Y.

Title

Nutrition and chronic renal disease: consensus and controversies. (Urologie et nephrologie en pratique chez le chien et le chat) [French]

Source

Point Veterinaire; 2016. 47(Numero Special):26-32. 27 ref.

Publisher

Newsmed

Location of Publisher

Paris

Country of Publication

France

Abstract

Chronic renal disease is associated with various changes to nitrogen, mineral and acid-base metabolism. Dietary modifications to correct some of these metabolic disorders and slow the progression of the disease are detailed in this article. Early introduction of an appropriate diet can increase the animal's acceptance of the diet and delay disease progression to more advanced stages. Correction of certain underlying metabolic imbalances and appetite stimulants can help increase food intake in animals with loss of appetite. However the use of feeding tubes is often necessary in the long term to order to maintain weight in advanced stages of the disease.

Publication Type

Journal article.

<82>

Accession Number

20173011723

Author

Reynolds, B.; Lefebvre, H.

Title

Feline chronic renal disease: treatment and monitoring. (Urologie et nephrologie en pratique chez le chien et le chat) [French]

Source

Point Veterinaire; 2016. 47(Numero Special):20-24. 15 ref.

Publisher

Newsmed

Location of Publisher

Paris

Country of Publication

France

Abstract

Treating a cat with chronic renal disease requires an understanding of therapeutic priorities depending on the stage of the condition. The aim is to slow the progression of the disease and to maintain a good quality of life for the animal. Therapy must be adapted for each individual case based on identified therapeutic priorities and practicalities of implementation of treatment by the owner. The criteria for objective effectiveness of each prescribed treatment should be defined and measured over time, and therapy changed as required.

Publication Type

Journal article.

<83>

Accession Number

20173011718

Author

Reynolds, B.; Lefebvre, H.

Title

Feline chronic renal disease: diagnosis and prognosis. (Urologie et nephrologie en pratique chez le chien et le chat) [French]

Source

Point Veterinaire; 2016. 47(Numero Special):14-19. 11 ref.

Publisher

Newsmed

Location of Publisher

Paris

Country of Publication

France

Abstract

Cats should be checked for chronic renal disease when a risk factor is identified. The clinical signs of the disease are non-specific and seen late in the development of the condition. Some chronic nephropathies can be diagnosed using medical imaging. Otherwise the diagnosis of CRD is usually established on the basis of the results of various repeated ancillary tests. Confirmed cases of CRD are graded according to the

International Renal Interest Society classification provided that the clinical condition of the cat is stable. This allows for an initial assessment, clarification of prognosis and guidance on individual management monitoring.

Publication Type  
Journal article.

<84>

Accession Number  
20173011711

Author  
Reynolds, B.; Lefebvre, H.

Title  
Pathophysiology of feline chronic renal disease. (Urologie et nephrologie en pratique chez le chien et le chat) [French]

Source  
Point Veterinaire; 2016. 47(Numero Special):8-12. 24 ref.

Publisher  
Newsmed  
Location of Publisher  
Paris

Country of Publication  
France

Abstract

Chronic renal disease (CRD) is the consequence of conditions that lead to progressive, irreversible kidney damage. There are numerous causes of CRD. In cats, tubulointerstitial fibrosis resulting from a chronic inflammatory process is the most common renal injury that causes CRD. The local activation of the renin-angiotensin system plays a key role in lesion development. CRD is associated with a set of systemic pathophysiological consequences that are mainly extrarenal such as systemic arterial hypertension, secondary hyperparathyroidism, hyperaemia, anaemia and metabolic acidosis. Proteinuria, when present, is not only a diagnostic marker but also a factor indicating further progression of CRD.

Publication Type  
Journal article.

<85>

Accession Number  
20173048147

Author  
Vitalaru, B. A.; Stefanescu, A.; Toader, M.

Title  
Researches regarding the correlation between renal parameters and the evolution of electrolytes in renal failure in dogs.

Source  
Lucrari Stiintifice - Medicina Veterinara, Universitatea de Stiinte Agricole si Medicina Veterinara "Ion Ionescu de la Brad" Iasi; 2016. 59(2):148-152. 5 ref.

Publisher  
Universitatea de Stiinte Agricole si Medicina Veterinara "Ion Ionescu de la Brad" Iasi  
Location of Publisher  
Iasi

#### Country of Publication

Romania

#### Abstract

Renal failure is a medical emergency defined as an acute syndrome of partial or total rapid loss and potentially reversible of the renal excretion function, typically on a healthy renal parenchymal and rarely on an old nephropathy untreated on time that can lead to chronic renal failure, or be incompatible with life. The cases studied are canine patients of different ages, belonging to different races and sharing acute or chronic renal insufficiency of different etiology. Determination of renal parameters was performed in all cases and their progress was closely correlated with the electrolyte and sanuguine gas parameters. The purpose of this research is to determine, based on the cases under consideration, the AnGap influence in establishing a vital prognosis and a therapeutic protocol. Determination of blood gases and electrolytes is an important component in determining the degree of dehydration, electrolyte imbalance and the degree of kidney damage. The difference between electrolytes and pH value are important indexes and provide extremely useful data to guide the therapeutic act. The following study was performed in the Faculty of Veterinary Medicine's Clinic and it was based on case studies spontaneously presented in the Clinic. This activity was conducted during 16 months (March 2015-June 2016). During this period, 30 patients who presented clinical signs of renal impairment and were confirmed by biochemical analysis were introduced into the study. The studied cases are dogs of different ages, belonging to different races and sharing acute or chronic renal impairment of different etiology. Determination of renal parameters was performed in all cases and their progress was closely correlated with the electrolyte and sanguine gas parameters.

#### Publication Type

Journal article.

<86>

#### Accession Number

20173048114

#### Author

D'Avila, M. S.; Franca, T. do N.; Peixoto, P. V.; Peixoto, T. C.; Santos, A. M. dos; Costa, S. Z. R.; Santos, R. da S.; Goncalves, T.; Nogueira, V. de A.

#### Title

Morphological and immunohistochemical (Troponin C) evaluation of cardiac lesions in dogs with chronic kidney disease. [Portuguese]

#### Source

Revista Brasileira de Medicina Veterinaria; 2016. 38(Suppl. 2):128-138. 48 ref.

#### Publisher

Sociedade de Medicina Veterinaria do Estado do Rio de Janeiro

#### Location of Publisher

Rio de Janerio

#### Country of Publication

Brazil

#### Abstract

This study had the objective (1) to verify the correlation between chronic kidney disease (CKD) and heart failure as well to evaluate the real extent of these changes and (2) to determine the reliability of the immunohistochemistry test using the human anti-troponin C antibody in detection of heart failure in dogs. Fragments of heart and kidneys paraffin embedded of 22 dogs (11 males and 11 females) with previous diagnosis of chronic kidney disease were used. The animals were from Department of Veterinary Pathology of the Federal Rural University of Rio de Janeiro (UFRRJ) and Federal University of Bahia (UFBA), from different breeds and they had between 11 months and 18 years old. The macroscopic examination revealed, in the heart of five dogs, moderate to accentuated thickening of left ventricular wall. It was also found endocardiosis in different degrees. Extrarenal uremic lesions included ulcerative glossitis and stomatitis, pneumopathies and uremic gastropathy, stomach mucosal ulceration and mineralization in the pharynx, larynx and subpleural up to intercostal muscles. Chronic renal lesions were characterized by marked

decrease in volume, firm texture, irregular surface and changes in cortico-medullary relationship. Microscopic evaluation revealed, in the kidneys of all dogs, different degrees of lesion. In severe cases, there was hyalinization and glomerular sclerosis, linfoplasmocytic inflammation, coagulative necrosis of the tubular kidney epithelial cells, interstitial fibrosis and mineralization. In the heart of 16 animals, it was observed groups of hypereosinophilic myocytes with homogeneous aspect, and in some cases, there was striation loss and pyknosis; in 14 dogs had swelling, linfoplasmocytic inflammation and mineralization. In other 2 animals swollen and vacuolization of cardiac cells were observed and, in 3, marked coagulative necrosis. In 11 dogs it was observed, in heart vessels, mild cell swelling of endothelial cell to necrosis, with deposition of eosinophilic material in the vascular wall and mineralization. Immunohistochemistry evaluation revealed, in all dogs, several groups of myocytes with significant reduction or absence of immunoreactivity for anti-troponin C antibody. This decrease in immunoreactivity occurred usually on the same myocytes with specific changes in HE stain, ranging from swelling, cytoplasmatic hypereosinophilic, striation loss, cell lysis, karyolysis and inflammatory infiltrate predominantly composed of lymphocytes and plasma cells. It is suggested that myocardial lesions observed in this study are closely correlated to vascular changes, resulting from long duration uremia and/or combination of metabolic and cellular changes which occurs in cardiorenal syndrome type IV, in which chronic involvement kidney may to induce chronic injuries in the heart.

Publication Type

Journal article.

<87>

Accession Number

20173048099

Author

Freitas, R. de A.; Silva, B. R. S. A. da; Athar, C. do V. A.; Marinho, J. P. M.; Veiga, C. C. P. da; Paiva, J. P.

Title

Staging of chronic kidney disease in domestic dogs with chronic valve disease. [Portuguese]

Source

Revista Brasileira de Medicina Veterinaria; 2016. 38(Suppl. 2):31-39. 50 ref.

Publisher

Sociedade de Medicina Veterinaria do Estado do Rio de Janeiro

Location of Publisher

Rio de Janeiro

Country of Publication

Brazil

Abstract

Heart failure causes, short or long term, in loss of kidney ability to maintain homeostasis. This interrelation of mutual injury, called cardiorenal syndrome, is already widely studied in medicine, however, there are few studies in veterinary, making it necessary to increased attention on the issue given that both diseases are the most common cause of death in geriatric dogs. The aim of the study was to determine the occurrence of chronic kidney disease in dogs with chronic valve disease through laboratory tests and imaging exams; staging and substaging them according to the International Renal Interest Society. In total 23 dogs participated in the study males and females of various ages, with echocardiographic diagnosis of chronic valve disease. All of these dogs after being staged in the degree of valve disease (stages B1, B2 and C), underwent clinical assessment of renal function with subsequent collection of biological samples (blood and urine), imaging exam (ultrasound) and measurement of blood pressure systolic systemic aiming to investigate previous renal injury. In this study were not include dogs in stage A (pre-arranged) and D stage (in treatment) because as inclusion criterion that the existence of valve degeneration and absence of drug use that were to interfere with the kidney function and /or perfusion. The results obtained, showed that females were more affected than males; the poodle was the breed with most diagnostic of chronic valve disease and that in stage 1 of chronic kidney disease was present in most dogs (15/23) in different stages of chronic valve disease. When these dogs were substaged as the degree of proteinuria, it could be seen that

this was present mostly in dogs in stage C of chronic valve disease. The risk of injury in target organ after the measurement of the systemic systolic blood pressure, it was noted that regardless of the stage of chronic valve disease, the dogs of this study were in the majority in minimal risk of developing target organ damage. The predominance of dogs in stage C with chronic kidney disease, can be explained by the deficit in renal perfusion secondary to reduced cardiac output. It can be concluded through this study that chronic kidney disease is a common finding in dogs with chronic valve disease.

Publication Type  
Journal article.

<88>

Accession Number  
20163398314

Author  
Vidane, A. S.

Title  
Clinical trials with amniotic membrane mesenchymal stem cells for chronic kidney failure in cat model.  
[Portuguese]

Source  
Modelo clinico de uso de celulas-tronco mesenquimais da membrana amniotica para o tratamento da insuficiencia renal cronica em gatos; 2015. :92 pp. 92 ref.

Publisher  
Faculdade de Medicina Veterinaria e Zootecnia, Universidade de Sao Paulo

Location of Publisher  
Sao Paulo

Country of Publication  
Brazil

Abstract

Chronic kidney disease (CKD) is a common clinical condition in domestic cats. It is characterized by tubulointerstitial, vascular, glomerular inflammation and severe fibrosis. Studies in rodent model of induced CKD have been shown a decrease and stabilization of the clinical condition, evidenced by renal function improvement and by inflammation and renal fibrosis reduction. In this study was evaluated the safety and effect of intra-renal and intravenous infusion of allogeneic mesenchymal stem cells derived from feline amniotic membrane (AMSCs) in cats with naturally occurring CKD. The AMSCs were isolated from fetal membranes collected after routine castrations. Ten cats, male and female, were enrolled and included in this study. A healthy cat received intrarenal injection of AMSCs guided by ultrasound in both kidneys (5x10<sup>5</sup> cells/kidney). Nine cats with naturally CDK received intravenous injection of AMSCs (2x10<sup>6</sup> cells x 2 treatments). The evaluation of the clinical condition was based on the measurement of complete blood count, blood biochemistry, blood gases, urinalysis and ultrasound. Analysis of variance (ANOVA) was performed to compare differences between the phases of treatment followed by Tukey test to compare means between groups. The clinical parameters of the healthy cat (intrarenal injection) did not change, but sedation and general anesthesia was required. The number of interventions stressed the animal and he developed transient hematuria after AMSCs injection. Cats with CDK, registered a significant improvement of renal function (decrease in serum creatinine and urine protein concentrations and increase in urine specific gravity). The kidney architecture and morphology did not change with the treatment. We conclude that the feline AMSCs have a renoprotective effect and improve renal function in cats with naturally occurring CKD, stabilizing the clinical condition and disease progression. Intravenous injection of AMSCs is an important tool to provide general well-being for cats with CDK.

Publication Type  
Thesis.



<89>

Accession Number

20173079388

Author

Felumlee, A. E.; Marolf, A. J.; Randall, E. K.; Bachand, A. M.; Quimby, J. M.

Title

Repeatability and reliability of glomerular filtration rate determination via gamma camera uptake of Tc-99m-DTPA in cats with chronic kidney disease.

Source

Veterinary Radiology & Ultrasound; 2017. 58(1):90-99. 16 ref.

Publisher

Wiley

Location of Publisher

Boston

Country of Publication

USA

Abstract

Measurement of glomerular filtration rate (GFR) via gamma camera uptake of 99mTc-diethylenetriaminepentaacetic acid is a standard method for quantifying renal function. Aims of this retrospective, observer agreement study were to determine intra- and interobserver variation in GFR values for cats with chronic kidney disease and to determine whether renal insufficiency classification changed between observers. Guideline cut-points were established for the difference in repeated GFRs to differentiate changes caused by therapeutic effect vs. inherent variation. Included cats had a diagnosis of chronic kidney disease and had undergone GFR examinations between the years of 2010 and 2013. Twenty-nine GFR studies were sampled. Each study was read twice, 6 months apart, by two veterinary radiologists and one radiology resident. Modified Bland-Altman plots were used to investigate differences between readings 1 and 2 by observer and between pairs of observers by reading. Reliability of clinical classification was assessed through comparisons between readings and observers. Measurements were not systematically different between readings for the experienced observers but were higher in reading 1 than reading 2 for the inexperienced observer. Measurements were not systematically different between the experienced observers in reading 1 or between any two observers in reading 2. Reliability for GFR measurements was high among experienced observers; variations in GFR measurements rarely led to differences in clinical classification. Results suggested that, for experienced observers, changes in GFR values following treatment in cats with chronic kidney disease between -0.4 and 0.4 mL/min/kg may be due to inherent variability rather than treatment effect.

Publication Type

Journal article.

<90>

Accession Number

20173079329

Author

Banzato, T.; Bonsembiante, F.; Aresu, L.; Zotti, A.

Title

Relationship of diagnostic accuracy of renal cortical echogenicity with renal histopathology in dogs and cats, a quantitative study.

Source

BMC Veterinary Research; 2017. 13(24):(17 January 2017). 11 ref.

Publisher

BioMed Central Ltd



Location of Publisher  
London  
Country of Publication  
UK

#### Abstract

**Background:** Renal cortical echogenicity is routinely evaluated during ultrasonographic investigation of the kidneys. Both in dog and cat previous ex-vivo studies have revealed a poor correlation between renal echogenicity and corresponding lesions. The aim of this study was to establish the in-vivo relationship between renal cortical echogenicity and renal histopathology. **Results:** Thirty-eight dogs and fifteen cats euthanized for critical medical conditions were included in the study. Ultrasonographic images of both kidneys were acquired ante mortem at standardized ultrasonographic settings. The echogenicity was quantified by means of Mean Gray Value (MGV) of the renal cortex measured with ImageJ. A complete histopathological examination of both kidneys was performed. Five kidneys were excluded because histopathology revealed neoplastic lesions. Only samples affected by tubular atrophy showed statistically different values in dog, and histopathology explained 13% of the total variance. MGV was not correlated neither to the degeneration nor to the inflammation scores. However, significant differences were identified between mildly and severely degenerated samples. Overall, the classification efficiency of MGV to detect renal lesions was poor with a sensitivity of 39% and a specificity of 86%. In cats, samples affected by both tubular vacuolar degeneration and interstitial nephritis were statistically different and histopathology explained 44% of the total variance. A linear correlation was evident between degeneration and MGV, whereas no correlation with inflammation was found. Statistically significant differences were evident only between normal and severely degenerated samples with a sensitivity of 54.17% and a specificity of 83.3% and MGV resulted scarce to discriminate renal lesions in this species. **Conclusions:** Renal cortical echogenicity shows low relevance in detecting chronic renal disease in dog whereas it results worth to identify severe renal damage in cat.

Publication Type  
Journal article.

<91>

Accession Number  
20173096213

Author  
Nivy, R.; Avital, Y.; Aroch, I.; Segev, G.

Title  
Utility of urinary alkaline phosphatase and gamma -glutamyl transpeptidase in diagnosing acute kidney injury in dogs.

Source  
Veterinary Journal; 2017. 220:43-47. 42 ref.

Publisher  
Elsevier Ltd

Location of Publisher  
Oxford

Country of Publication  
UK

#### Abstract

The diagnostic utility of urinary alkaline phosphatase (uALP) and gamma -glutamyl transpeptidase (uGGT) activities in naturally occurring acute kidney injury (AKI) was investigated in a heterogeneous group of dogs. The study included client-owned dogs with AKI (n=32), chronic kidney disease (CKD, n=13), lower urinary tract infection (LUTI, n=15) and healthy controls (n=24). uGGT and uALP activities were normalised to urinary creatinine (uCr) concentrations (uGGT/uCr and uALP/uCr, respectively). uALP/uCr and uGGT/uCr were positively and significantly correlated ( $r=0.619$ ,  $P<0.001$ ), and differed significantly ( $P\leq 0.001$ ) among groups, as well as between AKI and LUTI or CKD groups ( $P<0.05$ ), but not between the AKI and control

groups. Areas under the receiver operator characteristics (ROC) curve for uALP/uCr and uGGT/uCr as predictors of AKI were 0.75 and 0.65, respectively, with optimal cut-off points showing poor to moderate sensitivity (59% for uALP/uCr and 79% for uGGT/uCr) and specificity (59% for uALP/uCr and 75% for uGGT/uCr). Higher cut-off points, with 90% specificity, showed low sensitivity (41% for both uALP/uCr and uGGT/uCr). In conclusion, uALP/uCr is superior to uGGT/uCr as a marker of AKI, but both uGGT/uCr and uALP/uCr have unsatisfactory discriminatory power for diagnosing naturally occurring AKI in dogs and therefore cannot be recommended as sole screening tests for canine AKI. However, both may serve as ancillary, confirmatory, biomarkers for detecting AKI in dogs if appropriate cut-off points with high specificities are used.

Publication Type

Journal article.

<92>

Accession Number

20173094164

Author

Vergnano, D.; Valle, E.; Bruni, N.; Rizzi, R.; Bigliati, M.; Cocca, T.

Title

Effectiveness of a feed supplement in advanced stages of feline chronic kidney disease.

Source

Acta Scientiae Veterinariae; 2016. 44:1375. 30 ref.

Publisher

Universidade Federal do Rio Grande do Sul, Faculdade de Veterinaria

Location of Publisher

Porto Alegre

Country of Publication

Brazil

Abstract

The aim of this study was to evaluate the effectiveness of a feed supplement containing calcium carbonate, calcium lactate gluconate, chitosan and sodium bicarbonate in controlling hyperphosphataemia and metabolic acidosis in Italian cats with severe chronic kidney disease (CKD; IRIS, International Renal Interest Society, stage 3 and 4). Ten cats (median BW 4.00 (3.20; 5.70) kg, BCS 3/5 (2.25; 3.75), 11 (8.25;12.00) years) fed with a balanced renal diet were included in the study. To be enrolled in the study cats had to be affected by CKD in stages 3 or 4 and show hyperphosphatemia. Treatment consisted in oral administration of the product (Renal, Candioli Pharma) at 0.2 g/kg/day mixed with the food for 60 days. The animals were evaluated at the beginning of the study and at 15, 30, 60 days (T0, T15, T30, T60) for: clinical condition, BW, BCS, blood pressure and for routinely hematochemical, biochemical and urinary parameters. Owners were asked to assess appetite of the cat, palatability of the supplement, presence of vomit and/or diarrhoea, general health and vitality. All statistical analyses were performed using SAS software. After checking normality data were analyzed using Kruskal-Wallis and Wilcoxon tests. Results are expressed as median (interquartile range). For the parameters P ( $P<0.0001$ ), iCa ( $P=0.0008$ ) and  $\text{HCO}_3$  ( $P=0.0002$ ) there were statistically significant differences among times of supplementation (T0, T15, T30, T60). Statistically significant reduction of serum phosphorus concentration was obtained through the study (reduction of 59% at T60 vs T0). Also a statistically significant increase of bicarbonate was seen (7% from T0 to T60). At T60 was also recorded an increase of ionized calcium level, which however was in normal range. For the other laboratory parameters, no statistical difference was recorded. All the owners reported a good palatability of the product. The decrease of vomit and diarrhoea episodes and the increase of the appetite reported were statistically significant ( $P<0.05$ ). The feed supplement tested is therefore effective in reducing blood phosphate levels and in increasing blood bicarbonate levels, thus improving the cats' clinical conditions for the duration of the study without any adverse effect.

Publication Type

Journal article.

<93>

Accession Number

20173072607

Author

Lamoureux, A.; Kamosi, K.; Maurey, C.

Title

Symmetric dimethylarginine for the early diagnosis of chronic kidney disease in a puppy. [French]

Source

Point Veterinaire; 2017. 48(373 (Part 1)):56-61. 18 ref.

Publisher

Newsmed

Location of Publisher

Paris

Country of Publication

France

Abstract

A 5-month-old puppy had significant polyuria-polydipsia (PUPD) present for several weeks without alteration in biochemical parameters. Abdominal ultrasonography revealed abnormalities of renal conformation and the concentration of symmetrical dimethylarginine (SDMA) confirmed the decrease in glomerular filtration rate (GFR). Subclinical leptospirosis was discovered and treated. Renal biopsies demonstrated congenital dysplasia associated with stage I chronic renal disease (CRD), which was the cause of the PUPD. The investigation of CRD usually leads to an increase in creatinine and urea, but these parameters may lack specificity and precocity. In contrast, SDMA is an earlier and more specific parameter, making it a good biomarker for renal function. The measurement of GFR remains the gold standard, but is rarely used in practice. The definitive diagnosis of early nephropathy is still based on renal biopsies after the elimination of an infectious cause.

Publication Type

Journal article.

<94>

Accession Number

20173071489

Author

Kovarikova, S.; Konvalinova, J.; Blasko, M.; Svobodova, Z.

Title

Assessment of concentration of SDMA in healthy cats over seven years. [Czech]

Source

Veterinarstvi; 2017. 67(2):82-86. 14 ref.

Publisher

Profi Press, s.r.o.

Location of Publisher

Praha 2

Country of Publication

Czech Republic

Abstract

Chronic kidney disease is a frequent disorder in feline population and its prevalence increases with age. Early recognition of kidney disease is desirable and thus novel markers of renal function were established.

One of them is symmetrical dimethylarginine (SDMA). The aim of this study was to evaluate renal function in apparently healthy cats older than seven years. Blood samples from 72 cats were taken and creatinine, urea and IDEXX SDMATM concentrations were measured. In all examined cats, IDEXX SDMATM concentrations were normal. In three cats, IDEXX SDMATM concentrations were at the upper limit of reference range. Renal function in examined cats was good. IDEXX SDMATM appears to be suitable marker especially in cats with reduced muscle mass or in cases, when results of traditional parameters are ambiguous.

Publication Type  
Journal article.

<95>

Accession Number  
20173106013

Author  
Evason, M.; Remillard, R.

Title  
Chronic kidney disease staging & nutrition considerations.

Source  
NAVC Clinician's Brief; 2017. (March):89-95. 17 ref.

Publisher  
Educational Concepts LLC

Location of Publisher  
Tulsa

Country of Publication  
USA

Publication Type  
Journal article.

<96>

Accession Number  
20173117122

Title  
Serum concentrations of SDMA and creatinine.

Source  
Advances in Small Animal Medicine and Surgery; 2017. 30(2):4-5.

Publisher  
Elsevier Inc.

Location of Publisher  
Philadelphia

Country of Publication  
USA

Publication Type  
Journal article.

<97>

Accession Number

20173117118

Title

Correlation of urine and serum biomarkers with renal damage and survival in dogs.

Source

Advances in Small Animal Medicine and Surgery; 2017. 30(1):5-6.

Publisher

Elsevier Inc.

Location of Publisher

Philadelphia

Country of Publication

USA

Publication Type

Journal article.

<98>

Accession Number

20173116778

Author

Bijsmans, E.; Jepson, R.; Chang YuMei; Syme, H.; Elliott, J.

Title

Changes in systolic blood pressure over time in healthy cats and cats with chronic kidney disease.

Source

European Journal of Companion Animal Practice; 2017. 27(1):34-42. 29 ref.

Publisher

Federation of European Companion Animal Veterinary Associations (FECAVA)

Location of Publisher

Paris

Country of Publication

France

Abstract

Background: Hypertension is a common problem in older cats, most often associated with chronic kidney disease (CKD). Cross-sectional studies have suggested that blood pressure in cats increases with age. Hypothesis/Objectives: To determine whether blood pressure in cats increases with age and whether this occurs independently of the presence of CKD. To investigate risk factors for developing hypertension. Animals/Subjects: Two hundred and sixty-five cats with CKD and 133 healthy cats  $\geq 9$  years were retrospectively identified. Methods: Four groups were created according to status at initial evaluation (CKD or healthy) and blood pressure at the last included visit (normotensive [NT] or developed hypertension [DH]): Healthy-NT, Healthy-DH, CKD-NT and CKD-DH. Systolic blood pressure (SBP) over time slopes were compared with 0 and between groups. Risk factors for the development of hypertension were investigated, and associations of biochemical and clinical variables with SBP were examined. Results: Cats that were hypertensive at CKD diagnosis ( $n=105$ ) were not included in further analyses. Twenty-seven cats with CKD and 9 healthy cats developed hypertension  $\geq 3$  months after diagnosis of CKD or their first visit. Systolic blood pressure significantly increased with age in all cats ( $P<0.001$ ). Healthy cats were at less risk than cats with CKD to become hypertensive (hazard ratio 0.2,  $P<0.001$ ), with creatinine being an independent risk factor for the development of hypertension. Conclusions and Clinical Importance: The high prevalence of hypertension in azotemic cats in this study shows the importance of monitoring of SBP in elderly cats, and in particular in cats with CKD.

Publication Type

Journal article.

<99>

Accession Number

20173129221

Author

Liu HungTing; Chen LiTing; Chuang TsaiFan; Chang HuiWen; Kao HaoHsiang; Tsai PeiShiue [Tsai, P. S. J. ]

Title

The effects of vasopressin on the progression of chronic kidney disease and its potential treatment using vasopressin receptor antagonists in the field of veterinary medicine. (Special issue on companion animals and shelter medicine.)

Source

Taiwan Veterinary Journal; 2017. 43(1):23-28. 51 ref.

Publisher

Chinese Society of Veterinary Science

Location of Publisher

Taipei

Country of Publication

Taiwan

Abstract

Vasopressin (VP) is a nine-amino-acid antidiuretic hormone (ADH) released by hypothalamus and acts on various organs via three distinct G protein-coupled receptors, V1aR, V2R, V1bR (V3R). Large-scale retrospective study carried out in human patients indicated positive correlation between serum VP level and kidney disease severity. Currently, VP receptor antagonists are used to treat hyponatremia, autosomal dominant polycystic kidney disease (ADPKD), heart failure, cirrhosis, and syndrome of inappropriate antidiuretic hormone secretion (SIADH) in human patients; however, in the field of veterinary medicine, although the prevalence for chronic kidney disease (CKD) increases (up to 50%) along the age of companion animals, the treatment options for CKD cats and dogs are limited at this moment. In this article, we review information on the beneficial effects of VP receptor antagonists on the treatment of CKD and to provide supporting evidence for their potential applications in the field of veterinary medicine.

Publication Type

Journal article.

<100>

Accession Number

20173114562

Author

Kuisma, P.; Wiberg, M.

Title

Chronic kidney disease in cats - review. [Finnish]

Source

Suomen Eläinlääkärilehti; 2017. 123(1):14-21. 53 ref.

Publisher

Suomen Eläinlääkäriliitto

Location of Publisher

Helsinki

Country of Publication

Finland

Abstract

Chronic kidney disease is common in older cats. As the etiology is unknown, disease prevention is difficult. Kidney disease leads to the accumulation of nitrous waste products and disturbances in fluid and electrolyte balance. Typical signs include polydipsia, polyuria and weight loss. Diagnosis is based on increased serum kidney parameters and dilute urine. The most common laboratory findings are increased urea-, creatinine- and symmetric dimethyl arginine concentrations. Patients may also have proteinuria and hypertension. Chronic kidney disease is irreversible but the disease progress can be delayed. The cornerstones of treatment include diet, maintaining a good hydrational status, controlling hypertension and reducing proteinuria. Treatment recommendations are based on the severity of the disease. Prognosis is poor in the advanced stages of the disease. With early diagnosis and proper treatment, the quality of life can be improved and life span extended for many patients.

Publication Type  
Journal article.

<101>

Accession Number  
20173114561

Author  
Caney, S.

Title  
Management of CKD in cats.

Source  
Veterinary Times; 2017. 47(13):8, 10. 9 ref.

Publisher  
Veterinary Business Development Ltd

Location of Publisher  
Peterborough

Country of Publication  
UK

Publication Type  
Journal article.

<102>

Accession Number  
20173146271

Author  
Cleroux, A.; Alexander, K.; Beauchamp, G.; Dunn, M.

Title  
Evaluation for association between urolithiasis and chronic kidney disease in cats.

Source  
Journal of the American Veterinary Medical Association; 2017. 250(7):770-774. 21 ref.

Publisher  
American Veterinary Medical Association

Location of Publisher  
Schaumburg

Country of Publication  
USA

Abstract



**OBJECTIVE:** To determine whether urolithiasis is associated with chronic kidney disease (CKD) in cats. **DESIGN:** Retrospective case-control study. **ANIMALS:** 126 cats (59 and 67 with and without urolithiasis, respectively). **PROCEDURES:** Medical records from June 2006 to July 2013 were searched to identify cats that underwent abdominal or focal urinary tract ultrasonography and for which serum creatinine concentration and urine specific gravity data were obtained  $\leq 14$  days before or after the examination. In cats with (urolithiasis group) and without (control group) urolithiasis, the presence of CKD was determined according to International Renal Interest Society guidelines. Information recorded included signalment, body weight, serum creatinine concentration, and urine specific gravity; when present, the location and number of uroliths were noted. Differences between groups and associations between group and categorical variables were analyzed statistically. **RESULTS:** Age, weight, sex, and breed did not differ between groups. The prevalence of CKD was significantly higher in cats with urolithiasis than in the control group. Among cats with urolithiasis, there was a negative association between CKD and presence of cystoliths. There was no association between urolithiasis and the stage of CKD or between presence of CKD and location of nephroliths in the kidney. **CONCLUSIONS AND CLINICAL RELEVANCE:** Results confirmed a positive association between urolithiasis and CKD in the feline population studied and suggested that cats with urolithiasis should be evaluated for CKD. Further research is warranted to assess the nature of the relationship between CKD and urolithiasis in cats.

Publication Type

Journal article.

<103>

Accession Number

20173153554

Author

Wang, I. C.; Hsu, W. L.; Wu, P. H.; Yin, H. Y.; Tsai, H. J.; Lee, Y. J.

Title

Neutrophil gelatinase-associated lipocalin in cats with naturally occurring chronic kidney disease.

Source

Journal of Veterinary Internal Medicine; 2017. 31(1):102-108. 38 ref.

Publisher

Wiley

Location of Publisher

Boston

Country of Publication

USA

Abstract

**Background:** Neutrophil gelatinase-associated lipocalin (NGAL) is a biomarker for the early prediction of renal damage and the progression of chronic kidney disease (CKD) in humans and dogs. **Hypothesis:** Neutrophil gelatinase-associated lipocalin also may play a role in the progression of CKD in cats. **Animals:** Eighty CKD and 18 control cats. **Methods:** Cats were categorized into different stages according to the International Renal Interest Society (IRIS) staging system. Urine and plasma samples were collected and tested for NGAL concentrations using an in-house sandwich ELISA system and urinary NGAL (uNGAL)-to-creatinine ratio (UNCR) was determined. Cats in which serum creatinine concentration increased by  $>0.5$  mg/dL from baseline within 30 days were defined as exhibiting progression. **Results:** The urinary NGAL and UNCR of CKD cats were significantly higher than those of healthy cats ( $P<.05$ ) and were highly correlated with serum creatinine concentration. The area under the receiver operating characteristic curve (AUROC) for uNGAL, when predicting the progression of CKD, was 0.71 and the best cutoff value was 2.06 ng/mL with a sensitivity of 76.9% and a specificity of 75%. The AUROC for UNCR when predicting the progression of CKD was 0.79 and the best cutoff value was  $4.08 \times 10^{-6}$  with a sensitivity of 76.9% and specificity of 79.2%. Cats with UNCR values higher than their cutoffs experienced significantly faster deterioration with a median of 19 days. **Conclusions:** Both urinary NGAL and UNCR are useful markers for the prediction of CKD progression in cats.



Publication Type  
Journal article.

<104>

Accession Number  
20173168863

Author

Crivellenti, L. Z.; Borin-Crivellenti, S.; Fertal, K. L.; Contin, C. M.; Miranda, C. M. J.; Santana, A. E.

Title

Occult gastrointestinal bleeding is a common finding in dogs with chronic kidney disease.

Source

Veterinary Clinical Pathology; 2017. 46(1):132-137. 18 ref.

Publisher

Wiley

Location of Publisher

Boston

Country of Publication

USA

Abstract

Background: The risk of occult gastrointestinal bleeding (OGIB) is known to be increased among human dialysis patients suffering from end-stage renal disease. However, there are no studies to date that investigate the incidence of OGIB in either dogs or people with chronic kidney disease (CKD), irrespective of dialysis. Objectives: The purpose of the study was to determine whether the incidence of OGIB is greater in dogs with CKD as compared to a control population, and if this pathology is associated with changes in serum variables related to iron metabolism. Methods: Fecal occult bleeding was evaluated in 10 healthy dogs and 30 CKD dogs. Test results were compared to indicators of blood loss and/or iron metabolism. Results: Dogs with CKD had a significantly higher incidence of OGIB than the control group ( $P<.0001$ ). While 80% of dogs with stage 2 CKD did not exhibit anemia, 90% tested positive for OGIB. Similarly, subjects with stage 4 CKD had more significant blood loss than either stage 2 ( $P=.0071$ ) or stage 3 CKD ( $P=.0385$ ). Serum hemoglobin, transferrin, and iron concentrations in the CKD group were statistically lower than in the control group ( $P<.0001$ ) and correlated with fecal occult bleeding ( $r=-.61$ ;  $r=-.40$ ;  $r=-.44$ , respectively), as well as serum creatinine concentrations ( $P<.0001$ ,  $r=.64$ ). Conclusions: This preliminary study suggests that OGIB is a common clinical finding among dogs with CKD, even in the early stages of the disease process. Therefore, fecal occult blood tests may be useful as an indication for gastroprotective agents in the treatment plan.

Publication Type

Journal article.

<105>

Accession Number  
20163002222

Author

Han SeiMyoung; Kim JongTaek; Lee JongBok; See KyoungWon; Song WooJin; Ryu MinOk; Hwang CheolYong; Youn HwaYoung

Title

Continuous renal replacement therapy of chronic kidney disease with uncontrolled azotemia in six dogs.

Source

Journal of Veterinary Clinics; 2015. 32(5):440-444. 12 ref.

Publisher

Korean Society of Veterinary Clinics

Location of Publisher

Seoul

Country of Publication

Korea Republic

Abstract

The purpose of this case report was to present the treatment of continuous renal replacement therapy (CRRT) in dogs with end-stage CKD with uncontrolled uremia. Hemodialysis were carried out 6 patients who failed to improve clinical status with conventional management for CKD. Four dogs with urea reduction ratio (URR) range of 57-72% and 1 dog with URR of 37.3% showed good outcome with decreasing tendency of pre-dialysis. Therefore, we suggest that CRRT could be recommended for use in CKD dogs with uncontrolled azotemia or uremia and should be monitor carefully throughout the CRRT.

Publication Type

Journal article.

<106>

Accession Number

20163019175

Author

Dupont, S.; Maele, I. van de; Lourenco, M.; Hesta, M.

Title

Nutritional support and follow-up of a puppy with chronic kidney disease.

Source

Veterinary Record Case Reports; 2015. 3(1):e000158. 19 ref.

Publisher

BMJ Publishing Group

Location of Publisher

London

Country of Publication

UK

Abstract

A five months old, Flat-Coated Retriever puppy with poor body condition diagnosed with pyelonephritis and chronic kidney disease (CKD) was referred for a nutritional consult. The conflicting protein and phosphorus requirements for growth and poor body condition versus CKD were scrutinised. To maximise the quality of life (QoL) despite the poor prognosis, several diet plans were advised taking into account the different growth periods of this medium breed puppy. At 15 months of age, body condition was still below target and the creatinine level had increased consistently since the first consult. Despite the progressive decline in kidney function, serum urea concentration decreased compared with seven months before, whereas serum concentrations of total protein, albumin and phosphate remained normal at all times. With the different adjusted diet plans, the QoL of the puppy was improved, allowing for a normal and exceptionally energetic life until the age of nearly three years.

Publication Type

Journal article.

<107>

Accession Number

20153437922

Author

Desfontis, J. C.; Mallem, Y.

Title

Benefits and risks of SemintraReg. in the treatment of chronic renal insufficiency in cats. [French]

Source

Point Veterinaire; 2015. 46(361(Part 1)):21.

Publisher

Newsmed

Location of Publisher

Paris

Country of Publication

France

Abstract

The pharmacokinetics, efficacy, and adverse effects of SemintraReg. in treating chronic renal failure in cats were discussed.

Publication Type

Journal article.

<108>

Accession Number

20163035195

Author

Quimby, J.; Lappin, M.

Title

Evaluating sucralfate as a phosphate binder in normal cats and cats with chronic kidney disease.

Source

Journal of the American Animal Hospital Association; 2016. 52(1):8-12.

Publisher

American Animal Hospital Association

Location of Publisher

Denver

Country of Publication

USA

Abstract

Control of hyperphosphatemia is an important part of the management of chronic kidney disease (CKD). The purpose of this study was to determine the efficacy of sucralfate as a phosphate binder in normal cats and normophosphatemic CKD cats. A 500 mg sucralfate slurry was administered orally q 8 hr for 2 wk, and serum phosphorus, urine fractional excretion of phosphorus, and fecal phosphorus concentrations were measured. In normal cats treated with sucralfate, significant changes in serum phosphorus concentration or urinary excretion of phosphorus were not detected, and vomiting occurred after 14.7% of administrations. Of the five normophosphatemic cats with CKD treated with sucralfate, three experienced clinical decompensation, including vomiting, anorexia, constipation, and increased azotemia. Administration of sucralfate did not result in significant changes in fecal phosphorus concentration in these cats. The effects of sucralfate administration on serum phosphorus concentration and urinary excretion of phosphorus in CKD cats was difficult to determine because of dehydration and worsening azotemia associated with decompensation. Due to side effects and the apparent lack of efficacy of the medication, the study was discontinued. This study was unable to confirm efficacy of this sucralfate formulation as a phosphate binder, and side effects were problematic during the study.

Publication Type

Journal article.

<109>

Accession Number

20163053489

Author

Pereira, C. de O.; Costa, F. V. A. da; Bavaresco, A. Z.; Gouvea, A. S.

Title

Calcium oxalate ureterolithiasis in a cat. [Portuguese]

Source

Acta Scientiae Veterinariae; 2015. 43(Supplement):77. 8 ref.

Publisher

Universidade Federal do Rio Grande do Sul, Faculdade de Veterinaria

Location of Publisher

Porto Alegre

Country of Publication

Brazil

Abstract

A 7-year-old female cat, was referred to the Veterinary Teaching Hospital of the Federal University of Rio Grande do Sul, Brazil with history of weight loss for two months and previous diagnosis of chronic kidney insufficiency. Blood tests showed elevated levels of calcium and creatinine. At x-ray evaluation, it was found two radiopaques structures on the right kidney, consistent with uroliths and the presence of a small radiopaque structure in the region of the left ureter. Ultrasound exam indicated two hyperechoic structures in the right renal pelvis, forming acoustic shadowing suggestive of lithiasis. The left kidney showed partial loss of renal parenchyma by distention of the pelvis for anechogenic homogeneous content compatible with hydronephrosis. It was also observed dilated left ureter in its proximal third. After three days, the animal was subjected to ureterotomy. After midline incision of the ventral abdomen, the location of ureteral calculi was identified by inspection and palpation of the ureter. The ureter was carefully lifted into paralumbar space. Subsequently, the region where the calculi was located was gently dissected of periureteral fat and opened through a small longitudinal incision on the calculi. This was removed using a fine forceps. Subsequently, the calculi was submitted for analyze at Minnesota Urolith Center, University of Minnesota, USA, confirming its constitution of 100% calcium oxalate. Five days after surgery, the patient had normal levels of creatinine. Eighteen days after surgery the patient did another abdominal ultrasound and there was no dilatation of the left renal pelvis and proximal ureter.

Publication Type

Journal article.

<110>

Accession Number

20163052274

Author

Nentwig, A.; Schweighauser, A.; Maissen-Villiger, C.; Bruckmaier, R. M.; Zurbriggen, A.; Dorland, H. A. van; Francey, T.

Title

Assessment of the expression of biomarkers of uremic inflammation in dogs with renal disease.

Source

American Journal of Veterinary Research; 2016. 77(2):218-224.

Publisher

American Veterinary Medical Association

Location of Publisher

Schaumburg

Country of Publication

USA

Abstract

**OBJECTIVE:** To assess the expression of inflammatory cytokines and enzymes in venous whole blood of dogs with impaired renal function attributable to various causes. **ANIMALS:** 46 dogs with acute kidney injury (AKI), 8 dogs with chronic kidney disease (CKD), and 10 healthy dogs. **PROCEDURES:** Dogs with AKI and CKD were prospectively enrolled during 2010 if they met inclusion criteria. Demographic and laboratory characteristics were evaluated for each dog, and expression of inflammatory cytokines (interleukin [IL]-1 alpha, IL-1 beta, IL-8, tumor necrosis factor [TNF]- alpha, IL-10, and transforming growth factor [TGF]- beta) and enzymes (inducible nitric oxide synthase [iNOS] and 5-lipoxygenase [5-LO]) was measured in venous whole blood obtained at initial evaluation. **RESULTS:** Dogs with impaired renal function had markedly higher expression of the cytokines IL-1 alpha, IL-1 beta, and TGF- beta and the enzyme 5-LO, compared with expression in healthy dogs. Additionally, 17 of 46 AKI dogs (but none of the CKD dogs) had higher IL-8 mRNA expression and 3 of 8 CKD dogs (but only 2/46 AKI dogs) had higher TNF- alpha expression, compared with results for healthy dogs. No significant difference between renal disease groups was detected for inflammatory markers and laboratory variables, degree of azotemia, or cause of impaired renal function. **CONCLUSIONS AND CLINICAL RELEVANCE:** In this study, expression of the cytokines IL-1 alpha, IL-1 beta, and TGF- beta and the enzyme 5-LO was clearly increased in dogs with renal disease, which suggested that these markers were part of an inflammatory response in animals with AKI or CKD.

Publication Type

Journal article.

<111>

Accession Number

20163087082

Author

Bijsmans, E. S.; Jepson, R. E.; Syme, H. M.; Elliott, J.; Niessen, S. J. M.

Title

Psychometric validation of a general health quality of life tool for cats used to compare healthy cats and cats with chronic kidney disease.

Source

Journal of Veterinary Internal Medicine; 2016. 30(1):183-191. 39 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

**Background:** Numerous validated psychometric tools are available to assess impact of disease on a human's quality of life (QoL). To date, no psychometrically validated general health-related QoL tool exists for cats. **Hypothesis/Objectives:** To develop and validate a tool for assessment of owner-perceived QoL in cats (CatQoL) and to use this tool to compare QoL between healthy cats and those with chronic kidney disease (CKD). **Animals/Subjects:** Total of 204 owners of young healthy cats (YH, n=99; <9 years), older healthy cats (OH, n=35), and cats diagnosed with CKD (CKD, n=70) completed the CatQoL. **Methods:** Discussions with a focus group and 2 pilot surveys informed design of 16 QoL questions grouped into 4 domains. Each item scored according to frequency and importance, and item-weighted-impact-scores were calculated. The validity of the tool was assessed using principal components analysis and Cronbach's alpha. The average item-weighted-impact-score (AWIS) was compared among groups and domains. **Results:** Sixteen-item CatQoL showed good internal consistency reliability (Cronbach's alpha, 0.77) and unidimensionality with significant loadings (0.2-0.7) and communalities (>0.3). Young healthy cats had significantly higher AWIS (median [IQR], 1.25 [0.63, 1.88]) than OH (0.56 [-0.06, 1.00]) and CKD cats (-0.06

[-0.81, 0.88]), ( $P < .001$ ). CKD cats had significantly lower AWIS for eating domain (YH: 2.00 [1.00, 3.00]; OH: 2.00 [0.67, 3.00]; CKD : 1.00 [0.00, 2.67]) when compared with the YH group and OH group, and all groups differed significantly in their management domain (YH: -0.50 [-1.00, 0.00]; OH: -1.00 [-1.88, -0.50]; CKD : -1.50 [-2.50, -1.00],  $P < .001$ ). Conclusions and Clinical Importance: The CatQoL was validated for use in cats, and can be used as additional assessment parameter in clinical and research settings.

Publication Type  
Journal article.

<112>

Accession Number  
20163087007

Author

Quimby, J. M.; Webb, T. L.; Randall, E.; Marolf, A.; Valdes-Martinez, A.; Dow, S. W.

Title

Assessment of intravenous adipose-derived allogeneic mesenchymal stem cells for the treatment of feline chronic kidney disease: a randomized, placebo-controlled clinical trial in eight cats.

Source

Journal of Feline Medicine and Surgery; 2016. 18(2):165-171. 26 ref.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

**Objectives:** Feline chronic kidney disease (CKD) is characterized by chronic tubulointerstitial nephritis, and inflammation contributes to the progression of renal fibrosis. Mesenchymal stem cells (MSCs) have demonstrated anti-inflammatory and antifibrotic effects in rodent CKD models. However, few randomized trials evaluating the effectiveness of MSC therapy for diseases in companion animals have been reported. The purpose of this study was to evaluate the effectiveness of allogeneic MSCs for the treatment of feline CKD using a randomized, placebo-controlled trial. **Methods:** MSCs were isolated from the cryopreserved adipose tissues of specific pathogen-free research cats and culture expanded. CKD cats were enrolled in a randomized, placebo-controlled, blinded one-way crossover clinical study. Four CKD cats were randomized to receive  $2 \times 10^6$  MSCs/kg intravenously at 2, 4 and 6 weeks. Four CKD cats were randomized to receive placebo, with two cats crossing over to the MSC treatment group and one cat failing to complete the trial. Complete blood counts, chemistry and urinalysis were performed at weeks 0, 2, 4, 6 and 8. Glomerular filtration rate (GFR) via nuclear scintigraphy and urine protein:creatinine ratio (UPC) were determined at weeks 0 and 8. **Results:** Six cats received three doses of allogeneic MSC culture expanded from cryopreserved adipose without adverse effects. No significant change in serum creatinine, blood urea nitrogen, potassium, phosphorus, GFR by nuclear scintigraphy, UPC or packed cell volume was seen in cats treated with MSCs. Individual changes in GFR were 12%, 8%, 8%, 2%, -13% and -67% in treated cats compared with 16%, 36% and 0% in placebo-treated cats. **Conclusions and relevance:** While administration of MSC culture expanded from cryopreserved adipose was not associated with adverse effects, significant improvement in renal function was not observed immediately after administration. Long-term follow-up is necessary to determine whether MSC administration affects disease progression in cats with CKD.

Publication Type

Journal article.

<113>

Accession Number

20163086994

Author

Vaske, H. H.; Schermerhorn, T.; Grauer, G. F.

Title

Effects of feline hyperthyroidism on kidney function: a review.

Source

Journal of Feline Medicine and Surgery; 2016. 18(2):55-59. 45 ref.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

Chronic kidney disease and hyperthyroidism are two commonly diagnosed conditions in the geriatric feline population, and are often seen concurrently. Management of both diseases is recommended; however, the physiologic implications of both diseases must be understood to ensure the most favorable outcome for each patient. This report reviews the complex interplay between hyperthyroidism and kidney function, as well as the effects of hyperthyroid therapy on kidney function.

Publication Type

Journal article.

<114>

Accession Number

20163058883

Author

Chacar, F. C.

Title

Evaluation of urinary albumin, urinary vitamin D-binding protein, urinary retinol-binding protein, and Tamm-Horsfall in dogs with chronic kidney disease. [Portuguese]

Source

Determinacao urinaria das proteinas albumina, ligadas a vitamina D e ao retinol, e de Tamm-Horsfall, em caes com doenca renal cronica; 2015. :128 pp. 69 ref.

Publisher

Faculdade de Medicina Veterinaria e Zootecnia, Universidade de Sao Paulo

Location of Publisher

Sao Paulo

Country of Publication

Brazil

Abstract

Vitamin D-binding protein (VDBP) is the main carrier of the Vitamin D metabolites and its presence in urine is associated with the development of tubulointerstitial injury, according to previous studies in rats and humans. Retinol-binding protein (RBP) carries retinol from liver to peripheral tissues, and its urinary detection is also associated with tubulointerstitial injury. Albuminuria suggests glomerular lesion, but also may indicate tubular dysfunction (impairment of reabsorption). The presence of Tamm-Horsfall protein (THP) is expected in the urine of clinically normal people and animals, because it is synthesized exclusively by the epithelial cells of the distal segment of nephron, and when it is not detected it may indicate distal tubular injury and/or massive nephrons loss. However in dogs, there are few studies about these urinary proteins especially in cases of chronic kidney disease (CKD). The hypothesis of the present study was to investigate that not only urinary protein-to-creatinine ratio (UPC) measurements would be enough to localize properly the injury to a



specific nephron site, but also the evaluation of specific urinary proteins by electrophoresis (SDS-PAGE) and Western blotting could provide information regarding to the presence of glomerular and/or tubular injury; in addition, less excretion of THP, or its absence in urine, could be associated with advanced stages of CKD. The aim of the present study was to evaluate albumin, VDBP, RBP e THP in the urine of 40 CKD dogs, on stages 1 to 4 (IRIS), by using of electrophoresis (SDS-PAGE) and Western blotting. Forty-nine dogs were subdivided into: C group healthy dogs (n=9), E1 group (stage 1; n=10), E2 group (stage 2; n=10), E3 group (stage 3; n=10) e E4 group (stage 4; n=10). The predominance of low molecular weight proteins (MW <60 kDa) was detected in all CKD groups, mainly in E4 group that the mean of UPC was 4.37, and then it would be expected high MW proteins findings (MW >60 kDa). In fact, in E4 group, albumin was immunodetected, however low molecular weight proteins (VDBP and RBP) were also detected and in high intensity. VDBP and RBP were also observed in E3 group (mean UPC=1.51) and 3 to 7 bands of low molecular weight were detected. In the early stages of CKD (E1 and E2 groups), VDBP and RBP were also identified but UPC values were normal (non-proteinuric), which may suggest the role of these proteins as an early marker of renal injury. VDBP and RBP were not detected in healthy dogs. THP was observed in less intensity in the advanced stages of CDK that may suggest bad prognosis. In conclusion, UPC measurement per se was not able to indicate adequately the injury to a specific nephron site (e.g. glomerular and/or tubular), and therefore the additional information of electrophoresis (MW) and Western blotting (VDBP, RBP and THP) testing could allow the identification of the nephron site injured that caused loss (proteinuria) or decrease in urinary proteins.

Publication Type

Thesis.

<115>

Accession Number

20163106404

Author

Grauer, G. F.

Title

Early diagnosis of chronic kidney disease in dogs & cats use of serum creatinine & symmetric dimethylarginine.

Source

Today's Veterinary Practice; 2016. 6(2):68-72. 26 ref.

Publisher

Eastern States Veterinary Association, Inc (NAVCA)

Location of Publisher

Glen Mills

Country of Publication

USA

Abstract

Incorporating evaluation of serum SDMA along with closer monitoring of sCr may facilitate early diagnosis of CKD in dogs and cats. In general, diagnostic results that indicate increased monitoring include: \* sCr concentrations of 1.4 mg/dL or greater in dogs or 1.6 mg/dL or greater in cats \* Serum SDMA concentrations greater than 14 mcg/dL. Longitudinal assessment of these measures almost always provides better data than one-time evaluations. No single laboratory test is perfect; trending laboratory data, with the same test method, tends to improve diagnostic sensitivity.

Publication Type

Journal article.



<116>

Accession Number

20163106403

Author

Cline, M. G.

Title

Nutritional management of chronic kidney disease in cats & dogs.

Source

Today's Veterinary Practice; 2016. 6(2):58-66. 30 ref.

Publisher

Eastern States Veterinary Association, Inc (NAVC)

Location of Publisher

Glen Mills

Country of Publication

USA

Abstract

Nutritional intervention in a cat or dog with CKD can greatly affect morbidity and mortality. Diet selection should be based on a complete nutritional assessment of the patient, including staging the patient's CKD. Supplementation with the omega-3 fatty acids EPA and DHA is recommended if the diet does not provide those nutrients. Patients with a poor or selective appetite may benefit from assisted feeding or consultation with a board-certified veterinary nutritionist for a home-prepared diet formulation.

Publication Type

Journal article.

<117>

Accession Number

20163105681

Author

Constantinescu, R.; Balaci, I. M.; Cucos, C. A.; Codreanu, M. D.

Title

The biology of vascular resistance determination with Doppler ultrasound in canines with chronic renal failure.

Source

Analele Universitatii din Craiova - Biologie, Horticultura, Tehnologia Prelucrarii Produselor Agricole, Ingineria Mediului; 2015. 20:393-400. 8 ref.

Publisher

University of Craiova

Location of Publisher

Craiova

Country of Publication

Romania

Abstract

Organs with a rich arterial blood supply such as kidneys, liver, heart, and brain are more sensitive to blood pressure changes. The kidney is a well-vascularized organ and suitable to be evaluated by Doppler ultrasound, which is a non-invasive technique that can be used to estimate the renal vascular resistance by calculation the resistive index (RI) and pulsatility index (PI). RI was reported to be associated with early hypertensive renal damage and it's also correlated with systemic blood pressure in human patients (Jacob & Polzin 2003). The aim of this paper was to assess renal vascular resistance in dogs with chronic renal failure (CRF) and to investigate the possible relationship between renal RI and PI with systolic blood pressure and biochemical, electrolytes and blood gases parameters in dogs with CRF.

Publication Type

Journal article.

<118>

Accession Number

20163075765

Author

Taylor, S.

Title

Managing feline chronic kidney disease in practice.

Source

Veterinary Times; 2016. 46(9):6-7. 8 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Publication Type

Journal article.

<119>

Accession Number

20163113418

Title

Iron status of cats with chronic kidney disease.

Source

Advances in Small Animal Medicine and Surgery; 2016. 29(3):5-6. 1 ref.

Publisher

Elsevier Inc.

Location of Publisher

Philadelphia

Country of Publication

USA

Publication Type

Journal article.

<120>

Accession Number

20163112213

Author

Brown, C. A.; Elliott, J.; Schmiedt, C. W.; Brown, S. A.

Title

Chronic kidney disease in aged cats: clinical features, morphology, and proposed pathogenesises.

Source

Veterinary Pathology; 2016. 53(2):309-326.

**Publisher**

American College of Veterinary Pathologists Inc.

**Location of Publisher**

Lawrence

**Country of Publication**

USA

**Abstract**

Chronic kidney disease (CKD) is the most common metabolic disease of domesticated cats, with most affected cats being geriatric (>12 years of age). The prevalence of CKD in cats exceeds that observed in dogs, and the frequency of the diagnosis of CKD in cats has increased in recent decades. Typical histologic features include interstitial inflammation, tubular atrophy, and fibrosis with secondary glomerulosclerosis. In contrast to people and dogs, primary glomerulopathies with marked proteinuria are remarkably rare findings in cats. Although a variety of primary renal diseases have been implicated, the disease is idiopathic in most cats. Tubulointerstitial changes, including fibrosis, are present in the early stages of feline CKD and become more severe in advanced disease. A variety of factors - including aging, ischemia, comorbid conditions, phosphorus overload, and routine vaccinations - have been implicated as factors that could contribute to the initiation of this disease in affected cats. Factors that are related to progression of established CKD, which occurs in some but not all cats, include dietary phosphorus intake, magnitude of proteinuria, and anemia. Renal fibrosis, a common histologic feature of aged feline kidneys, interferes with the normal relationship between peritubular capillaries and renal tubules. Experimentally, renal ischemia results in morphologic changes similar to those observed in spontaneous CKD. Renal hypoxia, perhaps episodic, may play a role in the initiation and progression of this disease.

**Publication Type**

Journal article.

<121>

**Accession Number**

20163122085

**Author**

Segev, G.; Naylor, S.; Cowgill, L. D.

**Title**

Hematological and neurological side effects associated with the use of aluminum based phosphate binders in dogs with chronic kidney disease.

**Source**

Israel Journal of Veterinary Medicine; 2016. 71(1):31-38. 26 ref.

**Publisher**

Israel Veterinary Medical Association

**Location of Publisher**

Raanana

**Country of Publication**

Israel

**Abstract**

Hyperphosphatemia and secondary hyperparathyroidism are common in dogs with chronic kidney disease (CKD). It was hypothesized that dogs with CKD managed with aluminum-based phosphate binders accumulate aluminum, and may present clinical signs of toxicity. Fifty two client-owned dogs with CKD were examined in this retrospective study. Dogs diagnosed with CKD that were managed with aluminum based phosphate binders for at least 45 days and had complete blood count available were included, and followed for up to 120 days. Blood samples for aluminum concentration were drawn directly into plastic syringes using a newly placed peripheral intravenous catheter. The mean aluminum concentration for dogs was measured to 0.12±0.13 ppm (range, 0.031-0.52 ppm) (reference range <0.08 ppm). Eighteen dogs were suspected of having aluminum toxicity. The average aluminum daily dose in those dogs was significantly higher compared to dogs for which aluminum toxicity was not suspected (117.4±63.7 vs. 71.5±40.3 mg/kg/day,

P=0.002). Clinical signs suspected to result from aluminum toxicity were ataxia, altered mentation, paraparesis, tetraparesis, and decreased peripheral reflexes, decreased papillary light response and tremor. The most pronounced changes documented in dogs were progressive decrease in mean corpuscular volume and hemoglobin concentration. Both were found as reliable predictors of aluminum accumulation as well as sensitive and specific markers. It was concluded that dogs with CKD accumulate aluminum and are prone to aluminum toxicity. Progressive decrease in MCV and MCH should alert clinicians to aluminum accumulation. Dogs with advanced CKD managed with high aluminum doses should be screened routinely for aluminum accumulation.

Publication Type

Journal article.

<122>

Accession Number

20163095264

Author

Taylor, S.

Title

Managing feline chronic kidney disease: Part 2 - Complications.

Source

Veterinary Times; 2016. 46(11):16, 18. 9 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Publication Type

Journal article.

<123>

Accession Number

20163095211

Author

Wrzesniewska, K.; Madany, J.

Title

Clinical benefits of IRIS staging system in chronic kidney diseases in dogs and cats. [Polish]

Source

Zycie Weterynaryjne; 2016. 91(3):183-185. 21 ref.

Publisher

Krajowa Izba Lekarsko Weterynaryjna

Location of Publisher

Warszawa

Country of Publication

Poland

Abstract

The aim of this article is to present a staging system that allows a comprehensive methodology to clinical approach with short-term or long-term prognosis for dogs and cats to classify chronic kidney diseases (CKD). Clinical aspects are stated by the IRIS (International Renal Interest Society), classification. This classification

system uses a main staging system which is based on creatinine level and two sub-staging systems basing on UPC ratio (urine protein to urine creatinine ratio), and on blood pressure. The diagnostic key is blood creatinine concentration measured in plasma or serum, which also depends on age, sex, diet, body condition and dehydration. Creatinine level should be stable, reevaluated and rechecked several times during the treatment in order to confirm CKD diagnosis. More correct diagnosis and more effective therapeutical protocols are stated by 2 sub-stagings. First sub-staging is urine protein to urine creatinine ratio (UPC ratio) - the most practical and standardized one. Second sub-staging is blood pressure measurement. Undiagnosed and untreated hypertension may affect brain, heart, eyes and may also promote further renal injury. Earlier diagnosis, correct algorithms and treatment would benefit veterinarian by improvement the relationships with clients as well as by application of evidence-based treatment.

Publication Type

Journal article.

<124>

Accession Number

20163130391

Author

Sparkes, A. H.; Caney, S.; Chalhoub, S.; Elliott, J.; Finch, N.; Isuru Gajanayake; Langston, C.; Lefebvre, H. P.; White, J.; Quimby, J.

Title

ISFM Consensus Guidelines on the diagnosis and management of feline chronic kidney disease.

Source

Journal of Feline Medicine and Surgery; 2016. 18(3):219-239. 189 ref.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

Practical relevance: Chronic kidney disease (CKD) is one of the most commonly diagnosed diseases in older cats. In most cats, CKD is also a progressive disease and can be accompanied by a wide range of clinical and clinicopathological changes. These ISFM Consensus Guidelines have been developed by an independent panel of clinicians and academics to provide practical advice on the diagnosis and management of this complex disease. Clinical challenges: Although CKD is a common clinical problem in cats, the manifestations of disease vary between individuals. Thus there is a need for careful and repeat evaluation of cats with CKD and adjustment of therapy according to individual needs. In addition to addressing problems arising from CKD and improving quality of life (QoL) for the patient, therapy may also target slowing the underlying progression of disease and hence prolonging life. While maintaining QoL is of paramount importance in our patients, this can be challenging when multiple therapies are indicated. In some cases it is necessary to prioritise therapy, given an understanding of what is likely to most benefit the individual patient. Evidence base: In preparing these Guidelines, the Panel has carefully reviewed the existing published literature, and has also graded the quality of evidence for different interventions to help to provide practical recommendations on the therapeutic options for feline CKD. This is a field of veterinary medicine that has benefited from some excellent published clinical research and further research findings will undoubtedly modify the recommendations contained in these Guidelines in the future.

Publication Type

Journal article.

<125>

Accession Number

20163128548

Author

Williams, T. L.; Archer, J.

Title

Evaluation of urinary biomarkers for azotaemic chronic kidney disease in cats.

Source

Journal of Small Animal Practice; 2016. 57(3):122-129. 22 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Objectives: Evaluation of urine albumin:creatinine ratio, urine cystatin C:creatinine ratio, urine protein:creatinine ratio and urine specific gravity as screening tests for azotaemic chronic kidney disease in cats. Methods: A group of cats over eight years old were defined as either (i) healthy non-azotaemic (n=40) if they had serum creatinine concentration <153 micro mol/L and no history of apparent disease or (2) having azotaemic chronic kidney disease (n=12) if they had serum creatinine concentration >153 micro mol/L with urine specific gravity <1.035. Urine albumin:creatinine ratio, urine cystatin C:creatinine ratio, urine protein:creatinine ratio and urine specific gravity were compared between the two groups. Results: Urine cystatin C:creatinine ratio was significantly lower in cats with azotaemic chronic kidney disease than that in healthy cats [3.7 (1.4, 4.3) x 10<sup>-6</sup> versus 13.9 (6.3, 24.7) x 10<sup>-6</sup>; P=0.011]. Urine specific gravity was also significantly lower in the azotaemic chronic kidney disease group than that in the healthy group [1.022 (1.017, 1.028) versus 1.043 (1.034, >1.050); P<0.001]. Urine albumin:creatinine ratio and urine protein:creatinine ratio were not significantly different between the groups (P=0.075 and P=0.965, respectively). Clinical Significance: Urine cystatin C:creatinine ratio and urine specific gravity were significantly lower in cats with azotaemic chronic kidney disease than that in healthy cats; however, neither biomarker was an adequate sole screening test for azotaemic chronic kidney disease.

Publication Type

Journal article.

<126>

Accession Number

20163137457

Author

Hokamp, J. A.; Cianciolo, R. E.; Boggess, M.; Lees, G. E.; Benali, S. L.; Kovarsky, M.; Nabity, M. B.

Title

Correlation of urine and serum biomarkers with renal damage and survival in dogs with naturally occurring proteinuric chronic kidney disease.

Source

Journal of Veterinary Internal Medicine; 2016. 30(2):591-601. 34 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

**Background:** Urine protein loss is common in dogs with chronic kidney disease (CKD).  
**Hypothesis/Objectives:** To evaluate new biomarkers of glomerular and tubulointerstitial (TI) damage compared with histology and as survival indicators in dogs with naturally occurring, proteinuric CKD.  
**Animals:** One hundred and eighty dogs with naturally occurring kidney disease. **Methods:** Retrospective study using urine, serum, and renal biopsies from dogs with kidney disease, 91% of which had proteinuric CKD. Biomarkers were evaluated and correlated with pathologic renal damage, and significant associations, sensitivities, and specificities of biomarkers for renal disease type were determined. **Results:** Fractional excretions of immunoglobulin M (IgM\_FE) and immunoglobulin G (IgG\_FE) correlated most strongly with glomerular damage based on light microscopy ( $r=0.58$  and  $0.56$ , respectively;  $P<.01$ ). Serum creatinine (SCr) correlated most strongly with TI damage ( $r=0.70$ ,  $P<.01$ ). Urine IgM/creatinine and urine NAG/creatinine had the highest sensitivity (75%) and specificity (78%) for detection of immune complex-mediated glomerulonephritis. Although individually most biomarkers were significantly associated with decreased survival time ( $P<.05$ ), in a multivariate analysis, SCr, IgM\_FE, and glomerular damage based on transmission electron microscopy (TEM) were the only biomarkers significantly associated with survival time (SCr:  $P=.001$ ; IgM\_FE:  $P=.008$ ; TEM:  $P=.017$ ). **Conclusions and Clinical Importance:** Novel urine biomarkers and FEs are useful for detection of glomerular and TI damage in dogs with proteinuric CKD and might predict specific disease types and survival.

**Publication Type**  
 Journal article.

<127>

**Accession Number**  
 20163111334

**Author**  
 Gillet, C.; Mallem, Y.

**Title**  
 Use of telmisartan in cats with chronic kidney disease. [French]

**Source**  
 Le Nouveau Praticien Veterinaire Canine - Feline; 2015. 13(61):65-68. 12 ref.

**Publisher**  
 NEVA Europarc  
**Location of Publisher**  
 Creteil

**Country of Publication**  
 France

**Abstract**

This article discusses the pharmacokinetics, pharmacodynamics, indications, efficacy, dosages and potential adverse effects of Telmisartan as a new antihypertensive molecule in managing cats with chronic renal disorder. The advantages and benefits of Telmisartan as an alternative antihypertensive drugs for cats with chronic kidney disease are highlighted.

**Publication Type**  
 Journal article.

<128>

**Accession Number**  
 20153437920

**Author**  
 Beynen, A. C.



Title

Kidney diet for cat and dog. [Dutch]

Source

Dier en Arts; 2015. 30(12):400-401, 403.

Publisher

Uitgeverij Libre B.V.

Location of Publisher

Leeuwarden

Country of Publication

Netherlands

Abstract

Chronic kidney failure affects approximately 10% of dogs and 30% of cats older than 10 years. Guidelines are tabulated for specific cat and dog foods. Special attention is paid to levels of P, proteins, EPA, and K.

Publication Type

Journal article.

<129>

Accession Number

20163164027

Author

Santos, K. K. F. dos; Paulino Junior, D.; Veado, J. C. C.; Pereira, J. de A.

Title

Systolic blood pressure and heart rate in cats with chronic kidney disease undergoing chemical restraint during hemodialysis.

Source

Semina: Ciencias Agrarias (Londrina); 2016. 37(2):877-883. 16 ref.

Publisher

Universidade Estadual de Londrina

Location of Publisher

Londrina

Country of Publication

Brazil

Abstract

Dialysis is one of the used methods for treatment of Acute Renal Injury (ARI) and Chronic Kidney Disease (CKD) to replace the function of the kidneys when refers to blood depuration. Hemodialysis removes toxins accumulated in the body directly from the blood, being a useful alternative therapy for dogs and cats with CKD in advanced stages. Because of the difficulty on handling the patient feline, this procedure requires sedation. However, few studies have been conducted to assess the safety of anesthesia in dogs and cats with CKD undergoing dialysis. The present study aimed to evaluate two different protocols of chemical restraint in cats with CKD and the effect of these on systolic blood pressure (SBP) and heart rate (HR), since the procedure of extracorporeal circulation leads the patient to a hypotensive frame. Twelve adult cats were used, with an average weight of 4 kg, CKD, underwent two anesthetic protocols: Group GP (n=6) using propofol, and group GCM (n=6) using ketamine-midazolam association for the implantation procedure of central venous catheter (CVC) and hemodialysis. Cats in GP as well as the GCM group showed statistical difference in the change in SBP and HR only from baseline compared to the other time points evaluated. The two protocols maintained SBP and HR within physiological values.

Publication Type

Journal article.

<130>

Accession Number

20163174967

Author

Carney, H. C.; Ward, C. R.; Bailey, S. J.; Bruyette, D.; Dennis, S.; Ferguson, D.; Hinc, A.; Rucinsky, A. R.

Title

2016 AAFP guidelines for the management of feline hyperthyroidism.

Source

Journal of Feline Medicine and Surgery; 2016. 18(5):400-416. 99 ref.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

Clinical context: Since 1979 and 1980 when the first reports of clinical feline hyperthyroidism (FHT) appeared in the literature, our understanding of the disease has evolved tremendously. Initially, FHT was a disease that only referral clinicians treated. Now it is a disease that primary clinicians routinely manage. Inclusion of the measurement of total thyroxine concentration in senior wellness panels, as well as in diagnostic work-ups for sick cats, now enables diagnosis of the condition long before the cat becomes the classic scrawny, unkempt, agitated patient with a bulge in its neck. However, earlier recognition of the problem has given rise to several related questions: how to recognize the health significance of the early presentations of the disease; how early to treat the disease; whether to treat FHT when comorbid conditions are present; and how to manage comorbid conditions such as chronic kidney disease and cardiac disease with treatment of FHT. The 2016 AAFP Guidelines for the Management of Feline Hyperthyroidism (hereafter referred to as the Guidelines) will shed light on these questions for the general practitioner and suggest when referral may benefit the cat. Scope: The Guidelines explain FHT as a primary disease process with compounding factors, and provide a concise explanation of what we know to be true about the etiology and pathogenesis of the disease. The Guidelines also: \* Distill the current research literature into simple recommendations for testing sequences that will avoid misdiagnosis and separate an FHT diagnosis into six clinical categories with associated management strategies. \*Emphasize the importance of treating all hyperthyroid cats, regardless of comorbidities, and outline the currently available treatments for the disease. \* Explain how to monitor the treated cat to help avoid exacerbating comorbid diseases. \* Dispel some of the myths surrounding certain aspects of FHT and replace them with an evidence-based narrative that veterinarians and their practice teams can apply to feline patients and communicate to their owners. Evidence base: To help ensure better case outcomes, the Guidelines reflect currently available, evidenced-based knowledge. If research is lacking, or if a consensus does not exist, the expert panel of authors has made recommendations based on their extensive, cumulative clinical experience.

Publication Type

Journal article.

<131>

Accession Number

20163181971

Author

Piyarungsri, K.; Pusoonthornthum, R.

Title

Changes in reduced glutathione, oxidized glutathione, and glutathione peroxidase in cats with naturally occurring chronic kidney disease.

Source

Comparative Clinical Pathology; 2016. 25(3):655-662. 41 ref.

Publisher

Springer Science + Business Media

Location of Publisher

London

Country of Publication

UK

Abstract

Chronic kidney disease (CKD) is one of the most common diseases in geriatric cats. The objective of this study was to determine oxidative stress in CKD cats by measuring changes in reduced glutathione (GSH), oxidized glutathione (GSSG), glutathione peroxidase (GPx), and reduced glutathione to oxidized glutathione (GSH/GSSG) ratio in cats with naturally occurring chronic kidney disease (CKD). Thirteen clinically normal client-owned aged-matched cats and 23 naturally occurring CKD cats were included. Completed blood count, blood urea nitrogen, creatinine, GSH, GPx, GSSG, and GSH/GSSG ratio were measured on the first day of diagnosis. The results showed that CKD cats had significantly lower GSH, GPx, and GSH/GSSG ratio levels (2.77+or-0.27 mM, 2.32+or-0.40 nmol/min and 148.26+or-34.19) than the clinically normal client-owned age-matched cats (4.23+or-0.67 mM, 6.68+or-0.79 nmol/min and 312.64+or-76.80). The GSSG in the CKD cats (35.20+or-4.37 micro M) was significantly higher than in the clinically normal client-owned age-matched cats (19.66+or-2.75 micro M). The results indicated that cats with naturally occurring CKD experience oxidative stress.

Publication Type

Journal article.

<132>

Accession Number

20163191152

Author

Grauer, G. F.

Title

Meeting the challenges of chronic kidney disease.

Source

NAVC Clinician's Brief; 2016. (May):unpaginated.

Publisher

Educational Concepts LLC

Location of Publisher

Tulsa

Country of Publication

USA

Publication Type

Journal article.

<133>

Accession Number

20163189821

Author

Hall, J. A.; Yerramilli, M.; Obare, E.; Yerramilli, M.; Almes, K.; Jewell, D. E.

Title

Serum concentrations of symmetric dimethylarginine and creatinine in dogs with naturally occurring chronic kidney disease.

Source

Journal of Veterinary Internal Medicine; 2016. 30(3):794-802. 44 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

Background: Serum concentrations of symmetric dimethylarginine (SDMA) detected chronic kidney disease (CKD) in cats an average of 17.0 months before serum creatinine (Cr) concentrations increased above the reference interval. Objectives: To report on the utility of measuring serum SDMA concentrations in dogs for detection of CKD before diagnosis by measurement of serum Cr. Animals: CKD dogs (n=19) included those persistently azotemic for  $\geq 3$  months (n=5), dogs that were azotemic at the time of death (n=4), and nonazotemic dogs (n=10). CKD dogs were compared with healthy control dogs (n=20). Methods: Retrospective study, whereby serum Cr concentrations were determined by enzymatic colorimetry and serum SDMA concentrations were determined by liquid chromatography-mass spectrometry in dogs with necropsy confirmed CKD. Results: Serum SDMA increased before serum Cr in 17 of 19 dogs (mean, 9.8 months; range, 2.2-27.0 months). Duration of elevations in serum SDMA concentrations before the dog developed azotemia (N=1) or before the dog died (N=1) was not determined. Serum SDMA and Cr concentrations were linearly related ( $r=0.84$ ;  $P<.001$ ). Serum SDMA ( $r=-0.80$ ) and serum Cr ( $r=-0.89$ ) concentrations were significantly related to glomerular filtration rate (both  $P<.001$ ). Conclusion and Clinical Importance: Using serum SDMA as a biomarker for CKD allows earlier detection of kidney dysfunction in dogs than does measurement of serum Cr. Earlier detection might be desirable for initiating renoprotective interventions that slow progression of kidney disease.

Publication Type

Journal article.

<134>

Accession Number

20163188865

Author

Timmons, R. M.; Webb, C. B.

Title

Vitamin E supplementation fails to impact measures of oxidative stress or the anaemia of feline chronic kidney disease: a randomised, double-blinded placebo control study.

Source

Veterinary Medicine and Science; 2016. 2(2):117-124. 29 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Oxford

Country of Publication

UK

Abstract

This study was designed to test the hypothesis that supplementation with vitamin E, an antioxidant, in cats with chronic kidney disease (CKD), would reduce oxidative stress and its impact on RBC membrane fragility, resulting in these cats maintaining a greater packed cell volume (PCV) compared with CKD cats not receiving supplementation. Thirty-six cats with CKD were randomly assigned to receive either daily vitamin E or a placebo for 3 months in a double-blinded study design. History and physical examination, blood

pressure, complete blood count (CBC), PCV, biochemical profile and urinalysis (UA) were determined. Parameters of oxidative stress and osmotic fragility were measured. Cats were administered vitamin E or placebo once daily for 3 months. Cats were then reassessed and the diagnostics were repeated. Twenty-four cats completed the study, 11 in the vitamin E group and 13 in the placebo group. There were no significant differences between the two groups at the start, or upon completion of the study with regard to biochemical parameters, oxidative stress, erythrocyte osmotic fragility or PCV. None of these parameters changed significantly in either group over the treatment period. Daily supplementation with 30 IU of vitamin E did not affect the measures of oxidative stress or the anaemia seen in cats with CKD.

Publication Type

Journal article.

<135>

Accession Number

20163196495

Author

Bueno, C. M.; Rolemberg, D. S.; Kihara, M. T.; Filgueira, F. G. F.; Minto, B. W.; Nardi, A. B. de; Dias, L. G. G.; Moraes, P. C.

Title

Ureterotomy as treatment of ureter calculi in feline - case report. [Portuguese]

Source

Revista Brasileira de Medicina Veterinaria; 2016. 38(1):49-52. 14 ref.

Publisher

Sociedade de Medicina Veterinaria do Estado do Rio de Janeiro

Location of Publisher

Rio de Janeiro

Country of Publication

Brazil

Abstract

The aim of this study was to report a case of ureteral calculi in a cat which was successfully treated with surgical therapy ureterotomy. A 13 years old female cat, with clinical findings of cystitis for three years and presenting apathy, vomiting, reduced appetite, hypodipsia and normality in urination was referred to the Veterinary Hospital of Unesp-FCAV. Laboratory tests were performed (blood count and biochemical), and radiographic examination showed the presence of radiopaque structure in the left ureter, characterizing a partial ureterolithiasis. The animal was submitted to ureterotomy surgery for removal of uroliths. The removed material was sent for laboratory analysis, but could not be identified due to the sample size being insufficient. The patient continued with ureteral dilatation and hydronephrosis after surgery, presenting remission of clinical signs and normality of blood count and biochemical seven days after the operative procedure, occurring a reversal of the signs of chronic kidney disease, because the surgery was performed as soon as it was observed the presence of ureteral calculi. Medical treatment was important to give initial support for the patient, regulating the renal function and preventing serious injury. However, the ureterotomy was essential for the recovery of the patient, since it was observed remission of the clinical signs after the surgery and there were no postoperative complications.

Publication Type

Journal article.

<136>

Accession Number

20163187850

Author

Lefebvre, S.

Title

BARK report: literature review - epidemiology of feline chronic kidney disease.

Source

BARK report: literature review - epidemiology of feline chronic kidney disease; 2011. :12 pp. 47 ref.

Publisher

Banfield Pet Hospital

Location of Publisher

Portland

Country of Publication

USA

Publication Type

Miscellaneous.

<137>

Accession Number

20163172340

Author

Sikorska-Kopylowicz, A.

Title

Telmisartan, angiotensin II receptor antagonist, in chronic renal insufficiency treatment in cats and dogs.

[Polish]

Source

Zycie Weterynaryjne; 2016. 91(5):363-364. 5 ref.

Publisher

Krajowa Izba Lekarsko Weterynaryjna

Location of Publisher

Warszawa

Country of Publication

Poland

Abstract

This article aims at the presentation of a new approach in treating chronic renal insufficiency in dogs and cats. Telmisartan is an angiotensin II receptor antagonist, showing beneficial, particularly pharmacokinetic properties, metabolic effects, the efficacy of antihypertensive monotherapy and combined therapy and also good tolerance. It benefits the endothelial functions by improving renal function during insufficiency. Our research has confirmed that telmisartan should be used in the treatment of renal failure in dogs and cats.

Publication Type

Journal article.

<138>

Accession Number

20163204724

Author

Tipisca, V.; Murino, C.; Cortese, L.; Mennonna, G.; Auletta, L.; Vulpe, V.; Meomartino, L.

Title

Resistive index for kidney evaluation in normal and diseased cats.

Source

Journal of Feline Medicine and Surgery; 2016. 18(6):471-475. 36 ref.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

**Objectives:** The objectives were to determine the resistive index (RI) in normal cats and in cats with various renal diseases, and to evaluate the effect of age on RI. **Methods:** The subjects were cats that had ultrasonography (US) of the urinary tract and RI measurement at our centre between January 2003 and April 2014. Based on clinical evaluation, biochemical and haematological tests, urinalysis and US, the cats were classified as healthy or diseased. RI measurements were made from the interlobar or arcuate arteries. Data were analysed for differences between the right and the left kidney, the two sexes, different age groups in healthy cats, and between healthy and diseased cats. **Results:** A total of 116 cats (68 males, 48 females) were included: 24 healthy and 92 diseased. In the healthy cats, RI (mean+or-SD) differed significantly ( $P=0.02$ ) between the right kidney ( $0.54\pm0.07$ ) and the left kidney ( $0.59\pm0.08$ ). For the left kidney, RI was significantly higher in cats with chronic kidney disease ( $0.73\pm0.12$ ) and acute kidney injury ( $0.72\pm0.08$ ) ( $P=0.0008$ ). For the right kidney, RI was significantly higher in cats with chronic kidney disease ( $0.72\pm0.11$ ), acute kidney injury ( $0.74\pm0.08$ ), polycystic kidney disease ( $0.77\pm0.11$ ) and renal tumour ( $0.74\pm0.001$ ) ( $P<0.0001$ ). There was no significant effect on RI value in either kidney in terms of age or sex. **Conclusions and relevance:** RI could be considered a valuable diagnostic tool in cats, useful in the differential diagnosis of diffuse renal diseases. While it does not change with the age of the cat, ultrasonographers should be aware that RI may differ between the two kidneys.

Publication Type

Journal article.

<139>

Accession Number

20163219636

Author

Hall, J. A.; MacLeay, J.; Yerramilli, M.; Obare, E.; Yerramilli, M.; Schiefelbein, H.; Paetau-Robinson, I.; Jewell, D. E.

Title

Positive impact of nutritional interventions on serum symmetric dimethylarginine and creatinine concentrations in client-owned geriatric cats.

Source

PLoS ONE; 2016. 11(4):e0153654. 30 ref.

Publisher

Public Library of Sciences (PLoS)

Location of Publisher

San Francisco

Country of Publication

USA

Abstract

A prospective study was conducted in client-owned geriatric cats to evaluate the short-term effects of a test food on serum symmetric dimethylarginine (SDMA) and creatinine (Cr) concentrations. Test food contained functional lipids (fish oil), antioxidants (vitamins C and E), L-carnitine, botanicals (vegetables), highly bioavailable protein, and amino acid supplements. Cats ( $n=80$ ) were fed either test food or owner's-choice foods (non-nutritionally controlled cohort). Cats were included based on age ( $\geq 9$  years), indoor only, neutered, and free of chronic disease. At baseline, all cats had serum Cr concentrations within the reference interval. Renal function biomarkers and urinalysis results at baseline and after consuming test food or



owner's-choice foods for 3 and 6 months were evaluated. Cats consuming test food showed significant decreases in serum Cr and BUN concentrations across time. Overall, cats consuming owner's-choice foods showed significant increases in serum SDMA concentrations at 3 and 6 months compared with baseline ( $P \leq 0.05$ ), whereas in cats consuming test food serum SDMA concentrations did not change. At baseline or during the 6-month feeding trial, 23 (28.8%) cats had increased serum SDMA, but normal serum Cr consistent with IRIS Stage 1 chronic kidney disease. This included 6 cats fed test food and 17 cats fed owner's-choice foods. In the 6 cats fed test food, serum SDMA decreased in 3 cats and remained stable in 1 cat, whereas in the 17 cats fed owner's-choice foods, serum SDMA increased in 13 cats and decreased or remained stable in 4 cats. The increase in serum SDMA concentration was significant ( $P = 0.02$ ) only for cats fed owner's-choice foods. These results suggest that nonazotemic cats with elevated serum SDMA (early renal insufficiency) when fed a food designed to promote healthy aging are more likely to demonstrate stable renal function compared with cats fed owner's-choice foods. Cats fed owner's-choice foods were more likely to demonstrate progressive renal insufficiency.

Publication Type

Journal article.

<140>

Accession Number

20163219635

Author

Hall, J. A.; MacLeay, J.; Yerramilli, M.; Obare, E.; Yerramilli, M.; Schiefelbein, H.; Paetau-Robinson, I.; Jewell, D. E.

Title

Positive impact of nutritional interventions on serum symmetric dimethylarginine and creatinine concentrations in client-owned geriatric dogs.

Source

PLoS ONE; 2016. 11(4):e0153653. 40 ref.

Publisher

Public Library of Sciences (PLoS)

Location of Publisher

San Francisco

Country of Publication

USA

Abstract

A prospective study was conducted in client-owned geriatric dogs to evaluate the short-term effects of a test food on serum symmetric dimethylarginine (SDMA) and creatinine (Cr) concentrations. Test food contained functional lipids (fish oil), antioxidants (lipoic acid, vitamins C and E), L-carnitine, botanicals (fruits and vegetables), controlled sodium concentration, and high quality protein sources (high bioavailability and an ideal amino acid composition). Dogs ( $n=210$ ) were fed either test food or owner's-choice foods (non-nutritionally controlled cohort). Dogs were included based on age and body weight: small (6.8 to 11.4 kg) and medium dogs (11.5 to 22.7 kg) were  $\geq 9$  years, whereas dogs  $>22.7$  kg were  $\geq 7$  years at baseline. At baseline, all dogs had to have serum Cr concentrations within the reference interval and be free of chronic disease. Renal function biomarkers and urinalysis results at baseline, and after consuming test food or owner's-choice foods for 3 and 6 months, were evaluated. Only dogs consuming test food showed significant decreases in serum SDMA and Cr concentrations (both  $P \leq 0.05$ ) across time. At baseline or during the 6-month feeding trial, 18 dogs (8.6%) had increased serum SDMA, but normal serum Cr, consistent with IRIS Stage 1 chronic kidney disease. This included 9 dogs fed test food and 9 dogs fed owner's-choice foods. Compared with baseline, after feeding 9 dogs test food for 6 months, serum SDMA decreased in 8 dogs and increased in 1 dog. After feeding 9 dogs owner's-choice foods for 6 months, serum SDMA decreased in 4 dogs and increased in 4 dogs (remained stable in 1 dog). The decreases in serum SDMA and Cr concentrations were significant (both  $P = 0.03$ ) only for dogs fed test food. These results suggest that nonazotemic dogs with elevated serum SDMA (early renal insufficiency) when fed a test food designed to

promote healthy aging are more likely to demonstrate improved renal function compared with dogs fed owner's-choice foods.

Publication Type  
Journal article.

<141>

Accession Number  
20163195972

Author  
Sent, U.; Gossl, R.; Elliott, J.; Syme, H.; Zimmering, T.

Title  
Comparison of efficacy of long-term oral treatment with telmisartan and benazepril in cats with chronic kidney disease. [German]

Source  
Kleintierpraxis; 2016. 61(5):245-257. 40 ref.

Publisher  
Verlag M. & H, Schaper Gmbh

Location of Publisher  
Hannover

Country of Publication  
Germany

Abstract

Background: The efficacy and benefits of telmisartan in cats with chronic kidney disease (CKD) have not previously been reported. Hypothesis: Long-term treatment of cats with CKD using telmisartan decreases urine protein-to-creatinine ratio (UP/C) similar to benazepril. Animals: Two-hundred and twenty-four client-owned adult cats with CKD. Methods: Prospective, multicenter, controlled, randomized, parallel group, blinded clinical trial with noninferiority design. Cats were allocated in a 1:1 ratio to either telmisartan (1 mg/kg; n=112) or benazepril (0.5-1.0 mg/kg; n=112) PO q24 h. The primary endpoint was prospectively defined as the change in proteinuria (benazepril/telmisartan) based on a log transformed weighted average of UP/C change from baseline (AUC 0 -> t/t) as a percentage compared using a confidence interval (CI) approach. Changes of UP/C from baseline were assessed on all study days and corrected for multiple comparisons. Results: Telmisartan proved noninferior to benazepril in controlling proteinuria (CI, -0.035 to 0.268). At Day 180, UP/C compared to baseline in the telmisartan group was significantly lower (-0.05+or-0.31; P=.016), whereas in the benazepril group the change (-0.02+or-0.48) was not statistically significant (P=.136). Similar results were obtained at all assessment points with significant decrease in UP/C occurring with telmisartan but not benazepril. Conclusion and Clinical Importance: Both telmisartan and benazepril were well tolerated and safe. Telmisartan proved to be noninferior to benazepril and significantly decreased proteinuria relative to baseline at all assessment points whereas benazepril did not.

Publication Type  
Journal article.

<142>

Accession Number  
20163232895

Author  
King, J. N.; Panteri, A.; Graille, M.; Seewald, W.; Friton, G.; Desevaux, C.

Title  
Effect of benazepril, robenacoxib and their combination on glomerular filtration rate in cats.

Source

BMC Veterinary Research; 2016. 12(124):(23 June 2016). 43 ref.

Publisher

BioMed Central Ltd

Location of Publisher

London

Country of Publication

UK

Abstract

Background: Combined use of angiotensin-converting enzyme inhibitors and nonsteroidal anti-inflammatory drugs may induce acute kidney injury in humans, especially when combined with diuretics. The objective of this investigation was to evaluate the effects of benazepril, robenacoxib and their combination in healthy cats. In each of two studies (study 1 followed by study 2), 32 healthy cats were randomised to one of four groups (n=4 male and 4 female cats per group) in a parallel-group design. The groups received orally once daily for 7 days either placebo (control group), benazepril, robenacoxib or benazepril plus robenacoxib. In study 2, all groups received in addition 0.5 mg/kg furosemide twice daily by subcutaneous injection for 7 days. Results: Benazepril, robenacoxib and their combination were well tolerated as evidenced from lack of clinical signs and no negative effects on body weight, feed consumption and clinical chemistry, haematology and urinalysis variables. The primary endpoint of the study was the glomerular filtration rate (GFR), which was estimated from the plasma clearance of iohexol. In the absence of furosemide, GFR was significantly higher in cats receiving the combination of benazepril plus robenacoxib compared to the other three groups, and was also significantly higher in females receiving only benazepril compared to the control. Administration of furosemide induced diuresis, reduced GFR and activated the renin-aldosterone-angiotensin system, evidenced from increased plasma renin activity and plasma aldosterone concentrations. Compared to the control group in cats treated with furosemide, GFR was increased by benazepril (females only) but decreased by robenacoxib (males only). Benazepril, robenacoxib and their combination significantly inhibited the increase in plasma aldosterone induced by furosemide. Conclusions: The combination of benazepril and robenacoxib was well tolerated and either increased or had a neutral effect on GFR in healthy cats without or with concomitant furosemide. The combination of benazepril and robenacoxib reduced plasma aldosterone concentrations increased by furosemide. It is recommended to test the efficacy and safety of the combined use of benazepril and robenacoxib in cats with clinical disease, notably proteinuric chronic kidney disease.

Publication Type

Journal article.

<143>

Accession Number

20163204215

Author

Chervier, C.

Title

Chronic kidney disease in older animals. [Italian]

Source

Summa, Animali da Compagnia; 2016. 33(4):69-77. 9 ref.

Publisher

Point Veterinaire Italie s.r.l.

Location of Publisher

Milano

Country of Publication

Italy

Abstract

Chronic kidney disease is common in older animals. The main cause is chronic interstitial nephritis, but other conditions may be diagnosed. For each animal, it is important to check for complications of renal

dysfunction and an etiologic diagnosis. Blood tests, urinalysis, measurement of systemic blood pressure, medical imaging, even kidney cytology or biopsies are needed. Several biological parameters are used to provide a precise prognosis in dogs and cats. A specific diet is essential because it reduces the frequency of uraemic crises and reduces mortality. Complications are managed therapeutically.

Publication Type  
Journal article.

<144>

Accession Number  
20163240002

Author  
Fitzpatrick, R. L.; Wittenburg, L. A.; Hansen, R. J.; Gustafson, D. L.; Quimby, J. M.

Title  
Limited sampling pharmacokinetics of subcutaneous ondansetron in healthy geriatric cats, cats with chronic kidney disease, and cats with liver disease.

Source  
Journal of Veterinary Pharmacology and Therapeutics; 2016. 39(4):350-355. 9 ref.

Publisher  
Wiley-Blackwell  
Location of Publisher  
Oxford  
Country of Publication  
UK

Abstract

Ondansetron, a 5-HT<sub>3</sub> receptor antagonist, is an effective anti-emetic in cats. The purpose of this study was to compare pharmacokinetics of subcutaneous (SQ) ondansetron in healthy geriatric cats to cats with chronic kidney disease (CKD) or liver disease using a limited sampling strategy. 60 cats participated; 20 per group. Blood was drawn 30 and 120 min following one 2 mg (mean 0.49 mg/kg, range 0.27-1.05 mg/kg) SQ dose of ondansetron. Ondansetron concentrations were measured by liquid chromatography coupled to tandem mass spectrometry. Drug exposure represented as area under the curve (AUC) was predicted using a limited sampling approach based on multiple linear regression analysis from previous full sampling studies, and clearance (CL/F) estimated using noncompartmental methods. Kruskal-Wallis ANOVA was used to compare parameters between groups. Mean AUC (ng/mL.h) of subcutaneous ondansetron was 301.4 (geriatric), 415.2 (CKD), and 587.0 (liver). CL/F (L/h/kg) of SQ ondansetron was 1.157 (geriatric), 0.967 (CKD), and 0.795 (liver). AUC was significantly higher in liver and CKD cats when compared to geriatric cats ( $P < 0.05$ ). CL/F in liver cats was significantly decreased ( $P < 0.05$ ) compared to geriatric cats. In age-matched subset analysis, AUC and CL/F in liver cats remained significantly different from geriatric cats.

Publication Type  
Journal article.

<145>

Accession Number  
20163267986

Author  
Saraiva, F.; Kogika, M. M.; Reche Junior, A.; Freitas, M. F. de; Lorigados, C. A. B.; Pinto, A. C. B. C. F.

Title  
Renal ultrasonographic color doppler evaluation in cats with chronic kidney disease.

Source

39th World Small Animal Veterinary Association Congress, Cape Town, South Africa, 16-19 September 2014. Proceedings book; 2014. :822.

Publisher

World Small Animal Veterinary Association

Location of Publisher

Cape Town

Country of Publication

South Africa

Publication Type

Conference paper.

<146>

Accession Number

20163267849

Author

Merwe, L. van der

Title

Medical and nutritional management of chronic kidney disease.

Source

39th World Small Animal Veterinary Association Congress, Cape Town, South Africa, 16-19 September 2014. Proceedings book; 2014. :458-459. 3 ref.

Publisher

World Small Animal Veterinary Association

Location of Publisher

Cape Town

Country of Publication

South Africa

Publication Type

Conference paper.

<147>

Accession Number

20163267727

Author

Villaverde, C.

Title

Medical and nutritional management of chronic kidney disease.

Source

39th World Small Animal Veterinary Association Congress, Cape Town, South Africa, 16-19 September 2014. Proceedings book; 2014. :122-123. 4 ref.

Publisher

World Small Animal Veterinary Association

Location of Publisher

Cape Town

Country of Publication

South Africa

Publication Type

Conference paper.

<148>

Accession Number

20163272641

Author

Williams, T. L.; Dillon, H.; Elliott, J.; Syme, H. M.; Archer, J.

Title

Serum cystatin C concentrations in cats with hyperthyroidism and chronic kidney disease.

Source

Journal of Veterinary Internal Medicine; 2016. 30(4):1083-1089. 25 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

Background: Currently, no test can accurately predict the development of azotemia after treatment of hyperthyroidism. Serum cystatin C concentrations (sCysC) might be less influenced by changes in body muscle mass and so better indicate the presence of concurrent chronic kidney disease (CKD) in hyperthyroidism. Hypotheses: sCysC will be higher in hyperthyroid cats that develop azotemia compared with hyperthyroid cats that remain nonazotemic after treatment; sCysC will be higher in nonhyperthyroid cats with azotemic CKD than healthy older cats and, sCysC will decrease after treatment of hyperthyroidism. Animals: Ninety-one cats treated in first opinion practice. Methods: Case-control study. sCysC were compared between hyperthyroid cats which developed azotemia within 4 months of successful treatment of hyperthyroidism (pre-azotemic group) and hyperthyroid cats which remained nonazotemic after treatment (nonazotemic group), and between nonhyperthyroid cats with azotemic CKD and healthy older cats. sCysC were also compared between hyperthyroid cats before treatment and at time of establishment of euthyroidism. Data are presented as median [25th, 75th percentile]. Results: Baseline sCysC were not different between the pre-azotemic and nonazotemic groups (1.9 [1.4, 2.3] mg/L versus 1.5 [1.1, 2.2] mg/L, respectively;  $P=.22$ ). sCysC in nonhyperthyroid cats with azotemic CKD and healthy older cats were not significantly different (1.5 [1.0, 1.9] mg/L versus 1.2 [0.8, 1.4] mg/L, respectively;  $P=.16$ ). sCysC did not change significantly after treatment of hyperthyroidism (pretreatment 1.8 [1.2, 2.3] mg/L, after treatment 1.6 [1.1, 2.4] mg/L;  $P=.82$ ). Conclusions and Clinical Importance: sCysC do not appear to be a reliable marker of renal function in hyperthyroid cats.

Publication Type

Journal article.

<149>

Accession Number

20163272640

Author

Ghys, L. F. E.; Paepe, D.; Lefebvre, H. P.; Reynolds, B. S.; Croubels, S.; Meyer, E.; Delanghe, J. R.; Daminet, S.

Title

Evaluation of cystatin C for the detection of chronic kidney disease in cats.

Source

Journal of Veterinary Internal Medicine; 2016. 30(4):1074-1082. 50 ref.

Publisher  
Wiley-Blackwell  
Location of Publisher  
Boston  
Country of Publication  
USA

#### Abstract

Background: Serum cystatin C (sCysC) and urinary cystatin C (uCysC) are potential biomarkers for early detection of chronic kidney disease (CKD) in cats. An in-depth clinical validation is required. Objectives: To evaluate CysC as a marker for CKD in cats and to compare assay performance of the turbidimetric assay (PETIA) with the previously validated nephelometric assay (PENIA). Animals: Ninety cats were included: 49 CKD and 41 healthy cats. Methods: Serum CysC and uCysC concentrations were prospectively evaluated in cats with CKD and healthy cats. Based on plasma exo-iohexol clearance test (PexICT), sCysC was evaluated to distinguish normal, borderline, and low GFR. Sensitivity and specificity to detect PexICT <1.7 mL/min/kg were calculated. Serum CysC results of PENIA and PETIA were correlated with GFR. Statistical analysis was performed using general linear modeling. Results: Cats with CKD had significantly higher mean $\pm$ or-SD sCysC (1.4 $\pm$ or-0.5 mg/L) ( $P<.001$ ) and uCysC/urinary creatinine (uCr) (291 $\pm$ or-411 mg/mol) ( $P<.001$ ) compared to healthy cats (sCysC 1.0 $\pm$ or-0.3 and uCysC/uCr 0.32 $\pm$ or-0.97). UCysC was detected in 35/49 CKD cats. R<sup>2</sup> values between GFR and sCysC or sCr were 0.39 and 0.71, respectively (sCysC or sCr= micro +GFR+ epsilon ). Sensitivity and specificity were 22 and 100% for sCysC and 83 and 93% for sCr. Serum CysC could not distinguish healthy from CKD cats, nor normal from borderline or low GFR, in contrast with sCr. Conclusion: Serum CysC is not a reliable marker of reduced GFR in cats and uCysC could not be detected in all CKD cats.

Publication Type  
Journal article.

<150>

Accession Number  
20163283041  
Author  
Bozec, A. le  
Title  
Improving diet palatability for cats with CKD.  
Source  
Veterinary Focus; 2016. 26(2):23-24. 11 ref.  
Publisher  
Royal Canin Ltd (UK and Ireland)  
Location of Publisher  
Castle Cary  
Country of Publication  
UK

#### Abstract

The importance of proper formulation and palatability of diets for cats with chronic kidney disease are described.

Publication Type  
Journal article.

<151>



Accession Number

20163282358

Author

Lawson, J. S.; Syme, H. M.; Wheeler-Jones, C. P. D.; Elliott, J.

Title

Urinary active transforming growth factor beta in feline chronic kidney disease.

Source

Veterinary Journal; 2016. 214:1-6. 37 ref.

Publisher

Elsevier Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

The cytokine transforming growth factor beta 1 (TGF- beta 1) has been widely implicated in the development and progression of renal fibrosis in chronic kidney disease (CKD) in humans and in experimental models. The aims of this study were to assess the association between urinary active TGF- beta 1 and (a) development of CKD in a cross-sectional study, (b) deterioration of renal function over 1 year in a longitudinal study, and (c) renal histopathological parameters in cats. A human active TGF- beta 1 ELISA was validated for use in feline urine. Cross-sectional analysis revealed no significant difference in urinary active TGF- beta 1:creatinine ratio (aTGF- beta 1:UCr) between groups with differing renal function. Longitudinally, non-azotaemic cats that developed CKD demonstrated a significant ( $P=0.028$ ) increase in aTGF- beta 1:UCr approximately 6 months before the development of azotaemia, which remained elevated ( $P=0.046$ ) at diagnosis (approximately 12 months prior, 8.4 pg/mg; approximately 6 months prior, 22.2 pg/mg; at CKD diagnosis, 24.6 pg/mg). In the histopathology study, aTGF- beta 1:UCr was significantly higher in cats with moderate ( $P=0.02$ ) and diffuse ( $P=0.005$ ) renal fibrosis than in cats without fibrosis. Cats with moderate renal inflammation had significantly higher urinary active aTGF- beta 1 concentrations than cats with mild ( $P=0.035$ ) or no inflammatory change ( $P=0.004$ ). The parameter aTGF- beta 1:UCr was independently associated with Log urine protein:creatinine ratio in a multivariable analysis of clinicopathological parameters and interstitial fibrosis score in a multivariable analysis of histopathological features. These results suggest that urinary aTGF- beta 1 reflects the severity of renal pathology. Increases in urinary aTGF- beta 1 followed longitudinally in individual cats may indicate the development of CKD.

Publication Type

Journal article.

<152>

Accession Number

20163280612

Author

Davies, M.

Title

Veterinary clinical nutrition: success stories: an overview.

Source

Proceedings of the Nutrition Society; 2016. 75(3):392-397. 15 ref.

Publisher

Cambridge University Press

Location of Publisher

Cambridge

Country of Publication

UK

Abstract

In this overview of success stories in veterinary clinical nutrition topics in cats and dogs reviewed include the dietary management of chronic kidney disease, dissolution of urinary tract uroliths by dietary modification, the recognition that taurine and L-carnitine deficiencies can cause dilated cardiomyopathy; that clinical signs associated with feline hyperthyroidism (caused by a benign adenoma) can be controlled by a low-iodine diet alone; that dietary management of canine osteoarthritis can also reduce non-steroidal anti-inflammatory drug doses; and that disease-free intervals and survival times can be statistically longer in dogs with Stage III lymphoma managed with diet. As we discover more about nutrigenetics and nutrigenomics, and as we expand our basic understanding of idiopathic diseases we are bound to identify more nutritionally related causes, and be able to develop novel dietary strategies to manage disease processes, including the formulation of diets designed to alter gene expression to obtain beneficial clinical outcomes.

Publication Type

Journal article

Conference paper.

<153>

Accession Number

20163270561

Author

Lawson, J.; Syme, H.; Wheeler-Jones, C.; Elliott, J.

Title

Dietary phosphate restriction does not alter urinary active TGF- beta 1 excretion in cats with chronic kidney disease.

Source

BSAVA Congress 2016 Proceedings, 7-10 April 2016, Birmingham, UK; 2016. :510.

Publisher

British Small Animal Veterinary Association

Location of Publisher

Quedgeley

Country of Publication

UK

Publication Type

Conference paper.

<154>

Accession Number

20163255246

Author

Scherk, M.

Title

Current thoughts and therapeutic implications in feline chronic kidney diseases.

Source

Ontario Veterinary Medical Association Conference Proceedings, 29-31 January 2015, Toronto, Canada; 2015. :65-70.

Publisher

Ontario Veterinary Medical Association (OVMA)

Location of Publisher

Milton

Country of Publication

Canada  
Publication Type  
Conference paper.

<155>

Accession Number  
20163321183

Author  
Sanderson, S.

Title  
Rethinking nutritional management of chronic kidney disease in dogs.

Source  
Proceedings of the NAVC Conference, 16-20 January 2016, Orlando, Florida, USA. Volume 30, Small Animal and Exotics; 2016. :616-618.

Publisher  
North American Veterinary Community (NAVC)

Location of Publisher  
Gainesville

Country of Publication  
USA

Publication Type  
Conference paper.

<156>

Accession Number  
20163321181

Author  
Robertson, J.

Title  
Are you missing CKD in your healthy feline patients?

Source  
Proceedings of the NAVC Conference, 16-20 January 2016, Orlando, Florida, USA. Volume 30, Small Animal and Exotics; 2016. :608-611. 9 ref.

Publisher  
North American Veterinary Community (NAVC)

Location of Publisher  
Gainesville

Country of Publication  
USA

Publication Type  
Conference paper.

<157>

Accession Number

20163321180  
Author  
Robertson, J.  
Title  
Early chronic kidney disease recognition: understanding how it will impact patient management.  
Source  
Proceedings of the NAVC Conference, 16-20 January 2016, Orlando, Florida, USA. Volume 30, Small Animal and Exotics; 2016. :604-607. 10 ref.  
Publisher  
North American Veterinary Community (NAVC)  
Location of Publisher  
Gainesville  
Country of Publication  
USA  
Publication Type  
Conference paper.

<158>  
Accession Number  
20163321179  
Author  
Quimby, J. M.  
Title  
Pyelectasia in CKD cats: pyelonephritis or not?  
Source  
Proceedings of the NAVC Conference, 16-20 January 2016, Orlando, Florida, USA. Volume 30, Small Animal and Exotics; 2016. :602-603. 3 ref.  
Publisher  
North American Veterinary Community (NAVC)  
Location of Publisher  
Gainesville  
Country of Publication  
USA  
Publication Type  
Conference paper.

<159>  
Accession Number  
20163321178  
Author  
Quimby, J. M.  
Title  
Anemia in cats with chronic kidney disease.  
Source  
Proceedings of the NAVC Conference, 16-20 January 2016, Orlando, Florida, USA. Volume 30, Small Animal and Exotics; 2016. :601. 3 ref.  
Publisher  
North American Veterinary Community (NAVC)

Location of Publisher  
Gainesville  
Country of Publication  
USA  
Publication Type  
Conference paper.

<160>

Accession Number  
20163321177

Author  
Quimby, J. M.

Title  
Inappetence in feline chronic kidney disease: exploring etiology and management.

Source  
Proceedings of the NAVC Conference, 16-20 January 2016, Orlando, Florida, USA. Volume 30, Small Animal and Exotics; 2016. :598-600. 10 ref.

Publisher  
North American Veterinary Community (NAVC)

Location of Publisher  
Gainesville

Country of Publication  
USA

Publication Type  
Conference paper.

<161>

Accession Number  
20163321174

Author  
Queau, Y.

Title  
Feeding cats with chronic kidney disease: evidence and challenges.

Source  
Proceedings of the NAVC Conference, 16-20 January 2016, Orlando, Florida, USA. Volume 30, Small Animal and Exotics; 2016. :591-593. 5 ref.

Publisher  
North American Veterinary Community (NAVC)

Location of Publisher  
Gainesville

Country of Publication  
USA

Publication Type  
Conference paper.

<162>

Accession Number

20163315399

Author

Aronson, L. R.

Title

Update on the current status of kidney transplantation for chronic kidney disease in animals. (Special Issue: Chronic kidney disease.)

Source

Veterinary Clinics of North America, Small Animal Practice; 2016. 46(6):1193-1218.

Publisher

Saunders, An Imprint of Elsevier

Location of Publisher

Philadelphia

Country of Publication

USA

Abstract

Kidney transplantation is a novel treatment option for cats suffering from chronic renal failure or acute irreversible renal injury. Improvement in quality of life as well as survival times of cats that have undergone transplantation has helped the technique to gain acceptance as a viable treatment option for this fatal disease. This article reviews information regarding the optimal time for intervention, congenital and acquired conditions that have been successfully treated with transplantation, recipient and donor screening, immunosuppressive therapy, recent advances in anesthetic and surgical management, postoperative monitoring and long-term management, and troubleshooting perioperative and long-term complications.

Publication Type

Journal article.

<163>

Accession Number

20163315398

Author

Palm, C. A.; Culp, W. T. N.

Title

Nephroureteral obstructions: the use of stents and ureteral bypass systems for renal decompression. (Special Issue: Chronic kidney disease.)

Source

Veterinary Clinics of North America, Small Animal Practice; 2016. 46(6):1183-1192.

Publisher

Saunders, An Imprint of Elsevier

Location of Publisher

Philadelphia

Country of Publication

USA

Abstract

Canine and feline nephroureteral obstruction is a complex disease process that can be challenging to treat. Although the availability of various imaging modalities allows for a straightforward diagnosis to be made in most cases, the decision-making process for when a case should be taken to surgery and the optimal treatment modality that should be used for renal decompression remains controversial. In the following discussion, an overview of the perioperative management of cases with nephroureterolithiasis and nephroureteral obstruction is reviewed, with particular focus on the use of renal decompressive procedures, such as ureteral stenting and subcutaneous ureteral bypass system placement.

Publication Type

Journal article.

<164>

Accession Number

20163315394

Author

Vaden, S. L.; Elliott, J.

Title

Management of proteinuria in dogs and cats with chronic kidney disease. (Special Issue: Chronic kidney disease.)

Source

Veterinary Clinics of North America, Small Animal Practice; 2016. 46(6):1115-1130.

Publisher

Saunders, An Imprint of Elsevier

Location of Publisher

Philadelphia

Country of Publication

USA

Abstract

Proteinuria is a negative prognostic indicator for dogs and cats with chronic kidney disease. A normal dog or cat should excrete very little protein and have a urine protein:creatinine ratio that is less than 0.4 or less than 0.2, respectively; persistent proteinuria above this magnitude warrants attention. Administration of angiotensin converting enzyme inhibitors and/or angiotensin receptor blockers, blood pressure control and nutritional modification are considered a standard of care for renal proteinuria. Renal biopsy and administration of immunosuppressive agents should be considered in animals with glomerular proteinuria that have not responded to standard therapy. Targeted patient monitoring is essential when instituting management of proteinuria.

Publication Type

Journal article.

<165>

Accession Number

20163315393

Author

Ross, S.

Title

Utilization of feeding tubes in the management of feline chronic kidney disease. (Special Issue: Chronic kidney disease.)

Source

Veterinary Clinics of North America, Small Animal Practice; 2016. 46(6):1099-1114.

Publisher

Saunders, An Imprint of Elsevier

Location of Publisher

Philadelphia

Country of Publication

USA

Abstract



Esophagostomy feeding tubes are useful, and in many cases essential, for the comprehensive management of cats with moderate to advanced chronic kidney disease (CKD). They should be considered a lifelong therapeutic appliance to facilitate the global management of cats with CKD thus providing improved therapeutic efficacy and quality-of-life. Esophagostomy tubes facilitate the maintenance of adequate hydration and increase owner compliance by facilitating the administration of medications. Finally, feeding tubes provide a means to deliver a stage-appropriate dietary prescription for cats with CKD and maintain an adequate nutritional plane in a patient that otherwise would be subject to chronic wasting.

Publication Type

Journal article.

<166>

Accession Number

20163315392

Author

Larsen, J. A.

Title

Controversies in veterinary nephrology: differing viewpoints: role of dietary protein in the management of feline chronic kidney disease. (Special Issue: Chronic kidney disease.)

Source

Veterinary Clinics of North America, Small Animal Practice; 2016. 46(6):1095-1098.

Publisher

Saunders, An Imprint of Elsevier

Location of Publisher

Philadelphia

Country of Publication

USA

Abstract

The role of diet in management of chronic kidney disease (CKD) is important. There are different interpretations of the current knowledge on this topic. Neither clinical trials involving product testing, nor prospective research investigating dietary influences on cats with induced kidney disease provide guidance on the utility of specific nutritional strategies. Likewise, data derived from other species also has limitations. More research is needed to further our understanding of this topic. However, practical guidance from current knowledge for the management of individual patients can be utilized with success.

Publication Type

Journal article.

<167>

Accession Number

20163315391

Author

Scherk, M. A.; Laflamme, D. P.

Title

Controversies in veterinary nephrology: renal diets are indicated for cats with international renal interest society chronic kidney disease stages 2 to 4: the con view. (Special Issue: Chronic kidney disease.)

Source

Veterinary Clinics of North America, Small Animal Practice; 2016. 46(6):1067-1094.

Publisher

Saunders, An Imprint of Elsevier

Location of Publisher  
Philadelphia  
Country of Publication  
USA

Abstract

Renal diets typically incorporate protein and phosphorus restriction, supplement with potassium and Omega-3 fatty acids, and address metabolic acidosis. Compared to "maintenance" diets, these modifications appear to benefit cats with chronic kidney disease (CKD). However, there is limited data in cats justifying the specific amounts of the nutrients used in these diets, and there is little evidence supporting protein restriction in cats with CKD. Energy intake, maintenance of body weight, and muscle and body condition need to be addressed, and may take precedence over special diets. Further research is needed to better define optimum diets for cats with CKD.

Publication Type  
Journal article.

<168>

Accession Number  
20163315390

Author  
Polzin, D. J.; Churchill, J. A.

Title

Controversies in veterinary nephrology: renal diets are indicated for cats with international renal interest society chronic kidney disease stages 2 to 4: the pro view. (Special Issue: Chronic kidney disease.)

Source

Veterinary Clinics of North America, Small Animal Practice; 2016. 46(6):1049-1065.

Publisher

Saunders, An Imprint of Elsevier

Location of Publisher

Philadelphia

Country of Publication

USA

Abstract

Renal diets have been the mainstay of therapy for cats with chronic kidney disease (CKD) for many decades. Clinical trials in cats with CKD have shown them to be effective in improving survival, reducing uremic crises, and improving serum urea nitrogen and phosphorous concentrations. It has shown that, when food intake is adequate, renal diets can maintain body weight and body condition scores for up to 2 years. Although some have questioned whether renal diets provide adequate protein and have advocated feeding higher-protein diets to cats with CKD, there is currently no convincing evidence in support of this proposal.

Publication Type  
Journal article.

<169>

Accession Number  
20163315389

Author  
Jepson, R. E.

Title

Current understanding of the pathogenesis of progressive chronic kidney disease in cats. (Special Issue: Chronic kidney disease.)

Source

Veterinary Clinics of North America, Small Animal Practice; 2016. 46(6):1015-1048.

Publisher

Saunders, An Imprint of Elsevier

Location of Publisher

Philadelphia

Country of Publication

USA

Abstract

In cats with chronic kidney disease (CKD), the most common histopathologic finding is tubulointerstitial inflammation and fibrosis. However, these changes reflect a nonspecific response of the kidney to any inciting injury. The risk of developing CKD is likely to reflect the composite effects of genetic predisposition, aging, and environmental and individual factors that affect renal function over the course of a cat's life. However, there is still little information available to determine exactly which individual risk factors predispose a cat to develop CKD. Although many cats diagnosed with CKD have stable disease for years, some cats show overtly progressive disease.

Publication Type

Journal article.

<170>

Accession Number

20163315388

Author

Cowgill, L. D.; Polzin, D. J.; Elliott, J.; Nabity, M. B.; Segev, G.; Grauer, G. F.; Brown, S.; Langston, C.; Dongen, A. M. van

Title

Is progressive chronic kidney disease a slow acute kidney injury? (Special Issue: Chronic kidney disease.)

Source

Veterinary Clinics of North America, Small Animal Practice; 2016. 46(6):995-1013.

Publisher

Saunders, An Imprint of Elsevier

Location of Publisher

Philadelphia

Country of Publication

USA

Abstract

International Renal Interest Society chronic kidney disease Stage 1 and acute kidney injury Grade I categorizations of kidney disease are often confused or ignored because patients are nonazotemic and generally asymptomatic. Recent evidence suggests these seemingly disparate conditions may be mechanistically linked and interrelated. Active kidney injury biomarkers have the potential to establish a new understanding for traditional views of chronic kidney disease, including its early identification and possible mediators of its progression, which, if validated, would establish a new and sophisticated paradigm for the understanding and approach to the diagnostic evaluation, and treatment of urinary disease in dogs and cats.

Publication Type

Journal article.

<171>

Accession Number

20163315386

Author

Relford, R.; Robertson, J.; Clements, C.

Title

Symmetric dimethylarginine: improving the diagnosis and staging of chronic kidney disease in small animals. (Special Issue: Chronic kidney disease.)

Source

Veterinary Clinics of North America, Small Animal Practice; 2016. 46(6):941-960. 60 ref.

Publisher

Saunders, An Imprint of Elsevier

Location of Publisher

Philadelphia

Country of Publication

USA

Abstract

Chronic kidney disease (CKD) is a common condition in cats and dogs, traditionally diagnosed after substantial loss of kidney function when serum creatinine concentrations increase. Symmetric dimethylarginine (SDMA) is a sensitive circulating kidney biomarker whose concentrations increase earlier than creatinine as glomerular filtration rate decreases. Unlike creatinine SDMA is unaffected by lean body mass. The IDEXX SDMA test introduces a clinically relevant and reliable tool for the diagnosis and management of kidney disease. SDMA has been provisionally incorporated into the International Renal Interest Society guidelines for CKD to aid staging and targeted treatment of early and advanced disease.

Publication Type

Journal article.

<172>

Accession Number

20163336873

Author

Robertson, S.

Title

Anesthetic risks and management of patients with chronic renal failure.

Source

40th World Small Animal Veterinary Association Congress, Bangkok, Thailand, 15-18 May, 2015.

Proceedings book; 2015. :623-624. 6 ref.

Publisher

World Small Animal Veterinary Association

Location of Publisher

Bangkok

Country of Publication

Thailand

Abstract

Kidney disease can be divided into two main categories: acute kidney injury (AKI) and chronic kidney disease (CKD). AKI develops over hours or days and may be a result of toxicities, sepsis or acute urinary obstruction; these are high risk anesthesia patients and should be stabilized as much as possible before sedation or anesthesia. In this article CKD which is more commonly encountered is the focus of this discussion.

Publication Type

Conference paper.

<173>

Accession Number

20163336707

Author

Francey, T.

Title

Nutritional management of renal diseases (AKI, CKD, GN).

Source

40th World Small Animal Veterinary Association Congress, Bangkok, Thailand, 15-18 May, 2015.

Proceedings book; 2015. :202-203. 3 ref.

Publisher

World Small Animal Veterinary Association

Location of Publisher

Bangkok

Country of Publication

Thailand

Abstract

The use of therapeutic diets to treat chronic kidney disease, acute kidney injury and glomerular diseases in cats and dogs are discussed.

Publication Type

Conference paper.

<174>

Accession Number

20163336660

Author

Navarro, L.; Verde, M. T.; Pardo, M.; Fernandez, A.; Loste, A.

Title

Value of the urinary fractional excretion of electrolytes in the diagnosis of chronic kidney disease in dogs.

Source

40th World Small Animal Veterinary Association Congress, Bangkok, Thailand, 15-18 May, 2015.

Proceedings book; 2015. :110.

Publisher

World Small Animal Veterinary Association

Location of Publisher

Bangkok

Country of Publication

Thailand

Publication Type

Conference paper.

<175>

Accession Number

20163336571

Author

Ribeiro, J. F. A.; Lourenco, M. L. G.; Melchert, A.; Geraldles, S. S.; Guimaraes-Okamoto, P. T. C.

Title

Intermittent hemodialysis in a dog with chronic kidney disease: electrocardiographic aspects.

Source

40th World Small Animal Veterinary Association Congress, Bangkok, Thailand, 15-18 May, 2015.

Proceedings book; 2015. :39.

Publisher

World Small Animal Veterinary Association

Location of Publisher

Bangkok

Country of Publication

Thailand

Publication Type

Conference paper.

<176>

Accession Number

20163332378

Author

Finch, N. C.; Syme, H. M.; Elliott, J.

Title

Risk factors for chronic renal disease in cats.

Source

Advances in Small Animal Medicine and Surgery; 2016. 29(9):5. 1 ref.

Publisher

Elsevier Inc.

Location of Publisher

Philadelphia

Country of Publication

USA

Publication Type

Journal article.

<177>

Accession Number

20163340519

Author

Zatelli, A.; Roura, X.; D'Ippolito, P.; Berlanda, M.; Zini, E.

Title

The effect of renal diet in association with enalapril or benazepril on proteinuria in dogs with proteinuric chronic kidney disease.

Source

Open Veterinary Journal; 2016. 6(2):121-127. 25 ref.

Publisher

Faculty of Veterinary Medicine, University of Tripoli

Location of Publisher

Tripoli

Country of Publication

Libya

Abstract

Treating proteinuria in dogs reduces the progression of chronic kidney disease (CKD); renal diets and angiotensin-converting enzyme (ACE)-inhibitors are cornerstones of treatment. Whether different ACE-inhibitors have distinct kidney protective effects is unknown; it is therefore hypothesized that renal diets and enalapril or benazepril have different beneficial effects in proteinuric CKD dogs. Forty-four dogs with proteinuric CKD (IRIS stages 1-4) were enrolled in the study and were fed renal diet for 30 days. Thereafter, they were randomly assigned to one of 2 groups. Dogs in group A (n=22) received enalapril (0.5 mg/kg, q12h) and in group B (n=22) benazepril (0.5 mg/kg, q24h); in both groups, dogs were fed the same renal diet. After randomization, dogs were monitored for 120 days. Body weight and body condition score (BCS), serum concentrations of creatinine, blood urea nitrogen (BUN), albumin and total proteins, and urine protein-to-creatinine (UPC) ratio were compared at different time-points. After 30 days of renal diet, creatinine, BUN and UPC ratio decreased significantly ( $p < 0.0001$ ). Compared to randomization, body weight, BCS, albumin, total proteins, creatinine and BUN did not vary during follow-up in the 44 dogs and differences between group A and B were not observed. However, the UPC ratio of group A at day 60, 90 and 150 was significantly lower than in group B and compared to randomization ( $p < 0.05$ ). In group B it did not vary overtime. It is concluded that the renal diet is beneficial to decrease creatinine, BUN and UPC ratio in proteinuric CKD dogs. Enalapril further ameliorates proteinuria if administered along with renal diet.

Publication Type

Journal article.

<178>

Accession Number

20163338244

Author

Rossi, G.; Bertazzolo, W.; Binnella, M.; Scarpa, P.; Paltrinieri, S.

Title

Measurement of proteinuria in dogs: analytic and diagnostic differences using 2 laboratory methods.

Source

Veterinary Clinical Pathology; 2016. 45(3):450-458. 24 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

Background: Urinary protein-to-creatinine (UPC) ratio is an early diagnostic and prognostic marker of renal disease in dogs. Pyrogallol red molybdate (PRM) and Coomassie brilliant blue (CBB) are the most popular dye-binding assays for measurement of proteinuria. Published guidelines recommend strict cut-off points to substage patients with chronic renal diseases, irrespective of the assay applied. However, analytic variability and method-dependent differences could affect substaging of patients. Objectives: The aims of this study were to analytically validate the CBB assay to evaluate possible method-dependent differences with PRM in urinary protein (UP) determination, and to assess the influence of such differences in substaging according to the International Renal Interest Society (IRIS). Methods: Urine was collected from healthy and proteinuric dogs. Intra-assay and inter-assay repeatability (imprecision), linearity under dilution (LUD), and spiking recovery (inaccuracy) were determined for the CBB assay. Split samples were measured with PRM and CBB, and agreement between methods and concordance in classification according to IRIS guidelines was determined. Results: The CBB assay was precise ( $< 10\%$ ) at all urine protein concentrations after excluding outliers from the intra-assay precision assay of high urine protein concentrations. Acceptable accuracy was demonstrated with both LUD and spiking recovery test. Both UP and UPC determined by CBB were



significantly higher ( $P < .0001$ ) than those obtained with PRM, and both a constant and proportional bias were present. Concordance of IRIS substaging was only moderate. Conclusions: The CBB is precise and accurate, but the higher UPC obtained with CBB vs PRM may affect interpretation of the IRIS guidelines.

Publication Type

Journal article.

<179>

Accession Number

20163347293

Author

Geddes, R. F.; Biourge, V.; Chang, Y.; Syme, H. M.; Elliott, J.

Title

The effect of moderate dietary protein and phosphate restriction on calcium-phosphate homeostasis in healthy older cats.

Source

Journal of Veterinary Internal Medicine; 2016. 30(5):1690-1702. 52 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

**Background:** Dietary phosphate and protein restriction decreases plasma PTH and FGF-23 concentrations and improves survival time in azotemic cats, but has not been examined in cats that are not azotemic. **Hypothesis:** Feeding a moderately protein- and phosphate-restricted diet decreases PTH and FGF-23 in healthy older cats and thereby slows progression to azotemic CKD. **Animals:** A total of 54 healthy, client-owned cats ( $\geq 9$  years). **Methods:** Prospective double-blinded randomized placebo-controlled trial. Cats were assigned to test diet (protein 76 g/Mcal and phosphate 1.6 g/Mcal) or control diet (protein 86 g/Mcal and phosphate 2.6 g/Mcal) and monitored for 18 months. Changes in variables over time and effect of diet were assessed by linear mixed models. **Results:** A total of 26 cats ate test diet and 28 cats ate control diet. There was a significant effect of diet on urinary fractional excretion of phosphate ( $P = 0.045$ ), plasma PTH ( $P = 0.005$ ), and ionized calcium concentrations ( $P = 0.018$ ), but not plasma phosphate, FGF-23, or creatinine concentrations. Plasma PTH concentrations did not significantly change in cats fed the test diet ( $P = 0.62$ ) but increased over time in cats fed the control diet ( $P = 0.001$ ). There was no significant treatment effect of the test diet on development of azotemic CKD (3 of 26 (12%) test versus 3 of 28 (11%) control, odds ratio 1.09 (95% CI 0.13-8.94),  $P = 0.92$ ). **Conclusions and Clinical Importance:** Feeding a moderately protein- and phosphate-restricted diet has effects on calcium-phosphate homeostasis in healthy older cats and is well tolerated. This might have an impact on renal function and could be useful in early chronic kidney disease.

Publication Type

Journal article.

<180>

Accession Number

20163347289

Author

Freeman, L. M.; Lachaud, M. P.; Matthews, S.; Rhodes, L.; Zollers, B.

Title

Evaluation of weight loss over time in cats with chronic kidney disease.

Source

Journal of Veterinary Internal Medicine; 2016. 30(5):1661-1666. 23 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

Background: Thin body condition and weight loss are common in cats with chronic kidney disease (CKD). However, the time course and progression of weight loss before and after diagnosis have not been thoroughly evaluated. Hypothesis/Objectives: To describe weight loss in cats with CKD before and after diagnosis and its relationship to survival. Animals: A total of 569 cats (55.5% females and 44.5% males) with CKD from 6 US veterinary practices for which International Renal Interest Society (IRIS) stage, age, date of CKD diagnosis, and at least two body weight measurements were available. Methods: Body weight measurements were analyzed by time windows and polynomial growth curve analysis. Survival analysis was performed by Kaplan-Meier curves and log-rank tests. Results: Median age at diagnosis was 14.9 years (range, 5.0-22.8 years). Cats were categorized at diagnosis as IRIS stage 1 (n=34 [6%]), stage 2 (n=345 [61%]), stage 3 (n=141 [25%]), and stage 4 (n=49 [9%]). Median body weight at diagnosis was 4.2 kg (range, 1.6-9.9 kg). Cats lost a median of 8.9% of body weight in the 12 months before diagnosis, but weight loss was already present 3 years before diagnosis and accelerated after diagnosis of CKD. Cats <4.2 kg at the time of diagnosis had significantly shorter survival time compared to cats ≥4.2 kg at diagnosis (P<.0001). Conclusions and Clinical Importance: Weight loss can be detected in cats before diagnosis of CKD, accelerates after diagnosis, and is associated with shorter survival. Tracking body weight may help clinicians in earlier diagnosis of CKD.

Publication Type

Journal article.

<181>

Accession Number

20163347282

Author

Martinelli, E.; Locatelli, C.; Bassis, S.; Crosara, S.; Paltrinieri, S.; Scarpa, P.; Spalla, I.; Zanaboni, A. M.; Quintavalla, C.; Brambilla, P.

Title

Preliminary investigation of cardiovascular-renal disorders in dogs with chronic mitral valve disease.

Source

Journal of Veterinary Internal Medicine; 2016. 30(5):1612-1618. 25 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

Background: Veterinary literature lacks data about cardiovascular-renal disorders (CvRD) and cardiorenal-anemia syndrome (CRAS) in dogs. Hypothesis: A direct correlation exists between ACVIM class and IRIS stage; chronic kidney disease (CKD) complicates chronic mitral valve disease (CMVD) more often than does anemia in dogs. Animals: One hundred and fifty-eight client-owned dogs with CMVD. Methods: Signalment, physical examination findings, electrocardiography, thoracic radiographs, echocardiography, and blood analysis were retrospectively evaluated to assess the prevalence of CKD and anemia in dogs with CMVD

and to investigate the relationships among ACVIM class, IRIS stage, and survival. Results: The prevalence of CKD and anemia in dogs with CMVD was significantly higher than in the general population of dogs. Dogs being treated for heart failure had a significantly higher prevalence of CKD than did dogs that had not received treatment. A statistically significant direct correlation was found between ACVIM class and IRIS stage. Severe heart disease, severe renal disease or both, furosemide administration, and advanced age at diagnosis of heart disease were associated with shorter survival time. Survival time of dogs affected by CvRD was statistically shorter than survival time of dogs affected by CMVD alone. Conclusion and Clinical Relevance: Chronic mitral valve disease is associated with increased prevalence of CKD and anemia in dogs. Treatment for medical management of heart failure may play a role in inducing CKD. Class of heart disease and IRIS stage were directly correlated. Cardiovascular-renal disorders decrease survival time compared to the only presence of CMVD alone, whereas anemia does not play a central role in worsening heart function.

Publication Type  
Journal article.

<182>

Accession Number  
20163346107

Author  
Vitalaru, B. A.; Petrescu, V. F.

Title  
Peritoneal dialysis in chronic renal failure on cat.

Source  
Scientific Works. Series C. Veterinary Medicine; 2016. 62(1):73-76. 5 ref.

Publisher  
University of Agronomic Sciences and Veterinary Medicine of Bucharest

Location of Publisher  
Bucharest

Country of Publication  
Romania

Abstract

An 11 years old, castrated, male cat, mixed breed was referred to the Clinic of the Faculty of Veterinary Medicine Bucharest for vomiting, loss of appetite, anorexia, faintness, sharp breath, inability to exercise, oliguria and lethargy. Results from a complete blood (cell) count (CBC), serum chemical profile, and urinalysis submitted at that time were abnormal. The patient had chronic renal failure (Creatinine 10.9 mg/dL - reference range 0.8-2.4 mg/dL, BUN 124 mg/dL - reference range 16-36 mg/dL). The rectal temperature was 36.5 degrees C, the patient presented anemic mucous membranes, mild dehydration (persistent skin fold thickness for 2-3 seconds) and slight sensitivity to palpation in the renal lanyard. Abdominal ultrasound showed that kidney presented uncharacteristic drawing, irregular outline, abundant microlithiasis, and following examination of urine was found massive proteinuria, absent bacteriuria, minimal hematuria (50), pH 6.2, abundant FAM. Urinary density was 1.025. The patient was presented at Hemodialivet Clinic with the following renal parameters (Creatinine 9.9 mg/dL-reference range 0.8-2.4 mg/dL, BUN 107 mg/dL-reference range 16-36 mg/dL). The established treatment consisted in peritoneal dialysis, rehydration and electrolyte balance, parenteral nutrition. We used PD4 peritoneal dialysis Dianeal PD4 1.25. The patient was submitted to intravenous fluidotherapy with 5% Glucose, Sodium Chloride 0.9%, B12 vitamin, Arnetin, Emeset CRI. Recommendation for oral treatment: Ipakitine bid, Azodyl bid and kidney diet food. Continuous evaluation of hematological and biochemical blood parameters is vital for the establishment of appropriate therapies in renal patients. Hydroelectrolytic rebalancing associated with continuous peritoneal dialysis, erythropoietin therapy and using appropriate renal diet are the key to success in intensive care of renal patients.

Publication Type  
Journal article.

<183>

Accession Number

20163297661

Author

Perondi, F.; Lippi, I.; Paroli, A.; Pierini, A.; Meucci, V.; Guidi, G.

Title

Sodium and potassium in dogs and cats at different stages of CKD: retrospective study.

Source

LXVIII Convegno Nazionale SISVet, Convegno SICV, XI Convegno AIPVet, XII Convegno SIRA, Pisa, Italy, 6-18 June 2014; 2014. :61. 7 ref.

Publisher

Societa Italiana delle Scienze Veterinarie (SISVet)

Location of Publisher

Pisa

Country of Publication

Italy

Publication Type

Conference paper.

<184>

Accession Number

20163354652

Author

Miyagawa, Y.

Title

Importance of phosphate restriction in management of chronic renal failure: 3. Use of adsorbent.

[Japanese]

Source

Journal of Animal Clinical Medicine; 2015. 24(3):108-110. 5 ref.

Publisher

Japanese Society of Clinical Veterinary Medicine

Location of Publisher

Tottori

Country of Publication

Japan

Publication Type

Journal article.

<185>

Accession Number

20163354651

Author

Kitanaka, T.

Title

Importance of phosphate restriction in management of chronic renal failure: 2. Dietary phosphate restriction.

[Japanese]

Source

Journal of Animal Clinical Medicine; 2015. 24(3):106-107. 6 ref.

Publisher

Japanese Society of Clinical Veterinary Medicine

Location of Publisher

Tottori

Country of Publication

Japan

Publication Type

Journal article.

<186>

Accession Number

20163354650

Author

Hoshi, F.

Title

Importance of phosphate restriction in management of chronic renal failure: 1. Outline. [Japanese]

Source

Journal of Animal Clinical Medicine; 2015. 24(3):101-105.

Publisher

Japanese Society of Clinical Veterinary Medicine

Location of Publisher

Tottori

Country of Publication

Japan

Publication Type

Journal article.

<187>

Accession Number

20163362981

Author

Grauer, G. F.; Guess, S.

Title

Azotemia & acute kidney injury.

Source

NAVCClinician's Brief; 2016. (October):28-30. 4 ref.

Publisher

Educational Concepts LLC

Location of Publisher

Tulsa

Country of Publication

USA

Publication Type

Journal article.

<188>

Accession Number

20163322254

Author

Muntean, S.; Barabasi, I.; Nasalean, A.; Niculescu, S.; Dragan, R.; Ognean, L.

Title

Report a delayed haemolytic reactions in a dog with chronic renal insufficiency after a transfusion of integral blood.

Source

Lucrari Stiintifice - Universitatea de Stiinte Agricole a Banatului Timisoara, Medicina Veterinara; 2016.

49(4):79-85. 10 ref.

Publisher

Facultatea de Medicina Veterinara

Location of Publisher

Timisoara

Country of Publication

Romania

Publication Type

Journal article.

<189>

Accession Number

20163322235

Author

Saftencu, P. M.; Solcan, Gh.

Title

Historical and clinical examination findings in cats with end-stage chronic kidney failure.

Source

Lucrari Stiintifice - Universitatea de Stiinte Agricole a Banatului Timisoara, Medicina Veterinara; 2016.

49(4):107-112. 11 ref.

Publisher

Facultatea de Medicina Veterinara

Location of Publisher

Timisoara

Country of Publication

Romania

Abstract

Background: Chronic kidney disease (CKD) is one of the most common pathologies and leading cause of death in elderly cats. Clinical signs usually become multisystemic as the illness progresses. Objective: The present retrospective study aims to analyze the major clinical findings and the possible contributing factors to the appearance and progression of renal disease. Methods: The clinical records of all feline patients presented at the Faculty of Veterinary Medicine of Iasi were studied. The parameters taken into consideration were: vital signs, mentation, eating and digestive tract disorders, weight loss, type of food and urinary tract infections. All statistical analyses were performed with a statistical software package; using Mann Withney and Ttest paired samples tests, with a significance level at  $p < 0.05$ . Results: From all patients diagnosed with kidney failure, 21 were included in this study. The inclusion criteria was based on complete clinical examination, blood and urine biochemical analyses, and abdominal ultrasound. In terms of severity of

the illness 61.9% of the patients were diagnosed with stage IV CKD. The majority of the cats (61.9%) were males, and 60% of the felines from this group were older than 14 years. Conclusion: Chronic kidney disease is a progressive and most of the time irreversible illness, affecting almost one third of the cats over 14 years old. Prevention and early detection is difficult, but the best methods still remain regular physical examination, routine bloodwork and thorough history-taking.

Publication Type  
Journal article.

<190>

Accession Number  
20163367776

Author  
Caney, S.

Title  
Management and treatment of chronic kidney disease in cats. (Special Issue: Chronic kidney disease in cats.)

Source  
In Practice; 2016. 38(Suppl.):10-13. 10 ref.

Publisher  
BMJ Publishing Group

Location of Publisher  
London

Country of Publication  
UK

Abstract

Making a diagnosis of chronic kidney disease (CKD) in cats marks the start of a new and complex journey to provide optimal treatment for the patient. A successful outcome depends on attention to detail and a good working relationship with the career and patient. If it is possible to institute good treatment measures, many patient with CKD survive for several years following diagnosis, with an excellent quality of life.

Publication Type  
Journal article.

<191>

Accession Number  
20163367775

Author  
Cannon, M.

Title  
Diagnosis and investigation of chronic kidney disease in cats. (Special Issue: Chronic kidney disease in cats.)

Source  
In Practice; 2016. 38(Suppl.):2-9. 26 ref.

Publisher  
BMJ Publishing Group

Location of Publisher  
London

Country of Publication  
UK



## Abstract

Chronic kidney disease (CKD) is a common disorder of cats, particularly those in middle to old age. This article describes a practical approach to the diagnosis of CKD in cats and the additional investigations that will then allow an effective treatment plan to be developed, tailored to the needs of the individual cat. A second article in this supplement covers the approaches to treatment of CKD and its associated complications.

Publication Type

Journal article.

<192>

Accession Number

20163378661

Author

Sousa, M. G.; Lima, A. B. G.; Araujo, C. R. A.; Silva, V. B. C.; Ramos, A. T.; Machado, G. F.; Melo, G. D.; Carareto, R.

Title

Blood pressure and renal injury in dogs with visceral leishmaniasis.

Source

Pesquisa Veterinaria Brasileira; 2016. 36(9):857-863. 27 ref.

Publisher

Colegio Brasileiro de Patologia Animal

Location of Publisher

Rio de Janeiro

Country of Publication

Brazil

Abstract

Systemic hypertension is known to be a common consequence of chronic renal disease, which is frequently diagnosed in dogs with visceral leishmaniasis. Although many veterinary investigations have looked at the renal injury caused by *Leishmania* spp., the role played by this complication in the development of arterial hypertension documented in some animals with visceral leishmaniasis is not completely understood. In this study, 18 adult dogs with naturally-occurring visceral leishmaniasis and varying clinical signs underwent an indirect blood pressure measurement. Also, sera and spot urine were used for laboratory tests. The median systolic blood pressure was 135.2 mmHg (95% confidence interval: 128.5-147.7), median mean arterial pressure was 105.8 mmHg (98.3-110.4), and median diastolic arterial pressure was 88.5 mmHg (77.8-92.5). No differences existed between asymptomatic and symptomatic animals regarding arterial pressure, and no correlations were documented between blood pressure and serum creatinine, blood urea, urine protein-to-creatinine ratio, urine specific gravity, and the fractional excretion of sodium and potassium. Although an association between hypertension and the identification of inflammation on histopathology could not be demonstrated in hypertensive animals, the assessment of kidney samples from 12 dogs indicated mild inflammation with a lymphoplasmacytic infiltrate (6/12), moderate inflammation with multifocal lymphoplasmacytic and histiocytic infiltrates (3/12), and multifocal degeneration and protein casts (2/12). Anti-*Leishmania* spp. immunohistochemistry assays stained the renal epithelium in 2/12 of the animals. Even though mild systemic hypertension was documented in a small subset of animals, no relationship between the severity of clinical signs and hypertension could be anticipated.

Publication Type

Journal article.

<193>

Accession Number

20163384401

Author

Lee JungJin; Park HyeMi; Kim JungHyun

Title

Fournier's gangrene associated with chronic kidney disease in a dog.

Source

Canadian Veterinary Journal; 2016. 57(10):1057-1061. 23 ref.

Publisher

Canadian Veterinary Medical Association

Location of Publisher

Ottawa

Country of Publication

Canada

Abstract

A dog was diagnosed with Fournier's gangrene associated with chronic kidney disease. Clinical features included crepitant scrotal inflammation that spread to the penis; the lesion exhibited liquefactive necrosis or purulent moist gangrene. This is the first description of Fournier's gangrene associated with chronic kidney disease in a dog.

Publication Type

Journal article.

<194>

Accession Number

20163371650

Author

Desfontis, J. C.; Mallem, Y.

Title

Anti-anorexic therapy for cats with chronic diseases. [French]

Source

Point Veterinaire; 2016. 47(370 (Part 1)):30-32. 5 ref.

Publisher

Newsmed

Location of Publisher

Paris

Country of Publication

France

Abstract

The choice of a pharmacological stimulant of the appetite requires a reasoned approach and consideration of all interfering factors, such as pain and the etiology of a disease. Among all the usable molecules, only cyproheptadin and mirtazapin are currently recommended for this indication in off-label prescribing (human specialties). These molecules have a better tolerance in cats and smaller and better controlled unwanted side effects by adjusting the dose in cases of chronic renal failure or hepatic impairment.

Publication Type

Journal article.

<195>

Accession Number

20163365316

Author

Lippi, I.; Perondi, F.; Ross, S.; Marchetti, V.; Guidi, G.

Title

Assisted feeding through esophagostomy tube in patients affected by CKD and uremic syndrome: impact on BCS, renal function and survival. [Italian]

Source

Veterinaria (Cremona); 2016. 30(4):215-221. 9 ref.

Publisher

Edizioni SCIVAC

Location of Publisher

Cremona

Country of Publication

Italy

Abstract

Renal diet is a fundamental tool for the medical management of patients in acute and chronic kidney disease. Unfortunately, the majority of patients is not able to eat a sufficient amount of renal diet to receive an adequate caloric intake. The aim of the present study was to evaluate BCS, renal function and survival rate in a group of uremic patients with feeding tube, comparing to uremic patients without feeding tube. The study had involved fourteen dogs in acute on chronic CKD. Seven dogs were managed by the use of feeding tube (FT), 7 dogs were managed without a feeding tube (GC). For both groups BCS, serum creatinine, urea, phosphate and survival rate were evaluated at time 0 (T0), at one month (T1) and two months (T2). Data were statistically analysed. GC showed a significant difference in BCS ( $p=0.04$ ), creatinine ( $p=0.001$ ), urea ( $p=0.005$ ) phosphate ( $p=0.04$ ) at the different time intervals. Group FT showed a significant difference in BCS ( $p=0.03$ ), creatinine ( $p=0.006$ ), urea ( $p=0.0001$ ) and phosphate ( $p=0.02$ ) at the different time intervals. Group FT reported a higher percentage of survival ( $p=0.01$ ) to the uremic crisis compared to Group GC. The results of the present study reported a significant improvement in BCS, renal function and survival in patients managed with feeding tubes, compared to those without feeding tubes. Feeding tube seems to be a very useful therapeutic tool for the management of patients in uremic syndrome.

Publication Type

Journal article.

<196>

Accession Number

20163394631

Author

Fritsch, D. A.; Jewell, D. E.

Title

Acceptance and effects of a therapeutic renal food in pet cats with chronic kidney disease.

Source

Veterinary Record Open; 2015. 2(2):e000128.

Publisher

BMJ Publishing Group

Location of Publisher

London

Country of Publication

UK

Abstract

Introduction: Renal foods are used to manage chronic kidney disease (CKD) in dogs and cats, but their effectiveness may be limited by the ability to transition animals to them. Material and Methods: In a prospective study, pet cats with previously undiagnosed kidney disease (20 International Renal Interest Society (IRIS) 1, 61 IRIS 2, 14 IRIS 3/4, 33 at risk for CKD) were transitioned to a renal food. Markers of

renal function were measured and owners answered questionnaires about their pet over one year. Results: All but eight cats (120/128; 94 per cent) successfully transitioned to the renal food. Most of the time, cats moderately or extremely liked the food (89 per cent), ate at least half (73 per cent) and were moderately or extremely enthusiastic while eating (68 per cent). Cats rarely disliked the food (2 per cent) or refused to eat it (1 per cent). Markers of renal function were unchanged in IRIS 1 and 2 cats and changed little in IRIS 3/4 cats. In all groups, owner-assessed quality of life improved initially and then remained stable. Mean bodyweight did not change in cats with CKD. Conclusions: Most cats with CKD successfully transitioned to the renal food. The results also support previous studies that the renal food can help stabilise cats with CKD.

Publication Type

Journal article.

<197>

Accession Number

20163375478

Author

Caney, S. M. A.

Title

Diagnosis and management of chronic kidney disease in cats.

Source

Veterinary Times; 2016. 46(45):21-24. 24 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Publication Type

Journal article.

<198>

Accession Number

20163399137

Author

Codi, M.

Title

The ins and outs of managing feline chronic kidney disease.

Source

Today's Veterinary Technician; 2016. 1(1):46-53. 3 ref.

Publisher

Eastern States Veterinary Association, Inc (NAVCA)

Location of Publisher

Glen Mills

Country of Publication

USA

Abstract

This article discusses the physiology of the feline kidneys, clinical aspects, diagnosis, stages of the disease, treatment and nutritional support for cats with chronic kidney disease. It is also emphasized that there should be good communication between veterinary staff and owners about the treatment options to help ensure that

affected pets have good quality of life since chronic feline renal disease requires a lifelong treatment that can be challenging to the veterinary staff, owners and pets.

Publication Type

Journal article.

<199>

Accession Number

20153004717

Author

Almeida, T. L. A. C. de; Santos, K. K. F. dos; Vaz, S. G.; Silva, R. de B. P. da; Texeira, M. N.; Rego, E. W.; Manso Filho, H. C.

Title

Effect of hemodialysis treatment over urea and creatinine concentrations in dogs with chronic renal failure syndrome. [Portuguese]

Source

Ciencia Veterinaria nos Tropicos; 2012. 15(1/3):32-40. 14 ref.

Publisher

CRMV-PE

Location of Publisher

Zumbi

Country of Publication

Brazil

Abstract

The loss of the renal function may be produced by different diseases, including diseases in other body systems that produce secondary pathologies of the renal function. The hemodialysis is an important artificial treatment regularly used in humans and animals, which has the objective to restore the normal balance of fluids and electrolytes and remove some toxic metabolites. The objective of this paper is to describe the results of hemodialysis treatment over urea and creatinine concentrations in dogs with chronic renal failure syndrome. Results from 45 dogs were described, which presented elevated urea and creatinine concentrations which were submitted to 4 hemodialysis sessions. The results showed that after 3 hemodialysis sessions, urea and creatinine concentrations were reduced ( $P<0.05$ ) to physiological values. However, there was no reduction between the third and fourth session. Also, differences between age groups did not influence the result of the hemodialysis.

Publication Type

Journal article.

<200>

Accession Number

20143405921

Author

Baciero, G.

Title

Nutritional management in cats with chronic renal disease. [Spanish]

Source

Argos - Informativo Veterinario; 2014. (163):64.

Publisher

ASIS Biomedica s.l.

Location of Publisher

Zaragoza  
Country of Publication  
Spain  
Publication Type  
Journal article.

<201>

Accession Number  
20153007352

Author  
Kulendra, N. J.; Syme, H.; Benigni, L.; Halfacree, Z.

Title  
Feline double pigtail ureteric stents for management of ureteric obstruction: short- and long-term follow-up of 26 cats.

Source  
Journal of Feline Medicine and Surgery; 2014. 16(12):985-991. 17 ref.

Publisher  
Sage Publications  
Location of Publisher  
Thousand Oaks  
Country of Publication  
USA

Abstract

The objective of this study was to determine the outcome of cats with ureteric obstruction managed with double pigtail ureteric stents and to document the incidence of lower urinary tract signs at long-term follow-up. Data were obtained retrospectively from the medical records (2009-2012) of 26 cats that underwent ureteric stent placement. Owners were contacted for follow-up, and a quality of life questionnaire completed. Survival to discharge after stent placement was 85% (22/26). Prevalence of postoperative uroabdomen necessitating further surgery was 15% (4/26). Stents were replaced 4-28 months after the initial surgery in four cats because of migration, fracture, encrustation causing luminal obstruction or sterile cystitis, respectively. Nine cats were alive at follow-up, which was 3-28 months after the original surgery. Nine cats had azotaemic chronic kidney disease and nine had signs related to sterile cystitis; three of these cats were euthanased as a result of the severity of the signs. Preoperative serum creatinine of the survivors (9.4 mg/dl, n=9) was not significantly different from that of the non-survivors (6.5 mg/dl, n=13; P=0.295). Quality of life was assigned a mean score of 8/10. Median survival of cats following discharge was 419 days (range 44-994 days). Signs consistent with sterile cystitis affected 35% of cats. It was concluded that ureteric stent placement in cats was associated with a 15% mortality rate before hospital discharge. Long-term management of ureteric stents is associated with a high rate of lower urinary tract signs.

Publication Type  
Journal article.

<202>

Accession Number  
20153016394

Author  
Constantinescu, R.; Crivineanu, V.; Goran, G. V.; Codreanu, M. D.; Cornila, M.

Title  
Clinical staging expression of chronic kidney disease in dogs.

Source

Scientific Works. Series C. Veterinary Medicine; 2013. 59(3):68-71. 7 ref.

Publisher

University of Agronomic Sciences and Veterinary Medicine of Bucharest

Location of Publisher

Bucharest

Country of Publication

Romania

Abstract

Chronic kidney disease (CKD) is defined as the presence of functional or structural renal abnormalities, characterized by progressive loss of kidney function and/or structure. CKD includes all cases described as renal insufficiency or renal failure, but also the less advanced forms of kidney disease. Dogs of any age can be diagnosed with CKD, but it is more commonly seen in older dogs, without sex or breed predisposition, with an exception represented by inherited kidney disease. The CKD staging was based on serum creatinine values of 20 dogs, presenting a wide variety of clinical features, from clinically healthy to signs of uremic encephalopathy.

Publication Type

Journal article.

<203>

Accession Number

20153025193

Author

Bradea, A.; Vlagioiu, C.; Codreanu, M.; Constantinescu, R.

Title

Electrolyte profile aspects in chronic kidney disease in dogs. [Romanian]

Source

Revista Romana de Medicina Veterinara; 2014. 24(3):115-119. 10 ref.

Publisher

Asociatia Generala a Medicilor Veterinari din Romania

Location of Publisher

Bucuresti

Country of Publication

Romania

Abstract

Electrolytes are present in all intracellular and extracellular body fluids, but their concentrations are typically measured in blood, plasma or serum. Sodium and chloride are electrolytes whose concentrations are greatest in extracellular fluid. The concentration of potassium, calcium, phosphorus and magnesium are highest in intracellular fluid. Maintaining the intracellular and extracellular concentration of each electrolyte within narrow limits is essential in keeping the proper body functionality.

Publication Type

Journal article.

<204>

Accession Number

20153098278

Author

Lawson, J.; Elliott, J.; Wheeler-Jones, C.; Syme, H.; Jepson, R.



Title

Renal fibrosis in feline chronic kidney disease: known mediators and mechanisms of injury.

Source

Veterinary Journal; 2015. 203(1):18-26. many ref.

Publisher

Elsevier Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Chronic kidney disease (CKD) is a common medical condition of ageing cats. In most cases the underlying aetiology is unknown, but the most frequently reported pathological diagnosis is renal tubulointerstitial fibrosis. Renal fibrosis, characterised by extensive accumulation of extra-cellular matrix within the interstitium, is thought to be the final common pathway for all kidney diseases and is the pathological lesion best correlated with function in both humans and cats. As a convergent pathway, renal fibrosis provides an ideal target for the treatment of CKD and knowledge of the underlying fibrotic process is essential for the future development of novel therapies. There are many mediators and mechanisms of renal fibrosis reported in the literature, of which only a few have been investigated in the cat. This article reviews the process of renal fibrosis and discusses the most commonly cited mediators and mechanisms of progressive renal injury, with particular focus on the potential significance to feline CKD.

Publication Type

Journal article.

<205>

Accession Number

20153117583

Title

Symmetric dimethylarginine concentrations in cats.

Source

Advances in Small Animal Medicine and Surgery; 2015. 28(3):6. 1 ref.

Publisher

Elsevier Inc.

Location of Publisher

Philadelphia

Country of Publication

USA

Publication Type

Journal article.

<206>

Accession Number

20153085311

Author

Roura, X.

Title

Managing chronic feline kidney disease. [Spanish]

Source

Argos - Informativo Veterinario; 2014. (165):12-13. 5 ref.

Publisher

ASIS Biomedia s.l.

Location of Publisher

Zaragoza

Country of Publication

Spain

Abstract

The clinical signs, diagnosis and medical treatment of chronic kidney disease in cats are described.

Publication Type

Journal article.

<207>

Accession Number

20153128093

Author

Grauer, G. F.

Title

Feline friendly article: feline chronic kidney disease.

Source

Today's Veterinary Practice; 2015. 5(2):36-41. 17 ref.

Publisher

VetMed Communications

Location of Publisher

Glen Mills

Country of Publication

USA

Abstract

In this article the aetiology, pathophysiology, diagnosis, and treatment of chronic kidney disease in cats are discussed.

Publication Type

Journal article.

<208>

Accession Number

20153094678

Author

Dillitzer, N.; Thes, M.

Title

Diets of dogs and cats with renal failure. [German]

Source

Praktische Tierarzt; 2015. 96(3):234...244.

Publisher

Schlutersche Verlagsgesellschaft GmbH & Co. KG

Location of Publisher

Hannover

Country of Publication

Germany

#### Abstract

This article discusses the staging and nutritional management of chronic kidney disease to prevent the occurrence of chronic renal failure in dogs and cats. The nutritional programme and nutrient requirements in relation to phosphorus, dietary protein, energy and fibre content in the diet of dogs and cats affected with chronic kidney disease are highlighted.

#### Publication Type

Journal article.

<209>

#### Accession Number

20153135443

#### Author

Passlack, N.; Mainzer, B.; Lahrssen-Wiederholt, M.; Schafft, H.; Palavinskas, R.; Breithaupt, A.; Zentek, J.

#### Title

Concentrations of strontium, barium, cadmium, copper, zinc, manganese, chromium, antimony, selenium, and lead in the liver and kidneys of dogs according to age, gender, and the occurrence of chronic kidney disease.

#### Source

Journal of Veterinary Science; 2015. 16(1):57-66. 40 ref.

#### Publisher

Korean Society of Veterinary Science

#### Location of Publisher

Seoul

#### Country of Publication

Korea Republic

#### Abstract

This study was conducted to measure the concentrations of strontium (Sr), barium (Ba), cadmium (Cd), copper (Cu), zinc (Zn), manganese (Mn), chromium (Cr), antimony (Sb), selenium (Se), and lead (Pb) in canine liver, renal cortex, and renal medulla, and the association of these concentrations with age, gender, and occurrence of chronic kidney disease (CKD). Tissues from 50 dogs were analyzed using inductively coupled plasma mass spectrometry. Cu, Zn, and Mn levels were highest in the liver followed by the renal cortex and renal medulla. The highest Sr, Cd, and Se concentrations were measured in the renal cortex while lower levels were found in the renal medulla and liver. Female dogs had higher tissue concentrations of Sr (liver and renal medulla), Cd (liver), Zn (liver and renal cortex), Cr (liver, renal cortex, and renal medulla), and Pb (liver) than male animals. Except for Mn and Sb, age-dependent variations were observed for all element concentrations in the canine tissues. Hepatic Cd and Cr concentrations were higher in dogs with CKD. In conclusion, the present results provide new knowledge about the storage of specific elements in canine liver and kidneys, and can be considered important reference data for diagnostic methods and further investigations.

#### Publication Type

Journal article.

<210>

#### Accession Number

20153144517

#### Author

Jung JooHyun; Choi MinCheol

#### Title

Acute respiratory distress syndrome related with blood transfusion in a dog with chronic kidney disease.

Source

Journal of Veterinary Clinics; 2015. 32(1):94-97. 24 ref.

Publisher

Korean Society of Veterinary Clinics

Location of Publisher

Seoul

Country of Publication

Korea Republic

Abstract

An 11-year-old intact male Yorkshire terrier had intermittent vomiting, anorexia and depression for a month. Clinical laboratory works showed azotemia and anemia. Chronic kidney disease with developing anemia was diagnosed clinically. Clinical signs were resolved but anemia was deteriorated and blood transfusion was performed. On 10 hours after transfusion, the dog showed acute respiratory distress. Transfusion related acute respiratory distress syndrome (ARDS) was diagnosed based on acute clinical signs, risk factors of transfusion, bilateral alveolar infiltration on thoracic radiographs, and PO<sub>2</sub>:FiO<sub>2</sub> ratio less than 200 on arterial blood analysis. The dog died within 2 hours after ARDS diagnosis.

Publication Type

Journal article.

<211>

Accession Number

20153143540

Author

Keir, I.; Kellum, J. A.

Title

Acute kidney injury in severe sepsis: pathophysiology, diagnosis, and treatment recommendations.

Source

Journal of Veterinary Emergency and Critical Care; 2015. 25(2):200-209. 86 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Objective: To review the unique pathophysiology of sepsis-induced acute kidney injury (AKI) and highlight the relevant aspects of the Kidney Disease: Improving Global Outcomes (KDIGO) Clinical Practice Guideline for Acute Kidney Injury that may apply to veterinary patients. Data Sources: Electronic search of MEDLINE database. Human Data Synthesis: Sepsis-induced AKI is diagnosed in up to 47% of human ICU patients and is seen as a major public health concern associated with increased mortality and increased progression to chronic kidney disease (CKD). Consensus criteria for the definition and classification of AKI has allowed for accurate description of the epidemiology of patients with AKI. AKI develops from a complex relationship between the initial insult and activation of inflammation and coagulation. In contrast to the traditional view, clinical and experimental data dispute the role of renal ischemia-reperfusion in the development of sepsis-induced AKI. Renal tubular dysfunction with activation of the tubuloglomerular feedback mechanism appears to be a crucial contributor to sepsis-induced AKI. Furosemide and n-acetylcysteine (NAC) do not appear to be helpful in the treatment of AKI. Hydroxyethyl starches (HES), dopamine, and supraphysiological concentrations of chloride are harmful in patients with AKI. Veterinary Data Synthesis: Community and hospital-acquired AKI is a significant factor affecting survival in critical ill patients. Sepsis-induced AKI occurs in 12% of dogs with abdominal sepsis and is an important contributor to mortality. Early detection of AKI in hospitalized patients currently offers the best opportunity to improve patient outcome. The use of urinary

biomarkers to diagnose early AKI should be evaluated in critical care patients. Conclusion: Veterinary clinical trials comparing treatment choices with the development of AKI are needed to make evidence-based recommendations for the prevention and treatment of AKI.

Publication Type  
Journal article.

<212>

Accession Number  
20153153593

Title  
Serum calcium and phosphorus product and prognosis of chronic kidney disease.

Source  
Advances in Small Animal Medicine and Surgery; 2015. 28(4):5.

Publisher  
Elsevier Inc.  
Location of Publisher  
Philadelphia  
Country of Publication  
USA

Publication Type  
Journal article.

<213>

Accession Number  
20153163060

Author  
Garcia-Martinez, J. D.; Martinez-Subiela, S.; Tvarijonaviciute, A.; Caldin, M.; Ceron, J. J.

Title  
Urinary ferritin and cystatin C concentrations at different stages of kidney disease in leishmaniotic dogs.

Source  
Research in Veterinary Science; 2015. 99:204-207. 33 ref.

Publisher  
Elsevier Ltd  
Location of Publisher  
Oxford  
Country of Publication  
UK

Abstract

Traditional analytes do not detect early renal disease; therefore there is a need to find new early markers of chronic kidney disease (CKD) in dogs to avoid the progression to irreversible renal damage. Our objective was to evaluate the presence of ferritin and cystatin C in urine of dogs with CKD and to relate their concentrations with the severity of the disease. Samples obtained from dogs naturally infected with *Leishmania infantum* were classified into four groups on the basis of the results of urinary protein/creatinine ratio and serum creatinine. This study shows that ferritin and cystatin C concentrations were increased in the urine of dogs with renal damage. Cystatin C value in urine only increased in severe stages of CKD with serum creatinine values >1.4 mg/dL, while the urinary ferritin concentration increased in dogs with proteinuria and serum creatinine <1.4 mg/dL, being, therefore, a renal biomarker earlier than creatinemia.

Publication Type

Journal article.

<214>

Accession Number

20153162009

Author

Parker, V. J.; Gilor, C.; Chew, D. J.

Title

Feline hyperparathyroidism: pathophysiology, diagnosis and treatment of primary and secondary disease.

Source

Journal of Feline Medicine and Surgery; 2015. 17(5):427-439. 61 ref.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

Practical relevance: Hyperparathyroidism exists in primary and secondary forms. Primary hyperparathyroidism has typically been considered a disease that uncommonly affects cats, but this condition is more prevalent than previous diagnoses would suggest. Secondary hyperparathyroidism may be caused by either nutritional influences (ie, nutritional secondary hyperparathyroidism) or chronic kidney disease (ie, renal secondary hyperparathyroidism). Tertiary hyperparathyroidism has yet to be documented in veterinary medicine, but it is possible that this condition occurs in some cats following longstanding renal secondary hyperparathyroidism. Clinical challenges: Diagnosis of this group of calcium metabolic disorders presents a number of challenges for the clinician. For example, clinical signs can be non-specific and, especially in the case of primary hyperparathyroidism, there is often a low index of suspicion for the disease; careful sample handling is required for testing of parathyroid hormone (PTH) and ionized calcium levels; and there is currently no feline-specific assay for PTH, which has implications for test sensitivity and interpretation of results. Aims: This article briefly outlines PTH and calcium physiology by way of introduction to a review of PTH measurement and interpretation. Various forms of feline hyperparathyroidism are then described, encompassing diagnosis and treatment options.

Publication Type

Journal article.

<215>

Accession Number

20153161803

Author

McLeland, S. M.; Cianciolo, R. E.; Duncan, C. G.; Quimby, J. M.

Title

A comparison of biochemical and histopathologic staging in cats with chronic kidney disease.

Source

Veterinary Pathology; 2015. 52(3):524-534.

Publisher

American College of Veterinary Pathologists Inc.

Location of Publisher

Lawrence

Country of Publication

USA

Abstract

Chronic kidney disease (CKD) is prevalent in elderly cats. Frequently, a diagnosis is made in later stages of disease, by which time many renal lesions are irreversible. As such, little headway has been made in identifying an etiology and preventing this common disease. The aim of this study was to evaluate the presence and severity of both reversible and irreversible histopathologic changes in the kidneys of cats at each stage of CKD and, in addition, to determine if lesion prevalence and character were different between stages. A total of 46 cats with CKD were classified according to the International Renal Interest Society (IRIS) as stage I (3 cats), stage II (16 cats), stage III (14 cats), and stage IV (13 cats). Eleven young, nonazotemic and 10 geriatric, nonazotemic cats were included as controls. The severity of tubular degeneration, interstitial inflammation, fibrosis, and glomerulosclerosis was significantly greater in later stages of CKD compared with early stages of disease. Proteinuria was associated with increased severity of tubular degeneration, inflammation, fibrosis, tubular epithelial single-cell necrosis, and decreased normal parenchyma. Presence of hyperplastic arteriosclerosis, fibrointimal hyperplasia, or other vascular lesions were not found to be significantly different between hypertensive and normotensive cats. The greater prevalence and severity of irreversible lesions in stage III and IV CKD implies that therapeutic interventions should be targeted at earlier stages of disease.

Publication Type

Journal article.

<216>

Accession Number

20153161802

Author

Sanchez-Lara, A. C.; Elliott, J.; Syme, H. M.; Brown, C. A.; Haylor, J. L.

Title

Feline chronic kidney disease is associated with upregulation of transglutaminase 2: a collagen cross-linking enzyme.

Source

Veterinary Pathology; 2015. 52(3):513-523.

Publisher

American College of Veterinary Pathologists Inc.

Location of Publisher

Lawrence

Country of Publication

USA

Abstract

Chronic kidney disease is a major cause of morbidity and mortality in cats. Transglutaminase 2 (TG2) is a calcium-dependent enzyme proposed to mediate tubulointerstitial fibrosis in the kidney by cross-linking collagen fibrils. Postmortem kidney tissue was obtained from primary renal azotemic (n=10) and nonazotemic (n=5) cats (14 domestic short hair, 1 Burmese; aged 9-23.7 years). Extracellular matrix protein deposition was determined by Masson's trichrome staining and collagen immunofluorescence. Total kidney transglutaminase (TG) enzyme activity and TG2 protein were measured in tissue homogenates by putrescine incorporation and Western blotting. Extracellular TG enzyme activity and TG2 protein were determined in situ by immunofluorescence, quantified by multiphase image analysis. Results were compared using the unpaired Student's t-test with Welch's correction. Elevated plasma creatinine, urea, and phosphate concentrations were associated with tubulointerstitial fibrosis but not glomerular fibrosis. Kidney homogenates from azotemic cats showed a 3-fold higher total TG enzyme activity and TG2 protein compared with kidneys from nonazotemic cats. Immunofluorescent studies performed in situ confirmed a 3-fold higher extracellular TG enzyme activity and TG2 protein in cats with azotemia. Tubulointerstitial TG2 showed a positive linear correlation with both renal function and tubulointerstitial fibrosis. In conclusion, for



cats with azotemia, both filtration failure and tubulointerstitial fibrosis were associated with the upregulation of TG2, a collagen cross-linking enzyme and the major isoform of transglutaminase in the kidney. TG2 may provide a new therapeutic target for drugs designed to slow the progression of feline chronic kidney disease.

Publication Type

Journal article.

<217>

Accession Number

20153200149

Author

Ferlizza, E.; Campos, A.; Neagu, A.; Cuoghi, A.; Bellei, E.; Monari, E.; Dondi, F.; Almeida, A. M.; Isani, G.

Title

The effect of chronic kidney disease on the urine proteome in the domestic cat (*Felis catus*).

Source

Veterinary Journal; 2015. 204(1):73-81. 36 ref.

Publisher

Elsevier Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Chronic kidney disease (CKD) is a major cause of mortality in cats, but sensitive and specific biomarkers for early prediction and monitoring of CKD are currently lacking. The present study aimed to apply proteomic techniques to map the urine proteome of the healthy cat and compare it with the proteome of cats with CKD. Urine samples were collected by cystocentesis from 23 healthy young cats and 17 cats with CKD. One-dimensional sodium-dodecyl-sulfate polyacrylamide gel electrophoresis (1D-SDS-PAGE) was conducted on 4-12% gels. Two-dimensional electrophoresis (2DE) was applied to pooled urine samples from healthy cats (n=4) and cats with CKD (n=4), respectively. Sixteen protein bands and 36 spots were cut, trypsin-digested and identified by mass spectrometry. 1D-SDS-PAGE yielded an overall view of the protein profile and the separation of 32±6 protein bands in the urine of healthy cats, while CKD cats showed significantly fewer bands ( $P<0.01$ ). 2-DE was essential in fractionation of the complex urine proteome, producing a reference map that included 20 proteins. Cauxin was the most abundant protein in urine of healthy cats. Several protease inhibitors and transport proteins that derive from plasma were also identified, including alpha-2-macroglobulin, albumin, transferrin, haemopexin and haptoglobin. There was differential expression of 27 spots between healthy and CKD samples ( $P<0.05$ ) and 13 proteins were unambiguously identified. In particular, increased expression of retinol-binding protein, cystatin M and apolipoprotein-H associated with decreased expression of uromodulin and cauxin confirmed tubular damage in CKD cats suggesting that these proteins are candidate biomarkers.

Publication Type

Journal article.

<218>

Accession Number

20153209109

Author

Grauer, G. F.

Title

Laboratory evaluation in dogs & cats with chronic kidney disease.

Source

NAVC Clinician's Brief; 2015. (May):65-69. 21 ref.

Publisher

Educational Concepts LLC

Location of Publisher

Tulsa

Country of Publication

USA

Publication Type

Journal article.

<219>

Accession Number

20153208704

Author

Chacar, F. C.; Guimaraes-Okamoto, P. T. C.; Melchert, A.

Title

Feline hyperthyroidism and chronic kidney disease - review. [Portuguese]

Source

Veterinaria e Zootecnia; 2015. 22(1):8-14. 12 ref.

Publisher

Faculdade de Medicina Veterinaria e Zootecnia, Universidade Estadual Paulista

Location of Publisher

Botucatu

Country of Publication

Brazil

Abstract

Hyperthyroidism and chronic kidney disease are the most common diseases in older cats. The excess of thyroid hormones increases renal perfusion and thus the glomerular filtration rate (GFR). In the long term, hyperdynamic state induced by thyrotoxicosis culminates in progressive renal injury, characterized by proteinuria, oxidative stress and glomerulosclerosis. In addition, 40% of hyperthyroid cats have undiagnosed pre-existing chronic kidney disease. The values of urea and creatinine remains within the reference range due to high GFR caused by thyroid hormones. The hyperthyroid cats with underlying chronic kidney disease constitute a diagnostic challenge. Thus, further studies on the renal implications of feline hyperthyroidism are needed.

Publication Type

Journal article.

<220>

Accession Number

20153207267

Author

Bijsmans, E. S.; Jepson, R. E.; Chang, Y. M.; Syme, H. M.; Elliott, J.

Title

Changes in systolic blood pressure over time in healthy cats and cats with chronic kidney disease.

Source

Journal of Veterinary Internal Medicine; 2015. 29(3):855-861. 29 ref.

**Publisher**

Wiley-Blackwell

**Location of Publisher**

Boston

**Country of Publication**

USA

**Abstract**

**Background:** Hypertension is a common problem in older cats, most often associated with chronic kidney disease (CKD). Cross-sectional studies have suggested that blood pressure in cats increases with age. **Hypothesis/Objectives:** To determine whether blood pressure in cats increases with age and whether this occurs independently of the presence of CKD. To investigate risk factors for developing hypertension. **Animals/Subjects:** Two hundred and sixty-five cats with CKD and 133 healthy cats  $\geq 9$  years were retrospectively identified. **Methods:** Four groups were created according to status at initial evaluation (CKD or healthy) and blood pressure at the last included visit (normotensive [NT] or developed hypertension [DH]): Healthy-NT, Healthy-DH, CKD-NT and CKD-DH. Systolic blood pressure (SBP) over time slopes were compared with 0 and between groups. Risk factors for the development of hypertension were investigated, and associations of biochemical and clinical variables with SBP were examined. **Results:** Cats that were hypertensive at CKD diagnosis ( $n=105$ ) were not included in further analyses. Twenty-seven cats with CKD and 9 healthy cats developed hypertension  $\geq 3$  months after diagnosis of CKD or their first visit. Systolic blood pressure significantly increased with age in all cats ( $P<.001$ ). Healthy cats were at less risk than cats with CKD to become hypertensive (hazard ratio 0.2,  $P<.001$ ), with creatinine being an independent risk factor for the development of hypertension. **Conclusions and Clinical Importance:** The high prevalence of hypertension in azotemic cats in this study shows the importance of monitoring of SBP in elderly cats, and in particular in cats with CKD.

**Publication Type**

Journal article.

<221>

**Accession Number**

20153232043

**Author**

Ghys, L. F. E.; Paepe, D.; Duchateau, L.; Taffin, E. R. L.; Marynissen, S.; Delanghe, J.; Daminet, S.

**Title**

Biological validation of feline serum cystatin C: the effect of breed, age and sex and establishment of a reference interval.

**Source**

Veterinary Journal; 2015. 204(2):168-173. many ref.

**Publisher**

Elsevier Ltd

**Location of Publisher**

Oxford

**Country of Publication**

UK

**Abstract**

Chronic kidney disease (CKD) is common in cats, but the routine renal markers, serum creatinine (sCr) and urea, are not sensitive or specific enough to detect early CKD. Serum cystatin C (sCysC) has advantages over sCr, both in humans and dogs, and sCysC concentration is significantly higher in cats with CKD than in healthy cats. The objective of this study was to determine the effect of age, sex and breed on feline sCysC and to establish a reference interval for feline sCysC. In total, 130 healthy cats aged 1-16 years were included. sCysC was determined using a validated particle-enhanced nephelometric immunoassay. sCr, urea, urine specific gravity, urinary protein:creatinine ratio (UPC) and systolic blood pressure (SBP) were also measured. No significant differences in sCysC concentration were observed among young, middle-aged

and geriatric cats, female intact, female neutered cats, male intact and male neutered cats, or among purebred and domestic short-or longhaired cats. The 95% reference interval for feline sCysC was determined to be 0.58-1.95 mg/L. sCr was significantly higher in geriatric cats than young cats. Serum urea in geriatric cats was significantly higher than in middle-aged and young cats ( $P=0.004$  and  $P<0.001$ , respectively). SBP in geriatric cats was significantly higher than in both middle-aged and young cats ( $P=0.004$  and  $P=0.040$ , respectively). Male neutered and female neutered cats had significantly higher serum urea concentrations than female intact cats ( $P=0.003$  and  $P=0.006$ , respectively). Male intact cats had a significantly higher UPC than female intact and female neutered cats ( $P=0.02$  for each comparison). There were no significant differences among sex groups for USG. It is of concern that sCysC in the majority of cats with CKD in previous studies falls within the reference interval calculated in this study. Further studies are warranted to evaluate the diagnostic value of sCysC as a renal marker in cats.

Publication Type  
Journal article.

<222>

Accession Number  
20153170743

Author  
Robertson, J.

Title  
Chronic kidney disease in cats: tools for early diagnosis and staging and impact on therapy.

Source  
Proceedings of the NAVC Conference, 17-21 January 2015, Orlando, Florida, USA. Volume 29, Small animal and exotics edition, Book 1 & Book 2; 2015. :521-525. 15 ref.

Publisher  
North American Veterinary Community (NAVC)

Location of Publisher  
Gainesville  
Country of Publication  
USA

Publication Type  
Conference paper.

<223>

Accession Number  
20153170738

Author  
Acierno, M. J.

Title  
Improving the quality of life for cats with chronic kidney disease.

Source  
Proceedings of the NAVC Conference, 17-21 January 2015, Orlando, Florida, USA. Volume 29, Small animal and exotics edition, Book 1 & Book 2; 2015. :508-510.

Publisher  
North American Veterinary Community (NAVC)

Location of Publisher  
Gainesville  
Country of Publication

USA  
Publication Type  
Conference paper.

<224>

Accession Number  
20153239382

Author  
Quimby, J. M.; Dow, S. W.

Title  
Novel treatment strategies for feline chronic kidney disease: a critical look at the potential of mesenchymal stem cell therapy.

Source  
Veterinary Journal; 2015. 204(3):241-246. many ref.

Publisher  
Elsevier Ltd

Location of Publisher  
Oxford

Country of Publication  
UK

Abstract

Stem cell therapy is an innovative field of scientific investigation with tremendous potential for clinical application that holds promise for the treatment of a variety of diseases in veterinary medicine. Based on the known desirable properties of mesenchymal stem cells, the therapy has potential for treatment of both acute kidney injury and chronic kidney disease in cats. This review details terminology commonly used in this field of study, sources of mesenchymal stem cells and their proposed mechanism of action particularly as it relates to renal repair. Studies performed in rodent models of chronic kidney disease and feline clinical trial results are also summarized with the aim of providing an overview of the current status of this treatment modality and its potential for the future.

Publication Type  
Journal article.

<225>

Accession Number  
20153256342

Author  
Cook, A. B.; Langston, C. E.; Fischetti, A. J.; Donovan, T. A.

Title  
Imaging diagnosis - urinary bladder duplication in a cat.

Source  
Veterinary Radiology & Ultrasound; 2015. 56(4):E48-E53. 32 ref.

Publisher  
Wiley-Blackwell

Location of Publisher  
Oxford

Country of Publication  
UK

Abstract

A female kitten presented for chronic, intermittent, antibiotic-responsive urinary incontinence and chronic kidney disease. Abdominal ultrasound identified bilateral pelvic/ureteral dilation and three closely apposed thin-walled fluid-filled structures in the caudal abdomen, extending toward the pelvic inlet. Excretory urography and negative contrast cystography identified contrast medium accumulation from the dilated ureters into two tubular soft tissue masses of the caudal abdomen, with subsequent gradual filling of a more cranially located urinary bladder. A retrograde vaginocystourethrogram identified a normal uterus, normal vagina, and a single urethra continuous with the cranially located urinary bladder. Antemortem diagnosis was suspicious for bilateral ectopic ureteroceles. Postmortem diagnosis, 35 months following initial presentation, determined the fluid-filled masses to have abundant smooth muscle in the wall, including a muscularis mucosa connected by a common ostium, consistent with urinary bladder duplication. Urinary bladder duplication should be included as a differential diagnosis in cats with these clinical and imaging characteristics. In this case, differentiation of ectopic ureterocele from urinary bladder duplication required histological confirmation.

Publication Type

Journal article.

<226>

Accession Number

20153266930

Author

Nabity, M. B.; Lees, G. E.; Boggess, M. M.; Yerramilli, M.; Obare, E.; Yerramilli, M.; Rakitin, A.; Aguiar, J.; Relford, R.

Title

Symmetric dimethylarginine assay validation, stability, and evaluation as a marker for the early detection of chronic kidney disease in dogs.

Source

Journal of Veterinary Internal Medicine; 2015. 29(4):1036-1044. 23 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

**Background:** Symmetric dimethylarginine (SDMA) is a small molecule formed by methylation of arginine, and released into blood during protein degradation. SDMA is primarily eliminated by renal excretion and is a promising endogenous marker of glomerular filtration rate (GFR). **Objectives:** To validate an assay for SDMA measurement, determine stability of SDMA in blood, and compare SDMA with serum creatinine concentration (sCr) and GFR for early detection of decreasing kidney function in dogs with chronic kidney disease (CKD). **Animals:** Eight male dogs affected with X-linked hereditary nephropathy and 4 unaffected male littermates. **Methods:** Prospective study validating SDMA measurement using liquid chromatography-mass spectrometry, assessing stability of SDMA in serum and plasma, and serially determining sCr, SDMA, and GFR (using iohexol clearance) in dogs during progression from preclinical disease to end-stage renal failure. Correlations were determined using linear regression. Timepoints at which sCr, SDMA, and GFR identified decreased renal function were compared using defined cutoffs, trending in an individual dog, and comparison with unaffected littermates. **Results:** Symmetric dimethylarginine was highly stable in serum and plasma, and the assay demonstrated excellent analytical performance. In unaffected dogs, SDMA remained unchanged whereas in affected dogs, SDMA increased during disease progression, correlating strongly with an increase in sCr ( $r=0.95$ ) and decrease in GFR ( $r=-0.95$ ). Although trending improved sCr's sensitivity, SDMA identified, on average, <20% decrease in GFR, which was earlier than sCr using any comparison method. **Conclusions and Clinical Importance:** Symmetric dimethylarginine is useful for both early identification and monitoring of decreased renal function in dogs with CKD.

Publication Type  
Journal article.

<227>

Accession Number  
20153273758

Author

Quimby, J. M.; Brock, W. T.; Moses, K.; Bolotin, D.; Patricelli, K.

Title

Chronic use of maropitant for the management of vomiting and inappetence in cats with chronic kidney disease: a blinded, placebo-controlled clinical trial.

Source

Journal of Feline Medicine and Surgery; 2015. 17(8):692-697. 19 ref.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

**Objectives:** Maropitant is commonly used for acute vomiting. A pharmacokinetic and toxicity study in cats indicated that longer term usage appears safe. The aim of this study was to assess the efficacy of maropitant for management of chronic vomiting and inappetence associated with feline chronic kidney disease (CKD). **Methods:** Forty-one cats with stable International Renal Interest Society Stage II or III CKD, no known concurrent illness, and a complaint of chronic vomiting and inappetence attributed to CKD were enrolled in a randomized, placebo-controlled, blinded clinical study. A complete blood count, serum biochemistry, urinalysis, urine culture, T4 and blood pressure were required for entry. Maropitant was administered at a dose of 4 mg orally (median 1.1 mg/kg, range 0.6-2.9 mg/kg) daily for 2 weeks. Owners kept daily logs of vomiting incidence, appetite and activity scores. Physical examination, weight, body condition score and serum biochemistry were performed before and after the trial period. Mann-Whitney statistics were used to compare treatment groups. **Results:** Thirty-three cats successfully completed the trial: 21 cats received the drug (nine Stage II cats, 12 Stage III cats) and 12 cats received placebo (seven Stage II cats, five Stage III cats). There was a statistically significant decrease in vomiting in cats with CKD that received maropitant ( $P < 0.01$ ). Cats that received maropitant did not have statistically significant differences in appetite scores, activity scores, weight or serum creatinine compared with placebo. **Conclusions and relevance:** Maropitant was demonstrated to palliate vomiting associated with CKD, and may be helpful in the nutritional management of cats with CKD.

Publication Type

Journal article.

<228>

Accession Number  
20153247859

Author

Jepson, R.

Title

The cat with chronic kidneys.

Source



BSAVA Congress 2015: Scientific Proceedings, Birmingham, UK, 9-12 April 2015; 2015. :250-251.  
Publisher  
British Small Animal Veterinary Association  
Location of Publisher  
Quedgeley  
Country of Publication  
UK  
Publication Type  
Conference paper.

<229>  
Accession Number  
20153247845  
Author  
Quimby, J. M.  
Title  
What is the optimal diet for chronic kidney disease?  
Source  
BSAVA Congress 2015: Scientific Proceedings, Birmingham, UK, 9-12 April 2015; 2015. :232-233.  
Publisher  
British Small Animal Veterinary Association  
Location of Publisher  
Quedgeley  
Country of Publication  
UK  
Publication Type  
Conference paper.

<230>  
Accession Number  
20153247711  
Author  
Jepson, R.  
Title  
Feline hyperthyroidism and chronic kidney disease.  
Source  
BSAVA Congress 2015: Scientific Proceedings, Birmingham, UK, 9-12 April 2015; 2015. :80.  
Publisher  
British Small Animal Veterinary Association  
Location of Publisher  
Quedgeley  
Country of Publication  
UK  
Publication Type  
Conference paper.

<231>

Accession Number

20153247688

Author

Quimby, J. M.

Title

Treatment of chronic kidney disease: what's new and what's not in nutrition?

Source

BSAVA Congress 2015: Scientific Proceedings, Birmingham, UK, 9-12 April 2015; 2015. :54.

Publisher

British Small Animal Veterinary Association

Location of Publisher

Quedgeley

Country of Publication

UK

Publication Type

Conference paper.

<232>

Accession Number

20153247687

Author

Quimby, J. M.

Title

Chronic kidney disease: early diagnosis for long-term management.

Source

BSAVA Congress 2015: Scientific Proceedings, Birmingham, UK, 9-12 April 2015; 2015. :53.

Publisher

British Small Animal Veterinary Association

Location of Publisher

Quedgeley

Country of Publication

UK

Publication Type

Conference paper.

<233>

Accession Number

20153247645

Author

Bijsmans, E.; Jepson, R.; Syme, H.; Elliott, J.

Title

Nitric oxide in feline chronic kidney disease and hypertension.

Source

BSAVA Congress 2015: Scientific Proceedings, Birmingham, UK, 9-12 April 2015; 2015. :491.

Publisher

British Small Animal Veterinary Association  
 Location of Publisher  
 Quedgeley  
 Country of Publication  
 UK  
 Publication Type  
 Conference paper.

<234>

Accession Number  
 20153247589

Author  
 Pimenta, M. M.

Title

Occurrence of nephrolithiasis and/or ureterolithiasis in cats with chronic kidney disease attended at The Veterinary Hospital of the University of Sao Paulo. [Portuguese]

Source

Ocorrência de calculo renal e/ou ureteral em gatos com doença renal crônica atendidos no Hospital Veterinário da Universidade de São Paulo; 2013. :114 pp. 70 ref.

Publisher

Faculdade de Medicina Veterinária e Zootecnia, Universidade de São Paulo

Location of Publisher

São Paulo

Country of Publication

Brazil

Abstract

Kidney stone in cats have become a major concern in feline practice. Calcium oxalate stone (CaOx) located in the kidneys and/or ureters started to compose a new profile of urolithiasis in contrast to struvite stones often found in the urinary bladder. A cross-sectional clinical study with 96 cats was performed in order to determine the prevalence of renal origin lithiasis (nephrolithiasis and ureterolithiasis) in cats with CKD and a possible association between them. Twenty-four of these patients did not meet the classification criteria and were excluded. Cats with CKD (n=72) were divided into two groups, CKD with evidence of nephrolithiasis or ureterolithiasis (n=47) and CKD without evidence of nephrolithiasis or ureterolithiasis (n=25). Homogeneity was observed regarding the classification of CKD according to the stages proposed by IRIS - International Renal Interest Society (p=0.5613), also noted in relation to age (p=0.274). Cats classified as CKD stage two were over-represented in both groups. The size of the left and right kidney and urinary gravity (p=0.013) was marked by a significant statistically difference between the two groups. In terms of length size, according to longitudinal plane, the right kidney with lithiasis measured 3.25 cm and 3.61 cm without lithiasis (p=0.009). The same size relation was noticed for the left kidney (p=0.048), where the average volume observed was 3.21 cm for the calculi group and 3.69 cm for the group without calculi. The intact parathyroid hormone (iPTH) was assessed in all animals, as for total calcium, ionized calcium, phosphorus and potassium plasma concentrations. No difference were found for any of these parameters between the two groups. However, the ionized calcium median values were near the normal upper limit in both groups (1.39 mmol/L). Bicarbonate blood concentration (HCO<sub>3</sub><sup>-</sup>) evaluated in both groups were different (P=0.037), but without any clinical significance. Urinary creatinine, calcium: creatinine ratios and calcium urinary fractional excretion (FE<sub>Ca</sub>) were altered between groups, with p=0.039, p=0.037 and p=0.043, respectively. Bacteriuria was a common factor in cats with calculi and without calculi (p=0.162), however, infection was confirmed by urine culture in only 4/47 cats with calculi and 2/25 cats without calculi (p=1.00). Arterial blood pressure was also performed and remained unchanged when compared between both groups. There are strong evidence that cats fed with only dry food showed higher tendency to form calculi (p=0.052). Another group of 23 cats free from CKD and calculi composed a complementary group, enabling further study. The results of this study support the

high prevalence of nephrolithiasis and ureterolithiasis in cats with CKD. Either a cause or consequence of CKD, cats with calculi have an increased evidence of kidney damage.

Publication Type

Thesis.

<235>

Accession Number

20153321694

Author

Paeppe, D.; Lefebvre, H. P.; Concordet, D.; Hoek, I. van; Croubels, S.; Daminet, S.

Title

Simplified methods for estimating glomerular filtration rate in cats and for detection of cats with low or borderline glomerular filtration rate.

Source

Journal of Feline Medicine and Surgery; 2015. 17(10):889-900. 37 ref.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

Objectives: Diagnosis of early feline chronic kidney disease (CKD) is challenging. Glomerular filtration rate (GFR) is the best overall indicator of kidney function, but multisample plasma clearance methods to determine GFR are labour intensive, time consuming and stressful for feline patients. This study aimed to develop simplified methods to detect decreased GFR in cats. Methods: Data from a nine-sample combined plasma exogenous creatinine-iohexol clearance test of 73 cats were used. Limited sampling strategies were developed by comparing all sampling time combinations with the complete nine sampling times set and selecting the best sampling time combinations based on maximum relative error. By regression analysis, the ability of routine blood (serum creatinine, serum urea) and urine (urine specific gravity, urinary protein:creatinine ratio) variables to predict GFR or identify cats with low or borderline GFR was examined. Cut-off clearance marker concentrations to predict low or borderline GFR was determined at three time points after marker injection. All procedures were analysed for three clearance markers (exo-iohexol, creatinine, endo-iohexol). Results: For reliable estimation of GFR, at least three blood samples for clinical purposes and five blood samples for research purposes are required. Regression formulae based on routine variables did not reliably predict GFR, but accurately identified cats with low (sensitivity 96.5-98.2%; specificity 60-91.3%) or borderline (sensitivity 91.1-96%; specificity 76.5-81.8%) GFR. Clearance marker concentrations exceeding given marker cut-off concentrations also identified cats with low or borderline GFR with high sensitivities and specificities. Conclusions and relevance: These simplified methods will facilitate the detection of early kidney dysfunction in cats. Early diagnosis allows timely therapeutic intervention, and future studies must reveal whether this improves the long-term outcome of cats with CKD.

Publication Type

Journal article.

<236>

Accession Number

20153305917

Author

Chandler, M.  
 Title  
 Dietary therapy for chronic kidney disease in cats and dogs.  
 Source  
 Veterinary Times; 2015. 45(34):12, 14. 16 ref.  
 Publisher  
 Veterinary Business Development Ltd  
 Location of Publisher  
 Peterborough  
 Country of Publication  
 UK  
 Publication Type  
 Journal article.

<237>  
 Accession Number  
 20153337535  
 Author  
 Jesus, A. C. de; Souza, H. J. M. de; Gheren, M. W.; Silva, C. A. da  
 Title  
 Urinary tract infection in cats with chronic kidney disease. [Portuguese]  
 Source  
 Clinica Veterinaria; 2015. 20(117):70-76. 30 ref.  
 Publisher  
 Editora Guara  
 Location of Publisher  
 Sao Paulo  
 Country of Publication  
 Brazil  
 Abstract  
 Chronic kidney disease (CKD) and urinary tract infection (UTI) are among the most commonly encountered and often correlated disorders in small animal medicine. The development of UTI depends on an imbalance between the infecting organism and the host defense mechanisms. Nowadays, it is well established that the frequency of pathogens and resistance patterns can vary significantly not only from country to country, but also in different veterinary hospitals within the same country. Therefore, monitoring and identification of microorganism prevalence patterns are essential as preventive measures against infections. The aim of this study was to verify the frequency of UTI in cats with CKD, as well as to identify the bacterial species isolated from these animals and their antimicrobial susceptibility.  
 Publication Type  
 Journal article.

<238>  
 Accession Number  
 20153337439  
 Author  
 Williams, T.  
 Title  
 Chronic kidney disease in cats with hyperthyroidism.

Source  
 NAVC Clinician's Brief; 2015. (September):10-12. 6 ref.  
 Publisher  
 Educational Concepts LLC  
 Location of Publisher  
 Tulsa  
 Country of Publication  
 USA  
 Publication Type  
 Journal article.

<239>

Accession Number  
 20153333651  
 Author  
 Cheng, F. P.; Hsieh, M. J.; Chou, C. C.; Hsu, W. L.; Lee, Y. J.  
 Title  
 Detection of indoxyl sulfate levels in dogs and cats suffering from naturally occurring kidney diseases.  
 Source  
 Veterinary Journal; 2015. 205(3):399-403. 23 ref.  
 Publisher  
 Elsevier Ltd  
 Location of Publisher  
 Oxford  
 Country of Publication  
 UK  
 Abstract

Indoxyl sulfate (IS), a protein-bound uraemic toxin, has been found to accumulate in the serum of people with renal diseases and is associated with free radical induction, nephrotoxicity cardiovascular toxicity, and osteoblast cytotoxicity. Although IS has been studied in humans and in experimental models, the role of IS in dogs and cats with kidney disease has not been investigated. A high performance liquid chromatography system was applied to detect plasma IS concentrations in non-azotaemic animals (63 dogs, 16 cats) and in animals with renal azotaemia (66 dogs, 69 cats). The IS levels of azotaemic animals were significantly higher ( $P<0.01$ ) than those of non-azotaemic animals (median [IQR] 20.4 (9.5) mg/L vs. 7.2 (8.8) mg/L for dogs; median [IQR] 21 (18.9) mg/L vs. 14.8 (12.3) mg/L for cats). The IS level was significantly correlated with blood urea nitrogen, serum creatinine and phosphate concentrations. Dogs with acute kidney injury had significantly higher IS levels ( $P<0.01$ ) than those with chronic kidney diseases (CKD) (median [IQR] 57.7 (40.8) mg/L vs. 17.7 (25.1) mg/L). When CKD was graded using the International Renal Interest Society (IRIS) staging system, IS levels were correlated with CKD severity in both dogs and cats. The IS concentration is directly related to loss of renal function. Further studies are necessary to determine whether measurement of IS provides any additional diagnostic or prognostic information in dogs and cats with kidney disease.

Publication Type  
 Journal article.

<240>

Accession Number  
 20153350207

Author

Iwama, R.; Sato, T.; Katayama, M.; Shimamura, S.; Satoh, H.; Ichijo, T.; Furuhashi, K.

Title

Relationship of glomerular filtration rate based on serum iodixanol clearance to IRIS staging in cats with chronic kidney disease.

Source

Journal of Veterinary Medical Science; 2015. 77(8):1033-1035. 14 ref.

Publisher

Japanese Society of Veterinary Science

Location of Publisher

Tokyo

Country of Publication

Japan

Abstract

We examined the correlation between the glomerular filtration rate (GFR) estimated from an equation based on the serum iodixanol clearance technique and International Renal Interest Society (IRIS) stages of chronic kidney disease (CKD) in cats. The equation included the injection dose, sampling time, serum concentration and estimated volume of distribution (Vd) of the isotonic, nonionic, contrast medium iodixanol as a test tracer. The percent changes in the median basal GFR values calculated from the equation in CKD cats resembled those of IRIS stages 1-3. These data validate the association between the GFR derived from the simplified equation and IRIS stages based on the serum creatinine concentration in cats with CKD. They describe the GFR ranges determined using single-sample iodixanol clearance for healthy cats and cats with various IRIS stages of CKD.

Publication Type

Journal article.

<241>

Accession Number

20153350188

Author

Maeda, H.; Sogawa, K.; Sakaguchi, K.; Abe, S.; Sagizaka, W.; Mochizuki, S.; Horie, W.; Watanabe, T.; Shibata, Y.; Satoh, M.; Sanda, A.; Nomura, F.; Suzuki, J.

Title

Urinary albumin and transferrin as early diagnostic markers of chronic kidney disease.

Source

Journal of Veterinary Medical Science; 2015. 77(8):937-943. 19 ref.

Publisher

Japanese Society of Veterinary Science

Location of Publisher

Tokyo

Country of Publication

Japan

Abstract

Feline renal diseases are increasingly noted in veterinary practice. It is important to diagnose and identify the pathological basis of renal dysfunction accurately at an early stage, but there are only a few reports on this area in clinical veterinary medicine. We investigated the efficacy of measurement of urinary albumin (u-Alb) and urinary transferrin (u-Tf) for early diagnosis using 5- micro l urine samples collected noninvasively by catheterization from normal (IRIS stage I) cats and cats with stage I chronic kidney disease (CKD). The u-Alb levels in normal and stage I CKD cats were 6.0±4.5 and 11.2±8.4 mg/dl, respectively, and the u-Tf levels were 0.09±0.42 and 0.52±0.79 mg/dl, respectively. Based on ROC curve analysis, the sensitivity and specificity of u-Alb and u-Tf were higher than those of the currently used biomarker, the plasma creatinine level. The sensitivity of u-Alb was higher than that of u-Tf, whereas the specificity of u-Tf was

higher than that of u-Alb. The validity of the threshold albumin level (20 mg/dl) was confirmed by measurements using SDS-PAGE. Since leakage of u-Tf in urine precedes leakage of u-Alb, inclusion of u-Tf in biochemistry tests may be appropriate for IRIS staging as a diagnostic marker of early diagnosis of renal disorder in cats.

Publication Type  
Journal article.

<242>

Accession Number  
20153348932

Author  
Alves, M. A. M. K.; Crivellenti, L. Z.; Carvalho, M. B.

Title  
Fibrous osteodystrophy of renal origin in two old dogs: case report. [Portuguese]

Source  
Revista Portuguesa de Ciencias Veterinarias; 2014. 109(588/590):51-56. 29 ref.

Publisher  
Sociedade Portuguesa de Ciencias Veterinarias

Location of Publisher  
Lisboa

Country of Publication  
Portugal

Abstract

The renal osteodystrophy or fibrous osteodystrophy is a complication of the renal secondary hiperparathyroidism in advanced stage of chronic kidney disease (CKD). The condition is characterized by osteopenic disturbance and proliferative fibrous conjunctive tissue, more evident in the jaw and maxilla bones, which most commonly affects young animals. This report describes two cases of old dogs showing fibrous osteodystrophy. One male, eleven years old Labrador showed a history of recurrent vomiting, decreased appetite, weight lost and polyuria, and one male, ten years old mongrel showed inappetence, apathy, sporadic vomiting, frequent regurgitation, weight lost, polyuria and dark diarrheal stool; clinical signals verified in both dogs showed one month of evolution. At physical examination, both animals presented moderate dehydration, bilateral jaw increase, pale mucous and systemic arterial hypertension. The skull radiographs showed osteopenia of the jaw and maxilla, with a suggestive appearance of loss of bone support of the tooth. Laboratorial tests showed normocytic normochromic anemia, severe azotemia and hyperphosphatemia besides hypoalbuminemia. The relevant urinalysis findings were proteinuria and low urinary density. The diagnostic conclusion for both animals was CKD in stage 4, with fibrous osteodystrophy of renal origin. Although having been instituted a medical treatment for rehydration, hypertension control, reduction of hyperphosphatemia and minimization of uremia, both dogs eventually died due to worsening of the uremia. The present work stands out fibrous osteodystrophy of renal origin in old dogs, coincident with the first uremic sings presentation.

Publication Type  
Journal article.

<243>

Accession Number  
20153348685

Author  
Borin-Crivellenti, S.; Crivellenti, L. Z.; Carvalho, M. B.; Santana, A. E.



Title

Bone marrow cytological evaluation in dogs with chronic kidney disease.

Source

Arquivo Brasileiro de Medicina Veterinaria e Zootecnia; 2014. 66(6):1751-1756. 18 ref.

Publisher

FEPMVZ - Editora

Location of Publisher

Belo Horizonte

Country of Publication

Brazil

Abstract

Since anemia is indicated as an important compromising factor for the quality of life of dogs with chronic kidney disease (CKD), bone marrow cytological analysis may provide more information on the hematological profile these dogs and, therefore, allow clinicians to not only choose the most adequate treatment but also monitor the response to therapy. The aim of this study was to investigate the feasibility with sternal bone marrow puncture in chronic kidney disease (CKD) using only local anesthesia and check if the cytological analysis is helpful to determine the hematological status. We found that erythroid hypoplasia occurred only in terminal CKD patients, and that the bone marrows of dogs with CKD stages 2 and 3 were quantitatively similar to those of elderly dogs. All dogs tolerated the bone marrow puncture using only local anesthesia with lidocaine and bone marrow cytological evaluation may be a useful tool for hematopoietic evaluation of anemic dogs with CKD.

Publication Type

Journal article.

<244>

Accession Number

20153356286

Author

Kelawala, D. N.; Rajhans, M. S.; Patel, S. M.; Parikh, P. V.; Patil, D. B.

Title

Bilateral retinal detachment in a German shepherd dog with chronic kidney disease.

Source

Indian Journal of Veterinary Surgery; 2015. 36(1):57-58. 2 ref.

Publisher

Indian Society for Veterinary Surgery

Location of Publisher

Hisar

Country of Publication

India

Abstract

A 9-year-old male German shepherd with history of polyuria, polydipsia, weight loss, vomiting, weakness, lethargy and oliguria with poor body condition and unkempt hair coat is reported. Biochemical analysis indicated chronic kidney disease and the dog was subjected to aggressive medical therapy for 15 days and showed clinical resolution after the treatment. After a month, the dog is presented for sudden onset of blindness and hypertension. Ophthalmic examination revealed bilaterally negative menace reflex, sluggish pupillary light and corneal reflexes and pupillary dilatation. Retinal changes observed were haemorrhages, oedema and detachments. Ultrasonographic diagnosis confirmed the diagnosis of bilateral retinal detachment and the patient was treated accordingly, but succumbed two months after the initial presentation.

Publication Type

Journal article.

<245>

Accession Number

20153370390

Author

Paepe, D.

Title

Early recognition of feline chronic kidney disease. (Special Issue: Geriatric feline medicine.)

Source

European Journal of Companion Animal Practice; 2015. 25(3):61-77. 167 ref.

Publisher

Federation of European Companion Animal Veterinary Associations (FECAVA)

Location of Publisher

Paris

Country of Publication

France

Abstract

Feline chronic kidney disease (CKD) is a common, irreversible and progressive disease. Currently, feline CKD is often diagnosed late in the course of the disease limiting the therapeutic options. Detection of mild kidney dysfunction is difficult because the clinical signs, azotaemia and impaired urine concentrating ability may be absent. However, early detection of CKD is important, so early appropriate therapy can be initiated, the aim of which is to slow down declining kidney function and to postpone disease complications. Therefore, veterinarians are encouraged to screen at-risk populations. Research in feline nephrology currently focuses on the search for convenient and cost-effective methods to identify cats with early kidney dysfunction.

Publication Type

Journal article.

<246>

Accession Number

20153340094

Author

Burlacu, M. R.; Saftencu, P. M.; Solcan, G.

Title

Chronic kidney disease in type II feline diabetes mellitus.

Source

Lucrari Stiintifice - Universitatea de Stiinte Agricole a Banatului Timisoara, Medicina Veterinara; 2015. 48(4):158-165. 12 ref.

Publisher

Facultatea de Medicina Veterinara

Location of Publisher

Timisoara

Country of Publication

Romania

Abstract

Background: The pathophysiology of feline diabetes mellitus is complex and in most cases, aside the metabolic function, it involves other main organ systems such as nervous system, cardiovascular and renal function. Objective: This retrospective study quantifies the risk for chronic kidney disease in association with diabetes mellitus in cats. Methods: Clinical records of all cats presented to the Faculty of Veterinary Medicine of Iasi, Romania were analyzed. The following parameters were assessed: signalment, weight, diabetes mellitus and chronic kidney disease. Patients were divided into two groups: DM-CKD diabetic with chronic

kidney disease; nonDM-CKD non diabetic with chronic kidney disease. Period prevalence (PP) of chronic kidney disease in each group was calculated, as well as odds ratios (OR), including 95% confidence intervals (95% CI). DM risks were compared using Chi-square (significance level  $p < 0.05$ ). Results: A total of 83 cases (47 males; 36 females) were diagnosed with CKD. The group of DM-CKD included 18 cats (PP: 27.7%, 95%CI: 16.8-38.6%; OR: 21.6%; 95%CI: 16.3-53.7%,  $p < 0.0001$ ) which were also diagnosed with diabetes mellitus. In this group, 12 cats (14.5%) were males (PP: 31.5%, 95%CI: 16.8-46.3%; OR: 36.6%; 95%CI: 17.1-78.3%;  $p < 0.0001$ ) and 6 cats (7.3%) females (PP: 22.2%, 95%CI: 6.52-37.9%; OR: 21.6%; 95%CI: 8.15-57.5%;  $p < 0.0001$ ). The nonDM-CKD group, with 65 CKD cases of 5045 is an important indicator of diabetes mellitus influence, with a PP: 1.3%, 95%CI: 1-1.61%; OR: 0.03%; 95%CI: 0.01-0.06%, significantly less than DM-CKD group ( $p < 0.0001$ ) Conclusion: Renal function impairment in insulin dependent diabetes mellitus is often associated with insulin resistance, fluctuating insulin requirements and unstable clinical state of the cats. As a consequence case monitoring of diabetic felines becomes more difficult as polyuria/polydipsia syndrome is aggravated by chronic kidney disease.

Publication Type

Journal article.

<247>

Accession Number

20153340026

Author

Sturgess, K.

Title

Update on ckd treatment: feline med.

Source

Veterinary Times; 2015. 45(39):8, 10. 9 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Publication Type

Journal article.

<248>

Accession Number

20153380129

Author

Valle, P. G. do; Veado, J. C. C.; Anjos, T. M. dos; Tassini, L. E. de S.; Ferreira, L. F. L.; Lucas, L. de F.

Title

Effect of the association of diet, omega-three, and antioxidants in dogs with chronic kidney disease.

Source

Semina: Ciencias Agrarias (Londrina); 2015. 36(5):3161-3172. 30 ref.

Publisher

Universidade Estadual de Londrina

Location of Publisher

Londrina

Country of Publication

Brazil

#### Abstract

To evaluate the contribution of the drug combination of omega-3, vitamin E, sodium selenite, copper gluconate, zinc gluconate, chondroitin sulfate, and glucosamine (GeriooxReg.), 12 dogs with chronic kidney disease (CKD) in outpatient clinical care at the veterinary hospital of a federal institution of higher education were studied. Complete blood counts, urinalyses, measurements of the serum concentration of calcium, phosphorus, urea and creatinine, and calculations of the urinary protein to creatinine ratio (UPC) and glomerular filtration rate (GFR) were performed before starting the experiment (T0) and after 30 (T1), 90 (T2), and 120 days (T3). There was a significant negative correlation ( $P < 0.05$ ) between the GFR and UPC and between the GFR and serum urea and creatinine (when the GFR was high, the UPC, serum urea and creatinine were decreased). Improvement was observed in the clinical status of the patients studied, as reported by their owners, who indicated improved vitality and appetite, and by clinical observation, which showed improvement in the overall health status, coat, and analyzed parameters. The combination of omega-3, vitamin E, sodium selenite, copper gluconate, zinc gluconate, chondroitin sulfate, and glucosamine found in GeriooxReg. proved to be an important adjuvant in the conservative treatment of dogs with CKD, causing an increase in the GFR with a decrease in proteinuria. This result indicates that there was an improvement in the quality of excretion, not an increase in the excretion itself, which is a result of the undesired effect of increased glomerular pressure.

Publication Type

Journal article.

<249>

Accession Number

20153348328

Author

Decome, M.

Title

The SDMA: an early marker of chronic renal insufficient growth. [French]

Source

Point Veterinaire; 2015. 46(359(Part 2)):52-53. 12 ref.

Publisher

Newsmed

Location of Publisher

Paris

Country of Publication

France

#### Abstract

The diagnostic value of symmetric dimethylarginine (SDMA) as a biomarker of glomerular filtration rate and chronic kidney disease in cats and dogs is discussed.

Publication Type

Journal article.

<250>

Accession Number

20153390097

Author

Oburai, N. L.; Rao, V. V.; Bonath, R. B. N.

Title

Comparative clinical evaluation of Boerhavia diffusa root extract with standard enalapril treatment in canine chronic renal failure.

Source

Journal of Ayurveda and Integrative Medicine (J-AIM); 2015. 6(3):150-157. 65 ref.

Publisher

Medknow Publications

Location of Publisher

Mumbai

Country of Publication

India

Abstract

Background: Complementing herbal drugs with conservative modern treatment could improve renal condition in canine chronic renal failure (CRF). Objective: In this study, clinical evaluation of Boerhavia diffusa root extract was carried out in CRF in dogs in comparison with standard enalapril. Materials and Methods: A total of 20 dogs of mixed breeds suffering from CRF from 1 to 2 months were divided into two groups (n=10) and treated as follows: Group I - Enalapril at 0.5 mg/kg p.o. once daily for 90 days+amoxicillin and cloxacillin at 25 mg/kg i.m. once daily for 1-week; Group II - B. diffusa root extract at 500 mg p.o per dog daily for 90 days. Both groups were maintained on a supportive fluid therapy. The data were analyzed using paired t-test and one-way ANOVA followed by Dunnett's post-hoc test. Results: CRF caused a significant ( $P<0.05$ ) increase in systolic and diastolic blood pressure, serum creatinine, urea nitrogen, sodium, potassium, phosphorus, urinary protein, alkaline phosphatase (ALP), and glutamyl transferase (GGT). A significant ( $P<0.05$ ) decrease in hemoglobin and total erythrocyte count (TEC) was also observed. Nephrosonography revealed indistinct corticomedullary junction, altered renal architecture, hyper-echoic cortex, medulla, and sunken kidneys. Both the treatments significantly ( $P<0.05$ ) reduced systolic and diastolic blood pressure by day 30. Serum Creatinine, urea nitrogen, phosphorus, urinary protein, ALP, and GGT showed significant ( $P<0.05$ ) reduction by day 60 in both the treatments. However, potassium levels were normalized only by B. diffusa root extract treatment by day 30. Both the treatments failed to show a significant improvement in nephrosonographic picture even after 90 days posttreatment. Conclusions: In conclusion, the efficacy of B. diffusa root extract was comparable to standard enalapril treatment of CRF in dogs.

Publication Type

Journal article.

<251>

Accession Number

20153368571

Title

Prevent organs from breaking down. [German]

Source

Praktische Tierarzt; 2014. 95(Special Issue):42-49.

Publisher

Schlutersche Verlagsgesellschaft GmbH & Co. KG

Location of Publisher

Hannover

Country of Publication

Germany

Abstract

A review on the function of the heart and kidneys in dogs and cats was presented highlighting the diagnosis and treatment during occurrence of heart and kidney failure.

Publication Type

Journal article.

<252>

Accession Number

20153409119

Author

Geddes, R. F.; Elliott, J.; Syme, H. M.

Title

Relationship between plasma fibroblast growth factor-23 concentration and survival time in cats with chronic kidney disease.

Source

Journal of Veterinary Internal Medicine; 2015. 29(6):1494-1501. 40 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

Background: Fibroblast growth factor-23 (FGF-23) and parathyroid hormone (PTH) are commonly increased in cats with azotemic chronic kidney disease (CKD). Both are predictors of survival time in human patients, but these relationships have not previously been examined in the cat. Objectives: To investigate the relationship between plasma FGF-23 and PTH concentrations at diagnosis of CKD in cats with survival time and with disease progression over 12 months. Animals: 214 azotemic, client-owned cats ( $\geq 9$  years). Methods: Retrospective study: Biochemical and urinary variables at diagnosis of azotemic CKD, including plasma FGF-23 and PTH concentrations were assessed as predictors of survival time (all-cause mortality) using Cox regression, and as predictors of CKD progression over 12 months using logistic regression. Results: In the final multivariable Cox regression model, survival was negatively associated with plasma creatinine ( $P=.002$ ) and FGF-23 concentrations ( $P=.014$ ), urine protein-to-creatinine ratio ( $P<.001$ ) and age ( $P<.001$ ). Survival was positively associated with PCV ( $P=.004$ ). In the final multivariable logistic regression model, independent predictors of CKD progression included logFGF-23 and age. Neither plasma phosphate nor PTH was found to be an independent predictor of survival time or of CKD progression. Conclusions and Clinical Importance: Plasma FGF-23 concentration is a novel prognostic indicator in cats with CKD, independent of other factors including plasma creatinine and phosphate concentrations. Further work is required to assess if FGF-23 contributes directly to CKD progression, but regardless these findings may make FGF-23 a useful biomarker for predicting poorer outcomes in cats with CKD.

Publication Type

Journal article.

<253>

Accession Number

20153409117

Author

Sent, U.; Gossel, R.; Elliott, J.; Syme, H. M.; Zimmering, T.

Title

Comparison of efficacy of long-term oral treatment with telmisartan and benazepril in cats with chronic kidney disease.

Source

Journal of Veterinary Internal Medicine; 2015. 29(6):1479-1487. 40 ref.

Publisher

Wiley-Blackwell  
Location of Publisher  
Boston  
Country of Publication  
USA

#### Abstract

**Background:** The efficacy and benefits of telmisartan in cats with chronic kidney disease (CKD) have not previously been reported. **Hypothesis:** Long-term treatment of cats with CKD using telmisartan decreases urine protein-to-creatinine ratio (UP/C) similar to benazepril. **Animals:** Two-hundred and twenty-four client-owned adult cats with CKD. **Methods:** Prospective, multicenter, controlled, randomized, parallel group, blinded clinical trial with noninferiority design. Cats were allocated in a 1:1 ratio to either telmisartan (1 mg/kg; n=112) or benazepril (0.5-1.0 mg/kg; n=112) PO q24 h. The primary endpoint was prospectively defined as the change in proteinuria (benazepril:telmisartan) based on a log transformed weighted average of UP/C change from baseline (AUC 0->t/t) as a percentage compared using a confidence interval (CI) approach. Changes of UP/C from baseline were assessed on all study days and corrected for multiple comparisons. **Results:** Telmisartan proved noninferior to benazepril in controlling proteinuria (CI, -0.035 to 0.268). At Day 180, UP/C compared to baseline in the telmisartan group was significantly lower (-0.05+or-0.31; P=.016), whereas in the benazepril group the change (-0.02+or-0.48) was not statistically significant (P=.136). Similar results were obtained at all assessment points with significant decrease in UP/C occurring with telmisartan but not benazepril. **Conclusion and Clinical Importance:** Both telmisartan and benazepril were well tolerated and safe. Telmisartan proved to be noninferior to benazepril and significantly decreased proteinuria relative to baseline at all assessment points whereas benazepril did not.

Publication Type  
Journal article.

<254>

Accession Number  
20153420935  
Author  
Bird, L.; Walker, D.  
Title  
Treatment of acute kidney injury.  
Source  
Companion Animal; 2015. 20(4):204-210. 12 ref.  
Publisher  
MA Healthcare Limited  
Location of Publisher  
London  
Country of Publication  
UK

#### Abstract

This series of four articles explores the pathophysiology and treatment of chronic kidney disease (CKD) and acute kidney injury (AKI). We review the causes of CKD and AKI, treatment options and secondary complications. CKD and AKI are both relatively common in general practice, and early identification and appropriate management may improve the outcome of patients with these conditions. This fourth article focuses on the treatment of AKI.

Publication Type  
Journal article.



<255>

Accession Number

20153420928

Author

Danks, L.

Title

The nutritional management of feline chronic kidney disease.

Source

Companion Animal; 2015. 20(3):162-167. 21 ref.

Publisher

MA Healthcare Limited

Location of Publisher

London

Country of Publication

UK

Abstract

Chronic kidney disease (CKD) is a frequent disease seen in older cats and while it is a progressive condition, the veterinary practice team can play a key role in delaying the inevitable. Dietary modifications are key to slowing the progression of renal disease and alleviating its metabolic consequences. There are four main objectives of nutritional management. These are: (a) provide sufficient energy to maintain a good body condition; (b) alleviate the clinical manifestations of uraemia; (c) minimise fluid, electrolyte and acid-base disturbances; and (d) slow disease progression. This article reviews the nutritional concepts employed in the management of CKD, and demonstrates why a renal diet should be implemented early in the disease to maximise both its benefits and acceptance by the feline patient.

Publication Type

Journal article.

<256>

Accession Number

20153420921

Author

Bird, L.; Walker, D.

Title

Treatment of chronic kidney disease.

Source

Companion Animal; 2015. 20(2):104-111. 15 ref.

Publisher

MA Healthcare Limited

Location of Publisher

London

Country of Publication

UK

Abstract

This series of four articles explores the pathophysiology and treatment of chronic kidney disease (CKD) and acute kidney injury (AKI). We review the causes of CKD and AKI, treatment options and secondary complications. CKD and AKI are both relatively common in general practice, and early identification and appropriate management may improve the outcome of patients with these conditions. This second article focuses on the treatment of CKD.

Publication Type

Journal article.



<257>

Accession Number

20153420909

Author

Bird, L.; Walker, D.

Title

Pathophysiology of chronic kidney disease.

Source

Companion Animal; 2015. 20(1):15-19. 10 ref.

Publisher

MA Healthcare Limited

Location of Publisher

London

Country of Publication

UK

Abstract

This series of four articles explores the pathophysiology and treatment of chronic kidney disease (CKD) and acute kidney injury (AKI). We review the causes of CKD and AKI, treatment options and secondary complications. CKD and AKI are both relatively common in general practice and early identification and appropriate management may improve the outcome of patients with these conditions. This first article focuses on the pathophysiology of CKD and possible complications.

Publication Type

Journal article.

<258>

Accession Number

20153420285

Author

Kovarikova, S.

Title

Urinary biomarkers of renal function in dogs and cats: a review.

Source

Veterinari Medicina; 2015. 60(11):589-602. many ref.

Publisher

Institute of Agricultural Economics and Information

Location of Publisher

Prague

Country of Publication

Czech Republic

Abstract

Kidney diseases commonly affect dogs and cats. Early diagnosis of renal impairment may be challenging even when urinalysis is used to provide additional information. Serum creatinine concentration is often used in the diagnosis, but it is a relatively insensitive marker of renal function. Particular attention is aimed at the investigation of certain molecules that may occur in urine at elevated levels as a result of glomerular or tubular dysfunction. These changes may be found before the increase of serum creatinine levels. This review article summarises reports of urine biomarkers and their utility in detecting early kidney disease in dogs and cats. Detection of multiple urinary biomarkers in diagnosis of acute kidney injury and chronic kidney disease

may increase specificity and sensitivity. Early diagnosis of reduced renal functional mass allows early therapeutic interventions which may decrease morbidity and mortality.

Publication Type

Journal article.

<259>

Accession Number

20153431756

Author

Chalhoub, S.; Langston, C.

Title

CPD article: anaemia of renal disease: pathophysiology and treatment updates.

Source

Companion Animal; 2015. 20(8):448-452. 27 ref.

Publisher

MA Healthcare Limited

Location of Publisher

London

Country of Publication

UK

Abstract

Chronic kidney disease (CKD) often leads to renal anaemia, due to gradual reduction of erythropoietin-producing renal cells. About 15-30% of geriatric cats develop CKD, with renal disease being the primary cause of death of older cats. Of those cats with CKD, up to 65% in later-stage CKD will develop renal anaemia. Recognising and treating anaemia of renal disease is an important part of CKD therapy in both dogs and cats. The use of erythropoiesis-stimulating agents (ESAs) is standard-of-care in humans and becoming more used in veterinary medicine. Darbepoetin alfa (DA) has been shown to be effective in the treatment of renal anaemia.

Publication Type

Journal article.

<260>

Accession Number

20153428524

Author

Markovich, J. E.; Freeman, L. M.; Labato, M. A.; Heinze, C. R.

Title

Survey of dietary and medication practices of owners of cats with chronic kidney disease.

Source

Journal of Feline Medicine and Surgery; 2015. 17(12):979-983. 24 ref.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

The objective of this study was to describe the dietary and medication patterns of cats with chronic kidney disease (CKD). In this prospective, cross-sectional descriptive study, owners of cats with CKD were asked to complete a web-based survey. The study was advertised on CKD-, pet-, veterinary- and breed-associated websites and list serves. Owners of 1089 cats with CKD participated in the study. The mean reported age of the cats with CKD was 13.7+or-4.2 years. Forty percent (430/1089) of cats had concurrent diseases, with hyperthyroidism, heart disease and inflammatory bowel disease being the most common. Veterinarian recommendation was the most common reason reported (684/1032; 66%) for diet selection, and 51% (556/1089) of owners fed a veterinary therapeutic diet formulated for kidney disease as some component of the diet. Many owners (466/1079; 43%) reported that their cats had an abnormal appetite; of these owners, 52% responded that their cats had a poor appetite or required coaxing to eat 5-7 days per week. Forty-seven percent and 51% of cats were receiving subcutaneous fluids and oral medications, respectively; however, most cats (811/1036; 78%) were not receiving phosphorus-binding medications. Fifty-six percent and 38% of cats received commercial cat treats and dietary supplements, respectively. Anorexia or hyporexia is a common problem in cats with CKD and may lead to cats being fed suboptimal diets for their disease. This information may be useful for treating or designing nutritional studies for cats with CKD.

Publication Type

Journal article.

<261>

Accession Number

20133426477

Author

Paulino Junior, D.; Toni, M. C.; Meirelles, A. E.; Canola, J. C.; Camacho, A. A.

Title

Radiographic findings of uremic pneumonitis in dogs with chronic renal failure.

Source

Ars Veterinaria; 2013. 29(1):13-17. 21 ref.

Publisher

Faculdade de Ciencias Agrarias e Veterinarias, Campus de Jaboticabal, UNESP

Location of Publisher

Jaboticabal

Country of Publication

Brazil

Abstract

Kidney disease can progress relentlessly and takes the patient to a state of chronic renal failure (CRF) and, subsequently, to renal failure. Several systemic changes arising from the CRF are cited in the literature, and one of the most important is high level of seric urea, which can lead to pneumonitis. In order to identify the pulmonary alterations caused by CRF, radiographs were performed in 30 adult male and female dogs. The animals were divided into two groups (GI and GII). The control group (GI) consisted of 10 healthy dogs while GII of 20 dogs with CRF. The animals were patients of the Veterinary Hospital "Governador Laudo Natel" and were selected after screening their anamnesis, clinical and laboratorial exams. Dogs of GI and GII had the thoracic region imaged in right lateral and ventrodorsal projections for evaluation of heart size and pulmonary patterns. The heart size was assessed by vertebral heart score (VHS) and subjectively. The values found for VHS were 10.55+or-0.68 vertebral bodies for GI and 10.30+or-0.52 vertebral bodies for GII. The qualitative assessment showed cardiac right and left enlargement in most of the GII animals, unlike the GI with right side enlargement only. No difference was noted ( $p=0.2757$ ) for VHS between the two groups of animals, but 100% of the dogs of GII exhibited pulmonary pattern compatible with pneumonitis.

Publication Type

Journal article.

<262>

Accession Number

20133424943

Author

Littman, M. P.; Daminet, S.; Grauer, G. F.; Lees, G. E.; Dongen, A. M. van

Title

Consensus recommendations for the diagnostic investigation of dogs with suspected glomerular disease. (Special Issue: International Renal Interest Society Consensus clinical practice guidelines for glomerular disease in dogs.)

Source

Journal of Veterinary Internal Medicine; 2013. 27(s1):S19-S26. 19 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

Background: The International Renal Interest Society (IRIS) offers guidelines for chronic kidney disease and acute kidney injury. As dogs with glomerular disease may present differently and require different treatment than those with whole nephron or tubular disease, the IRIS Canine Glomerulonephritis (GN) Study Group was convened to formulate guidelines for these cases. The Diagnosis Subgroup was asked to make recommendations for diagnostic evaluation of such cases. Objective: To seek consensus among renal specialists for the evaluation of dogs with proteinuria because of suspected glomerular disease. Methods: After reviewing the literature, subgroup members discussed and wrote the draft paper and recommendations, which members of the IRIS Canine GN Study Group voted upon by electronic secret ballot, with comments noted. Consensus was declared if votes showed strong or general agreement from 85% of the respondents. Results: Diagnostic tests were categorized as essential, recommended, or potentially helpful, with prioritization dependent on case characteristics, eg, for cases with uncomplicated proteinuria versus complicated with hypoalbuminemia, azotemia, or both. Consensus was reached with 86-100% agreement on all questions posed. All cases should have basic examinations including blood pressure measurement, blood, and urine testing, and a search for infectious diseases relevant to their environs. The majority ranked imaging (chest radiographs, abdominal ultrasonogram) and renal biopsy procured and interpreted by experienced personnel as essential evaluations in complicated cases, but a few respondents deemed these to be essential in uncomplicated cases as well. Conclusions and Clinical Importance: Strong consensus about recommendations for diagnostic evaluation of dogs with suspected glomerular protein loss was attained. These guidelines help clinicians characterize disease processes for more informed therapeutic decision-making.

Publication Type

Journal article.

<263>

Accession Number

20133424738

Author

Cobrin, A. R.; Blois, S. L.; Kruth, S. A.; Abrams-Ogg, A. C. G.; Dewey, C.

Title

Biomarkers in the assessment of acute and chronic kidney diseases in the dog and cat.

Source

Journal of Small Animal Practice; 2013. 54(12):647-655. many ref.

**Publisher**

Wiley-Blackwell

**Location of Publisher**

Oxford

**Country of Publication**

UK

**Abstract**

In both human and veterinary medicine, diagnosing and staging renal disease can be difficult. Measurement of glomerular filtration rate is considered the gold standard for assessing renal function but methods for its assessment can be technically challenging and impractical. The main parameters used to diagnose acute and chronic kidney disease include circulating creatinine and urea concentrations, and urine-specific gravity. However, these parameters can be insensitive. Therefore, there is a need for better methods to diagnose and monitor patients with renal disease. The use of renal biomarkers is increasing in human and veterinary medicine for the diagnosis and monitoring of acute and chronic kidney diseases. An ideal biomarker would identify site and severity of injury, and correlate with renal function, among other qualities. This article will review the advantages and limitations of renal biomarkers that have been used in dogs and cats, as well as some markers used in humans that may be adapted for veterinary use. In the future, measuring a combination of biomarkers will likely be a useful approach in the diagnosis of kidney disorders.

**Publication Type**

Journal article.

<264>

**Accession Number**

20143002693

**Author**

Nivy, R.; Itkin, Y.; Bdolah-Abram, T.; Segev, G.; Aroch, I.

**Title**

Neutrophil counts and morphology in cats: a retrospective case-control study of 517 cases.

**Source**

Israel Journal of Veterinary Medicine; 2013. 68(3):149-157, 23. 35 ref.

**Publisher**

Israel Veterinary Medical Association

**Location of Publisher**

Raanana

**Country of Publication**

Israel

**Abstract**

Neutrophil count and morphological abnormalities are common in ill cats. This retrospective study examined the associations between these parameters and clinical and clinicopathologic findings, morbidity, mortality and the final diagnoses in a large population of ill cats, in a teaching hospital setting. The study included 517 cats, divided into three groups based on their neutrophil count; neutropenia (26 cats, 5%), within reference interval (WRI, 313 cats, 61%) and neutrophilia (178 cats, 34%). Occurrence of neutrophilic left shift and cytoplasmic toxicity was recorded. There were significant ( $P < 0.05$ ) group differences in concentrations of albumin, total protein, globulin, urea and bilirubin, aspartate aminotransferase and creatine kinase activities, and in frequencies of sepsis ( $P < 0.0001$ ), high rise syndrome ( $P = 0.014$ ), acute kidney injury ( $P = 0.01$ ), peritonitis ( $P = 0.001$ ), chronic kidney disease ( $P = 0.023$ ), pleural effusion ( $P = 0.0002$ ), pyothorax ( $P = 0.012$ ) and feline immunodeficiency virus (FIV) infection ( $P = 0.02$ ). The frequency of neutrophilia was unexpectedly high in FIV-infected cats (17/29, 59%). Neutrophil cytoplasmic toxicity and left shift occurred in 57% and 10% of the cats, respectively. Both were significantly more frequent in cats with neutrophilia or neutropenia compared to the group with neutrophil count WRI ( $P < 0.0001$ ). Mortality rate was higher ( $P < 0.0001$ ) in cats with neutropenia or neutrophilia. The area under the receiver operating characteristic curve of the neutrophil count as a predictor of mortality was 0.61 (95% confidence interval 0.55-0.68). Cost of treatment and

hospitalization duration significantly differed between groups. Presence of left shift was significantly associated with mortality ( $P=0.004$ ). Concurrent neutropenia or neutrophilia with cytoplasmic toxicity and left shift was significantly associated with mortality.

Publication Type

Journal article.

<265>

Accession Number

20133418059

Author

Sturgess, C.

Title

Closer observations of renal disease in canines and felines.

Source

Veterinary Times; 2013. 43(50):8-9. 5 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Publication Type

Journal article.

<266>

Accession Number

20143009164

Author

Rossi, G.; Giordano, A.; Breda, S.; Lisi, C.; Roura, X.; Zatelli, A.; Paltrinieri, S.

Title

Big-endothelin 1 (big ET-1) and homocysteine in the serum of dogs with chronic kidney disease.

Source

Veterinary Journal; 2013. 198(1):109-115. 40 ref.

Publisher

Elsevier Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

This study was aimed at determining the serum concentration of homocysteine (Hcy) and big endothelin-1 (big ET-1, the precursor of endothelin) in dogs with chronic kidney disease (CKD) with and without hypertension, proteinuria and inflammation, in order to explore their role as biomarkers of hypertension associated with CKD. Hcy and big ET-1 were measured using an enzyme-linked immunosorbent assay and an enzymatic cyclic reaction, respectively, in dogs with CKD staged, as proposed by the International Renal Interest Society (IRIS), using serum creatinine, urinary protein to creatinine (UPC) ratio and systolic blood pressure, and classified as affected or not by inflammation based on the serum concentration of C-reactive protein (CRP). Serum Hcy was significantly higher in dogs of IRIS stages II, III and IV compared with controls

and in proteinuric compared with non-proteinuric dogs. No differences relating to the degree of hypertension or to the CRP concentration were found. Serum big ET-1 significantly increased in dogs of IRIS stage IV compared with controls, in proteinuric compared with non-proteinuric dogs, in dogs with severe hypertension compared with those without hypertension, and in dogs with increased CRP compared to those with normal CRP concentrations. Hcy only correlated with serum creatinine but big ET-1 significantly correlated with serum creatinine, UPC ratio, systolic blood pressure, and increased CRP. In conclusion, both Hcy and big ET-1 increase in dogs with CKD. Although further research is needed, big ET-1, but not Hcy, may also be considered as a biomarker of hypertension.

Publication Type

Journal article.

<267>

Accession Number

20143016552

Author

Bradea, A.; Codreanu, M.; Vlagioiu, C.; Simion, V.

Title

Hematologic aspects in chronic kidney disease (CDK) in dogs.

Source

Bulletin of University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. Veterinary Medicine; 2013. 70(2):191-194. 11 ref.

Publisher

University of Agricultural Sciences and Veterinary Medicine

Location of Publisher

Cluj-Napoca

Country of Publication

Romania

Abstract

Dogs with progressive chronic renal failure register hematological alteration of different intensities reflected on the complete blood count parameters. Dogs with CKD typically present normochromic, normocytic, hypo/aregenerative anemia, induced by conjunctive substitution phenomenon in renal parenchyma level with reduced erythropoietin secretion in this level(1). The purpose of this study was to evaluate changes in hematological parameters on a number of 12 dogs withCKD. Additional, leucocyte series components were evaluated. This study correlated hematological parameters (red blood cells and white blood cells) with parameters that reveal and characterize the level of renal functional alteration in CKD (blood urea nitrogen, creatinine, phosphorus, sodium and potassium) with dynamic evaluation. In 10 out of 12 individuals, an alteration in hematological profile elements by decreased levels (hypochrome anemia) with hematocrit values that varied between 15.2% and 33.5% and a decrease in hemoglobin levels between 6.4 and 11.7 g/dl. Platelets number was near the upper limit and in severe cases, in 2 dogs (16.66%) were over 682 K/ micro L. White blood cells series registered inconstant and uncharacteristic modifications correlated mainly with etiopathogenetic inductor context such as lymphopenia in 4 dogs (33.33%) varying from 24.58 and 39.6 K/ micro L, granulocytes increased levels in 3 out of 12 dogs (25%) varying between 14.7-16.2 K/ micro L and an increase in lymphocytes over monocytes ratio in 4 out of 12 dogs (33.33%) with values between 14.2-23.4\*10<sup>9</sup>/L. Complete blood count in CKD provides useful information about the progress of the disease as well as anemia type appreciation offering additional information for therapeutic protocol adjustment for amending induced hematological consequences.

Publication Type

Journal article.



<268>

Accession Number

20143026835

Author

Berent, A.

Title

New techniques on the horizon: interventional radiology and interventional endoscopy of the urinary tract ('endourology'). (Special Issue: Endoscopy and endosurgery, part 2.)

Source

Journal of Feline Medicine and Surgery; 2014. 16(1):51-65. 41 ref.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

Practical relevance: Interventional radiology and interventional endoscopy (IR/IE) uses contemporary imaging modalities, such as fluoroscopy and endoscopy, to perform diagnostic and therapeutic procedures in various body parts. The majority of IR/IE procedures currently undertaken in veterinary medicine pertain to the urinary tract, and this subspecialty has been termed 'endourology'. This technology treats diseases of the renal pelvis, ureter(s), bladder and urethra. In human medicine, endourology has overtaken traditional open urologic surgery in the past 20-30 years, and in veterinary medicine similar progress is occurring. Aim: This article presents a brief overview of some of the more common IR/IE procedures currently being performed for the treatment of urinary tract disease in veterinary patients. These techniques include percutaneous nephrolithotomy for lithotripsy of problematic nephrolithiasis, mesenchymal stem cell therapy for chronic kidney disease, sclerotherapy for the treatment of idiopathic renal hematuria, various diversion techniques for ureteral obstructions, laser lithotripsy for lower urinary tract stone disease, percutaneous cystolithotomy for removal of bladder stones, hydraulic occluder placement for refractory urinary incontinence, percutaneous cystostomy tube placement for bladder diversion, urethral stenting for benign and malignant urethral obstructions, and antegrade urethral catheterization for treatment of urethral tears. Evidence base: The majority of the data presented in this article is solely the experience of the author, and some of this has only been published and/or presented in abstract form or small case series. For information on traditional surgical approaches to these ailments readers are encouraged to evaluate other sources.

Publication Type

Journal article.

<269>

Accession Number

20143054279

Author

O'Neill, D. G.; Elliott, J.; Church, D. B.; McGreevy, P. D.; Thomson, P. C.; Brodbelt, D. C.

Title

Canine chronic kidney disease in UK veterinary practices: prevalence, risk factors and survival.

Source

Society for Veterinary Epidemiology and Preventive Medicine. Proceedings of a meeting held in Madrid, Spain, 20-22 March 2013; 2013. :184-194. 44 ref.

Publisher

Society for Veterinary Epidemiology and Preventive Medicine

Location of Publisher

Roslin



Country of Publication

UK

Abstract

Analyses covering 107,214 dogs attending 89 UK practices aimed to estimate the prevalence and identify risk factors associated with canine chronic kidney disease (CKD) diagnosis and survival. The apparent prevalence (AP) was estimated using a cross-sectional approach while the true prevalence (TP) was estimated using Bayesian analysis. A nested case-control study design was used to evaluate risk factors. Survival analysis was conducted using the Kaplan-Meier survival curve method and multivariable Cox proportional hazards regression modelling. CKD AP was estimated at 0.21% and TP at 0.37%. CKD risk factors included increasing age, being insured and certain breeds. The median survival time was 226 days. IRIS stage and blood urea nitrogen concentration at diagnosis were significantly associated with hazard of CKD death. This study of a clinically important condition indicates the increasing importance of electronic patient records (EPRs) to evaluate diseases in companion animals.

Publication Type

Book chapter

Conference paper.

<270>

Accession Number

20143047081

Author

Zel, M. K.; Tozon, N.; Svete, A. N.

Title

Plasma and erythrocyte glutathione peroxidase activity, serum selenium concentration, and plasma total antioxidant capacity in cats with IRIS stages I-IV chronic kidney disease.

Source

Journal of Veterinary Internal Medicine; 2014. 28(1):130-136. 38 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

**Background:** Serum selenium concentrations and the activity of plasma glutathione peroxidase (GPx) decrease with the progression of chronic kidney disease (CKD) in human patients. Selenium is considered a limiting factor for plasma GPx synthesis. Plasma total antioxidant capacity (TAC) is decreased in CKD cats in comparison to healthy cats. **Hypothesis:** Serum selenium concentrations and plasma and erythrocyte GPx activity in cats with CKD are lower than in healthy cats. Serum selenium concentrations, the activity of enzymes, and plasma TAC progressively decrease with the progression of kidney disease according to IRIS (International Renal Interest Society) classification. **Animals:** Twenty-six client-owned cats in IRIS stages I-IV of CKD were compared with 19 client-owned healthy cats. **Methods:** A CBC, serum biochemical profile, urinalysis, plasma and erythrocyte GPx activity, serum selenium concentration, and plasma TAC were measured in each cat. **Results:** Cats in IRIS stage IV CKD had a significantly higher ( $P=.025$ ) activity of plasma GPx ( $23.44 \pm 6.28$  U/mL) than cats in the control group ( $17.51 \pm 3.75$  U/mL). There were no significant differences in erythrocyte GPx, serum selenium concentration, and plasma TAC, either among IRIS stages I-IV CKD cats or between CKD cats and healthy cats. **Conclusions and Clinical Importance:** Erythrocyte GPx activity, serum selenium concentration, and plasma TAC do not change in CKD cats compared with healthy cats. Selenium is not a limiting factor in feline CKD. Increased plasma GPx activity in cats with stage IV CKD suggests induction of antioxidant defense mechanisms. Antioxidant defense systems might not be exhausted in CKD in cats.

Publication Type

Journal article.

<271>

Accession Number

20143047066

Author

Cortadellas, O.; Talavera, J.; Fernandez del Palacio, M. J.

Title

Evaluation of the effects of a therapeutic renal diet to control proteinuria in proteinuric non-azotemic dogs treated with benazepril.

Source

Journal of Veterinary Internal Medicine; 2014. 28(1):30-37. 32 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

Background: Angiotensin-converting enzyme inhibitors (ACEIs) are currently used to control proteinuria in dogs with chronic kidney disease. Renal diets (RDs) have beneficial effects in the management of azotemic dogs, but its role in proteinuric non-azotemic (PNAz) dogs has been poorly documented. Hypothesis: Administration of a RD to PNAz dogs treated with benazepril (Be) improves proteinuria control compared with the administration of a maintenance diet (MD). Animals: Twenty-two PNAz (urine protein/creatinine ratio [UPC] >1) dogs. Methods: Randomized open label clinical trial design. Dogs were assigned to group-MD (5.5 g protein/100 kcal ME)/Be or to group-RD (3.7 g protein/100 kcal ME)/Be group during 60 days. Dogs with serum albumin (Alb) <2 g/dL received aspirin (1 mg/kg/12 hours). A physical examination, systolic blood pressure (SBP) measurement, complete blood count (CBC), biochemistry panel, urinalysis, and UPC were performed at day 0 (D0) and day 60 (D60). Results: At D0, there were no significant differences between groups in the evaluated variables. During the study, logUPC (geometric mean (95% CI) and SBP (mean±or-SD mmHg) significantly decreased (paired t-test, P=0.001)) in Group-RD (logUPCD0=3.16[1.9-5.25]; UPCD60=1.20 [0.59-2.45]; SBPD0=160±or-17.2; SBPD60=151±or-15.8), but not in Group-MD (UPCD0=3.63[2.69-4.9]; UPCD60=2.14 [0.76-6.17]; SBPD0=158±or-14.7; SBPD60=153±or-11.5). However, RM-ANOVA test did not confirm that changes were consequence of dietary modification. Weight and Alb concentration did not change significantly in any group. Conclusion and Clinical Relevance: The administration of a RD to PNAz dogs treated with Be might help to control proteinuria and SBP compared with the administration of a MD, without inducing clinically detectable malnutrition, but more studies are warranted.

Publication Type

Journal article.

<272>

Accession Number

20143044098

Author

Sparkes, A.

Title

Present and future of feline chronic renal disease. [Spanish]

Source

Argos - Informativo Veterinario; 2013. (154):34-35.

Publisher

ASIS Biomedica s.l.

Location of Publisher

Zaragoza

Country of Publication

Spain

Abstract

The clinical signs, diagnosis and treatment of kidney diseases in cats are described.

Publication Type

Journal article.

<273>

Accession Number

20143075086

Author

Queau, Y.

Title

Nutritional management of feline chronic kidney disease.

Source

Veterinary Focus; 2013. 23(3):40-46. 30 ref.

Publisher

Royal Canin Ltd (UK and Ireland)

Location of Publisher

Castle Cary

Country of Publication

UK

Abstract

In this article the dietary modifications, implementation, therapeutic diet, and types of nutritional support in the management of chronic kidney disease in cats are presented.

Publication Type

Journal article.

<274>

Accession Number

20143075085

Author

Geddes, R.

Title

Biomarkers for early diagnosis of feline chronic kidney disease.

Source

Veterinary Focus; 2013. 23(3):34-39. 20 ref.

Publisher

Royal Canin Ltd (UK and Ireland)

Location of Publisher

Castle Cary

Country of Publication

UK

Abstract

This article discusses the biomarkers that have been and are currently being investigated to facilitate early diagnosis of feline chronic kidney disease (CKD), and reviews current recommendations for veterinarians using biomarkers in their practice.

Publication Type

Journal article.

<275>

Accession Number

20143075083

Author

Lefebvre, S.

Title

Clinical findings in cats and dogs with chronic kidney disease.

Source

Veterinary Focus; 2013. 23(3):26-27. 2 ref.

Publisher

Royal Canin Ltd (UK and Ireland)

Location of Publisher

Castle Cary

Country of Publication

UK

Abstract

To determine the demographic and clinicopathological properties of cats and dogs with chronic kidney disease (CKD), canine and feline patients admitted at the Banfield pet hospitals (Oregon, USA) that was first diagnosis with CKD during the years 2011 and 2012 were used in this study. From a total of 11 752 cats and 7293 dogs the following were observed: no significant differences were evident in the distribution of breed size in dogs with CKD as compared with the general population, nor was any difference evident in dogs and cats with CKD and the general population on the type of food consumed. The prevalence of cats and dogs with CKD that were underweight and had periodontal disease was much higher than the general population that was more than 10 years of age. It was also observed that cats and dogs with CKD are more prone to cystitis, hyperthyroidism, and diabetes mellitus.

Publication Type

Journal article.

<276>

Accession Number

20143075080

Author

Lippi, I.; Guidi, G.

Title

A practical approach to hemodialysis for canine renal disease.

Source

Veterinary Focus; 2013. 23(3):2-9. 13 ref.

Publisher

Royal Canin Ltd (UK and Ireland)

Location of Publisher

Castle Cary  
Country of Publication  
UK

Abstract

In this article the authors discuss the advantages, disadvantages, effectiveness and safety of haemodialysis in the management of life threatening uraemia in dogs, the principles and procedures of haemodialysis, various factors that must be considered when selecting a dialysis protocol for each patient, as well as the various methods that can be done to prevent blood coagulation during dialysis.

Publication Type  
Journal article.

<277>

Accession Number  
20143064155

Author  
Passlack, N.; Neumann, K.; Zentek, J.

Title  
Effects of a new iron-oxide phosphate binder on the renal excretion of phosphorus in healthy adult cats: a pilot study. [German]

Source  
Kleintierpraxis; 2014. 59(2):57-68. 37 ref.

Publisher  
Verlag M. & H, Schaper GmbH

Location of Publisher  
Hannover

Country of Publication  
Germany

Abstract

Iron-based phosphate binders can be considered as an innovative approach for the treatment of patients with chronic kidney disease in veterinary medicine. Studies in humans and rats have already demonstrated a high efficacy and tolerance of these phosphate binders; however, up to now, relevant studies in cats have been lacking. This pilot study was aimed at evaluating the potential effect of a phosphate binder based on iron (III) oxide in healthy adult cats, focusing particularly on any dose-dependent effects. Eight cats were divided into four groups, receiving either a diet with a reduced phosphorus concentration without (0 mg/kg body weight [BW]/day) or with the new phosphate binder (150 mg/kg BW/day, 300 mg/kg BW/day or 450 mg/kg BW/day). The results demonstrated that increasing levels of the phosphate binder were associated with a clear decrease in the urinary phosphorous concentrations in the test cats. However, the treatment group that received the highest dose showed a reduction in feed intake, though this reduction was not statistically significant. The 300 mg/kg BW/day dose was, therefore, considered as the "optimum" dose, since an efficient reduction in the renal phosphorous excretion combined with no negative effects on feed acceptance were observed in this treatment group. In a second experiment, blood samples were collected from twelve cats which were given a diet with a reduced phosphorous concentration augmented with either a placebo or the new phosphate binder at the "optimum" dose of 300 mg/kg BW/day. In order to evaluate the iron status of the cats and therefore the intestinal stability of the new phosphate binder, the serum iron concentrations and also the erythrocytes, haemoglobin and haematocrit were measured. The blood iron concentrations were within the normal range for all 12 cats; no group differences could be detected. The values of erythrocytes, haematocrit and haemoglobin were higher in the group that received the new phosphate binder compared to the placebo group; however, all the values in both groups were within the normal range. In conclusion, the present pilot study could demonstrate a high efficiency and a good tolerance of a phosphate binder based on iron (III) oxide in cats. The "optimum" dose was found to be 300 mg/kg BW/day. Based on the proband's blood values, a good intestinal stability of the new phosphate binder

could be assumed. Future studies in cats with chronic kidney disease are required to prove the efficiency of this phosphate binder in practice.

Publication Type  
Journal article.

<278>

Accession Number  
20143099156

Author  
Freitas, G. C.; Veado, J. C. C.; Carregaro, A. B.

Title  
Evaluation tests of early renal injury in dogs and cats. [Portuguese]

Source  
Semina: Ciencias Agrarias (Londrina); 2014. 35(1):411-426. many ref.

Publisher  
Universidade Estadual de Londrina

Location of Publisher  
Londrina

Country of Publication  
Brazil

Abstract

The identification of kidney injury is an important measure that aims to prevent the installation of irreversible changes, such as chronic kidney disease, seen most frequently in dogs and cats. Serum urea and creatinine parameters are routinely assessed, when searching renal failure. However, these values are only changed when 66 to 75% of glomerular filtration rate has been lost. In many situations, an attack of this magnitude may be enough to cause the animal's death. Evaluations that identify the aggression, even before the functions themselves are altered, have been studied and shown to be important early evaluators, signaling prior to possible irreversible damage. The quantification of urinary enzymes, urinary protein, fractional excretion of electrolytes, glomerular filtration rate and urinary sediment, have shown great value as sensitive tests of renal injury. There is the need of the use of tests that assists in early diagnosis and also determines the progression of disease and efficacy of the treatment. The present review aims to describe the laboratory tests that may be performed to evaluate early kidney injury in dogs and cats.

Publication Type  
Journal article.

<279>

Accession Number  
20143094649

Author  
Greene, J. P.; Lefebvre, S. L.; Wang, M. S.; Yang, M. Y.; Lund, E. M.; Polzin, D. J.

Title  
Risk factors associated with the development of chronic kidney disease in cats evaluated at primary care veterinary hospitals.

Source  
Journal of the American Veterinary Medical Association; 2014. 244(3):320-327. 24 ref.

Publisher  
American Veterinary Medical Association

Location of Publisher

Schaumburg  
Country of Publication  
USA

Abstract

Objective - To identify risk factors associated with diagnosis of chronic kidney disease (CKD) in cats.  
Design - Retrospective case-control study. Animals - 1,230 cats with a clinical diagnosis of CKD, serum creatinine concentration >1.6 mg/dL, and urine specific gravity <1.035 and 1,230 age-matched control cats.  
Procedures - Data on putative risk factors for CKD were extracted for multivariate logistic regression analysis from the medical records of cats brought to 755 primary care veterinary hospitals. For a subset of cats evaluated 6 to 12 months prior to the date of CKD diagnosis or control group inclusion, the percentage change in body weight between those dates as well as clinical signs at the earlier date were analyzed for associations with CKD development. Results - Risk factors for CKD in cats included thin body condition, prior periodontal disease or cystitis, anesthesia or documented dehydration in the preceding year, being a neutered male (vs spayed female), and living anywhere in the United States other than the northeast. The probability of CKD decreased with increasing body weight in nondehydrated cats, domestic shorthair breed, and prior diagnosis of diabetes mellitus and increased when vomiting, polyuria or polydipsia, appetite or energy loss, or halitosis was present at the time of diagnosis or control group inclusion but not when those signs were reported 6 to 12 months earlier. Median weight loss during the preceding 6 to 12 months was 10.8% and 2.1% in cats with and without CKD, respectively. Conclusions and Clinical Relevance - The probability of CKD diagnosis in cats was influenced by several variables; recent weight loss, particularly in combination with the other factors, warrants assessment of cats for CKD.

Publication Type  
Journal article.

<280>

Accession Number  
20143082229

Author  
Faucher, M.

Title  
Detection of proteinuria in cats with chronic renal disease. [French]

Source  
Point Veterinaire; 2013. 44(340(Part 1)):70-71. 5 ref.

Publisher  
Wolters Kluwer France

Location of Publisher  
Rueil-Malmaison

Country of Publication  
France

Abstract

This article discusses advantages and limitations on the use of dipstick reaction sulfosalicylic acid (SSA) and the ratio protein/urinary creatinine(RPCU) in cats using MRC reference test a semiquantitative enzyme linked immunosorbent assay (ELISA) test on detecting chronic renal disease.

Publication Type  
Journal article.

<281>

Accession Number



20143121195

Author

Berent, A. C.; Weisse, C. W.; Todd, K.; Bagley, D. H.

Title

Technical and clinical outcomes of ureteral stenting in cats with benign ureteral obstruction: 69 cases (2006-2010).

Source

Journal of the American Veterinary Medical Association; 2014. 244(5):559-576. 44 ref.

Publisher

American Veterinary Medical Association

Location of Publisher

Schaumburg

Country of Publication

USA

Abstract

**Objective** - To evaluate the technical, short-term, and long-term outcomes in cats with benign ureteral obstructions treated by means of double-pigtail ureteral stent placement. **Design** - Retrospective case series. **Animals** - 69 cats (79 ureters). **Procedures** - The diagnosis of benign ureteral obstruction was made via abdominal ultrasonography, radiography, and ureteropyelography. Ureteral stent placement was attempted endoscopically, surgically, or both, with fluoroscopic guidance. The medical records were reviewed for pre-, intra-, and postoperative data; complications; and outcome. **Results** - 69 cats (79 ureters) had stent placement attempted for various causes: ureterolithiasis (56/79 [71%]), stricture (10/79 [13%]), both ureterolithiasis and stricture (12/79 [15%]), or a purulent plug (1/79 [1%]). Stent placement was successful in 75 of 79 ureters (95%). Median number of stones per ureter was 4 (range, 0 to >50), and 67 of 79 (85%) had concurrent nephrolithiasis. Preoperative azotemia was present in 95% (66/69) of cats (median creatinine concentration, 5.3 mg/dL [range, 1.1 to 25.8 mg/dL]), and 71% (49/69) remained azotemic (median, 2.1 mg/dL [range, 1.0 to 11.8 mg/dL]) after successful surgery. Procedure-related, postoperative (<7 days), short-term (7 to 30 days), and long-term (>30 days) complications occurred in 8.7% (6/69; 7/79 ureters), 9.1% (6/66), 9.8% (6/61), and 33% (20/60) of cats, respectively; most of these complications were minor and associated with intermittent dysuria or the need for ureteral stent exchange. The perioperative mortality rate was 7.5% (5/69), and no deaths were procedure related. The median survival time was 498 days (range, 2 to >1,278 days). For patients with a renal cause of death, median survival time was >1,262 days, with only 14 of 66 cats (21%) dying of chronic kidney disease. Nineteen (27%) cats needed a stent exchange (stricture in-growth [n=10], migration [4], ureteritis [2], dysuria [2], pyelonephritis [1], or reflux [1]). No patient died of the procedure or recurrent ureteral obstruction. **Conclusions and Clinical Relevance** - Results of the present study indicated that ureteral stenting is an effective treatment for benign ureteral obstructions in cats regardless of obstructive location, cause, or stone number. The perioperative morbidity and mortality rates were lower than those reported with traditional ureteral surgery. The short- and long-term complications were typically minor but may necessitate stent exchange or use of an alternative device, particularly with ureteral strictures. The prognosis for feline ureteral obstructions after ureteral stenting could be considered good when the procedure is performed by trained specialists.

Publication Type

Journal article.

<282>

Accession Number

20143127532

Author

Davies, M.

Title

Variation in content of homemade diets for canine chronic kidney disease.

Source

Veterinary Record; 2014. 174(14):352.

Publisher

BMJ Publishing Group

Location of Publisher

London

Country of Publication

UK

Abstract

A study was conducted to determine whether a homemade diet based on a recipe for dogs with chronic kidney disease would have similar nutrient contents. It was shown that the 6 diets prepared from raw ingredients varied in energy, carbohydrate, ash, fibre, phosphate, protein, fat and dry matter contents due to the different characteristics of the raw ingredients and/or methods of preparation. These results show that owner-prepared diets for dogs with chronic kidney disease are not fully reliable.

Publication Type

Journal article.

<283>

Accession Number

20143153513

Author

Sae-Thang, A.; Osathanon, R.

Title

Effect of omega-3 polyunsaturated fatty acids supplementation on reducing hypertension in chronic renal failure dogs. [Thai]

Source

Journal of Applied Animal Science; 2008. 1(1):9-18. 33 ref.

Publisher

Faculty of Veterinary Science, Mahidol University

Location of Publisher

Nakhon Pathom

Country of Publication

Thailand

Abstract

Chronic renal failure is a common disease in elder dogs. The degeneration of nephron is one of the causes of this disease, which leads to the end-stage renal failure. Hypertension in chronic renal failure is engendered by the destruction of that nephron results in the reduction of renal function, and following by the induction of renin angiotensin aldosterone system as well as inflammatory cytokines. The objective of this review is to evaluate and describe the use of omega-3 polyunsaturated fatty acids (n-3 PUFA) for reducing hypertension in chronic renal failure dogs. The supplement of n-3 PUFA leads to changing of eicosanoids synthesis (e.g. prostaglandins, thromboxanes, and leukotrienes) to other derivatives, which induce vasodilation and reduce the inflammation-mediated destruction of glomerulus. For that reason, the omega-3 polyunsaturated fatty acids supplementation is an alternative treatment for reducing hypertension in chronic renal failure dogs.

Publication Type

Journal article.

<284>

Accession Number

20143170847

Author

McLeland, S. M.; Lunn, K. F.; Duncan, C. G.; Refsal, K. R.; Quimby, J. M.

Title

Relationship among serum creatinine, serum gastrin, calcium-phosphorus product, and uremic gastropathy in cats with chronic kidney disease.

Source

Journal of Veterinary Internal Medicine; 2014. 28(3):827-837. 26 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

**Background:** Chronic kidney disease (CKD) in cats is associated with gastrointestinal signs commonly attributed to uremic gastropathy. Consequently, patients often are treated with antacids and gastrointestinal protectants. This therapeutic regimen is based on documented gastric lesions in uremic humans and dogs, but the nature and incidence of uremic gastropathy in cats are unknown. **Hypothesis/Objectives:** Evaluate uremic gastropathy in CKD cats to facilitate refinement of medical management for gastrointestinal signs. **Animals:** Thirty-seven CKD cats; 12 nonazotemic cats **Methods:** Stomachs were evaluated for the presence of classic uremic gastropathy lesions. Histopathologic lesions were compared with serum creatinine concentrations, calcium-phosphorus product (CPP), and serum gastrin concentrations. **Results:** Gastric ulceration, edema, and vascular fibrinoid change were not observed. The most important gastric lesions in CKD cats were fibrosis and mineralization. Sixteen CKD cats (43%) had evidence of gastric fibrosis of varying severity and 14 CKD cats (38%) had gastric mineralization. CKD cats were more likely to have gastric fibrosis and mineralization than nonazotemic controls ( $P=.005$  and  $P=.021$ , respectively). Only cats with moderate and severe azotemia had gastric mineralization. CPP was correlated with disease severity; severely azotemic CKD cats had significantly higher CPP when compared with nonazotemic controls, and to mildly and moderately azotemic cats ( $P<.05$ ). Gastrin concentrations were significantly higher in CKD cats when compared with nonazotemic controls ( $P=.003$ ), but increased concentrations were not associated with gastric ulceration. **Conclusions and Clinical Importance:** Uremic gastropathy in CKD cats differs from that described in other species and this difference should be considered when devising medical management.

Publication Type

Journal article.

<285>

Accession Number

20143171009

Author

Hsu, W. L.; Lin, Y. S.; Hu, Y. Y.; Wong, M. L.; Lin, F. Y.; Lee, Y. J.

Title

Neutrophil gelatinase-associated lipocalin in dogs with naturally occurring renal diseases.

Source

Journal of Veterinary Internal Medicine; 2014. 28(2):437-442. 30 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

**Background:** Neutrophil gelatinase-associated lipocalin (NGAL) is released from renal tubular cells after injury and serves in humans as a real-time indicator of active kidney damage, including acute kidney injury (AKI) and chronic kidney disease (CKD). However, NGAL concentrations in dogs with naturally occurring AKI or CKD rarely have been explored in detail. **Hypothesis/Objectives:** The goal of this study was to evaluate whether NGAL can serve as a useful biomarker in dogs with naturally occurring renal disease. **Animals:** Client-owned dogs with renal disease (57) and control dogs without any disease (12) were examined. **Methods:** Serum NGAL (sNGAL) and urine NGAL (uNGAL) concentrations were measured in each animal by a newly developed ELISA system. Demographic, hematologic, and serum biochemical data were recorded. Survival attributable to AKI and CKD was evaluated at 30 days and 90 days, respectively. **Results:** Serum and urine NGAL concentrations in azotemic dogs were significantly higher than in nonazotemic dogs and were highly correlated with serum creatinine concentration ( $P < .05$ ). Among CKD dogs, death was associated with significantly higher sNGAL and uNGAL concentrations compared with survivors. Receiver-operating characteristic curve (ROC) analysis showed that sNGAL was better than serum creatinine concentration when predicting clinical outcomes for CKD dogs ( $P < .05$ ). The best cutoff point for sNGAL was 50.6 ng/mL, which gave a sensitivity and a specificity of 76.9 and 100%, respectively. Furthermore, dogs that had higher concentrations of sNGAL survived for a significantly shorter time. **Conclusion:** sNGAL is a useful prognostic marker when evaluating dogs with CKD.

**Publication Type**

Journal article.

<286>

**Accession Number**

20143170985

**Author**

Steinbach, S.; Weis, J.; Schweighauser, A.; Francey, T.; Neiger, R.

**Title**

Plasma and urine neutrophil gelatinase-associated lipocalin (NGAL) in dogs with acute kidney injury or chronic kidney disease.

**Source**

Journal of Veterinary Internal Medicine; 2014. 28(2):264-269. 29 ref.

**Publisher**

Wiley-Blackwell

**Location of Publisher**

Boston

**Country of Publication**

USA

**Abstract**

**Background:** Neutrophil gelatinase-associated lipocalin (NGAL) is a protein that is used in human medicine as a real-time indicator of acute kidney injury (AKI). **Hypothesis:** Dogs with AKI have significantly higher plasma NGAL concentration and urine NGAL-to-creatinine ratio (UNCR) compared with healthy dogs and dogs with chronic kidney disease (CKD). **Animals:** 18 healthy control dogs, 17 dogs with CKD, and 48 dogs with AKI. **Methods:** Over a period of 1 year, all dogs with renal azotemia were prospectively included. Urine and plasma samples were collected during the first 24 hours after presentation or after development of renal azotemia. Plasma and urine NGAL concentrations were measured with a commercially available canine NGAL Elisa Kit (BioportoReg. Diagnostic) and UNCR was calculated. A single-injection plasma inulin clearance was performed in the healthy dogs. **Results:** Median (range) NGAL plasma concentration in healthy dogs, dogs with CKD, and AKI were 10.7 ng/mL (2.5-21.2), 22.0 ng/mL (7.7-62.3), and 48.3 ng/mL (5.7-469.0), respectively. UNCR was  $2 \times 10^{-8}$  (0-46),  $1,424 \times 10^{-8}$  (385-18,347), and  $2,366 \times 10^{-8}$  (36-994,669), respectively. Dogs with renal azotemia had significantly higher NGAL concentrations and UNCR than did healthy dogs ( $P < .0001$  for both). Plasma NGAL concentration was significantly higher in dogs with AKI compared with dogs with CKD ( $P = .027$ ). **Conclusions and Clinical Importance:** Plasma NGAL could be helpful to differentiate AKI from CKD in dogs with renal azotemia.

Publication Type  
Journal article.

<287>

Accession Number  
20143188460

Author

Bernachon, N.; Fournel, S.; Gatto, H.; Monginoux, P.; McGahie, D.

Title

Comparative palatability of five supplements designed for cats suffering from chronic renal disease.

Source

Irish Veterinary Journal; 2014. 67(10):(19 May 2014). 24 ref.

Publisher

BioMed Central Ltd

Location of Publisher

London

Country of Publication

UK

Abstract

Background: Intestinal phosphate binders, uremic toxin binders and some other types of supplements are an integral part of the management of chronic kidney disease (CKD) in various species, including cats. This pathology in domestic carnivores requires life-long nutritional and medical management. In this context, the compliance of owners and patients cannot be achieved without an adequate level of palatability for oral medication or supplementation. Knowing that hyporexia and anorexia are among the most commonly seen clinical signs in cats suffering from CKD this is already, in itself, a serious obstacle to acceptable compliance in sick animals. The aim of the present study was to investigate the palatability of four commercially available products designed for cats suffering from CKD: IpakitineReg. (Vetoquinol, France), AzodylReg. (Vetoquinol, USA), RenalzinReg. (Bayer, France), RubenalReg. (Vetoquinol, France) and an additional recently developed product: PronefraReg. (Virbac, France). The study was performed with a group of previously-characterised cats, all living in an enriched and well-being securing environment of an independent centre housing panels of pets expert in palatability measurement. In total 172 monadic testings were performed. The palatability of each product was assessed by measuring their rates of prehension and consumption, and the consumption proportions were also analysed. Results: The most palatable presentation (based on useful consumption) was PronefraReg., which was significantly higher than AzodylReg. ( $p=0.046$ ), IpakitineReg. ( $p<0.0001$ ), RenalzinReg. ( $p<0.0001$ ) and RubenalReg. ( $p<0.0001$ ). The product with the highest rate of prehension was also PronefraReg., which was significantly higher than AzodylReg. ( $p=0.0019$ ), IpakitineReg. ( $p=0.0023$ ), RenalzinReg. ( $p=0.0008$ ) and RubenalReg. ( $p<0.0001$ ). Conclusion: PronefraReg. was the most palatable presentation tested, meaning it may be useful for improving ease of supplementation in CKD cats.

Publication Type

Journal article.

<288>

Accession Number  
20143185243

Author

Sanderson, S.

Title

Enhancing quality of life: nutritional management of renal patients.

Source

Proceedings of the NAVC Conference, 18-22 January 2014, Orlando, Florida, USA. Volume 28, Small Animal & Exotics; 2014. :unpaginated. 21 ref.

Publisher

North American Veterinary Community (NAVC)

Location of Publisher

Gainesville

Country of Publication

USA

Publication Type

Conference paper.

<289>

Accession Number

20143185240

Author

Parker, V. J.

Title

AKI, CKD, PLN, oh my! Nutritional management of kidney disease.

Source

Proceedings of the NAVC Conference, 18-22 January 2014, Orlando, Florida, USA. Volume 28, Small Animal & Exotics; 2014. :unpaginated. 10 ref.

Publisher

North American Veterinary Community (NAVC)

Location of Publisher

Gainesville

Country of Publication

USA

Publication Type

Conference paper.

<290>

Accession Number

20143185220

Author

Robertson, J.

Title

Diagnosis and management of feline chronic kidney disease.

Source

Proceedings of the NAVC Conference, 18-22 January 2014, Orlando, Florida, USA. Volume 28, Small Animal & Exotics; 2014. :unpaginated. 9 ref.

Publisher

North American Veterinary Community (NAVC)

Location of Publisher

Gainesville

Country of Publication

USA

Publication Type

Conference paper.

<291>

Accession Number

20143185217

Author

Grauer, G. F.

Title

Hypertension, proteinuria, and ace inhibitors in CKD: the good, bad, and ugly.

Source

Proceedings of the NAVC Conference, 18-22 January 2014, Orlando, Florida, USA. Volume 28, Small Animal & Exotics; 2014. :unpaginated.

Publisher

North American Veterinary Community (NAVC)

Location of Publisher

Gainesville

Country of Publication

USA

Publication Type

Conference paper.

<292>

Accession Number

20143185199

Author

Lappin, M. R.

Title

Parenteral vaccines and chronic kidney disease in cats: is there an association?

Source

Proceedings of the NAVC Conference, 18-22 January 2014, Orlando, Florida, USA. Volume 28, Small Animal & Exotics; 2014. :unpaginated. 29 ref.

Publisher

North American Veterinary Community (NAVC)

Location of Publisher

Gainesville

Country of Publication

USA

Publication Type

Conference paper.

<293>

Accession Number

20143159883

Author



Bijsmans, E. S.; Jepson, R. E.; Syme, H. M.; Elliott, J.  
 Title  
 The efficacy of amlodipine besylate to control hypertension in cats with CKD.  
 Source  
 BSAVA Congress 2014, Birmingham, UK, 3-6 April, 2014. Scientific Proceedings Veterinary Programme; 2014. :512.  
 Publisher  
 British Small Animal Veterinary Association  
 Location of Publisher  
 Quedgeley  
 Country of Publication  
 UK  
 Publication Type  
 Conference paper.

<294>  
 Accession Number  
 20143207380  
 Author  
 Nagae, H.; Orima, H.  
 Title  
 Subcutaneous fluid administration in chronic kidney disease. [Japanese]  
 Source  
 Journal of Animal Clinical Medicine; 2013. 22(1):7-11. 14 ref.  
 Publisher  
 Japanese Society of Clinical Veterinary Medicine  
 Location of Publisher  
 Tottori  
 Country of Publication  
 Japan  
 Publication Type  
 Journal article.

<295>  
 Accession Number  
 20143206923  
 Author  
 Faucher, M. R.; Freiche, V.; Bongrand, Y.; German, A. J.  
 Title  
 Primary hyperparathyroidism caused by a parathyroid carcinoma in a 16-year-old male neutered cat with concurrent chronic kidney disease.  
 Source  
 Veterinary Quarterly; 2014. 34(1):37-40. 16 ref.  
 Publisher  
 Taylor & Francis  
 Location of Publisher  
 Abingdon  
 Country of Publication

UK

Abstract

A 16-year-old domestic shorthaired cat with chronic kidney disease was presented with a subacute history of weakness and anorexia. Severe hypercalcaemia was identified and attributed to a cervical mass, diagnosed as a parathyroid carcinoma after surgery. Renal function, as evaluated by plasma creatinine, initially worsened during hypercalcaemia but fully returned to previously documented values two months post-operatively.

Publication Type

Journal article.

<296>

Accession Number

20143198065

Author

Marino, C. L.; Lascelles, B. D. X.; Vaden, S. L.; Gruen, M. E.; Marks, S. L.

Title

Prevalence and classification of chronic kidney disease in cats randomly selected from four age groups and in cats recruited for degenerative joint disease studies.

Source

Journal of Feline Medicine and Surgery; 2014. 16(6):465-472. 40 ref.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

Chronic kidney disease (CKD) and degenerative joint disease are both considered common in older cats. Information on the co-prevalence of these two diseases is lacking. This retrospective study was designed to determine the prevalence of CKD in two cohorts of cats: cats randomly selected from four evenly distributed age groups (RS group) and cats recruited for degenerative joint disease studies (DJD group), and to evaluate the concurrence of CKD and DJD in these cohorts. The RS group was randomly selected from four age groups from 6 months to 20 years, and the DJD group comprised cats recruited to four previous DJD studies, with the DJD group excluding cats with a blood urea nitrogen and/or serum creatinine concentration >20% (the upper end of normal) for two studies and cats with CKD stages 3 and 4 for the other two studies. The prevalence of CKD in the RS and DJD groups was higher than expected at 50% and 68.8%, respectively. CKD was common in cats between 1 and 15 years of age, with a similar prevalence of CKD stages 1 and 2 across age groups in both the RS and DJD cats, respectively. We found significant concurrence between CKD and DJD in cats of all ages, indicating the need for increased screening for CKD when selecting DJD treatments. Additionally, this study offers the idea of a relationship and causal commonality between CKD and DJD owing to the striking concurrence across age groups and life stages.

Publication Type

Journal article.

<297>

Accession Number

20143224909

Author

Williams, T. L.; Elliott, J.; Syme, H. M.

Title

Association between urinary vascular endothelial growth factor excretion and chronic kidney disease in hyperthyroid cats.

Source

Research in Veterinary Science; 2014. 96(3):436-441. 18 ref.

Publisher

Elsevier Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Many hyperthyroid cats develop azotaemic chronic kidney disease (aCKD) following treatment, which has led to the hypothesis that hyperthyroidism might be detrimental to renal function. Renin-angiotensin-aldosterone system (RAAS) activation occurs in hyperthyroidism, which could cause peri-tubular hypoxia, tubular damage and the development of aCKD. Urinary vascular endothelial growth factor:creatinine ratio (VEGFCR) is postulated to be a marker of tubular hypoxia. VEGFCR was correlated with plasma renin activity (PRA) and compared between hyperthyroid cats that did and did not develop aCKD following treatment (pre-azotaemic and non-azotaemic groups respectively). PRA was positively correlated with VEGFCR ( $rs=0.382$ ;  $P=0.028$ ); however, pre-azotaemic hyperthyroid cats had significantly lower VEGFCR than non-azotaemic cats at baseline (median 122.3fg/g versus 167.0fg/g;  $P<0.001$ ). RAAS activation in hyperthyroidism is associated with increased VEGFCR; however, increased VEGFCR was not correlated with the development of aCKD. Therefore, tubular hypoxia may not be a mechanism for renal damage in hyperthyroid cats.

Publication Type

Journal article.

<298>

Accession Number

20143224220

Author

Ghys, L. F. E.; Meyer, E.; Paepe, D.; Delanghe, J.; Daminet, S.

Title

Analytical validation of a human particle-enhanced nephelometric assay for cystatin C measurement in feline serum and urine.

Source

Veterinary Clinical Pathology; 2014. 43(2):226-234. 44 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

Background: In people and dogs, Cystatin C (CysC), a renal glomerular and tubular marker, seems superior to serum creatinine to estimate the glomerular filtration rate (GFR). A particle-enhanced nephelometric immunoassay is available to measure human CysC, but there are no reports in cats. Objective: The goal of this study was the validation of the human CysC nephelometric assay with feline serum and urine, and to perform a pilot study comparing serum and urine CysC between healthy cats and cats with chronic kidney disease (CKD). Methods: Western blot analysis was used to assess cross-reactivity between the polyclonal rabbit anti-human CysC antibody and feline CysC. Imprecision and linearity were determined for feline serum

and urine CysC. Serum and urine CysC were measured in 10 healthy and 10 CKD cats. Results: Cross-reactivity between the polyclonal rabbit anti-human CysC antibody and feline CysC was demonstrated. Intra- and inter-assay coefficients of variation in feline serum and urine were 1.3% and 0.4%, and 12.5%, and 4.1%, respectively. Cats with CKD had a significantly higher serum CysC concentration (1.24 [0.63-2.99] vs 0.79 [0.43-1.05] mg/L;  $P = .02$ ) and urine CysC/urinary Creatinine (uCr) ratio (565.6 [0-1311] vs <0.049/uCr mg/mol;  $P = .005$ ) compared with healthy cats. Conclusions: The human nephelometric assay showed satisfactory validation results for feline CysC. Cats with CKD had a significantly higher sCysC concentration and uCysC/uCr ratio compared with healthy cats. Additional studies are necessary to evaluate CysC as an early marker of renal damage in cats.

Publication Type  
Journal article.

<299>

Accession Number

20143236397

Author

Buoncompagni, S.; Bowles, M. H.

Title

Treatment of systemic hypertension associated with kidney disease in the dog and cat. [German]

Source

Tierärztliche Praxis. Ausgabe K, Kleintiere/Heimtiere; 2014. 42(3):194-201. 36 ref.

Publisher

Schattauer GmbH

Location of Publisher

Stuttgart

Country of Publication

Germany

Abstract

Systemic hypertension is an increasingly diagnosed disorder in dogs and cats and frequently occurs secondary to chronic kidney disease. Prevention of damage to organs such as the kidneys, brain, heart, and eyes is one of the primary concerns in the management of veterinary patients with hypertension. This article reviews the guidelines for antihypertensive therapy in patients with, or at risk for, kidney disease, including the initiation of treatment and currently recommended medications.

Publication Type

Journal article.

<300>

Accession Number

20143243143

Author

Nabi, S. U.; Wani, A. R.; Shah, O. S.; Dey, S.

Title

Association of periodontitis and chronic kidney disease in dogs.

Source

Veterinary World; 2014. 7(6):403-407. 25 ref.

Publisher

Veterinary World

Location of Publisher

Rajkot  
Country of Publication  
India  
Abstract

Aim: The purpose of our study is to study the etiopathogenesis of periodontitis in chronic kidney disease and to identify a correlation between periodontitis and chronic kidney disease, with the help of periodontal examination, ultrasonographic and hematobiochemical analysis. Materials and Methods: 46 dogs with renal failure were studied and classified as presenting a slight (56.52%), moderate (36.95%) and severe (47.8%) degree of periodontal disease. Results: Marked gingival recession involving whole maxillary dental arcade, Oral mucosa ulcers and tissue necrosis and mobility of mandibular incisors was observed in dogs with chronic kidney disease. Dogs with normal renal function were observed to have minimal gingival recession of the mandibular teeth only. Conclusion: In view of the causative association between periodontal infection, generalized inflammation and important systemic diseases like chronic kidney disease, we hypothesize that targeted prophylaxis and careful treatment of oral diseases can prevent the progression of renal failure.

Publication Type  
Journal article.

<301>

Accession Number  
20143239978

Author  
Galvao, A. L. B.; Carvalho, M. B.

Title  
Hepatic and electrolyte profile of older dogs healthy or with chronic kidney disease treated with antioxidant N-acetylcysteine. [Portuguese]

Source  
Archives of Veterinary Science; 2014. 19(2):9-14. 12 ref.

Publisher  
Universidade Federal do Parana, UFPR

Location of Publisher  
Palotina

Country of Publication  
Brazil

Abstract  
N-acetylcysteine (NAC) has been used in hepatic and renal protection in experimental models. The objective of this study was to evaluate the effects of NAC treatment on profile hepatic and electrolytic for older dogs healthy or with chronic kidney disease (CKD) naturally acquired and clinically stable. Four groups of aged dogs (9-15 years) were evaluated, including the control normal group (N-C, n=4), normal group treated (N-T, n=5), group control chronic kidney disease (CKD-C, n=5) and the group treated chronic kidney disease (CKD-T, n=4). The groups N-T and CKD-T were submitted to treatment with NAC (VO) at the dose of 10 mg/kg bid for 60 days. The groups N-C and CKD-C were not submitted to any type of treatment. The serum concentration total protein (SPt), albumin (SAIb), alanina amino-transferase (SALT), alkaline phosphatase (SFA), sodium (SNa), potassium (SK), phosphorus (SP), total calcium (SCat) and the calcium ionc (SCai) were previously evaluated, 15, 30, 45 and 60 days after being treated with NAC. The data were compared by ANOVA for repeated measures followed by the Tukey test (alpha =0,05). The NAC had no effect on the hepatic profile of the dogs studied. The SNa in the N-T (149+or-4,99 mg/dL) was higher compared to N-C (141+or-1,32 mg/dL) (P<0,05). In multiple comparisons of mean SK and SCat in the N-T average at 15 days of treatment (4,94+or-0,38 mEq/L; 12,37+or-0,45 mEq/L) was higher than the average baseline (4,26+or-0,22 mEq/L; 10,13+or-0,56 mEq/L). It was conclude that the antioxidant NAC promoted in older dogs healthy, increase of SK and SCat.

Publication Type  
Journal article.

<302>

Accession Number

20143168532

Author

Maffei, L. D.; Franco, R. P.; Santos, C. B. A. dos

Title

Cardiovascular changes in a dog with a secondary systemic hypertension chronic renal failure: case report.

[Portuguese]

Source

PUBVET; 2014. 8(8):Art.1703. 19 ref.

Publisher

F. B. Moreira

Location of Publisher

Londrina

Country of Publication

Brazil

Abstract

Systemic hypertension in dogs can occur secondary to chronic kidney disease (CKD), because there is activation of the renin angiotensin aldosterone system (RAAS) leading to vasoconstriction and increased blood pressure and afterload, promoting concentric hypertrophy of the ventricular myocardium. The objective of this study is to report the radiographic, electrocardiographic and Doppler echocardiographic a dog carrier hypertension secondary to CKD before and after therapy. We treated a canine patient with CKD presenting unilateral ocular hemorrhagic stroke and presence of mitral murmur grade II/VI. Laboratory tests revealed renal azotemia, with urinalysis showing isosthenuria, proteinuria and granular cylinders. Blood pressure (SBP) showed average values of 250 mmHg. On the chest radiograph Vertebral Heart System (VHS) was 10.7 vertebrae, indicating cardiomegaly and increased left ventricular (LV), as suggested in electrocardiography with increasing duration of QRS Complex. Doppler echocardiography showed hypertrophic cardiomyopathy and decrease in LV internal diamentro, ventricular septal hypertrophy, dilatation of the aorta and increased fractional shortening (% FEC) LV. Therapy was instituted the basis of enalapril maleate and commercial diet for CKD. After 90 days, there was a reduction in ocular hemorrhagic stroke, with mean SBP maintaining the 130 mmHg, reduction in serum biochemical values in VHS (10.6 v) heart in myocardial hypertrophy and LV% FEC. The changes found suggest myocardial remodeling due to hypertension secondary source to CKD, with improvement after therapy instituted.

Publication Type

Journal article.

<303>

Accession Number

20143257179

Author

Pimenta, M. M.; Reche Junior, A.; Freitas, M. F.; Kogika, M. M.; Hagiwara, M. K.

Title

Study of nephrolithiasis and ureterolithiasis in cats with chronic kidney disease. [Portuguese]

Source

Pesquisa Veterinaria Brasileira; 2014. 34(6):555-561. 28 ref.

Publisher

Colegio Brasileiro de Patologia Animal

Location of Publisher  
Rio de Janeiro  
Country of Publication  
Brazil

#### Abstract

Nephrolithiasis and/or ureterolithiasis were investigated by means of ultrasonography in 72 cats with chronic kidney disease (CKD), predominantly classified in stage II, according to IRIS - International Renal Interest Society criteria. Of these patients, 47 (65.27%) had nephrolithiasis and/or ureterolithiasis. There was no statistical difference between the study group (CKD with calculi) and control group (CKD without calculi) regarding age ( $p=0.274$ ). Nevertheless, patients with nephrolithiasis and/or ureterolithiasis had greater evidence of renal injury, characterized by statistically significant differences in the urinary density ( $p=0.013$ ) and the smaller size of the right kidney ( $p=0.009$ ) and left kidney ( $p=0.048$ ), measured in the longitudinal plane. There were no difference between groups in the other parameters investigated such as plasmatic total calcium, ionized calcium, phosphorus, sodium, potassium and intact parathyroid hormone concentrations. The values of serum urea and bicarbonate differ between groups with  $p=0.039$  and  $p=0.037$ , respectively. Furthermore, arterial blood pressure was measured, remaining unchanged between the groups. One can conclude that nephrolithiasis and/or ureterolithiasis are common findings in cats with CKD and these results reinforce the need to perform image investigation in cats with CKD even in the asymptomatic ones, or those in the early stages of the disease.

Publication Type  
Journal article.

<304>

Accession Number  
20143275318

Author  
Hanzlicek, A. S.; Roof, C. J.; Sanderson, M. W.; Grauer, G. F.

Title  
The effect of Chinese rhubarb, *Rheum officinale*, with and without benazepril on the progression of naturally occurring chronic kidney disease in cats.

Source  
Journal of Veterinary Internal Medicine; 2014. 28(4):1221-1228. 37 ref.

Publisher  
Wiley-Blackwell  
Location of Publisher  
Boston

Country of Publication  
USA

#### Abstract

Background: Renal fibrosis is common in progressive kidney disease. Transforming growth factors beta (TGF- beta ) are important mediators of all types of fibrosis, including renal fibrosis. Chinese rhubarb has been shown to have antifibrotic properties in part because of inhibition of TGF- beta and has slowed the progression of kidney disease in rodent models. Hypothesis: That administration of a Chinese rhubarb supplement will slow the progression of chronic kidney disease (CKD) in cats and the concurrent administration of Chinese rhubarb and benazepril will be more effective than either alone. Animals: Twenty-nine client-owned cats with naturally occurring IRIS Stage 2 or early Stage 3 CKD and without comorbidity such as cancer, urinary tract obstruction, urinary tract infection, poorly controlled hyperthyroidism, or systemic hypertension were enrolled in the study. Methods: A randomized, positive-controlled, prospective study was performed. Cats received Chinese rhubarb, benazepril, or both in addition to standard treatment for CKD. Repeated measures ANOVA was used to assess changes in serum creatinine concentration, body weight, hematocrit, urine protein: urine creatinine ratio (UPC), and systemic arterial blood pressure over time between and within treatment groups over an average of 22 months. Results: No significant differences were



detected in serum creatinine concentration, body weight, hematocrit, UPC, and systemic arterial pressure over time between or within treatment groups. Conclusions and Clinical Importance: This study failed to detect a significant difference in the progression of CKD in cats treated with Chinese rhubarb, benazepril, or both. Further study in specific subsets of cats with CKD is warranted.

Publication Type  
Journal article.

<305>

Accession Number  
20133424118

Author  
Sparkes, A.

Title  
Chronic kidney disease in cats. New and future developments. [Dutch]

Source  
Dier en Arts; 2013. 28(12):422-425.

Publisher  
Uitgeverij Libre B.V.

Location of Publisher  
Leeuwarden

Country of Publication  
Netherlands

Abstract

The need for early diagnosis of chronic kidney disease is discussed, as well as the use of markers for the prognosis of the disease. Currently the use of a therapeutic diet is the only intervention which can prolong life. Decreasing phosphate levels in the diet slows down disease progression. Similarities between chronic kidney disease in man and cat are discussed.

Publication Type  
Journal article.

<306>

Accession Number  
20143308787

Author  
Funayama, M.; Uechi, M.

Title  
Evaluation of pharmacokinetics of orbifloxacin in dogs with chronic kidney disease. [Japanese]

Source  
Journal of the Japan Veterinary Medical Association; 2014. 67(8):603-607. 26 ref.

Publisher  
Japan Veterinary Medical Association

Location of Publisher  
Tokyo

Country of Publication  
Japan

Abstract

Orbifloxacin, is a fluoroquinolone antibiotic developed for use in veterinary medicine that is quickly and widely distributed after administration and is excreted primarily by kidney. In this study the pharmacokinetics

of orbifloxacin after a single oral administration of 5.0 mg/kg body weight was evaluated in three dogs with experimentally induced chronic kidney disease (CKD group) compared to three healthy dogs (healthy group). The mean glomerular filtration rates by inulin clearance for the CKD group and the healthy group were 2.32±0.45 ml/min/kg and 4.14±0.66 ml/min/kg respectively. The maximum blood concentration of orbifloxacin was 3.60±0.23 micro g/ml in the healthy group one hour after administration, and 3.07±0.31 micro g/ml in the CKD group two hours after administration. The average blood concentration of orbifloxacin a 24 hours after administration was 0.45±0.14 micro g/ml in the healthy group and 0.41±0.10 micro g/ml in the CKD group. In this study the concentration of orbifloxacin were higher in the CKD group, whereas there was no significant difference compared to the healthy group. In conclusion, orbifloxacin showed favorable pharmacokinetic properties with no obvious adverse reactions in the CKD group compared to the healthy group. Therefore, these results suggest that no dosage adjustment of orbifloxacin is needed for CKD dogs.

Publication Type  
Journal article.

<307>

Accession Number  
20143314294

Author  
Bradea, A.; Vlagioiu, C.; Codreanu, M. D.; Ivascu, C.

Title  
Chronic kidney disease in a German shepherd - a case study.

Source  
Lucrari Stiintifice - Universitatea de Stiinte Agricole a Banatului Timisoara, Medicina Veterinara; 2014. 47(4):10-13. 7 ref.

Publisher  
Facultatea de Medicina Veterinara  
Location of Publisher  
Timisoara  
Country of Publication  
Romania

Abstract  
Chronic kidney disease (CKD) is the most commonly recognized form of kidney disease in dogs and cats. It is defined as any structural and/or functional abnormality of one or both kidneys that has been continuously present for three months or longer (David J. Polzin, 2011). The purpose of this case study was to assess and monitor a 11 year old German shepherd diagnosed with chronic kidney disease over a period of an year based on clinical signs such as vomiting, inappetence, polyuria and polydipsia in conjunction with routine serum biochemistry tests on blood collected by venipuncture in standard tubes and hematological tests on tubes with anticoagulant. Additional examination included urinalysis and ultrasonography. Chronic kidney disease monitoring must consist with regular assessment of blood urea nitrogen, creatinine and total protein serum levels in conjunction with characteristic parameters investigation of the etiopathogenetic factor.

Publication Type  
Journal article.

<308>

Accession Number  
20143322941  
Author

Caney, S.  
 Title  
 Advances in treating cats with CKD.  
 Source  
 Veterinary Times; 2014. 44(38):8-9. 12 ref.  
 Publisher  
 Veterinary Business Development Ltd  
 Location of Publisher  
 Peterborough  
 Country of Publication  
 UK  
 Abstract

Chronic kidney disease (CKD) is one of the most common diagnoses made in clinical practice, estimated to affect more than a third of cats more than 10 years old. Thankfully, CKD is an area of active research and innovation, with new treatments and information emerging every year. Thanks to these treatment advances, it is now possible to stabilise many cats with CKD so they can live a good quality of life for years following their diagnosis. This article will briefly review the treatments available and evidence of their benefit.

Publication Type  
 Journal article.

<309>

Accession Number  
 20143355859  
 Author  
 Cherry, H.  
 Title  
 Assessing pain and emotional well being in feline patients with chronic kidney disease.  
 Source  
 The Veterinary Nurse; 2014. 5(7):392, 394-396. 29 ref.  
 Publisher  
 MA Healthcare Limited  
 Location of Publisher  
 London  
 Country of Publication  
 UK  
 Abstract

Pain is both a sensory and emotional experience and can be measured with the use of pain scoring charts. Pain scoring is seen as a valuable tool especially as an aid to post-operative nursing care. Currently pain scoring systems are designed for assessing acute post-operative pain and have been validated for use in dogs. However they can be useful in assessing pain experienced in cats suffering from diseases such as chronic kidney disease, and can assist the nursing care provided to patients hospitalised for treatment of the disease. Patient care could be improved if a more holistic approach to nursing was adopted which encouraged veterinary nurses to not only consider the physical aspects of pain but also the emotional side.

Publication Type  
 Journal article.

<310>

Accession Number

20143365946

Author

Pereira, C. de O.; Coelho, E. M.; Costa, F. V. A. da; Valle, S. de F.; Rocha, K. S. da; MacHado, G.; Corbellini, L. G.

Title

Correlation between age and staging of chronic kidney disease in azotemic cats by IRIS. [Portuguese]

Source

Acta Veterinaria Brasilica; 2013. 7(Suppl. 1):319-320. 7 ref.

Publisher

Universidade Federal Rural do Semi-Arido (UFERSA)

Location of Publisher

Mossoro

Country of Publication

Brazil

Abstract

Chronic kidney disease is defined as any function or structure abnormality of one or both kidneys with occurrence for three months or more. The average age of cats with this disease is 12.6 years. However, its prevalence increases with age of the animal. The International Society of Renal Interest (IRIS) classified chronic kidney disease in four stages, according to the serum creatinine concentration measured in the animal. The aim of this study is to evaluate the correlation between age and the degree of chronic kidney disease in azotemic cats, according to serum creatinine concentration in Laboratory of Veterinary Clinical Analysis in Veterinary Hospital of UFRGS during 2011 to 2012. The results obtained by Pearson's test showed that there is a poor correlation between this two parameters and that they are inversely related.

Publication Type

Journal article

Conference paper.

<311>

Accession Number

20143365943

Author

Mendes, S. S.; Patitucci, L. T.; Nobre e Castro, M. C.

Title

Systolic blood pressure measurement in healthy dogs and with Chronic Kidney Disease. [Portuguese]

Source

Acta Veterinaria Brasilica; 2013. 7(Suppl. 1):310-312. 7 ref.

Publisher

Universidade Federal Rural do Semi-Arido (UFERSA)

Location of Publisher

Mossoro

Country of Publication

Brazil

Abstract

Chronic Kidney Disease (CKD) occurs when more than 75% of nephrons lose their function. The study included 24 healthy dogs and 20 dogs with chronic kidney disease. The average systolic blood pressure was 139,2±15,8 mm Hg in the control group, and 157,9±31,06 mm Hg in DRC group, that presents with 40% of the dogs with moderate to severe risk of target organ damage. We concluded that the measurement of blood pressure in clinical routine is useful to diagnose and start early hypertension treatment.

Publication Type

Journal article

Conference paper.

<312>

Accession Number

20143338452

Author

Jepson, R.

Title

Chronic kidney disease: a better understanding.

Source

Companion; 2014. (October):28-29.

Publisher

British Small Animal Veterinary Association

Location of Publisher

Quedgeley

Country of Publication

UK

Publication Type

Journal article.

<313>

Accession Number

20143338347

Author

Gomez, J.; Viniegra, E.

Title

Semintra the next generation: ease of administration and specificity of action in the management of chronic kidney disease (CKD) in cats. [Spanish]

Source

Argos - Informativo Veterinario; 2014. (161):8-9. 5 ref.

Publisher

ASIS Biomedica s.l.

Location of Publisher

Zaragoza

Country of Publication

Spain

Publication Type

Journal article.

<314>

Accession Number

20143387226

Author

Kondo, H.; Shimizu, A.

Title

Two cases of cutaneous calcinosis of the paws in cats with chronic renal failure. [Japanese]

Source

Japanese Journal of Veterinary Dermatology; 2014. 20(3):153-157. 13 ref.

Publisher

Japanese Society of Veterinary Dermatology

Location of Publisher

Tokyo

Country of Publication

Japan

Abstract

Cutaneous calcinosis of the paws in cats is a rare skin disorder. In this report, we summarize our experience of two feline cases affected with this disorder. Those cats showed nodular structures on both hindlimb of pads that formed ruptured abscesses, and both cats also had chronic renal failure. In case 1, we removed several stones (4-2 mm), from the ruptured abscess which were mainly composed of proteins and calcium phosphate. Histopathologically, case 1 was diagnosed as local calcinosis. In case 2, creamy and pasty exudate fluid was observed emanating the ruptured abscess. A smear of the exudate fluid showed a chalky-like appearance on a slide, which was histopathologically indicated to be local calcinosis.

Publication Type

Journal article.

<315>

Accession Number

20143413155

Author

Braff, J.; Obare, E.; Yerramilli, M.; Elliott, J.; Yerramilli, M.

Title

Relationship between serum symmetric dimethylarginine concentration and glomerular filtration rate in cats.

Source

Journal of Veterinary Internal Medicine; 2014. 28(6):1699-1701. 7 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

**Background:** Direct measurement of glomerular filtration rate (GFR) is the preferred method to assess renal function in cats, but it is not widely used in the diagnosis of chronic kidney disease (CKD). In cats with CKD, symmetric dimethylarginine (SDMA) has been shown to increase and to correlate with plasma creatinine concentrations. **Hypothesis:** In cats, reduced GFR corresponds with increased serum SDMA concentration. **Animals:** The study group consisted of ten client-owned cats whose GFR had been measured previously. Cats ranged in age from 11.1 to 16.9 years; both azotemic and nonazotemic animals were included. **Methods:** Glomerular filtration rate was determined for each cat by plasma iothelol clearance using the three sample slope-intercept method, and serum SDMA concentration was measured by liquid chromatography-mass spectrometry. **Results:** A linear relationship was observed between GFR and the reciprocal of serum SDMA concentration ( $R^2=0.82$ ,  $P<.001$ ). A similar relationship was found between GFR and the reciprocal of plasma creatinine concentration ( $R^2=0.81$ ,  $P<.001$ ). **Conclusions and Clinical Importance:** Increased serum SDMA concentrations were observed in cats with reduced renal function as determined by direct measurement of GFR. This finding indicates that SDMA could have clinical applications in the diagnosis of CKD in cats.

Publication Type

Journal article.

<316>

Accession Number

20143414360

Author

Vitalaru, B. A.; Micsa, C.; Birtoiu, A.

Title

Peritoneal dialysis: key therapy in kidney failure in small sized dogs.

Source

Bulletin of University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. Veterinary Medicine; 2014. 71(2):445-448. 7 ref.

Publisher

University of Agricultural Sciences and Veterinary Medicine

Location of Publisher

Cluj-Napoca

Country of Publication

Romania

Abstract

Peritoneal dialysis (PD) is a highly effective therapeutic method employed to remove toxic byproducts and metabolites from the body when this role can no longer be fulfilled by the kidneys that are either permanently damaged as in chronic kidney failure, or need time and proper treatment to recover from other diseases of the kidney itself or pathologies that may affect the renal function as they progress. This technique uses the peritoneum ability to act as a filtering membrane, through which the toxins, such as urea and creatinine, pass into the peritoneal cavity, being subsequently removed along with the dialysate. The study describes the evolution and follows the dynamic of the biomarkers in 5 dogs suffering from kidney failure, that did not respond well to specific treatment and for whom peritoneal dialysis was the best therapeutic approach. Peritoneal dialysis was performed in 5 dogs, with ages between 5 and 15 years old, during 6 months, using Diaenal PD4 glucose 1.36% W/V/13.6 mg/ml produced by Baxter. Blood samples were taken from each dog before the procedure, and then twice a week to monitor the electrolytes, creatinine and urea levels. Also, before introducing the dialysate into the peritoneal cavity, the patients underwent ultrasound examination to evaluate the kidneys and to exclude other problems that would prevent this maneuver, and 2 hours after administering the dialysate to measure the absorption rate. All 5 patients exhibited an important recovery after 8-14 dialysis sessions, showing that the procedure was able to maintain kidney stability, a fact proved also by the levels of metabolites involved in the clinical evolution. Ecography performed before and after dialysis revealed that the hydration level is key point in the success of the procedure. Peritoneal dialysis is a more affordable and less invasive procedure to gradually eliminate the uremic toxins. It can offer temporary support for kidneys until the recovery of renal function is done, or when hemodialysis cannot be used as a basic treatment.

Publication Type

Journal article.

<317>

Accession Number

20143414342

Author

Rusenov, A.; Zapryanova, D.; Rusenova, N.; Atanasoff, A.; Ivanov, V.

Title

Glomerular and tubular markers in dogs with chronic kidney failure and healthy control dogs.

Source



Bulletin of University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. Veterinary Medicine; 2014. 71(2):353-356. 13 ref.

Publisher

University of Agricultural Sciences and Veterinary Medicine

Location of Publisher

Cluj-Napoca

Country of Publication

Romania

Abstract

The study aimed to examine the changes in two glomerular markers (uALB, uCRP), as well three tubular markers (uGGT, uALP, and uLDH) in dogs with Chronic Kidney Failure (CKF) and to compare the changes to healthy control dogs. Fourteen dogs with CKF of different age, breed and sex were included in the study as well 10 healthy control dogs. The diagnosis was based on physical examination and laboratory findings. Urinary ALB/Cr was significantly higher in CKF dogs than in healthy control dogs. No significant increase in urinary LDH/Cr, uGGT/Cr and uAF/Cr was found in CKF dogs than in healthy control dogs. No significant difference was detected for uCRP, which was not detectable in control dogs and only in 4 of the CKF dogs. The studied glomerular marker (uALB) in dogs with CKF was significantly increased compared to healthy control dogs. Urinary CRP, uLDH, uGGT and uAF cannot be reliable indicators for CKF in dogs.

Publication Type

Journal article.

<318>

Accession Number

20143413152

Author

Hall, J. A.; Yerramilli, M.; Obare, E.; Yerramilli, M.; Jewell, D. E.

Title

Comparison of serum concentrations of symmetric dimethylarginine and creatinine as kidney function biomarkers in cats with chronic kidney disease.

Source

Journal of Veterinary Internal Medicine; 2014. 28(6):1676-1683. 27 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

Background: Symmetric dimethylarginine (SDMA) has been shown to be an accurate and precise biomarker for calculating estimated glomerular filtration rate (GFR) in humans, as well as a more sensitive biomarker than serum creatinine concentration (sCr) for assessing renal dysfunction. Objectives: The purpose of this retrospective study was to report on the utility of measuring serum SDMA concentrations in cats for detection of chronic kidney disease (CKD) before diagnosis by conventional measurement of sCr. Animals: Chronic kidney disease cats (n=21) included those persistently azotemic for  $\geq 3$  months (n=15), nonazotemic cats with GFR  $>30\%$  decreased from median GFR of normal cats (n=4), and nonazotemic cats with calcium oxalate kidney stones (n=2). Healthy geriatric cats (n=21) were selected from the same colony. Methods: Symmetric dimethylarginine concentrations (liquid chromatography-mass spectroscopy) and sCr (enzymatic colorimetry) were determined retrospectively from historical data or banked serum samples in azotemic cats or at the time GFR (iohexol clearance) was measured in nonazotemic cats. Results: Serum SDMA ( $r=-0.79$ ) and sCr ( $r=-0.77$ ) concentrations were significantly correlated to GFR (both  $P<.0001$ ). Symmetric dimethylarginine became increased before sCr in 17/21 cats (mean, 17.0 months; range, 1.5-48 months). Serum SDMA had higher sensitivity (100%) compared with sCr (17%), but lower specificity (91%)

versus 100%) and positive predictive value (86% versus 100%). Conclusion and Clinical Importance: Using serum SDMA as a biomarker for CKD allows earlier detection of CKD in cats compared with sCr, which may be desirable for initiating renoprotective interventions that slow progression of CKD.

Publication Type  
Journal article.

<319>

Accession Number  
20143331165

Author  
McKelvey, D.

Title  
Chronic kidney disease - life in the slow lane.

Source  
2014 Ontario Veterinary Medical Association (OVMA) Conference Proceedings, Toronto, Ontario, Canada, 30 January - 1 February 2014; 2014. :74-78.

Publisher  
Ontario Veterinary Medical Association (OVMA)

Location of Publisher  
Milton

Country of Publication  
Canada

Publication Type  
Conference paper.

<320>

Accession Number  
20143422682

Author  
Chacar, F. C.; Guimaraes-Okamoto, P. T. C.; Oliveira, J. de; Melchert, A.

Title  
Peritoneal dialysis in dogs and cats. [Portuguese]

Source  
Veterinaria e Zootecnia; 2014. 21(2):229-237. 16 ref.

Publisher  
Faculdade de Medicina Veterinaria e Zootecnia, Universidade Estadual Paulista

Location of Publisher  
Botucatu

Country of Publication  
Brazil

Abstract

Peritoneal dialysis (PD) removes the uremic solutes by diffusion across the peritoneum which acts as a semipermeable membrane. Its indications in dogs and cats are peritonitis, pancreatitis, heart failure, intoxication and especially acute or chronic renal disease, wherein the serum concentration of urea is greater than 100 mg/dl and/or the concentration of creatinine is greater 10 mg/dl. There are several techniques of PD, but the most appropriate for dogs and cats is the continuous ambulatory peritoneal dialysis (CAPD). Although PD is an effective therapeutic option for many different diseases, it hasn't been practice in clinical

routine. Studies about PD technique in small animals are scarce. Thus, this study aims to review the main aspects of PD, and its use in dogs and cats.

Publication Type

Journal article.

<321>

Accession Number

20143421605

Author

Lippi, I.; Guidi, G.; Marchetti, V.; Tognetti, R.; Meucci, V.

Title

Prognostic role of the product of serum calcium and phosphorus concentrations in dogs with chronic kidney disease: 31 cases (2008-2010).

Source

Journal of the American Veterinary Medical Association; 2014. 245(10):1135-1140. 21 ref.

Publisher

American Veterinary Medical Association

Location of Publisher

Schaumburg

Country of Publication

USA

Abstract

Objective - To investigate serum calcium-phosphorus concentration product (sCaPP) as a predictor of mortality rate in dogs with chronic kidney disease (CKD). Design - Retrospective case-control study. Animals - 31 dogs with definitive CKD and 35 apparently healthy dogs. Procedures - All dogs had been referred for nephrological consultation between December 2008 and December 2010. Dogs with CKD had stable disease for  $\geq 3$  months. On the basis of glomerular filtration rate  $< 60$  mL/min/m<sup>2</sup>, 13 of the 35 apparently healthy dogs were subsequently classified as having early CKD. Disease stage among dogs was determined on the basis of plasma creatinine concentration as follows: stage 1,  $< 123.7$  micro mol/L (n=13), stage 2, 123.7 to 176.8 micro mol/L (7); stage 3, 185.6 to 442 micro mol/L (13); or stage 4,  $> 442$  micro mol/L (11). For each dog, serum concentrations of ionized and total calcium and phosphorus were evaluated once; the latter 2 variables were used to determine sCaPP Results - The sCaPP differed significantly between the 22 healthy dogs and dogs with stage 3 or stage 4 CKD. The proportion of dogs with sCaPP  $> 70$  mg<sup>2</sup>/dL<sup>2</sup> increased with stage of disease. Mortality rate among the 24 dogs with sCaPP  $> 70$  mg<sup>2</sup>/dL<sup>2</sup> was higher than that among the 42 dogs with sCaPP  $< 70$  mg<sup>2</sup>/dL<sup>2</sup>. Dogs with sCaPP  $> 70$  mg<sup>2</sup>/dL<sup>2</sup> had a comparatively lower survival rate, and risk of death was 4.2 times as high as risk for dogs with sCaPP  $\leq 70$  mg<sup>2</sup>/dL<sup>2</sup>. Conclusions and Clinical Relevance - For dogs with CKD, sCaPP  $> 70$  mg<sup>2</sup>/dL<sup>2</sup> appeared to be a negative prognostic indicator, which was not influenced by the concomitant serum concentrations of phosphorus and total or ionized calcium.

Publication Type

Journal article.

<322>

Accession Number

20143391139

Author

Chervier, C.

Title

Chronic kidney disease in older animals. [French]  
 Source  
 Point Veterinaire; 2014. 45(Special):102-109. 24 ref.  
 Publisher  
 Newsmed  
 Location of Publisher  
 Paris  
 Country of Publication  
 France

Abstract

Chronic kidney disease is common in older animals. The main cause is chronic interstitial nephritis, but other conditions may be diagnosed. For each animal, it is important to check for complications of renal dysfunction and an etiologic diagnosis. Blood tests, urinalysis, measurement of systemic blood pressure, medical imaging, even kidney cytology or biopsies are needed. Several biological parameters are used to provide a precise prognosis in dogs and cats. A specific diet is essential because it reduces the frequency of uraemic crises and reduces mortality. Complications are managed therapeutically.

Publication Type  
 Journal article.

<323>

Accession Number  
 20123415241  
 Author  
 Foster, J. D.; Pinkerton, M. E.

Title

Bilateral ureteropelvic junction stenosis causing hydronephrosis and renal failure in an adult cat.

Source

Journal of Feline Medicine and Surgery; 2012. 14(12):938-941. 11 ref.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

A 3.5-year-old male neutered cat was presented for investigation of renomegaly appreciated during a routine physical examination. Marked renomegaly due to bilateral hydronephrosis was detected and further testing identified International Renal Interest Society stage 2, non-hypertensive, non-proteinuric chronic kidney disease. Ten months later the cat was evaluated for acute lethargy; severe azotemia with oliguria was documented. Medical therapy failed to result in clinical improvement and the cat was euthanased. Necropsy revealed bilateral marked hydronephrosis secondary to a tortuous proximal ureter consistent with proximal ureteropelvic junction stenosis. This is the first report of this disorder leading to progressive renal failure in a cat.

Publication Type  
 Journal article.

<324>

Accession Number

20123415229

Author

Hanzlicek, A. S.; Roof, C. J.; Sanderson, M. W.; Grauer, G. F.

Title

Comparison of urine dipstick, sulfosalicylic acid, urine protein-to-creatinine ratio and a feline-specific immunoassay for detection of albuminuria in cats with chronic kidney disease.

Source

Journal of Feline Medicine and Surgery; 2012. 14(12):882-888. 15 ref.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

The performance of the urine dipstick, sulfosalicylic acid (SSA), and urine protein-to-creatinine (UPC) tests for the detection of albuminuria was assessed in cats with chronic kidney disease (CKD). Two hundred and thirty-nine urine samples from 37 cats with CKD were used. Test results were dichotomized as either positive or negative, compared with those for the feline-specific rapid urine albumin immunoassay and test performance variables calculated for each test. A positive urine dipstick ( $\geq$  trace) and positive SSA ( $\geq 5$  mg/dl), positive SSA alone or  $\geq 2+$  urine dipstick alone were indicative of albuminuria. In these cases, protein quantification would be warranted if proteinuria/albuminuria is persistent. In the case of a negative urine dipstick result the addition of the SSA added little diagnostic value. Of the tests investigated, the single best test for the detection of albuminuria was the UP/C ( $\geq 0.2$ ) in which either a negative or positive test result provided useful information.

Publication Type

Journal article.

<325>

Accession Number

20123415228

Author

Gowan, R. A.; Baral, R. M.; Lingard, A. E.; Catt, M. J.; Stansen, W.; Johnston, L.; Malik, R.

Title

A retrospective analysis of the effects of meloxicam on the longevity of aged cats with and without overt chronic kidney disease.

Source

Journal of Feline Medicine and Surgery; 2012. 14(12):876-881. 24 ref.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

The study sought to examine the effect of long-term meloxicam treatment on the survival of cats with and without naturally-occurring chronic kidney disease at the initiation of therapy. The databases of two feline-only clinics were searched for cats older than 7 years that had been treated continuously with meloxicam for a period of longer than 6 months. Only cats with complete medical records available for review were recruited into the study. The median longevity in the renal group was 18.6 years [95% confidence interval (CI) 17.5-19.2] and the non-renal group was 22 years [95% CI 18.5-23.8]. The median longevity after diagnosis of CKD was 1608 days [95% confidence interval 1344-1919] which compares favourably to previously

published survival times of cats with CKD. In both groups the most common cause of death was neoplasia. Long-term treatment with oral meloxicam did not appear to reduce the lifespan of cats with pre-existent stable CKD, even for cats in IRIS stages II and III. Therefore, to address the need for both quality of life and longevity in cats with chronic painful conditions, meloxicam should be considered as a part of the therapeutic regimen.

Publication Type  
Journal article.

<326>

Accession Number  
20133044904

Author

Tvarijonaviciute, A.; Ceron, J. J.; Holden, S. L.; Biourge, V.; Morris, P. J.; German, A. J.

Title

Effect of weight loss in obese dogs on indicators of renal function or disease.

Source

Journal of Veterinary Internal Medicine; 2013. 27(1):31-38. 58 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

Background: Obesity is a common medical disorder in dogs, and can predispose to a number of diseases. Human obesity is a risk factor for the development and progression of chronic kidney disease. Objectives: To investigate the possible association of weight loss on plasma and renal biomarkers of kidney health. Animals: Thirty-seven obese dogs that lost weight were included in the study. Methods: Prospective observational study. Three novel biomarkers of renal functional impairment, disease, or both (homocysteine, cystatin C, and clusterin), in addition to traditional markers of chronic renal failure (serum urea and creatinine, urine specific gravity [USG], urine protein-creatinine ratio [UPCR], and urine albumin corrected by creatinine [UAC]) before and after weight loss in dogs with naturally occurring obesity were investigated. Results: Urea ( $P=.043$ ) and USG ( $P=.012$ ) were both greater after weight loss than before loss, whilst UPCR, UAC, and creatinine were less after weight loss ( $P=.032$ ,  $P=.006$ , and  $P=.026$ , respectively). Homocysteine ( $P<.001$ ), cystatin C ( $P<.001$ ) and clusterin ( $P<.001$ ) all decreased upon weight loss. Multiple linear regression analysis revealed associations between percentage weight loss (greater weight loss, more lean tissue loss;  $r=-0.67$ ,  $r^2=0.45$ ,  $P<.001$ ) and before-loss plasma clusterin concentration (greater clusterin, more lean tissue loss;  $r=0.48$ ,  $r^2=0.23$ ,  $P=.003$ ). Conclusion and Clinical Importance: These results suggest possible subclinical alterations in renal function in canine obesity, which improve with weight loss. Further work is required to determine the nature of these alterations and, most notably, the reason for the association between before loss plasma clusterin and subsequent lean tissue loss during weight management.

Publication Type  
Journal article.

<327>

Accession Number  
20133044545

Author

Lin ShengChuan; Kuo TzongFu; Huang FuJen; Chang TsungChou; Hsuuw YanDer

Title

Intrarenal artery autologous mesenchymal stem cell injection for treatment of chronic glomerulonephritis in cat.

Source

Journal of Animal and Veterinary Advances; 2012. 11(16):3019-3022. 20 ref.

Publisher

Medwell Online

Location of Publisher

Faisalabad

Country of Publication

Pakistan

Abstract

Chronic glomerulonephritis is a major cause of morbidity and mortality in feline chronic kidney diseases. Mesenchymal stem cells are multipotent stem cells found in the stroma of bone marrow, adipose tissue and umbilical cord. Mesenchymal stem cells can be induced to differentiate into a wide array of cells types including osteoblasts, chondrocytes, myocytes, adipocytes, endothelium and neuronal cells. The effects of mesenchymal stem cell therapy have been investigated in rodent chronic renal failure models including genetic disease, glomerulo-nephritis and experimentally-induced chronic kidney diseases. The purpose of this study was to assess the feasibility of intra-renal artery mesenchymal stem cells transfer in cat with chronic glomerulo-nephritis. Researchers, hypothesized that mesenchymal stem cells could be safely administered to cats with chronic glomerulo-nephritis. Intra-renal artery mesenchymal stem cells injection would improve the function of the injected kidney. This clinical result showed the optimal direction that the patient demonstrated blood urea nitrogen and creatinine improvement after intra-renal artery mesenchymal stem cells transfer.

Publication Type

Journal article.

<328>

Accession Number

20133026704

Author

Ludwig, J.

Title

Chronic kidney disease in cats - diagnosis, classification, treatment. [German]

Source

Biologische Tiermedizin; 2012. 29(2):33-46. many ref.

Publisher

Aurelia-Verlag GmbH

Location of Publisher

Baden-Baden

Country of Publication

Germany

Abstract

Chronic kidney disease (CKD) of the cat shows a high prevalence, increasing with age. The international Renal Interest Society has developed a four step classification model for standardization of diagnosis and therapy which is based mainly on the degree of azotemia; proteinuria and hypertension can be used as subscales. CKD can clinically only be noticed after destruction of the majority of nephrons due to the big capacity for compensation of the kidneys. Therapy of CKD aims towards a relief of the clinical symptoms, the avoidance of further organ damage and slowing down of the disease progression. Out of the big number of conventional therapy measures, the positive effect of fluid therapy and renal diet is acknowledged and



proven. ACE inhibitors could show an efficacy in proteinuria, however without a proven influence on survival time so far. Further therapeutic measures are indicated only when specific symptoms (hypertension, hyperphosphatemia, hypokalemia, anemia etc.) are present. Besides that approach, in cats with CKD a biological treatment with Solidago comp., Ubichinon comp. and Coenzyme comp. (SUC) has proven helpful, if needed combined with Hepar comp. Heel. The therapy according to the standardised SUC protocol acts in a causal way by aiding as well the renal excretion function as the energy supply and cell respiration in the damaged kidney cells. Especially cats in CKD stage II and III treated with the SUC-protocol generally show, usually within a few days, showing a clear improvement of general wellbeing, increased appetite and quality of life. The presented SUC-protocol is often used as single therapy, based on the positive clinical experience. A multimodal combination of conventional drug approach with the SUC-protocol for optimisation of therapy is possible. Weekly therapy intervals in the long-term use of SUC support the compliance and quality of life of the affected patients.

Publication Type  
Journal article.

<329>

Accession Number  
20123385622

Author

Brovida, C.; Galli, E. A.; Tomassone, L.; Declame, V.; Capucchio, M. T.

Title

Proteinuria in cats with renal disease: an epidemiologic investigation. [Italian]

Source

Veterinaria (Cremona); 2012. 26(5):17. 28 ref.

Publisher

Edizioni SCIVAC

Location of Publisher

Cremona

Country of Publication

Italy

Abstract

Introduction and aim of the study - Primary renal proteinuria is an important marker of kidney function and it is diagnosed more frequently in the Dog than in the Cat, in spite of the fact that cats show an important amount of kidney diseases. For this reason a study has been developed to evaluate the proteinuria in CKD cats, through a retrospective analysis on cats consulted at the ANUBIReg. Ospedale per Animali da Compagnia, in the period 2005-2011. Materials and methods - The cases have been selected and evaluated following the IRIS (International Renal Interest Society) guidelines. The hematocrit (Hct), blood creatinine, and urinalysis, in particular the Urine Protein/Urine Creatinine (UPC) ratio and the urine specific gravity have been evaluated. Reference values for UPC were: (a) normal with UPC <0.2; (b) borderline with UPC between 0.2 and 0.4; (c) proteinuric with UPC >0.4. When available, also blood phosphorus and potassium values have been evaluated. Attention has been particularly focused on correlations between UPC and blood creatinine and between proteinuria and urine specific gravity. Results - On 195 selected cats with CKD, 58 (29.74%) cats resulted proteinuric, with a UPC ratio >0.4. Discussion - A statistically relevant number of proteinuric cats has been found in the investigated population of cats showing signs of CKD, as well as a significant negative correlation between UPC and urinary specific gravity.

Publication Type

Journal article.

<330>

Accession Number

20133065608

Author

Habenicht, L. M.; Webb, T. L.; Clauss, L. A.; Dow, S. W.; Quimby, J. M.

Title

Urinary cytokine levels in apparently healthy cats and cats with chronic kidney disease.

Source

Journal of Feline Medicine and Surgery; 2013. 15(2):99-104. 27 ref.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

Chronic kidney disease (CKD) is a common cause of illness and death in cats. The hallmark of CKD in cats is chronic tubulointerstitial nephritis, and inflammation contributes to the progression of renal fibrosis. However, at present, it is difficult to assess directly the degree of intra-renal inflammation without renal biopsy. Measurement of inflammatory cytokine levels in urine may provide a non-invasive means of assessing intra-renal inflammation. Urine cytokine levels (urine cytokine/urine creatinine ratio) were measured in 18 healthy cats and 26 cats with CKD. When urine cytokine levels in healthy and CKD cats were compared, we found significantly higher levels of IL-8 and transforming growth factor- beta 1 (TGF- beta 1) in urine of CKD cats, along with significantly lower vascular endothelial growth factor (VEGF) levels. A significant positive correlation between serum creatinine and TGF- beta 1 levels was found in CKD cats. Urinary cytokine measurement may, potentially, be a useful means of assessing intra-renal inflammation, fibrosis and vascular health in cats with CKD.

Publication Type

Journal article.

<331>

Accession Number

20133038706

Author

Caney, S.

Title

Caring for a cat with chronic kidney disease.

Source

Caring for a cat with chronic kidney disease; 2011. :68 pp.

Publisher

Cat Professional Ltd

Location of Publisher

Midlothian

Country of Publication

UK

Abstract

This book is written as an information source and support tool primarily aimed to cat owners whose cats are diagnosed with chronic kidney disease. The science and emotional aspects of dealing with a diagnosis of kidney disease are highlighted. The book discusses what a diagnosis of chronic kidney disease means and how best to treat and manage the condition. A case study is included to show how treatment can be successful and a glossary of terms used by veterinarians is also featured. This book is designed to be a resource for veterinarians, veterinary students, nurses, technicians and cat owners.

Publication Type  
Book.

<332>

Accession Number  
20133075276

Author  
Kim YeWon; Hyun ChangBaig

Title  
Evaluation of therapeutic effect of the extract from Rhubarb (*Rheum officinalis*) in dogs with chronic renal failure.

Source  
Journal of Veterinary Clinics; 2012. 29(6):435-440. 17 ref.

Publisher  
Korean Society of Veterinary Clinics  
Location of Publisher  
Seoul

Country of Publication  
Korea Republic

Abstract

This study was designed to evaluate the clinical efficacy and safety of Rhubarb extracts (RubenalReg.) in dogs with chronic renal failure (CRF). Client-owned 40 dogs with CRF graded International renal interest Society (IRIS) II-III were enrolled in this study. The dogs were equally allocated and blindly administered with RubenalReg. or placebo. The following items were evaluated at day 0, 30, 90 and 180: body condition score (PCS), clinical score (appetite, polydipsia/polyuria, quality of life score), hemogram (WBC, RBC, PCV), serum biochemistry (ALT/AST, ALP, Creatinine/BUN, total protein, albumin), serum electrolyte (Na, K, Cl, Ca, P), systolic blood pressure, urinalysis (UPC, USG) and IRIS stage. In this study, we found that the RubenalReg. preparation was well tolerated by dogs and induced no adverse effects. Statistically significant improvements were observed in clinical score (quality of life score by vet and clients), serum BUN and creatinine levels, serum phosphorus concentration, level of proteinuria, and the IRIS score of CRF in dogs after 6 month of treatment of RubenalReg.. Those findings suggested that the Rhubarb extracts can improve the clinical signs of CRF (i.e. azotemia, hypertension, proteinuria, hyperphosphoremia) and the quality of life (i.e. BCS, clinical score) and can retard the progression of CRF in dogs. Therefore the Rhubarb extracts can be a good supplementary drug for treating dogs with subclinical and clinical renal diseases. However, care should be taken for interpreting our result, because this study is not double-blinded controlled study but pilot study.

Publication Type  
Journal article.

<333>

Accession Number  
20133049906

Author  
Kuwahara, Y.; Tanaka, T.; Kuwahara, N.

Title  
Possible participation of ureteral blockage in chronic renal failure in a cat. [Japanese]

Source  
Journal of Veterinary Medicine, Japan; 2012. 65(7):567-570. 3 ref.

Publisher  
Buneido Publishing Company Ltd  
Location of Publisher  
Tokyo  
Country of Publication  
Japan  
Publication Type  
Journal article.

<334>

Accession Number  
20133095641

Author  
Karck, J.; Spiessen, L. von; Rohn, K.; Meyer-Lindenberg, A.

Title  
Interrelation between the degree of a chronic renal insufficiency and/or systemic hypertension and ocular changes in cats. [German]

Source  
Tierärztliche Praxis. Ausgabe K, Kleintiere/Heimtiere; 2013. 41(1):37-45. 50 ref.

Publisher  
Schattauer GmbH  
Location of Publisher  
Stuttgart  
Country of Publication  
Germany

Abstract

Objective: The aim of this study was to evaluate whether the degree of renal insufficiency and/or high blood pressure in cats with chronic renal insufficiency (CRI) is related to the degree of change in the fundus and whether there are differences in blood pressure between the different accompanying diseases. Material and methods: In cats with CRI and/or hypertensive retinopathy and healthy cats, the following examinations were carried out: physical examination, ophthalmic examination, measurement of the blood pressure using Doppler ultrasonography, complete blood count, serum biochemical analyses, including serum thyroxine (T4) concentration, urinalysis and ultrasonography of the heart and abdomen. Results: A total of 69 diseased and 24 healthy cats were examined. 53/69 cats displayed changes of the fundus, 17/69 cats had uveitis and 4/69 had hyphaema. Cats of the control group had no ocular changes and a mean systolic blood pressure of 13±6.7 mmHg, which was not related to age. The degree of the CRI was negligibly negatively correlated with the degree of fundic changes and blood pressure. The blood pressure was significantly positively correlated with the degree of fundus changes and age. Cats with systemic hypertension, which only suffered from CRI, had a significantly lower blood pressure than cats with an additional left ventricular hypertrophy or only a left ventricular hypertrophy, hyperthyroidism or primary hypertension. Conclusion and clinical relevance: According to the results of the present study, the degree of the CRI is not a reliable prognostic factor for the development and the degree of fundic change. The blood pressure in hypertensive cats with CRI without additional diseases is lower compared to hypertensive cats with CRI and left ventricular hypertrophy, left ventricular hypertrophy alone, hyperthyroidism or primary hypertension.

Publication Type  
Journal article.

<335>

Accession Number

20133093199

Author

Jepson, R. E.; Coulton, G. R.; Cowan, M. L.; Markwell, P.; Syme, H. M.; Elliott, J.

Title

Evaluation of mass spectrometry of urinary proteins and peptides as biomarkers for cats at risk of developing azotemia.

Source

American Journal of Veterinary Research; 2013. 74(2):333-342. 42 ref.

Publisher

American Veterinary Medical Association

Location of Publisher

Schaumburg

Country of Publication

USA

Abstract

**Objective:** To evaluate proteomic delineation of feline urine by mass spectrometry as a method for identifying biomarkers in cats at risk of developing azotemia. **Samples:** Urine samples from geriatric cats (>9 years old) with chronic kidney disease and nonazotemic cats that either remained nonazotemic (n=10) or developed azotemia (10) within 1 year. **Procedures:** Optimization studies with pooled urine were performed to facilitate the use of surface enhanced laser desorption-ionization time-of-flight mass spectrometry (SELDI-TOF-MS) for analysis of the urinary proteome of cats. Urine samples from nonazotemic cats at entry to the study were analyzed via SELDI-TOF-MS with weak cation exchange and strong anion exchange arrays. Spectral data were compared to identify biomarkers for development of azotemia. **Results:** Low protein concentration in feline urine precluded direct application to array surfaces, and a buffer exchange and concentration step was required prior to SELDI-TOF-MS analysis. Three preparation conditions by use of weak cation and strong anion exchange arrays were selected on the basis of optimization studies for detection of biomarkers. Eight potential biomarkers with an m/z of 2,822, 9,886, 10,033, 10,151, 10,234, 11,653, 4,421, and 9,505 were delineated. **Conclusions and Clinical Relevance:** SELDI-TOF-MS can be used to detect urinary low-molecular weight peptides and proteins that may represent biomarkers for early detection of renal damage. Further study is required to purify and identify potential biomarkers before their use in a clinical setting.

Publication Type

Journal article.

<336>

Accession Number

20133071050

Author

Passlack, N.

Title

Management of chronic kidney disease in cats. [German]

Source

Praktische Tierarzt; 2013. 94(2):116...124. 7 ref.

Publisher

Schlutersche Verlagsgesellschaft GmbH & Co. KG

Location of Publisher

Hannover

Country of Publication

Germany

Abstract

This article discusses the risk factors, clinical aspects, early detection of kidney diseases, stages of renal failure and dietary therapy of cats with chronic renal failure. The management of energy supply, protein content, phosphorus level and other nutrients; along with the supplementation of antioxidants and fatty acids in the dietary regulation of cats with kidney diseases or chronic renal failure are highlighted.

Publication Type  
Journal article.

<337>

Accession Number  
20133103484

Author  
Crivellenti, L. Z.; Motheo, T. F.; Salomao, R. L.; Honsho, D. K.; Momo, C.

Title  
Intrascrotal testicular torsion and seminoma in a dog with chronic renal failure.

Source  
Turkish Journal of Veterinary & Animal Sciences; 2013. 37(1):113-116. 15 ref.

Publisher  
TUBITAK

Location of Publisher  
Ankara

Country of Publication  
Turkey

Abstract

A 10-year-old mongrel dog was presented with signs of vomiting, prostration, anorexia, abdominal pain, dyspnea, dysuria, and enhanced scrotal volume. Clinical, laboratory, and radiological examinations showed intrascrotal testicular pathology and chronic renal failure. Emergency treatment was carried out; however, the patient died. Necropsy diagnosed an intrascrotal testicular torsion and seminoma. The aim of the present report is to describe an intrascrotal testicular torsion associated with chronic renal failure in a dog.

Publication Type  
Journal article.

<338>

Accession Number  
20133099342

Author  
Guidi, G.; Rossini, C.; Cinelli, C.; Meucci, V.; Lippi, I.

Title  
Canine chronic kidney disease: retrospective study of a 10-year period of clinical activity. (Current Aspects in Biology, Animal Pathology, Clinic and Food Hygiene)

Source  
Veterinary science. LXIV Annual Meeting of the Italian Society for Veterinary Sciences, Asti, 2010; 2012. :115-118. 3 ref.

Publisher  
Springer Berlin  
Location of Publisher  
Heidelberg  
Country of Publication  
Germany

## Abstract

Chronic kidney disease (CKD) is a progressive, pathological disease with a higher prevalence in geriatric patients. The aim of the present study was to estimate the prevalence of dogs affected by CKD at the Department of Veterinary Clinics over a 10-year period of clinical activity, according to gender, age, breed, and IRIS stage. Males showed a prevalence of 60.17%, while females showed a prevalence of 39.82%; 28.40% of dogs were younger than 6 years, 42.12% were between 6 and 10 years, and 29.46% were older than 10 years. Mixed breed patients showed a prevalence of 31.38%, followed by Boxer (9.36%), German shepherd (7.76%), and setter (5.42%). The prevalence of CKD was 24.25% in IRIS 2, 52.97% in IRIS 3, and 22.76 in IRIS 4. The results showed that CKD represents a more frequent reason for consultation in canine patients than in the past. It is not clear whether the high prevalence of CKD is due to an actual increase in the disease or an increased frequency of early diagnosis.

## Publication Type

Conference paper.

<339>

## Accession Number

20133127442

## Author

Geddes, R. F.; Finch, N. C.; Elliott, J.; Syme, H. M.

## Title

Fibroblast growth factor 23 in feline chronic kidney disease.

## Source

Journal of Veterinary Internal Medicine; 2013. 27(2):234-241. 39 ref.

## Publisher

Wiley-Blackwell

## Location of Publisher

Boston

## Country of Publication

USA

## Abstract

**Background:** Fibroblast growth factor 23 (FGF-23) is a phosphaturic hormone involved in the pathogenesis of secondary renal hyperparathyroidism (SRHP) in humans. There are no published studies examining feline FGF-23. **Objectives:** Validation of a method for FGF-23 quantification in feline plasma and assessment of the associations among plasma FGF-23, PTH, creatinine, and phosphate concentrations in cats with chronic kidney disease (CKD). **Animals:** One hundred nonazotemic and azotemic geriatric (>9 years) client-owned cats. **Methods:** Retrospective cross-sectional study: Cats were categorized into 4 groups: control group (plasma creatinine (Cr)  $\leq$  2.0 mg/dL), stage 2 (Cr 2.1-2.8 mg/dL), stage 3 (Cr 2.9-5.0 mg/dL), stage 4 (Cr > 5.0 mg/dL). Stages 2 and 3 were further subdivided based on International Renal Interest Society targets for plasma phosphate concentration (PO<sub>4</sub>): stage 2a (PO<sub>4</sub>  $\leq$  4.5 mg/dL), stage 2b (PO<sub>4</sub> > 4.5 mg/dL), stage 3a (PO<sub>4</sub>  $\leq$  5 mg/dL), stage 3b (PO<sub>4</sub> > 5 mg/dL). Plasma FGF-23 concentrations were measured by a human intact FGF-23 ELISA. Descriptive statistics and linear regression were performed. **Results:** The ELISA demonstrated acceptable precision, reproducibility, and specificity. Plasma FGF-23 concentrations increased with increasing plasma creatinine concentrations and were significantly different between all groups ( $P < .008$ ). Plasma FGF-23 concentrations were significantly higher in cats in stage 2b than stage 2a ( $P = .008$ ) and in stage 3b than in stage 3a ( $P = .012$ ). Phosphate, log creatinine, total calcium, log parathyroid hormone, and packed cell volume were all independent predictors of FGF-23. **Conclusions and Clinical Importance:** FGF-23 concentrations increase with increasing stage of feline CKD and might be a marker or mediator of feline SRHP.

## Publication Type

Journal article.



<340>

Accession Number

20133136298

Author

Giovaninni, L. H.; Kogika, M. M.; Lustoza, M. D.; Reche Junior, A.; Wirthl, V. A. B. F.; Simoes, D. M. N.; Coelho, B. M.

Title

Serum intact parathyroid hormone levels in cats with chronic kidney disease.

Source

Pesquisa Veterinaria Brasileira; 2013. 33(2):229-235. 49 ref.

Publisher

Colegio Brasileiro de Patologia Animal

Location of Publisher

Rio de Janeiro

Country of Publication

Brazil

Abstract

Chronic kidney disease (CKD) is frequently observed in cats and it is characterized as a multisystemic illness, caused by several underlying metabolic changes, and secondary renal hyperparathyroidism (SRHPT) is relatively common; usually it is associated with the progression of renal disease and poor prognosis. This study aimed at determining the frequency of SRHPT, and discussing possible mechanisms that could contribute to the development of SRHPT in cats at different stages of CKD through the evaluation of calcium and phosphorus metabolism, as well as acid-base status. Forty owned cats with CKD were included and divided into three groups, according to the stages of the disease, classified according to the International Renal Interest Society (IRIS) as Stage II (n=12), Stage III (n=22) and Stage IV (n=6). Control group was composed of 21 clinically healthy cats. Increased serum intact parathyroid hormone (iPTH) concentrations were observed in most CKD cats in all stages, and mainly in Stage IV, which hyperphosphatemia and ionized hypocalcemia were detected and associated to the cause for the development of SRHPT. In Stages II and III, however, ionized hypercalcemia was noticed suggesting that the development of SRHPT might be associated with other factors, and metabolic acidosis could be involved to the increase of serum ionized calcium. Therefore, causes for the development of SRHPT seem to be multifactorial and they must be further investigated, mainly in the early stages of CKD in cats, as hyperphosphatemia and ionized hypocalcemia could not be the only factors involved.

Publication Type

Journal article.

<341>

Accession Number

20133152436

Author

Ross, L. A.; Labato, M. A.

Title

Current techniques in peritoneal dialysis.

Source

Journal of Veterinary Emergency and Critical Care; 2013. 23(2):230-240.

Publisher

Wiley-Blackwell

Location of Publisher

Oxford

Country of Publication

UK

Abstract

**Objective:** To provide a current overview of the technique of peritoneal dialysis in dogs and cats. **Clinical Implication:** Peritoneal dialysis is the process by which water and solutes move between blood in the peritoneal capillaries and fluid (dialysate) instilled into the peritoneal cavity, across the semipermeable membrane of the peritoneum. The primary indication for peritoneal dialysis (PD) in animals is for treatment of renal failure to correct water, solute, and acid-base abnormalities and to remove uremic toxins. **Summary:** Peritoneal dialysis is a modality of renal replacement therapy commonly used in human medicine for the treatment of chronic kidney disease and end-stage kidney failure. Peritoneal dialysis utilizes the peritoneum as a membrane across which fluids and uremic solutes are exchanged. Dialysate is instilled into the peritoneal cavity and, through the process of diffusion and osmosis, water, toxins, electrolytes, and other small molecules are allowed to equilibrate.

Publication Type

Journal article.

<342>

Accession Number

20133152434

Author

Polzin, D. J.

Title

Evidence-based step-wise approach to managing chronic kidney disease in dogs and cats.

Source

Journal of Veterinary Emergency and Critical Care; 2013. 23(2):205-215.

Publisher

Wiley-Blackwell

Location of Publisher

Oxford

Country of Publication

UK

Abstract

**Objective:** To provide a framework for successfully managing chronic kidney disease (CKD) over an extended period of time with the goal of optimizing clinical outcomes by fostering a veterinarian-client relationship that facilitates successful application of evidence-based treatment. **Etiology:** Ultimately, CKD results from loss of functional nephrons; however, the specific disease process responsible for this loss usually cannot be determined due to development of chronic changes (eg, fibrosis) and compensatory adaptations that have occurred in the kidneys of patients with CKD. **Earlier diagnosis may foster a better understanding of the etiologies of CKD.** **Diagnosis:** Diagnosis of CKD is based on establishing loss of kidney function(s) due to primary kidney disease that have been present for an extended time (typically 3 months or longer). **Therapy:** The goals of therapy are to: (1) slow progressive loss of kidney function, (2) ameliorate clinical and biochemical consequences of CKD, and (3) maintain adequate nutrition. These goals are achieved by: (1) managing adaptive processes that promote progression of CKD, (2) controlling intake of water, nutrients, minerals and electrolytes, and (3) correcting hormonal deficiencies. **Prognosis:** The short-term prognosis for dogs with CKD varies from good to poor, while the long-term prognosis for dogs with CKD is generally guarded to poor depending on the International Renal Interest Society (IRIS) CKD stage of the patient. Both short-term and long-term prognosis for cats with CKD may vary from good to poor depending on the IRIS CKD stage. However, prognosis is more variable and unpredictable in cats.

Publication Type

Journal article.

<343>

Accession Number

20133152429

Author

Galvao, J. F. de B.; Nagode, L. A.; Schenck, P. A.; Chew, D. J.

Title

Calcitriol, calcidiol, parathyroid hormone, and fibroblast growth factor-23 interactions in chronic kidney disease.

Source

Journal of Veterinary Emergency and Critical Care; 2013. 23(2):134-162.

Publisher

Wiley-Blackwell

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Objective: To review the inter-relationships between calcium, phosphorus, parathyroid hormone (PTH), parent and activated vitamin D metabolites (vitamin D, 25(OH)-vitamin D, 1,25(OH)<sub>2</sub>-vitamin D, 24,25(OH)<sub>2</sub>-vitamin D), and fibroblast growth factor-23 (FGF-23) during chronic kidney disease (CKD) in dogs and cats. Data Sources: Human and veterinary literature. Human Data Synthesis: Beneficial effects of calcitriol treatment during CKD have traditionally been attributed to regulation of PTH but new perspectives emphasize direct renoprotective actions independent of PTH and calcium. It is now apparent that calcitriol exerts an important effect on renal tubular reclamation of filtered 25(OH)-vitamin D, which may be important in maintaining adequate circulating 25(OH)-vitamin D. This in turn may be vital for important pleiotropic actions in peripheral tissues through autocrine/paracrine mechanisms that impact the health of those local tissues. Veterinary Data Synthesis: Limited information is available reporting the benefit of calcitriol treatment in dogs and cats with CKD. Conclusions: A survival benefit has been shown for dogs with CKD treated with calcitriol compared to placebo. The concentrations of circulating 25(OH)-vitamin D have recently been shown to be low in people and dogs with CKD and are related to survival in people with CKD. Combination therapy for people with CKD using both parental and activated vitamin D compounds is common in human nephrology and there is a developing emphasis using combination treatment with activated vitamin D and renin-angiotensin-aldosterone-system (RAAS) inhibitors.

Publication Type

Journal article.

<344>

Accession Number

20133152428

Author

Geddes, R. F.; Finch, N. C.; Syme, H. M.; Elliott, J.

Title

The role of phosphorus in the pathophysiology of chronic kidney disease.

Source

Journal of Veterinary Emergency and Critical Care; 2013. 23(2):122-133.

Publisher

Wiley-Blackwell

Location of Publisher

Oxford

Country of Publication

UK

Abstract

**Objective:** To review the human and veterinary literature on the role of phosphorus in the pathophysiology of chronic kidney disease (CKD) and to explore why control of plasma phosphorus concentration is an important goal in the management of patients with this disease. **Data Sources:** Human and veterinary studies, reviews, clinical reports, textbooks, and recent research findings focused on phosphate homeostasis and CKD patient management. **Human Data Synthesis:** Recent studies using rodent models and human patients with CKD have focused on trying to elucidate the role of the phosphatonins, predominantly fibroblast growth factor-23, in phosphate homeostasis and the pathophysiology of secondary renal hyperparathyroidism (SRHP). Fibroblast growth factor-23 is now considered to be a key regulator of plasma phosphorus concentration in people but has only recently been investigated in companion animal species. **Veterinary Data Synthesis:** Cross-sectional studies of naturally occurring CKD in dogs and cats have shown hyperphosphatemia and SRHP to be highly prevalent and associated with increased morbidity and mortality in these patients. Experimental studies of surgically induced renal impairment in the dog and cat, and cases of naturally occurring CKD have emphasized the ability of renal care diets to modify plasma phosphorus and parathyroid hormone concentrations. Evidence from these studies indicates that maintaining plasma phosphorus concentrations to within the International Renal Interest Society targets for CKD patients improves survival time and reduces clinical manifestations of hyperphosphatemia and SRHP. **Conclusions:** The maintenance of plasma phosphorus concentrations in to within the International Renal Interest Society targets is recommended in management of CKD patients. The discovery of the phosphatonins has improved understanding of the mechanisms involved in phosphorus homeostasis and SRHP and may lead to improved ability to monitor and manage these patients.

Publication Type

Journal article.

<345>

Accession Number

20133152427

Author

Brown, S. A.

Title

Renal pathophysiology: lessons learned from the canine remnant kidney model.

Source

Journal of Veterinary Emergency and Critical Care; 2013. 23(2):115-121.

Publisher

Wiley-Blackwell

Location of Publisher

Oxford

Country of Publication

UK

Abstract

**Objective:** To review the pathophysiology of chronic kidney disease (CKD) in dogs and the contributions of the canine remnant kidney model to our understanding of this disease. **Data Sources:** Original studies in the human and veterinary medical fields. **Data Synthesis:** Three of the fundamental principles of modern nephrology - the intact nephron hypothesis, the trade-off hypothesis, and the hyperfiltration theory were developed directly as a result of studies of the remnant kidney model. Most of the pivotal early studies were conducted in dogs. As a result, our understanding of CKD, and of the renal and systemic adaptations to CKD, is largely based on studies of this model. **Conclusions:** Studies of the remnant kidney model have advanced our understanding of the pathophysiology of CKD. Nearly every therapeutic intervention used in CKD, by veterinarians and physicians alike, has its basis in studies of the remnant kidney model or in

knowledge that was derived from studies of this model. A great debt is owed to the canine participants in these studies and to a small number of key scientists who conducted this important and insightful research.  
 Publication Type  
 Journal article.

<346>

Accession Number  
 20133161277

Author  
 DeVictoria, T. M.

Title  
 Case report: pyelonephritis and chronic renal insufficiency in a cat.

Source  
 Veterinary Technician; 2013. 34(4):article 4.

Publisher  
 Veterinary Learning Systems Inc.

Location of Publisher  
 Yardley

Country of Publication  
 USA

Abstract

This article reports on a case of pyelonephritis and chronic renal insufficiency in a 5-year-old, 9.3-lb (4.23 kg), spayed domestic shorthaired cat presented with a 2-day history of lethargy, a 50% decrease in appetite, and an increased frequency of urination; in addition, she had vomited once. Highlight of the report focused on the diagnosis and treatment of the animal.

Publication Type  
 Journal article.

<347>

Accession Number  
 20133133618

Author  
 Nogueira, T. Q.; Poggiani, S. dos S. C.

Title  
 Systemic hypertension associated with chronic kidney disease: literature review. [Portuguese]

Source  
 PUBVET; 2013. 7(1):unpaginated. 48 ref.

Publisher  
 F. B. Moreira

Location of Publisher  
 Londrina

Country of Publication  
 Brazil

Abstract

Kidneys have several important functions for the maintenance of homeostasis of the organism, among them is the regulation of arterial blood pressure. Chronic kidney disease is the most common cause of high blood pressure, and hence of hypertension in dogs and cats. Due to this close relationship between blood pressure and renal function, this paper aims to discuss the association between hypertension and chronic kidney

disease, addressing the pathophysiology of this disease, its complications and its diagnostic and therapeutic aspects.

Publication Type

Journal article.

<348>

Accession Number

20133178265

Author

Dorfelt, R.

Title

How I approach... anuria and acute kidney injury.

Source

Veterinary Focus; 2013. 23(1):16-23. 21 ref.

Publisher

Royal Canin Ltd (UK and Ireland)

Location of Publisher

Castle Cary

Country of Publication

UK

Abstract

The aetiology, clinical signs, pathogenesis, physiopathology, diagnosis and treatment of anuria and acute and chronic kidney diseases in cats and dogs are described.

Publication Type

Journal article.

<349>

Accession Number

20133193103

Author

Buoncompagni, S.; Bowles, M. H.

Title

Treatment of systemic hypertension associated with kidney disease.

Source

Compendium Continuing Education for Veterinarians; 2013. 35(5):unpaginated. 36 ref.

Publisher

Veterinary Learning Systems

Location of Publisher

Yardley

Country of Publication

USA

Abstract

Systemic hypertension is an increasingly diagnosed disorder in dogs and cats and frequently occurs secondary to chronic kidney disease. Prevention of damage to organs such as the kidneys, brain, heart, and eyes is one of the primary concerns in the management of veterinary patients with hypertension. This article reviews the guidelines for antihypertensive therapy in patients with, or at risk for, kidney disease, including the initiation of treatment and currently recommended medications.

Publication Type

Journal article.

<350>

Accession Number

20133212131

Author

White, J. D.; Stevenson, M.; Malik, R.; Snow, D.; Norris, J. M.

Title

Urinary tract infections in cats with chronic kidney disease.

Source

Journal of Feline Medicine and Surgery; 2013. 15(6):459-465. 25 ref.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

Routine urine cultures were performed in cats with chronic kidney disease (CKD) to assess the overall prevalence and clinical signs associated with a positive urine culture (PUC). An occult urinary tract infection (UTI) was defined as a PUC not associated with clinical signs of lower urinary tract disease or pyelonephritis. Multivariate logistic and Cox proportional hazard regression models were used to evaluate the risk factors for an occult UTI and its relationship with survival. There were 31 PUCs from 25 cats. Eighty-seven percent of PUCs had active urine sediments. The most common infectious agent was *Escherichia coli* and most bacteria were sensitive to amoxicillin-clavulanate. Eighteen of 25 cats had occult UTIs. Among cats with occult UTI, increasing age in female cats was significantly associated with PUC; no significant association between occult UTI and survival was found and serum creatinine was predictive of survival in the short term (200 days) only. In conclusion, among cats with CKD, those with occult UTI were more likely to be older and female, but there was no association with severity of azotaemia. The presence of an occult UTI, when treated, did not influence survival.

Publication Type

Journal article.

<351>

Accession Number

20133229593

Author

Jaturakan, O.; Vanichwatanaramlouk, M.; Kornkaew, A.; Trisirirotj, M.; Chansaisakorn, W.; Komolvanich, S.; Tachampa, K.; Buranakarl, C.

Title

SDS-PAGE electrophoresis for urinary protein analysis in dogs with chronic kidney disease and urinary tract infection.

Source

Thai Journal of Veterinary Medicine; 2013. 43(1):75-83. 37 ref.

Publisher

Faculty of Veterinary Science, Chulalongkorn University

Location of Publisher

Bangkok



## Country of Publication

Thailand

## Abstract

The objective of the present study was to investigate urinary protein profiles in dogs with chronic kidney disease (CKD) in comparison to dogs with urinary tract infection (UTI). Animals were divided into 4 groups: control, CKD stages II+III, CKD stage IV and UTI. Blood pressure was measured using oscillometric method. Blood was collected for determinations of packed cell volume (PCV), blood urea nitrogen (BUN) and plasma creatinine concentrations. Urine was collected for urinalysis and protein determination. Total urinary proteins were measured using semi-quantitative method by precipitation with sulfosalicylic acid and a standard SDS-polyacrylamide gel electrophoresis (SDS-PAGE) which were presented as urinary protein creatinine (UPC) ratio and electrophoresis urinary total protein creatinine (E-UTPC) ratio, respectively. The protein of high molecular weight (HMW) (>67 kDa), middle molecular weight (MMW) (66-67 kDa) and low molecular weight (LMW) (<66 kDa) were determined. The results showed that blood pressure in dogs with CKD stage IV was significantly higher than the control healthy group ( $p<0.05$ ). The PCV was lower in dogs with CKD stage IV compared with the control and UTI group ( $p<0.05$ ). Dogs with CKD stage II+III or IV had significantly higher UPC ratio and E-UTPC ratio ( $p<0.05$ ) compared with the control group. Although dogs with UTI had higher E-UTPC ratio compared with the control group, it was lower than dogs with CKD stage IV ( $p<0.05$ ). There were positive correlations between plasma creatinine concentration and both proteinuria (HMW;  $p<0.01$  and MMW;  $p<0.05$ ) and mean arterial blood pressure ( $p<0.05$ ). The urinary protein distributions in CKD groups were similar to UTI. It is concluded that although the proteinuria in CKD was higher than UTI, the degree and pattern of urinary protein with different molecular weight could not be used to distinguish between CKD and UTI in dogs.

## Publication Type

Journal article.

<352>

## Accession Number

20133225531

## Author

Little, S.

## Title

Special needs cats - cats with cancer and diabetic cats with chronic kidney disease.

## Source

Small Animal and Exotics Proceedings. North American Veterinary Conference, Orlando, Florida, USA, 19-23 January 2013.; 2013. :unpaginated. 11 ref.

## Publisher

North American Veterinary Conference

## Location of Publisher

Gainesville

## Country of Publication

USA

## Publication Type

Conference paper.

<353>

## Accession Number

20133225312

## Author

Syme, H. M.  
 Title  
 A common duo: hyperthyroidism and chronic kidney disease.  
 Source  
 Small Animal and Exotics Proceedings. North American Veterinary Conference, Orlando, Florida, USA, 19-23 January 2013.; 2013. :unpaginated. 12 ref.  
 Publisher  
 North American Veterinary Conference  
 Location of Publisher  
 Gainesville  
 Country of Publication  
 USA  
 Publication Type  
 Conference paper.

<354>

Accession Number  
 20133237741  
 Author  
 Lomas, A. L.; Lyon, S. D.; Sanderson, M. W.; Grauer, G. F.  
 Title  
 Acute and chronic effects of tepoxalin on kidney function in dogs with chronic kidney disease and osteoarthritis.  
 Source  
 American Journal of Veterinary Research; 2013. 74(6):939-944.  
 Publisher  
 American Veterinary Medical Association  
 Location of Publisher  
 Schaumburg  
 Country of Publication  
 USA  
 Abstract

Objective - To determine whether tepoxalin alters kidney function in dogs with chronic kidney disease (CKD). Animals - 16 dogs with CKD (International Renal Interest Society stage 2 or 3) and osteoarthritis. Procedures - Kidney function was assessed via serum biochemical analysis, urinalysis, urine protein-to-creatinine concentration ratio, urine gamma -glutamyl transpeptidase-to-creatinine concentration ratio, iothexol plasma clearance, and indirect blood pressure measurement twice before treatment. Dogs received tepoxalin (10 mg/kg, PO, q 24 h) for 28 days (acute phase; n=16) and an additional 6 months (chronic phase; 10). Recheck examinations were performed weekly (acute phase) and at 1, 3, and 6 months (chronic phase). Kidney function variables were analyzed via repeated-measures ANOVA. Results - There was no difference over time for any variables in dogs completing both phases of the study. Adverse drug events (ADEs) resulting in discontinuation of tepoxalin administration included increased serum creatinine concentration (1 dog; week 1), collapse (1 dog; week 1), increased liver enzyme activities (1 dog; week 4), vomiting and diarrhea (1 dog; week 8), hematochezia (1 dog; week 24), and gastrointestinal ulceration or perforation (1 dog; week 26). Preexisting medical conditions and concomitant drug use may have contributed to ADEs. Kidney function was not affected in the latter 5 dogs. Discontinuation of tepoxalin administration stabilized kidney function in the former dog and resolved the ADEs in 4 of the 5 latter dogs. Conclusions and Clinical Relevance - Tepoxalin may be used, with appropriate monitoring, in dogs with International Renal Interest Society stage 2 or 3 CKD and osteoarthritis.

Publication Type  
 Journal article.

<355>

Accession Number

20133237723

Author

Surdyk, K. K.; Brown, C. A.; Brown, S. A.

Title

Evaluation of glomerular filtration rate in cats with reduced renal mass and administered meloxicam and acetylsalicylic acid.

Source

American Journal of Veterinary Research; 2013. 74(4):648-651.

Publisher

American Veterinary Medical Association

Location of Publisher

Schaumburg

Country of Publication

USA

Abstract

Objective - To determine whether administration of meloxicam or acetylsalicylic acid alters glomerular filtration rate (GFR) in cats with renal azotemia. Animals - 6 young adult cats. Procedures - 3 sexually intact male cats and 3 sexually intact female cats had surgically reduced renal mass and azotemia comparable to International Renal Interest Society chronic kidney disease stages 2 and 3. Renal function was evaluated by measurement of serum creatinine concentration, urinary clearance of exogenously administered creatinine, and the urine protein-to-creatinine concentration ratio (UP:C). Measurements taken in cats receiving placebo at the beginning and end of the study were compared with results obtained at the end of 7 days of treatment with either meloxicam (0.2 mg/kg, SC, on day 1; 0.1 mg/kg, SC, on days 2 to 7) or acetylsalicylic acid (20 mg/kg, PO, on days 1, 4, and 7). Results - No significant treatment effects on urinary clearance of exogenously administered creatinine, serum creatinine concentration, or UP:C were detected. Mean+or-SEM serum creatinine concentration and urinary clearance of exogenously administered creatinine measurements following 7 days of treatment with meloxicam (serum creatinine concentration, 2.67+or-0.17 mg/dL; urinary clearance of exogenously administered creatinine, 1.34+or-0.08 mL/min/kg) and acetylsalicylic acid (serum creatinine concentration, 2.62+or-0.12 mg/dL; urinary clearance of exogenously administered creatinine, 1.35+or-0.07 mL/min/kg) were not significantly different from the mean baseline values for these variables (serum creatinine concentration, 2.77+or-0.14 mg/dL; urinary clearance of exogenously administered creatinine, 1.36+or-0.07 mL/min/kg). Conclusions and Clinical Relevance - Neither meloxicam nor acetylsalicylic acid had a measurable effect on urinary clearance of exogenously administered creatinine, serum creatinine concentration, or UP:C. These results are consistent with the hypothesis that GFR of euvolemic cats with normal or reduced renal function is not dependent on cyclooxygenase function.

Publication Type

Journal article.

<356>

Accession Number

20133244921

Author

Adams, L. G.

Title

Nephroliths and ureteroliths: a new stone age.

Source

New Zealand Veterinary Journal; 2013. 61(4):212-216. 9 ref.

Publisher

Taylor & Francis

Location of Publisher

Melbourne

Country of Publication

Australia

Abstract

Nephroliths may obstruct the renal pelvis or ureter, predispose to pyelonephritis, or result in compressive injury of the renal parenchyma leading to progressive chronic kidney disease. Indications for removal of nephroliths in dogs include obstruction, recurrent infection, progressive nephrolith enlargement, presence of clinical signs (renal pain), and patients with nephroliths in a solitary functional kidney. The most common indication for removal of upper tract uroliths in cats is ureteral obstruction caused by ureteroliths. Nonobstructive nephroliths in cats are not usually treated unless they move into the ureter resulting in ureteral obstruction. The treatment approach to nephroliths and ureteroliths is different for dogs versus cats. Surgical removal of nephroliths or ureteroliths by nephrotomy and ureterotomy respectively is associated with potential for complications in more than 30% of cats treated by ureterotomy; therefore, minimally invasive options should also be considered. Extracorporeal shock wave lithotripsy (ESWL) treatment of nephroliths results in small "passable" stone fragments in most dogs, whereas ESWL does not work effectively in cats. Ureteral stents are effective for relief of ureteral obstruction by ureteroliths in both dogs and cats. Ureteral stents may be left in place long-term to relieve ureteral obstruction by ureteroliths. Post-operative morbidity and mortality are substantially lower for ureteral stent placement compared to open surgical ureterotomy in cats.

Publication Type

Journal article

Conference paper.

<357>

Accession Number

20133239093

Author

Borner, R.

Title

Chronic kidney disease in the cat - more specific quality of life through early diagnosis and effective therapy. [German]

Source

Praktische Tierarzt; 2013. 94(7):652, 654.

Publisher

Schlutersche Verlagsgesellschaft GmbH & Co. KG

Location of Publisher

Hannover

Country of Publication

Germany

Abstract

This article discusses the importance of early diagnosis and effective therapy in improving the quality of life of cats suffering from chronic kidney diseases. Focus is given on the clinical signs of chronic kidney disease as well as the use and efficacy of SUC therapy (combination of Solidago compound, ubiquinone and coenzymes).

Publication Type

Journal article.

<358>

Accession Number

20133270649

Author

O'Neill, D. G.; Elliott, J.; Church, D. B.; McGreevy, P. D.; Thomson, P. C.; Brodbelt, D. C.

Title

Chronic kidney disease in dogs in UK veterinary practices: prevalence, risk factors and survival.

Source

Journal of Veterinary Internal Medicine; 2013. 27(4):814-821. 55 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

Background: The prevalence for chronic kidney disease (CKD) in dogs varies widely (0.05-3.74%). Identified risk factors include advancing age, specific breeds, small body size, and periodontal disease. Hypothesis/Objectives: To estimate the prevalence and identify risk factors associated with CKD diagnosis and survival in dogs. Purebred dogs were hypothesized to have higher CKD risk and poorer survival characteristics than crossbred dogs. Animals: A merged clinical database of 107,214 dogs attending 89 UK veterinary practices over a 2-year period (January 2010-December 2011). Methods: A longitudinal study design estimated the apparent prevalence (AP) whereas the true prevalence (TP) was estimated using Bayesian analysis. A nested case-control study design evaluated risk factors. Survival analysis used the Kaplan-Meier survival curve method and multivariable Cox proportional hazards regression modeling. Results: The CKD AP was 0.21% (95% CI: 0.19-0.24%) and TP was 0.37% (95% posterior credibility interval 0.02-1.44%). Significant risk factors included increasing age, being insured, and certain breeds (Cocker Spaniel, Cavalier King Charles Spaniel). Cardiac disease was a significant comorbid disorder. Significant clinical signs included halitosis, weight loss, polyuria/polydipsia, urinary incontinence, vomiting, decreased appetite, lethargy, and diarrhea. The median survival time from diagnosis was 226 days (95% CI 112-326 days). International Renal Interest Society stage and blood urea nitrogen concentration at diagnosis were significantly associated with hazard of death due to CKD. Conclusions and Clinical Importance: Chronic kidney disease compromises dog welfare. Increased awareness of CKD risk factors and association of blood biochemistry results with survival time should facilitate diagnosis and optimize case management to improve animal survival and welfare.

Publication Type

Journal article.

<359>

Accession Number

20133192455

Author

Jepson, R.

Title

The prevalence of kidney disease in cats. [Dutch]

Source

Dier en Arts; 2013. 28(5):154-159.

Publisher

Uitgeverij Libre B.V.

Location of Publisher  
Leeuwarden  
Country of Publication  
Netherlands

Abstract

Ten chronic kidney diseases in cats are described, including tubulo-interstitial nephritis and polycystic kidney disease. Differences between acute and chronic kidney disease are outlined and symptoms of chronic kidney diseases are tabulated. After the initial diagnosis of chronic kidney disease, classification by creatine levels in blood serum, protein-creatinine levels in urine, and blood pressure is recommended to decide treatment options.

Publication Type  
Journal article.

<360>

Accession Number  
20133341172

Author  
Crivellenti, L. Z.; Crivellenti, S. B.; Carvalho, M. B.

Title  
Toxicity of dimethyl sulfoxide in healthy dogs and with chronic kidney disease. [Portuguese]

Source  
Ciencia Rural; 2013. 43(10):1831-1837. 18 ref.

Publisher  
Centro de Ciencias Rurais, Universidade Federal de Santa Maria

Location of Publisher  
Santa Maria

Country of Publication  
Brazil

Abstract

The objective of this study was to evaluate the effects of dimethyl sulfoxide (DMSO) treatment on aspects of renal function, serum profile, total blood count parameters and clinical condition of healthy or chronic kidney disease (CKD) dogs. The evaluations were done before, during and after the administration of DMSO 10% at a dose of 0.5 g kg<sup>-1</sup>, each 24 h, for three days. DMSO resulted in some adverse effects in both healthy and CKD dogs, however the effects were more frequent and worse in CKD dogs. Despite these adverse effects, both groups don't have contraindications to use the drug in a short time. The severity of adverse effects related to the DMSO and its possible association with death in stage 4 CKD dogs, are contraindications for the drug in this group of patients.

Publication Type  
Journal article.

<361>

Accession Number  
20133358803

Title  
Therapeutic diet for dogs and cats with heart and kidney diseases. [German]

Source  
Kleintierpraxis; 2013. 58(Suppl.):25-31.

Publisher

Verlag M. & H, Schaper Gmbh  
Location of Publisher  
Hannover  
Country of Publication  
Germany

Abstract

This article discusses the normal physiological functions of the heart and kidneys in dogs and cats, along with the aetiological factors that contribute to heart and kidney diseases. The clinical aspects and diagnosis of various heart and kidney diseases, and the importance of dietary management of patients with chronic kidney disease and heart disorders are highlighted.

Publication Type  
Journal article.

<362>

Accession Number  
20133385632

Author

Taylor, S.; Sparkes, A. H.

Title

Feline CKD: new horizons - where do we go from here? (Special Issue: Chronic kidney disease - a challenge for the 21st century.)

Source

Journal of Feline Medicine and Surgery; 2013. 15(1 Suppl.):45-52.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

Practical relevance: Chronic kidney disease (CKD) is common in humans as well as in cats, and is a significant human health problem. In feline medicine, despite recent research and improvements in our understanding of the condition, management remains limited by late diagnosis and an inadequate ability to prevent progression of disease. Investigation of future treatments that both delay the progression of CKD and manage clinical signs, and that are also easy and cost effective to administer, is desirable. To this end, we may learn from our colleagues in the medical profession. Audience: CKD is commonly encountered in general practice and so all practitioners dealing with cats will benefit from understanding future treatment possibilities and interventions in the management of CKD. Evidence base: Large-scale medical studies have been performed to provide an evidence base for treatment decisions in human CKD. Several studies in cats have looked at various aspects of treatment and prognosis, but large-scale studies are needed to assess the benefits of treatments such as angiotensin-converting enzyme inhibitors and angiotensin receptor blockers. Clinical challenges: Providing treatment that is effective, easy to administer and not cost-prohibitive is the challenge currently faced by clinicians in the management of feline CKD.

Publication Type  
Journal article.

<363>

Accession Number



20133385631

Author

Korman, R. M.; White, J. D.

Title

Feline CKD: current therapies - what is achievable? (Special Issue: Chronic kidney disease - a challenge for the 21st century.)

Source

Journal of Feline Medicine and Surgery; 2013. 15(1 Suppl.):29-44.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

Practical relevance: Treatment of feline chronic kidney disease (CKD) tends to focus on minimising the adverse effects of reduced renal function, rather than addressing an underlying cause. Despite this, and the progressive nature of CKD, treatment can improve quality of life and enable many cats to have long survival times. Evidence base: Strong evidence supports the provision of renal diets, which are protein and phosphorus restricted; compliance is improved by gradual dietary transition. Additional phosphorus restriction is achieved by the use of phosphate binding agents, although it is unknown if these yield similar survival benefits to those provided by renal diets. Interventions to control hypokalaemia and hypertension in affected cats are important to prevent serious complications. Administration of benazepril to cats with proteinuric kidney disease has been shown to significantly improve their appetite but not their survival. As CKD progresses, many cats will benefit from treatment to control clinical signs of uraemic gastroenteritis and anaemia.

Publication Type

Journal article.

<364>

Accession Number

20133385630

Author

Paepe, D.; Daminet, S.

Title

Feline CKD: diagnosis, staging and screening - what is recommended? (Special Issue: Chronic kidney disease - a challenge for the 21st century.)

Source

Journal of Feline Medicine and Surgery; 2013. 15(1 Suppl.):15-27.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

Practical relevance: Feline chronic kidney disease (CKD) is frequently encountered by veterinarians. Timely diagnosis and staging may facilitate the initiation of adequate therapy and improve the prognosis for patients. Clinical challenges: Feline CKD is diagnosed based on the presence of compatible clinical signs and renal azotaemia, which implies that urinalysis (particularly urine specific gravity) is mandatory to confirm the diagnosis. Although the diagnosis of advanced feline CKD and associated complications is usually straightforward, based on complete blood and urine examination, all routine blood and urine tests have their

limitations in detecting early CKD. Therefore, diagnosing early or non-azotaemic CKD is much more challenging. Although determination of glomerular filtration rate (GFR) would be ideal to identify early kidney dysfunction, practical limitations hamper its routine use in clinical practice. Patient group: CKD is typically a disease of aged cats, but may affect cats of all ages. Conclusive breed and sex predispositions for feline CKD are not reported. Audience: This review is directed at practising veterinarians and provides an overview of the required diagnostic tests, the classification system established by the International Renal Interest Society, and the importance of and possible techniques for early detection of CKD. Evidence base: Staging of cats with CKD is essential as it directs management and provides a prognostic guide. Given that diagnosis at early disease stages is associated with more prolonged survival times, simple, inexpensive and accurate methods for early CKD diagnosis are needed. Techniques currently under investigation include limited sampling strategies to estimate GFR, clearance marker cut-off concentrations to identify cats with low GFR, new indirect GFR markers and urinary biomarkers.

Publication Type  
Journal article.

<365>

Accession Number  
20133385629

Author  
Reynolds, B. S.; Lefebvre, H. P.  
Title

Feline CKD: pathophysiology and risk factors - what do we know? (Special Issue: Chronic kidney disease - a challenge for the 21st century.)

Source

Journal of Feline Medicine and Surgery; 2013. 15(1 Suppl.):3-14.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

Practical relevance: Chronic kidney disease (CKD) is one of the most frequently encountered disorders in cats, having increased in prevalence in recent decades. Although the underlying cause is rarely identified, the common final outcome of feline CKD is tubulointerstitial fibrosis. Knowledge of CKD pathophysiology is necessary for optimal individualised patient management, especially with regard to diagnosis and treatment of extrarenal complications. Patient group: CKD is most common in senior and geriatric cats, but should be considered in any feline patient with ureterolithiasis, hyperthyroidism, retrovirus infection, systemic hypertension, cardiovascular disease or urinary tract infection. Evidence base: Most of our knowledge of the pathogenesis of CKD is extrapolated from human nephrology and experimental animal studies. There is, therefore, a need for further studies in cats. The prevalence of clinical signs in feline CKD is well documented. Several concurrent diseases associated with CKD have also been reported in cats, especially in the geriatric population, but there is no or only limited published evidence demonstrating a cause-and-effect relationship between most of these conditions and CKD. Studies performed over the past 15 years have nevertheless allowed identification of major risk factors (proteinuria, plasma phosphate and plasma creatinine) influencing the progression of feline CKD. Clinical challenges: Clinical signs occur in the late stages of renal disease, so populations at higher risk of CKD should be screened routinely. CKD-associated complications (systemic hypertension, secondary renal hyperparathyroidism, hypokalaemia, anaemia, metabolic acidosis) must not be overlooked as they may affect the progression of disease. Disease progression is itself unpredictable and renal function may remain stable for extended periods. Most cats with early CKD do not progress to end-stage CKD before they die. Audience: General practitioners play a major role in screening feline patients at risk of development or progression of CKD.

Publication Type  
Journal article.

<366>

Accession Number  
20133384455

Author  
Foster, J. D.

Title  
Canine chronic kidney disease: current diagnostics & goals for long-term management.

Source  
Today's Veterinary Practice; 2013. 3(5):21-26. 3 ref.

Publisher  
VetMed Communications

Location of Publisher  
Glen Mills

Country of Publication  
USA

Abstract

This article discusses the medical history, clinical aspects, physical examination, diagnosis, diagnostic techniques, prognosis, treatment and therapeutic goals of canine chronic kidney disease.

Publication Type  
Journal article.

<367>

Accession Number  
20133374523

Author  
Saraiva, F. H.

Title  
Ultrasonographic evaluation of chronic kidney disease in cats by B mode, color and spectral Doppler.

[Portuguese]

Source  
O exame ultrassonografico modo B, Doppler colorido e pulsado na avaliacao da doenca renal cronica em felinos; 2010. :126 pp. 92 ref.

Publisher  
Faculdade de Medicina Veterinaria e Zootecnia, Universidade de Sao Paulo

Location of Publisher  
Sao Paulo

Country of Publication  
Brazil

Abstract

Chronic kidney disease is a common in dogs and cats, especially in older cats, and an important cause of morbidity and mortality. Factors like advanced age, congenital alterations, inappropriate nutrition, use of nephrotoxic drugs, intoxications and infectious disease may lead to parenchymal lesions in kidney. The most frequent histopathologic change in cats is diffuse tubulointerstitial nephritis. Independent of the cause of the nephron damage, the chronic renal disease is an irreversible and usually progressive affection. This study aim to analyze the contribution of ultrasography in the diagnosis and staging of chronic kidney diseases

using B mode, color Doppler and spectral Doppler. Sixteen presenting no manifestation of urinary disease and serum creatinine levels less than 1.6 mg/dL served as control group; four cats represented stage I, with serum creatinine levels less than 1.6 mg/dL and ultrasonographic changes; 17 cats represented stage II, with serum creatinine levels between 1.6 and 2.8 mg/dL; eight cats represented stage III/IV, with serum creatinine levels between 2.9 e 5.0 mg/dL, grouped with the felines with serum creatinine levels above 5.0 mg/dL. The kidneys underwent an ultrasonographic examination observing: cortical echogenicity, regularity of the contour and corticomedullary definition in the B mode; length, width and height in the longitudinal, transverse and dorsal planes in the B mode; filling of the interlobars, arcuate and interlobular arteries by the color Doppler; and resistive index of the intrarenal vessels using the pulsed Doppler. The ratio between the length of the kidney and the luminal diameter of the aorta in normal felines and in felines with kidney disease was established. The increase in echogenicity of the cortex showed to be a relevant characteristic to be considered in the ultrasonographic evaluation of chronic kidney disease. The color Doppler showed to be an important tool in the diagnosis of the chronic kidney disease, especially when the alterations in the B mode weren't expressive. The resistive index did not present itself above of the normal limits in the initial stages of the chronic kidney disease, suggesting it's uselessness as a predictor of the chronic kidney disease. Changes in B mode associated with increase in resistive index may indicate a poor prognosis of the chronic kidney disease. Increase in the echogenicity of the cortical, contour irregularity, corticomedullary indefiniteness, reduced vascular filling detected by color Doppler and the increase in the resistive index were important elements to be considered in the diagnosis of the chronic kidney disease.

Publication Type

Thesis.

<368>

Accession Number

20133374511

Author

Waki, M. F.

Title

Study of chronic kidney disease progression in dogs, according to the stages classification, through the sequential evaluation of proteinuria by urine protein electrophoresis and determination of albuminuria.

[Portuguese]

Source

Estudo da progressao da doenca renal cronica em caes, segundo a classificacao em estagios, pela avaliacao sequencial da proteinuria pela eletroforese de proteinas urinarias e determinacao de albuminuria; 2013. :194 pp. 89 ref.

Publisher

Faculdade de Medicina Veterinaria e Zootecnia, Universidade de Sao Paulo

Location of Publisher

Sao Paulo

Country of Publication

Brazil

Abstract

During the course of chronic kidney disease (CKD) in dogs, one of the mechanisms involved in the autoperpetuation and progression of renal disease, in theory, is glomerular hyperfiltration, and this process may result in the development of microalbuminuria or proteinuria due to the presence of high molecular weight proteins (albumin). As the disease progresses, the presence of high concentrations of proteins in the glomerular filtrate may also cause the development of interstitial and tubular injuries, and in consequence the presence of low molecular weight proteins in urine as the impairment of tubular reabsorption mechanism of proteins is affected. Other theories of progression of renal injury are also raised such as the initial involvement of the tubulointerstitial segment. Thus, it is expected that during the course of CKD, the evaluation of the quality (determination of albumin and molecular weights) and quantity of urinary proteins may indicate relevant information about the location and rate of progression of renal injury. The objective of

this study was to evaluate, longitudinally, albuminuria and proteinuria (by quantitative and qualitative methods - protein electrophoresis) of dogs with CKD in stages 1, 2 and 3 over the period of at least 5 months, and observe the changes in intensity or the appearance of proteinuria and/or albuminuria. Sixteen dogs (Group 1=5 dogs in stage 1, Group 2=5 dogs in stage 2 and Group 3=6 dogs in stage 3), 9 females and 7 males of various breeds and ages ranging from 24 to 168 months, were followed-up for 5-18 months and medical and laboratory monitoring data were recorded every 30 days. Dogs of Groups 1 and 2 showed good clinical control, however the Group 3 had a progressive deterioration of the disease (3 dogs died). In Group 1, the increase in urinary protein-to-creatinine ratio (UPC; ranging from 0.154 to 1.14) was observed in only one dog (no. 1) and albuminuria was not involved, however low molecular weights proteins (LMWP) were detected (tubular injury) and also the progressive decrease in glomerular filtration rate was noticed by the increase of serum concentrations of cystatin C; the remaining dogs in this group demonstrated normal UPC and UAC (urinary albumin-to-creatinine ratio), however the predominance of LMWP in 2 dogs was observed. In Group 2, similar findings were also noticed in CKD dogs no. 6 (initially hypertensive) and 8, UPC ranged from 4.89 to 12.77 and 0.5 to 1.0, respectively; dog no. 6 demonstrated no macroalbuminuria but only microalbuminuria, and the predominance of LMWP (tubular injury) was observed as well as the dog no. 8 that had 78 to 100% of LMWP with 3 to 6 bands and no micro or macroalbuminuria was detected. Group 3 presented proteinuria in dogs no. 11, 13 and 15 and microalbuminuria was only observed in dog no. 11; the predominance of LMWP was noticed in dogs no.11 and 13, and mixed proteinuria in dog no. 15. Thus, the sequential or longitudinal study of proteinuria by means of several information obtained of UPC, UAC and urine protein electrophoresis in dogs with chronic kidney disease, followed-up over a period, could give more accurate information about the quality of proteins, allowing the possible identification of the segments of the nephron involved that could probably be affected throughout the course of the disease.

Publication Type

Thesis.

<369>

Accession Number

20133407903

Author

Quimby, J. M.; Lunn, K. F.

Title

Mirtazapine as an appetite stimulant and anti-emetic in cats with chronic kidney disease: a masked placebo-controlled crossover clinical trial.

Source

Veterinary Journal; 2013. 197(3):651-655. 22 ref.

Publisher

Elsevier Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Cats with chronic kidney disease (CKD) often experience inappetence and vomiting and might benefit from the administration of mirtazapine, a medication with appetite stimulant and anti-nausea properties. The aim of this placebo-controlled, double-masked crossover clinical trial was to evaluate the effects of mirtazapine on bodyweight, appetite and vomiting in cats with CKD. Eleven cats with stable CKD were randomized to receive 1.88 mg mirtazapine or placebo orally every other day for 3 weeks. After a 4 day washout period, each cat crossed over to the alternate treatment for 3 weeks. Physical examinations and serum biochemistry profiles were performed before and after each treatment period and owners kept daily logs of appetite, activity, behavior, and vomiting episodes. Compared to placebo, mirtazapine administration resulted in a statistically significant increase in appetite ( $P=0.02$ ) and activity ( $P=0.02$ ) and a statistically significant decrease in vomiting ( $P=0.047$ ), as determined by Wilcoxon matched pairs analysis. Cats treated with

mirtazapine also gained significant bodyweight compared with placebo-treated cats ( $P=0.002$ ) as determined by linear mixed model analysis. Median weight gain during mirtazapine administration was 0.18 kg (range 0-0.45 kg). Median weight loss during placebo administration was 0.07 kg (range 0-0.34 kg). Mirtazapine is an effective appetite stimulant and anti-emetic for cats with CKD and could be a useful adjunct to the nutritional management of these cases.

Publication Type

Journal article.

<370>

Accession Number

20133383505

Author

Ahn, H. J.; Hyun, C.

Title

Evaluation of serum neutrophil gelatinase-associated lipocalin (NGAL) activity in dogs with chronic kidney disease.

Source

Veterinary Record; 2013. 173(18):452.

Publisher

BMJ Publishing Group

Location of Publisher

London

Country of Publication

UK

Abstract

The aim of this study was to evaluate an assay for detecting serum neutrophil gelatinase-associated lipocalin (NGAL) and to correlate this with the severity chronic kidney disease in dogs. 62 dogs in the Korea Republic with CKD and 8 normal dogs were included in the study. Serum NGAL levels were measured using a commercial ELISA kit. It was shown that the median serum NGAL in healthy dogs was 4-10 times lower compared to dogs with CKD. Serum NGAL was also directly correlated with serum creatinine and blood urea nitrogen concentrations. In conclusion, serum NGAL can be used as an alternative biomarker for detecting advanced CKD in dogs. This is the first study to evaluate serum NGAL levels in dogs with naturally occurring CKD.

Publication Type

Journal article.

<371>

Accession Number

20133414540

Author

Segev, G.; Palm, C.; LeRoy, B.; Cowgill, L. D.; Westropp, J. L.

Title

Evaluation of neutrophil gelatinase-associated lipocalin as a marker of kidney injury in dogs.

Source

Journal of Veterinary Internal Medicine; 2013. 27(6):1362-1367. 30 ref.

Publisher

Wiley-Blackwell

Location of Publisher



Boston  
Country of Publication  
USA

#### Abstract

**Background:** Acute kidney injury (AKI) is a common and often fatal disorder in dogs. **Hypothesis:** Urine neutrophil gelatinase-associated lipocalin (NGAL)/creatinine ratio is a sensitive and specific biomarker of AKI in dogs. **Animals:** Ninety-four dogs. **Methods:** Prospective study. Dogs were classified as follows: (1) healthy dogs, (2) dogs with lower urinary tract disorders, (3) dogs with chronic kidney disease (CKD), (4) dogs with azotemic International Renal Interest Society (IRIS) AKI Grades II-V, and (5) dogs with IRIS AKI Grade I (nonazotemic). Urinary NGAL was quantitated in each dog using an ELISA assay and concentrations were expressed as a ratio to urinary creatinine concentration from the same specimen, and designated the urinary NGAL/creatinine ratio (UNCR). **Results:** There was a significant difference in UNCR among the study groups ( $P<.001$ ). Both the azotemic and nonazotemic AKI groups had higher UNCR when compared with all other groups ( $P<.001$  for all pairs). There was a statistically significant difference in UNCR between dogs diagnosed with CKD compared with dogs with lower urinary tract diseases ( $P=.005$ ) as well as between dogs with CKD and healthy dogs ( $P=.001$ ). Receiver operator characteristics (ROC) analysis of UNCR as an indicator of azotemic and nonazotemic AKI had an area under the ROC curve of 0.94 and 0.96, respectively. **Conclusions and Clinical Relevance:** NGAL/creatinine ratio is a sensitive and specific marker of AKI. It can be used to screen patients at risk for AKI and can be utilized to diagnose milder forms of AKI potentially earlier in the course of the disease.

Publication Type  
Journal article.

<372>

Accession Number  
20133414539

Author  
Geddes, R. F.; Elliott, J.; Syme, H. M.

Title  
The effect of feeding a renal diet on plasma fibroblast growth factor 23 concentrations in cats with stable azotemic chronic kidney disease.

Source  
Journal of Veterinary Internal Medicine; 2013. 27(6):1354-1361. 34 ref.

Publisher  
Wiley-Blackwell  
Location of Publisher  
Boston

Country of Publication  
USA

#### Abstract

**Background:** Fibroblast growth factor 23 (FGF-23) is a phosphatonin, which is increased in cats with azotemic CKD. Dietary phosphate restriction decreases FGF-23 concentrations in humans and rodents, but this relationship has not previously been examined in the cat. **Objectives:** To investigate the effect of feeding renal diet on plasma FGF-23 concentrations in cats with stable azotemic CKD. **Animals:** Azotemic, client-owned cats ( $\geq 9$  years); 33 cats ate renal diet (RD group) and 11 cats did not eat renal diet (comparator group) over 28-56 days. **Methods:** Retrospective longitudinal study: Plasma FGF-23, PTH, and phosphate concentrations were measured at baseline and after 28-56 days. Cats in the RD group were classified as hyperphosphatemic (HP) or normophosphatemic (NP) based on the International Renal Interest Society targets for plasma phosphate concentration. Nonparametric tests were performed. **Results:** In the HP group ( $n=15$ ), feeding renal diet was associated with a significant decrease in plasma phosphate ( $P=.001$ ), PTH ( $P=.007$ ), and FGF-23 ( $P=.008$ ), but not creatinine concentrations ( $P=.91$ ). In the NP group ( $n=18$ ), feeding renal diet was associated with a significant decrease in plasma FGF-23 ( $P=.006$ ), but not phosphate ( $P=.48$ ),



PTH ( $P=.35$ ), or creatinine concentrations ( $P=.10$ ). No significant changes were seen in any parameters in the comparator group during the study period. Conclusions and Clinical Importance: Feeding renal diet is associated with reductions in plasma FGF-23 concentrations in hyper- and normophosphatemic cats with stable azotemic CKD, suggesting that dietary phosphate restriction may enable cats with CKD to maintain normal plasma phosphate concentrations in association with lower plasma FGF-23 concentrations.

Publication Type  
Journal article.

<373>

Accession Number  
20133422212

Author  
Zatelli, A.; Pierantozzi, M.; D'Ippolito, P.; Bigliati, M.; Zini, E.

Title  
Effect of dietary supplements in reducing probability of death for uremic crises in dogs affected by chronic kidney disease (masked RCCT).

Source  
The Scientific World Journal; 2012. 2012:219082. 16 ref.

Publisher  
Hindawi Publishing Corporation

Location of Publisher  
New York

Country of Publication  
USA

Abstract

Chitosan and alkalinizing agents can decrease morbidity and mortality in humans with chronic kidney disease (CKD). Whether this holds true in dog is not known. Objective of the study was to determine whether a commercial dietary supplement containing chitosan, phosphate binders, and alkalinizing agents (Renal), compared to placebo, reduces mortality rate due to uremic crises in dogs with spontaneous CKD, fed a renal diet (RD). A masked RCCT was performed including 31 azotemic dogs with spontaneous CKD. Dogs enrolled in the study were randomly allocated to receive RD plus placebo (group A; 15 dogs) or RD plus Renal (group B; 16 dogs). During a first 4-week period, all dogs were fed an RD and then randomized and clinically evaluated up to 44 weeks. The effects of dietary supplements on mortality rate due to uremic crises were assessed. At 44 weeks, compared to group A, dogs in group B had approximately 50% lower mortality rate due to uremic crises ( $P=0.015$ ). Dietary supplementation with chitosan, phosphate binders, and alkalinizing agents, along with an RD, is beneficial in reducing mortality rate in dogs with spontaneous CKD.

Publication Type  
Journal article.

<374>

Accession Number  
20133405871

Title  
New treatment options for chronic kidney disease in cats. [German]

Source  
Praktische Tierarzt; 2013. 94(10):944-945.

Publisher  
Schlutersche Verlagsgesellschaft GmbH & Co. KG

Location of Publisher  
Hannover  
Country of Publication  
Germany

Abstract

This article discusses the pathology, clinical aspects, biochemical profile, risk factors, diagnosis, management and new medical treatment programme for chronic kidney disease in cats.

Publication Type  
Journal article.

<375>

Accession Number  
20133405159

Title

The chronic kidney disease in the cat (CNI): Effective and well-tolerated treatment option for more quality of life. [German]

Source

Kleintierpraxis; 2013. 58(11):605-606.

Publisher

Verlag M. & H, Schaper Gmbh

Location of Publisher

Hannover

Country of Publication

Germany

Publication Type

Journal article.

<376>

Accession Number  
20133260852

Author

Jepson, R.

Title

Diagnosis and classification of kidney disease in cats. [Dutch]

Source

Dier en Arts; 2013. 28(6/7):202-209.

Publisher

Uitgeverij Libre B.V.

Location of Publisher

Leeuwarden

Country of Publication

Netherlands

Abstract

The importance of early diagnosis of chronic kidney disease in older cats (older than 9 years) is discussed. The determination of glomerular filtration speed is outlined, as well as urine testing. The classification method of the International Renal Interest Society is described to identify the different stages of chronic kidney disease.

Publication Type

Journal article.

<377>

Accession Number

20123019022

Author

White, J. D.; Malik, R.; Norris, J. M.

Title

Feline chronic kidney disease: can we move from treatment to prevention?

Source

Veterinary Journal; 2011. 190(3):317-322. many ref.

Publisher

Elsevier Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Chronic kidney disease (CKD) is arguably the most common disease of older domestic cats. Recent research has focused on treatment options and prognostic variables. Specifically, the roles of dietary protein, hypertension and proteinuria as potential causes of a progressive decline in kidney function have been evaluated. The value of prescription kidney diets and the prognostic value of proteinuria have been confirmed. However, in contrast to dogs, rodents and people, significant proteinuria is uncommon in the cat and hypertension is not a prognostic indicator. Despite significant progress, the cause of CKD in the overwhelming majority of cats remains unknown and fundamental questions remain unanswered. Treatment of feline CKD is limited to non-specific options until some of the causes and pathophysiological mechanisms that result in chronic tubulointerstitial nephritis are identified.

Publication Type

Journal article.

<378>

Accession Number

20123048350

Author

Vijay Kumar; Adarsh Kumar; Varshney, A. C.

Title

Ultrasonographic imaging for structural characterization of renal affections and diagnosis of associated chronic renal failure in 10 dogs.

Source

ISRN Veterinary Science; 2011. 2011:Article ID 901713. 17 ref.

Publisher

Hindawi Publishing Corporation

Location of Publisher

New York

Country of Publication

USA

Abstract

The present study comprises of 10 dogs of either sex with primary indication of azotaemia. All the dogs were subjected to detailed clinical, haematobiochemical, urinalysis, and microbiological examination along with radiographical and ultrasonographical examination. Based on the ultrasonographic structural abnormalities, the different renal affections associated with CRF in majority of dogs were diagnosed. The different affections included "end-stage" kidneys (n=4), hydronephrosis (n=1), renomegaly (n=1), nephritis (n=1), nephrolithiasis (n=1), nephrocalcinosis (n=1), and renal cyst (n=1). The significant ultrasonographic features in these affections included small kidneys with loss of corticomedullary demarcation ("end-stage" kidneys); increased cortical echogenicity (nephritis); dilation of the renal pelvis, separation of the central renal sinus with anechoic space, atrophy of renal medulla, (hydronephrosis); enlarged kidneys with increased overall echogenicity of renal cortex (renomegaly and associated nephritis); hyperechoic-mineralized structure with shadowing (nephrolithiasis); diffuse, small, multiple hyperechoic structures in the renal parenchyma with distal acoustic shadowing (nephrocalcinosis); small spherical intercortical anechoic structures fluid (renal cysts). In the present study, ultrasound proved to be a quick, convenient, and sensitive modality in detecting alterations in renal size and parenchymal architecture. All the dogs so diagnosed with CRF were rendered conservative medical treatment to control clinical signs of uraemia; maintain adequate fluid, electrolyte, and acid/base balance; provide adequate nutrition; minimize progression of renal failure.

Publication Type

Journal article.

<379>

Accession Number

20123088057

Author

Phillips, H.; Aronson, L. R.

Title

Use of end-to-side arterial and venous anastomosis techniques for renal transplantation in two dogs.

Source

Journal of the American Veterinary Medical Association; 2012. 240(3):298-303. 32 ref.

Publisher

American Veterinary Medical Association

Location of Publisher

Schaumburg

Country of Publication

USA

Abstract

**Case Description** - A sexually intact male Old English Sheepdog and a sexually intact female Bull Terrier were evaluated for renal dysplasia and chronic renal failure, respectively. **Clinical Findings** - Both dogs were anemic and had high serum concentrations of urea nitrogen and creatinine. Electrolyte abnormalities (calcium and phosphorus) were also evident. The decision was made to pursue renal transplantation, and donor dogs were identified. **Treatment and Outcome** - End-to-side anastomosis of the renal artery and vein of each donor's left kidney to the recipient's ipsilateral external iliac artery and vein, respectively, was performed. The left caudal abdominal musculature was scarified by making an incision, and nephropexy to that musculature was performed with a simple interrupted pattern of polypropylene sutures. No intraoperative or postoperative complications associated with the vascular anastomoses were encountered. Azotemia, anemia, and electrolyte imbalances resolved after transplantation. **Clinical Relevance** - The end-to-side anastomosis technique described here, which is a preferred method in human medicine, was successful, providing an alternative to other renal transplantation techniques in dogs. Additional studies are needed to determine whether any vascular anastomosis technique is preferable for use in dogs requiring renal transplantation.

Publication Type

Journal article.

<380>

Accession Number

20123095955

Author

Garcia-Martinez, J. D.; Tvarijonaviciute, A.; Ceron, J. J.; Caldin, M.; Martinez-Subiela, S.

Title

Urinary clusterin as a renal marker in dogs.

Source

Journal of Veterinary Diagnostic Investigation; 2012. 24(2):301-306.

Publisher

American Association of Veterinary Laboratory Diagnosticians

Location of Publisher

Davis

Country of Publication

USA

Abstract

A validation of a species-specific enzyme immunoassay for urinary clusterin measurement in dogs was performed, and the use of urinary clusterin as a marker of renal damage was evaluated in a population of dogs with leishmaniasis. Urine was obtained from 75 dogs; 64 dogs had leishmaniasis and 11 were healthy. The dogs with leishmaniasis were divided into 5 groups: I (n=9; serum creatinine [SCr] <1.4 mg/dl, urinary protein-to-creatinine [UPC] ratio ≤0.5); II (n=29; SCr <1.4 mg/dl, UPC >0.5); III (n=6; SCr ≥1.4 mg/dl to <2 mg/dl, UPC >0.5); IV (n=13; SCr ≥2 mg/dl to <5 mg/dl, UPC >0.5); and V (n=7; SCr ≥5 mg/dl, UPC >0.5). The urinary clusterin concentration was measured, and the urinary clusterin-to-creatinine ratio was calculated. Canine urinary clusterin assay showed good analytical performance based on precision accuracy and limit-of-detection results. There was a statistically significant increase in urinary clusterin and clusterin-to-creatinine ratio in groups II-V compared with group I and healthy group. The results of the current study showed that urinary clusterin concentration and urinary clusterin-to-creatinine ratios are increased in dogs with analytical evidences of renal damage and that the urinary clusterin-to-creatinine ratio might be used as a potential early biomarker of chronic kidney disease.

Publication Type

Journal article.

<381>

Accession Number

20123113435

Author

Hanzlicek, A. S.; Ganta, C.; Myers, C. B.; Grauer, G. F.

Title

Renal transitional-cell carcinoma in two cats with chronic kidney disease.

Source

Journal of Feline Medicine and Surgery; 2012. 14(4):280-284. 23 ref.

Publisher

Sage Publications

Location of Publisher

Thousand Oaks

Country of Publication

USA

Abstract

Two 12-year-old cats were diagnosed with chronic kidney disease (CKD) based on physical examination, clinicopathologic data and, in one case, abdominal ultrasound findings. Approximately 1 year after the initial diagnosis of CKD both cats developed renal transitional cell carcinoma (TCC) - bilateral in one cat. Based on post-mortem examination, one cat had no evidence of metastasis and the other had metastasis to the large intestine, heart and lungs. This is the first report of de novo bilateral renal TCC in a cat, as well as the first report of renal TCC developing in cats with previous history of confirmed CKD.

Publication Type

Journal article.

<382>

Accession Number

20123130192

Author

Chalhoub, S.; Langston, C. E.; Farrelly, J.

Title

The use of darbepoetin to stimulate erythropoiesis in anemia of chronic kidney disease in cats: 25 cases.

Source

Journal of Veterinary Internal Medicine; 2012. 26(2):363-369. 41 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

Background: Anemia is present in 30-65% in cats with chronic kidney disease (CKD) and few long-term treatment options exist. Darbepoetin is effective in treating anemia of kidney disease in humans and may be used in cats. Hypothesis/Objective: To evaluate the use of darbepoetin, a recombinant analog of human erythropoietin, to stimulate erythropoiesis, and to effectively treat anemia of kidney disease in cats. Animals: Twenty-five of 66 cats that received  $\geq 2$  doses of darbepoetin at the Animal Medical Center between January 2005 and December 2009 were included in this study. Methods: Cats were included in the study if they received darbepoetin and follow-up data were available for at least 56 days and had CKD as a primary clinical diagnosis. Cats were excluded if they were treated with darbepoetin but did not have kidney disease. Response to treatment was defined as reaching or exceeding a target packed red blood cell volume or hematocrit of 25%. Results: Fourteen of 25 cats responded. Thirteen of those 14 cats received a dosage of 1 micro g/kg/wk or higher. Presumptive adverse effects included vomiting, hypertension, seizures, and fever. Conclusions and Clinical Relevance: Darbepoetin is effective for treatment of anemia of kidney disease in cats. Pure red cell aplasia appears to be less common with darbepoetin than with epoetin usage.

Publication Type

Journal article.

<383>

Accession Number

20123130182

Author

Nabity, M. B.; Lees, G. E.; Cianciolo, R.; Boggess, M. M.; Steiner, J. M.; Suchodolski, J. S.

Title

Urinary biomarkers of renal disease in dogs with X-linked hereditary nephropathy.

Source

Journal of Veterinary Internal Medicine; 2012. 26(2):282-293. 40 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

**Background:** Sensitive and specific biomarkers for early tubulointerstitial injury are lacking. **Hypothesis:** The excretion of certain urinary proteins will correlate with the state of renal injury in dogs with chronic kidney disease. **Animals:** Twenty-five male colony dogs affected with X-linked hereditary nephropathy (XLHN) and 19 unaffected male littermates were evaluated. **Methods:** Retrospective analysis of urine samples collected every 2-4 weeks was performed. Urine proteins evaluated were retinol binding protein (uRBP/c), beta 2-microglobulin (uB2M), N-acetyl- beta -D-glucosaminidase (uNAG/c), neutrophil gelatinase-associated lipocalin (uNGAL/c), and immunoglobulin G (uIgG/c). Results were correlated with serum creatinine concentration (sCr), glomerular filtration rate (GFR), urine protein:creatinine ratio, and histopathologic analysis of serial renal biopsies. Analytical validation was performed for all assays; uNAG stability was evaluated. **Results:** All urinary biomarkers distinguished affected dogs from unaffected dogs early in their disease process, increasing during early and midstages of disease. uRBP/c correlated most strongly with conventional measures of disease severity, including increasing sCr ( $r=0.89$ ), decreasing GFR ( $r=-0.77$ ), and interstitial fibrosis ( $r=0.80$ ),  $P<.001$ . However, multivariate analysis revealed age, sCr, uIgG/c, and uB2 M, but not uRBP/c, as significant independent predictors of GFR ( $P<.05$ ). **Conclusions and Clinical Importance:** All urinary biomarkers were elevated before sCr increased, but typically after proteinuria developed in dogs with progressive glomerular disease because of XLHN. uRBP/c measurement might be promising as a noninvasive tool for diagnosis and monitoring of tubular injury and dysfunction in dogs.

Publication Type

Journal article.

<384>

Accession Number

20123130181

Author

Chakrabarti, S.; Syme, H. M.; Elliott, J.

Title

Clinicopathological variables predicting progression of azotemia in cats with chronic kidney disease.

Source

Journal of Veterinary Internal Medicine; 2012. 26(2):275-281. 25 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

**Background:** Chronic kidney disease (CKD) is common in geriatric cats, but often appears to be stable for long periods of time. **Objectives:** To describe CKD progression and identify risk factors for progression in newly diagnosed azotemic cats. **Animals:** A total of 213 cats with CKD (plasma creatinine concentration  $>2$  mg/dL, urine specific gravity  $<1.035$ ) were followed up until progression occurred or for at least 1 year; 132, 73, and 8 cats were in International Renal Interest Society (IRIS) stages 2, 3, and 4, respectively. **Methods:** Progression was defined as a 25% increase in plasma creatinine concentration. Logistic regression was used to assess variables at diagnosis that were associated with progression within 1 year. Changes in IRIS



stage during follow-up also were described. Cases that remained in stages 2 or 3, but did not have renal function assessed in the last 60 days of life, were excluded from analysis of the proportion reaching stage 4. Results: Of the cats, 47% (101) progressed within 1 year of diagnosis. High plasma phosphate concentration and high urine protein-to-creatinine ratio (UPC) predicted progression in all cats. Low PCV and high UPC independently predicted progression in stage 2 cats, whereas higher plasma phosphate concentration predicted progression in stage 3 cats; 19% (18/94) of cats diagnosed in stage 2; and 63% (34/54) of cats diagnosed in stage 3 reached stage 4 before they died. Conclusions: Proteinuria, anemia, and hyperphosphatemia may reflect more progressive kidney disease. Alternatively, they may be markers for mechanisms of progression such as tubular protein overload, hypoxia, and nephrocalcinosis.

Publication Type

Journal article.

<385>

Accession Number

20123129382

Author

Larsen, J. A.; Parks, E. M.; Heinze, C. R.; Fascetti, A. J.

Title

Evaluation of recipes for home-prepared diets for dogs and cats with chronic kidney disease.

Source

Journal of the American Veterinary Medical Association; 2012. 240(5):532-538. 46 ref.

Publisher

American Veterinary Medical Association

Location of Publisher

Schaumburg

Country of Publication

USA

Abstract

Objective - To evaluate recipes of diets recommended for animals with chronic kidney disease (CKD), compare nutritional profiles for those recipes to requirements for adult dogs and cats, and assess their appropriateness for the management of CKD. Design - Evaluation study. Sample - Recipes of 67 home-prepared diets promoted for use in dogs (n=39 recipes) and cats (28) with CKD. Procedures - Recipes were analyzed with computer software to determine calories, macronutrient calorie distribution, and micronutrient concentrations and were assessed for appropriateness for the management of CKD. Results - Assumptions were required for the analysis of every recipe, and no recipe met all National Research Council nutrient recommended allowances (RA) for adult animals. Compared with RAs, concentrations of crude protein or at least 1 amino acid were low in 30 of 39 (76.9%) canine recipes and 12 of 28 (42.9%) feline recipes. Choline was most commonly below the RA in both canine (37/39 [94.9%]) and feline (23/28 [82.1%]) recipes; selenium (34/39 [87.2%] canine and 9/28 [32.1%] feline recipes), zinc (24/39 [61.5%] canine and 19/28 [67.9%] feline recipes), and calcium (22/39 [56.4%] canine and 7/28 [25.0%] feline recipes) concentrations were also frequently below recommendations. The median phosphorus concentration in canine and feline recipes was 0.58 and 0.69 g/1,000 kcal, respectively. Conclusions and Clinical Relevance - Many problems with nutritional adequacy were detected, and use of the recipes could result in highly variable and often inappropriate diets. Many recipes would not meet nutritional and clinical needs of individual patients and should be used cautiously for long-term feeding.

Publication Type

Journal article.

<386>

Accession Number

20123139807

Author

Mritunjay Kumar; Kalyan Sarma; Saravanan, M.; Mondal, D. B.

Title

Dietary management of chronic renal failure cases in dogs.

Source

Veterinary Practitioner; 2011. 12(1):40-43. 25 ref.

Publisher

Veterinary Practitioner, c/o Dr. A. K. Gahlot

Location of Publisher

Bikaner

Country of Publication

India

Abstract

The clinical importance of chronic renal failure in dogs as well as its treatment with focus on the aims and significance of therapeutic diets are discussed.

Publication Type

Journal article.

<387>

Accession Number

20123041270

Author

Horinaka, O.; Nojiri, A.; Nisido, T.; Yamaguchi, T.

Title

A dog with local calcinosis of the pad due to chronic renal failure. [Japanese]

Source

Japanese Journal of Veterinary Dermatology; 2011. 17(4):251-252. 4 ref.

Publisher

Japanese Society of Veterinary Dermatology

Location of Publisher

Tokyo

Country of Publication

Japan

Abstract

This report shows a rare case of a young dog with metastatic skin calcification on its footpads due to chronic renal failure. A female Shih Tzu (4 years and 8 months old, weighing 6.4kg, neutered) was first admitted to the author's veterinary surgery due to the pain on the footpad of its left hind leg. Cephalexin 30mg/kg q12h was administered and the affected area was cleansed by using chlorhexidine after numerous bony discoloured swellings were found on the footpad. By the time a detailed examination was carried out 125 days after the first admission, the swellings (calcinosis) spread to all the footpads. The results of the detailed examination including X-ray and biochemical examination of blood indicated renal failure and the dog died 240 days after the first admission. In this case, it took a while to diagnose as chronic renal failure because the dog did not show other symptoms such as polydipsia, polyuria and weight loss.

Publication Type

Journal article.

<388>

Accession Number

20123137267

Author

Desfontis, J. C.

Title

Benefits/risks of antiemetics in a cat with acute or chronic renal failure. [French]

Source

Point Veterinaire; 2012. 43(324 Part 1):20.

Publisher

Editions du Point Veterinaire

Location of Publisher

Maisons-Alfort

Country of Publication

France

Abstract

The efficacy of antiemetics to treat vomiting and their effects on a cat with renal failure in France [date not given] are presented.

Publication Type

Journal article.

<389>

Accession Number

20123172727

Author

Alavanja, K.; Crnogaj, M.; Kucer, N.

Title

Feline chronic renal failure. [Croatian]

Source

Veterinarska Stanica; 2012. 43(2):159-168. 26 ref.

Publisher

Hrvatski Veterinarski Institut, Centar za Peradarstvo

Location of Publisher

Zagreb

Country of Publication

Croatia

Abstract

Chronic renal failure is one of the most common health problems of geriatric cats and is characterized by progressive and irreversible cessation of kidney function. Loss of function of % of nephrons will lead to an inability to concentrate urine and loss of 3/4; to uremia. However, the secretory and excretory functions may improve within months, due to the hypertrophy of the remaining functional nephrons. The prevalence of clinical signs is gradual and involves polydipsia and polyuria, decreased appetite, and poor coat quality. Often, the size of the kidneys is reduced due to replacement of functional kidney tissue with fibrous connective tissue, though the remaining functional part can be increased. Uremia is an important clinical syndrome that occurs with a loss of integrity of both kidneys. For more accurate prognosis and treatment, it is necessary to determine the stage of the disease. The concentration of creatinine plays an important role as an index of the glomerular filtration rate. However, it should be considered that chronic kidney failure, like any chronic illness, leads to a loss of body mass, primarily of muscle mass, and that the creatinine concentration can be lowered without enhancing glomerular filtration. This disease develops under the influence of the primary cause, which as a result affects the kidneys, or both. Therefore the primary goal of any treatment is to slow progression of the disease and prevent the loss of the functional kidney. This

includes all the mentioned therapeutic procedures, dietary therapy, antihypertensive treatment, mitigation of proteinuria and calcitriol therapy. Dietary therapy has proven to be very successful in mitigating symptoms and improving the quality of life for cats. Likewise, reducing hypertension and associated proteinuria significantly reduced mortality. It is very important to approach each patient individually, as although the clinical state of cats with chronic renal insufficiency is related, it certainly is not the same and cannot be treated uniformly.

Publication Type

Journal article.

<390>

Accession Number

20123169342

Author

Kramer, S.; Kietzmann, M.; Pankow, W. R.

Title

The use of fluoroquinolones in bacterial urinary tract infections in cats.

Source

Tierärztliche Praxis. Ausgabe K, Kleintiere/Heimtiere; 2012. 40(2):113-121.

Publisher

Schattauer GmbH

Location of Publisher

Stuttgart

Country of Publication

Germany

Abstract

Older cats (>10 years) with FLUTD (Feline Lower Urinary Tract Disease) symptoms are often affected by urinary tract infections. In most of these cats organ diseases (e.g. chronic renal failure, diabetes mellitus) or iatrogenic factors (immunosuppressive drugs, indwelling catheter) are found that clearly predispose cats to this kind of infection. From a diagnostic point of view, urinalysis and urine culture are the most important tools in detecting bacteriuria. The microbiological spectrum is thereby comparable to that found in dogs, revealing *Escherichia (E.) coli* but also *Staphylococcus* spp. and *Enterococcus* spp./*Streptococcus* spp. Antibiotic therapy should be based on the results of susceptibility testing. If this kind of information is not available, drug selection has to be decided on an empirical basis unless it is a complicated urinary tract infection. Preferred antibiotics should have a high renal excretion rate and thus ensure therapeutically effective drug levels in the urine. In this respect, the fluoroquinolones belong to the group of appropriate drugs to be used in cats. The relevance of therapeutical drug concentrations achievable in the urine is discussed for the example of marbofloxacin, a third-generation fluoroquinolone. New pharmacokinetic data showed that marbofloxacin concentrations of  $\geq 2$  micro g/ml are maintained in the urine of healthy cats for 72 and 103 hours after administration of 2 and 4 mg/kg BW s.c., respectively.

Publication Type

Journal article.

<391>

Accession Number

20123161286

Author

Kucera, J.

Title

The occurrence of anemia in cats with chronic renal failure. [Czech]

Source

Veterinarstvi; 2012. 62(1):3-5. 14 ref.

Publisher

Profi Press, s.r.o.

Location of Publisher

Praha 5

Country of Publication

Czech Republic

Abstract

In 40 cats with chronic renal failure was at 27.5% (11/40) observed anemia. This finding was in most cases of moderate range and in significant number of patients was related to non-renal ethiopathogenetic factors such as oncologic statuses and feline infectious peritonitis. The finding of anemia positively correlated with the degree of chronic renal failure and presented a significant adverse prognostic factor in relation to survival time of patient from establishment of diagnosis CRF.

Publication Type

Journal article.

<392>

Accession Number

20123204330

Author

Galler, A.; Tran, J. L.; Krammer-Lukas, S.; Holler, U.; Thalhammer, J. G.; Zentek, J.; Willmann, M.

Title

Blood vitamin levels in dogs with chronic kidney disease.

Source

Veterinary Journal; 2012. 192(2):226-231. many ref.

Publisher

Elsevier Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Chronic kidney disease (CKD) may affect excretion and metabolism of vitamins but data for dogs are limited. In this study, blood vitamin levels were investigated in 19 dogs with chronic renal failure. High performance liquid chromatography was used to quantify retinol, retinyl esters, tocopherol, thiamine, riboflavin, pyridoxal-5'-phosphate, ascorbic acid and 25-hydroxycholecalciferol concentrations, whereas cobalamin, folate, biotin and pantothenic acid were measured by microbiological methods. Levels of retinol, retinyl palmitate, ascorbic acid, and vitamins B1, B2 and B6 were increased compared to healthy dogs. Dogs with CKD showed decreased concentrations of 25-hydroxycholecalciferol and folate. Alpha-tocopherol, biotin, pantothenate and cobalamin levels were not significantly different between controls and dogs with CKD. Whether lower vitamin D and folate concentrations in dogs with CKD justify supplementation has to be evaluated in future studies.

Publication Type

Journal article.

<393>

Accession Number  
20123193602  
Author  
Bedwell-Wilson, W.  
Title  
Understanding, treating chronic kidney disease.  
Source  
Veterinary Practice News; 2012. 24(6):30.  
Publisher  
BowTie News  
Location of Publisher  
Irvine  
Country of Publication  
USA  
Publication Type  
Journal article.

<394>  
Accession Number  
20123227360  
Author  
Bartges, J. W.  
Title  
Chronic kidney disease in dogs and cats. (Special Issue: Geriatrics.)  
Source  
Veterinary Clinics of North America, Small Animal Practice; 2012. 42(4):669-692.  
Publisher  
W.B. Saunders  
Location of Publisher  
Philadelphia  
Country of Publication  
USA  
Publication Type  
Journal article.

<395>  
Accession Number  
20123226449  
Author  
Chakrabarti, S.; Syme, H.; Brown, C.; Elliott, J.  
Title  
Lesions associated with proteinuria in feline chronic kidney disease.  
Source  
BSAVA Congress 2012, The ICC/NIA, Birmingham, UK, 11-15 April, 2012. Scientific Proceedings  
Veterinary Programme; 2012. :492.  
Publisher  
British Small Animal Veterinary Association  
Location of Publisher

Quedgeley  
Country of Publication  
UK  
Publication Type  
Conference paper.

<396>

Accession Number  
20123280873

Author  
Loyd, K.; Grauer, G. F.

Title  
Kidney disease in a cat.

Source  
NAVC Clinician's Brief; 2011. (December):48-52.

Publisher  
Educational Concepts LLC

Location of Publisher  
Tulsa

Country of Publication  
USA

Abstract

The clinical signs, diagnosis and treatment of chronic kidney disease in an 11-year-old male cat in the USA [date not given] are presented.

Publication Type  
Journal article.

<397>

Accession Number  
20123307317

Author  
Steinbach, S.; Neiger, R.

Title  
Feline chronic kidney disease: staging and management according to the Guidelines of the International Renal Interest Society. [German]

Source  
Kleintierpraxis; 2012. 57(9):485...499. many ref.

Publisher  
Verlag M. & H, Schaper Gmbh

Location of Publisher  
Hannover

Country of Publication  
Germany

Abstract

Chronic kidney disease (CKD) has a prevalence of up to 35% in the elderly cat and is thus frequently a reason why these patients are presented to the veterinarian. The International Renal Interest Society (IRIS) was founded in 1998 with the goal to unify the diagnosis and management of CKD in dogs and cats. After reaching a diagnosis of CKD, patients are staged according to the degree of azotaemia into one of four



stages. Next, the patient is grouped into one of two substages according to the presence and extent of proteinuria and/or hypertension. For each stage and substage specific treatment recommendations are available to guarantee consistent and scientifically established therapeutic options. The therapy of concomitant symptoms and diseases, which are not a part of the staging and substaging, are also addressed and discussed. The staging system and treatment recommendations are guidelines which have to be tailored to the individual patient. This article summarizes the IRIS staging systems and the derived treatment recommendations.

Publication Type  
Journal article.

<398>

Accession Number  
20123326094

Author  
Caney, S. M. A.

Title  
Phosphate restriction and kidney disease.

Source  
Veterinary Times; 2012. 42(40):14, 16. 7 ref.

Publisher  
Veterinary Business Development Ltd

Location of Publisher  
Peterborough

Country of Publication  
UK

Abstract

This paper presents the results of an owner survey on management of chronic kidney disease (CKD) in cats. Focus is given on opinions regarding the management of CKD through the use of intestinal phosphate binders (IPBs).

Publication Type  
Journal article.

<399>

Accession Number  
20123353685

Author  
Pusoonthornthum, R.; Vimuktanandana, O.; Pusoonthornthum, P.; Rungsipipat, A.; Krishnamra, N.

Title  
Calcium-phosphorus homeostasis in cats with spontaneous chronic kidney disease and metabolic acidosis.

Source  
Comparative Clinical Pathology; 2012. 21(5):985-991. 23 ref.

Publisher  
Springer Science + Business Media

Location of Publisher  
London

Country of Publication  
UK

Abstract

The effect of metabolic acidosis on calcium-phosphorus homeostasis in cats with spontaneous chronic kidney disease (CKD) was studied. The cats were assigned into the clinically normal cats (n=6), CKD (n=9), and CKD with metabolic acidosis (12 cats). The CKD cats were cats with a blood urea nitrogen  $\geq 50$  mg/dl and creatinine level  $\geq 2.1$  mg/dl. A complete blood count, sodium, potassium, total calcium, adjusted calcium, ionized calcium, phosphorus, parathyroid hormone, and vitamin D levels were measured. The cats with spontaneous CKD had a significantly lower hemoglobin and pack cell volume than the clinically normal cats. The CKD cats with metabolic acidosis had mean creatinine levels of  $7.12 \pm 0.76$  mg/dl (severe azotemic stage) and significantly increased levels of parathyroid hormone and plasma phosphorus levels which indicated the presence of renal secondary hyperparathyroidism.

Publication Type  
Journal article.

<400>

Accession Number

20123336476

Author

Bazelle, J.; Watson, P.

Title

Chronic kidney disease in cats.

Source

Veterinary Times; 2012. 42(41):8...14.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Abstract

Chronic kidney disease is a common disease in cats with an increasing prevalence with age. Causes of renal damage are variable and include inflammatory, infectious, neoplastic or mechanical lesions. Eventually, any patient will progress to severe chronic kidney disease with irreversible loss of renal function. The severity of chronic kidney disease is now classified according to the degree of elevation of serum creatinine and the presence or absence of systemic hypertension and proteinuria following the IRIS classification scheme. Management aims to decrease the systemic consequences and reduce progression of the renal disease. Dietary management and maintenance of hydration are important in the treatment of chronic kidney disease. Drugs can be used in combination with diet to improve the control of hyperphosphataemia, hypertension, proteinuria, nausea, urinary tract infection or anorexia. Negative prognostic factors recognised in the cat with CKD are presence of proteinuria, increasing IRIS stage, anaemia and hyperphosphataemia.

Publication Type

Journal article.

<401>

Accession Number

20123353105

Author

Caney, S.

Title

Importance of early diagnosis in chronic kidney disease cases.

Source

Veterinary Times; 2012. 42(43):20...23.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Abstract

Early diagnosis of chronic kidney disease (CKD) is desirable so appropriate treatment and monitoring can be implemented. Unfortunately, early diagnosis is difficult without proactive diagnostic testing. A thorough history and physical examination is helpful in detecting subtle and non-specific signs of illness such as weight loss, which may be seen in patients with CKD. Urine specific gravity testing is a simple and effective screening test for identifying patients that may be suffering from renal disease and has the advantage of being possible in the absence of the cat. Blood tests, specifically urea and creatinine levels, are required to confirm a diagnosis of CKD. Care should be taken to interpret blood creatinine and phosphate levels using the IRIS guidelines ([www.iris-kidney.com](http://www.iris-kidney.com)) rather than in-house or commercial laboratory reference ranges. Early diagnosis facilitates early, appropriate interventions, which can make a huge difference to both quality and length of life.

Publication Type

Journal article.

<402>

Accession Number

20123379250

Author

Babicsak, V. R.; Zardo, K. M.; Santos, D. R. dos; Belotta, A. F.; Oliveira, H. S.; Mamprim, M. J.; Machado, V. M. de V.; Vulcano, L. C.

Title

Ultrasonographic contribution to the diagnosis of renal dysplasia in dogs. [Portuguese]

Source

Veterinaria e Zootecnia; 2012. 19(2):181-185. 8 ref.

Publisher

Faculdade de Medicina Veterinaria e Zootecnia, Universidade Estadual Paulista

Location of Publisher

Botucatu

Country of Publication

Brazil

Abstract

Renal dysplasia is a congenital disease that causes chronic kidney disease in young individuals, whose diagnosis is made through histopathological examination. Ultrasound is a complementary method that may aid the identification of renal changes. In this report we describe the renal sonographic aspects of three dogs with renal dysplasia.

Publication Type

Journal article.

<403>

Accession Number

20113000527

Author

Martinez, P. P.; Carvalho, M. B.

Title

Participation of renal excretion of calcium, phosphorus, sodium and potassium on the homeostasis in healthy dogs and in dogs with chronic kidney disease. [Portuguese]

Source

Pesquisa Veterinaria Brasileira; 2010. 30(10):868-876. 37 ref.

Publisher

Colegio Brasileiro de Patologia Animal

Location of Publisher

Rio de Janeiro

Country of Publication

Brazil

Abstract

In chronic kidney disease (CKD), the first problem to be solved by the organism is to maintain water and sodium homeostasis and, with the worsening of the renal injuries, other severe problems related to the calcium and phosphorus homeostasis emerge. The present study has the purpose to evaluate the renal excretion and serum profile of calcium, phosphorus, sodium and potassium in healthy dogs and in dogs with naturally acquired CKD. Three groups of adult male and female dogs of varied breeds were evaluated. Normal dogs were in the control group (G1) and the CKD dogs were distributed into two groups in accordance with the stage of renal function impairment (G2 e G3, respectively, stages 1-2 and stages 3-4, proposed by IRIS 2006 staging CKD). The G3 dogs showed increased serum levels of ionized calcium and phosphorus, in addition to the reduction of sodium levels. Regarding the renal excretion of the analyzed electrolytes, the G1 and G2 groups showed a decrease of filtered load and increase of fractional excretion, yet there were no significant variations on the urinary excretions. The results suggest that the kidneys of the CKD dogs can maintain similar values of electrolytes urinary excretion as the kidneys of normal dogs. The mechanism involves an increase of fractional excretion while glomerular filtration decreases. This compensation process, however, can lose its efficiency in the later stages of the disease, in relation to the maintenance of phosphorus and sodium serum levels.

Publication Type

Journal article.

<404>

Accession Number

20113046765

Author

Cooper, R. L.; Labato, M. A.

Title

Peritoneal dialysis in cats with acute kidney injury: 22 cases (2001-2006).

Source

Journal of Veterinary Internal Medicine; 2011. 25(1):14-19. 15 ref.

Publisher

Blackwell Publishing Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Background: Peritoneal dialysis (PD) has been described for use in animals with acute kidney injury refractory to fluid therapy. However, no study has examined the use of PD in a large group of cats. Hypothesis: PD is an important adjunctive therapy to treat acute kidney injury in cats. Animals: The medical

records of 22 cats with acute kidney injury that had received PD were examined. Animals were excluded if acute uremia was a result of postrenal causes such as uroabdomen or urethral obstruction. Methods: Medical records were reviewed for the following: indication for PD, outcome, number of cycles performed, survival time, and predialysis and postdialysis results for blood urea nitrogen (BUN), creatinine, potassium, chloride, sodium, phosphorus, total protein, and albumin concentrations, and urine output. Results: Indications for PD include acute-on-chronic kidney injury, acute kidney injury caused by toxins, bilateral ureteroliths, bilateral ureteral ligation as a complication of ovariohysterectomy, and unknown causes. The median survival time for all cats on PD was 4 days, although the median survival time for the cats that were discharged was 774 days. The most common complications were dialysate retention and sequestration of dialysate SC. There was a significant ( $P<.05$ ) decrease between predialysis and postdialysis results for BUN, creatinine, potassium, phosphorus, total protein, and albumin concentrations. There was a significant ( $P<.05$ ) difference in survival times between sexes. Conclusions and Clinical Importance: PD is an effective option for treatment of cats with acute kidney injury refractory to fluid therapy.

Publication Type

Journal article.

<405>

Accession Number

20113067154

Author

Kang MinHee; Park HeeMyung

Title

Diagnosis and management of feline hyperthyroidism complicated with chronic kidney disease.

Source

Journal of Veterinary Clinics; 2010. 27(6):723-725. 14 ref.

Publisher

Korean Society of Veterinary Clinics

Location of Publisher

Seoul

Country of Publication

Korea Republic

Abstract

A 14-year-old spayed, mixed breed, female cat was admitted for evaluation of a polyphagia, hyperactivity and chronic weight loss. Physical examination revealed a tachycardia and mild elevated systemic blood pressure. This cat had azotemia and mild increased total thyroxine (TT4) and free thyroxine concentration. However triiodothyronine (T3) level was normal, the T3 suppression test for definite diagnosis were made. No changes of TT4 serum concentration before and after the exogenous T3 administration in this cat showed hyperthyroidism. This cat was diagnosed as mild hyperthyroidism concurrent with chronic kidney disease (CKD) and antithyroid drug, methimazole, was used for medical management. This is first case report describing clinical and laboratory characteristic features of feline hyperthyroidism complicated with CKD and its clinical outcome using medical management in our country.

Publication Type

Journal article.

<406>

Accession Number

20113059096

Author

Norlin, A.  
 Title  
 Hypertension in cats with chronic kidney disease. [Swedish]  
 Source  
 Svensk Veterinartidning; 2011. 63(2):11-18. 31 ref.  
 Publisher  
 Sveriges Veterinarförbund  
 Location of Publisher  
 Stockholm  
 Country of Publication  
 Sweden  
 Abstract

Chronic kidney disease (CKD) is common in elderly cats. Hypertension is often recognized in cats with CKD, but the exact cause is not known. There are several ways of measuring blood pressure. Indirect methods, such as the Doppler method, are preferable for clinical practitioners. When defining hypertension, possible target organ damage (TOD) should be considered. Staging according to risk category, rather than defining a single limit for hypertension, is recommended by IRIS, International Renal Interest Society, and the American College of Veterinary Internal Medicine Consensus Study Panel. Treatment of hypertension in cats with CKD should be instituted when systolic blood pressure exceeds 160 mmHg on two separate occasions, or at lower values if evidence of TOD exists. Amlodipine lowers blood pressure effectively in cats and is the treatment of choice. However, there is only moderate evidence (grade III) to recommend the use of amlodipine in the treatment of hypertensive cats with CKD. Randomized controlled clinical trials are desirable to validate these recommendations. Benazepril has also been proven beneficial in the treatment of CKD in cats, and a coadministration with amlodipine has been suggested. This combination therapy, however, is in need of further study.

Publication Type  
 Journal article.

<407>  
 Accession Number  
 20113059088  
 Author  
 Reis, J. S. dos; Said, R. A.  
 Title  
 Pathogenesis and therapeutics of chronic renal failure in dogs. [Portuguese]  
 Source  
 Clinica Veterinaria; 2011. 16(90):90...102. 67 ref.  
 Publisher  
 Editora Guara  
 Location of Publisher  
 Sao Paulo  
 Country of Publication  
 Brazil  
 Abstract

Chronic kidney disease (CKD) is a progressive condition that affects the kidneys and causes renal failure when more than 75% of nephrons are affected. As a consequence, the excretive, regulatory and endocrine functions of the kidneys are changed, resulting in altered clinical and laboratory findings in these patients. Despite the irreversible character of CKD, it is possible to prolong and improve the quality of life of affected dogs by the implementation of a conservative therapeutic management. Treatment success depends on the stage of the disease and of constant monitoring of the natural progression of the disease, as well as the patient's response to intervention. This study aimed to discuss the pathogenesis, clinical signs and

laboratory findings associated with CKD in dogs, emphasizing the therapeutic management that should be adopted at the different stages of the disease.

Publication Type

Journal article.

<408>

Accession Number

20113066379

Author

Silveira, M. F.; Ricciardi, M. F.; Tuleski, G. L. R.

Title

Use of keto analogues for the control of uraemia in a cat with chronic kidney disease. [Portuguese]

Source

A Hora Veterinaria; 2011. 30(179):42-45. 20 ref.

Publisher

A Hora Veterinaria

Location of Publisher

Porto Alegre

Country of Publication

Brazil

Abstract

Chronic kidney disease is a severe emergency in small animal clinics. One of the underpinnings of this disorder is based on therapeutic dietary modification to reduce the clinical signs of uraemia, minimize the mineral and electrolyte disturbance and optimize nutrition, thereby limiting the progression of renal injury. The use of keto analogues has been proposed in the protocols for treatment of renal deficiency based on nutritional therapy. Use of the alpha-keto amino acid, serving as a nutritional supplement to provide amino acids of high biological value, allows the diet to contain lower levels of protein and decrease the levels of serum urea. This paper reports the treatment of a cat with chronic renal disease using keto analogues to control uraemia.

Publication Type

Journal article.

<409>

Accession Number

20113075724

Author

Polzin, D. J.

Title

Chronic kidney disease.

Source

Nephrology and urology of small animals; 2011. :433-471. many ref.

Publisher

John Wiley & Sons

Location of Publisher

Chichester

Country of Publication

UK

Publication Type



Book chapter.

<410>

Accession Number

20113110328

Author

Morales Salinas, E.; Montesinos Ramirez, L. I.; Garcia Ortuno, L. E.; Nunez Diaz, A. C.; Camacho Gonzalez, L. A.

Title

Glomerulocystic kidney disease in two dogs with renal failure.

Source

Veterinaria Mexico; 2008. 39(1):97-107. 36 ref.

Publisher

Veterinaria Mexico, Revista de la Facultad de Medicina Veterinaria y Zootecnia

Location of Publisher

Coyoacan

Country of Publication

Mexico

Abstract

Two cases of glomerulocystic kidney disease (GCKD) are described in dogs with renal failure. The laboratory test of the two dogs showed renal hyperazotemia with secondary non-regenerative anemia, associated to chronic renal failure. Macroscopic kidney lesions in both dogs were similar: showing multiple small cysts with an average of 1 mm in diameter, mainly in the renal cortex. Histopathological examination of the kidneys in both dogs revealed dilatation in the filtration space and Bowman's capsule forming cysts with glomerular atrophy and mild to severe periglomerular and interstitial fibrosis. These findings suggest that cystic glomerular changes may be developed as a consequence of fibrosis, which could act by compressing the glomerulo-tubular junctions. There are few reported cases of GCKD in dogs prior to these two. It may be explained that this is only a sporadic entity, adding that it may well be mistaken with other similar renal cystic pathologies, linked or not to a renal failure; therefore, it should be included in the differential diagnoses. For the first time, this report gives a clinical-pathological description of two cases in dogs with GCKD in Mexico.

Publication Type

Journal article.

<411>

Accession Number

20113114399

Author

Hsu, V. S.; Grant, D. C.; Zajac, A. M.; Witonsky, S. G.; Lindsay, D. S.

Title

Prevalence of IgG antibodies to *Encephalitozoon cuniculi* and *Toxoplasma gondii* in cats with and without chronic kidney disease from Virginia.

Source

Veterinary Parasitology; 2011. 176(1):23-26. 21 ref.

Publisher

Elsevier Ltd

Location of Publisher

Oxford

Country of Publication

UK

#### Abstract

Kidney disease is a common and serious condition in domestic cats. There are numerous causes of kidney disease including parasitic infection. *Encephalitozoon cuniculi* is a microsporidian parasite that develops in the kidneys of rabbits and causes chronic renal disease. Little has been reported concerning *E. cuniculi* in cats and no serological studies on this parasite in cats have been conducted in the United States to date. The present study explored the possibility that *E. cuniculi* is an unrecognized contributor to the high prevalence of kidney disease observed in cats. A serological survey was conducted to determine the prevalence of IgG antibodies to spores of *E. cuniculi* in cats with and without a diagnosis of chronic kidney disease (CKD) according to the International Renal Interest Society (IRIS) staging system. Likewise, samples were examined for IgG antibodies to *Toxoplasma gondii*, a common well studied protozoan of cats. Plasma and sera were obtained from 232 feline patients at the Virginia-Maryland Regional College of Veterinary Medicine teaching hospital. With the investigators blinded to the renal status of test subjects, samples were screened via indirect immunofluorescent antibody assay (IFA). Thirty-six of the 232 cats met the IRIS staging system criteria for CKD. Antibodies to *E. cuniculi* were found in 15 of the 232 samples, which included 4 of the 36 cats with CKD. Sera from cats serologically positive to *E. cuniculi* did not react to spores of *E. intestinalis* or *E. hellem* when examined in the IFA. Antibodies to *T. gondii* were found in 63 of the 232 samples, which included 10 of the 36 cats with CKD. The prevalence of antibodies in cats with CKD to either protozoan was not significantly different ( $P>0.05$ ) from the cats without CKD in the study. Collectively the results do not support the hypothesis that either *E. cuniculi* or *T. gondii* play a significant etiologic role in the occurrence or progression of CKD in cats.

Publication Type

Journal article.

<412>

Accession Number

20113154072

Author

Glickman, L. T.; Glickman, N. W.; Moore, G. E.; Lund, E. M.; Lantz, G. C.; Pressler, B. M.

Title

Association between chronic azotemic kidney disease and the severity of periodontal disease in dogs.

Source

Preventive Veterinary Medicine; 2011. 99(2/4):193-200. 19 ref.

Publisher

Elsevier B.V.

Location of Publisher

Amsterdam

Country of Publication

Netherlands

#### Abstract

Naturally occurring periodontal disease affects >75% of dogs and has been associated with cardiac lesions and presumptive endocarditis. However, the relationships between periodontal disease and chronic kidney disease (CKD) in dogs have not been studied. In a retrospective longitudinal study the incidence of azotemic CKD was compared between a cohort of 164,706 dogs with periodontal disease and a cohort of age-matched dogs with no periodontal disease from a national primary care practice. These dogs contributed 415,971 dog-years of follow-up from 2002 to 2008. Hazard ratios and 95% confidence intervals from Cox regression were used to compare the incidence of azotemic CKD in dogs with stage 1, 2, or 3/4 periodontal disease to dogs with no periodontal disease. The hazard ratio for azotemic CKD increased with increasing severity of periodontal disease (stage 1 hazard ratio=1.8, 95% confidence interval: 1.6, 2.1; stage 2 hazard ratio=2.0, 95% confidence interval: 1.7, 2.3; stage 3/4 hazard ratio=2.7, 95% confidence interval: 2.3, 3.0;  $P_{trend}<0.0001$ ) after adjustment for age, gender, neuter status, breed, body weight, number of hospital visits, and dental procedures. Increasing severity of periodontal disease was also associated with serum

creatinine >1.4 mg/dl and blood urea nitrogen >36 mg/dl, independent of a veterinarian's clinical diagnosis of CKD.

Publication Type  
Journal article.

<413>

Accession Number  
20113136212

Author  
Adams, L. G.

Title  
Treatment of chronic kidney disease: an evidence-based medicine approach.

Source  
BSAVA Congress 2011, The ICC/NIA, Birmingham, UK, 31 March - 3 April. Scientific Proceedings Veterinary Programme; 2011. :151-153. 3 ref.

Publisher  
British Small Animal Veterinary Association

Location of Publisher  
Quedgeley

Country of Publication  
UK

Publication Type  
Book chapter  
Conference paper.

<414>

Accession Number  
20113177890

Author  
Prihirunkit, K.; Lekcharoensuk, C.; Pooripanpipat, S.; Tipsawek, S.

Title  
Alteration of some natural anticoagulants in dogs with chronic renal failure.

Source  
Comparative Clinical Pathology; 2011. 20(3):217-221. 17 ref.

Publisher  
Springer Science + Business Media

Location of Publisher  
London

Country of Publication  
UK

Abstract

The diagnosis of hypercoagulation is essential for the identification of individuals at high risk for thrombosis and for early treatment of thrombotic disorder. The objective of the study was to evaluate some parameters for assessing the prothrombotic state in dogs with chronic renal failure (CRF). Some natural anticoagulants, protein C (PC), protein S (PS), and antithrombin III (AT III), as well as fibrinogen concentration and clinical chemistries, were concentrated. The study groups consisted of 42 dogs with CRF and 34 age- and sex-matched clinically healthy control dogs. The level of AT III in the CRF group was significantly lower ( $P<0.05$ ), but the fibrinogen concentration was significantly higher ( $P<0.05$ ) than in the control group. Additionally, the

cholesterol level in the CRF group was significantly higher than in the control group ( $P < 0.05$ ) and was positively correlated to creatinine ( $R = 0.5$ ,  $P < 0.05$ ). Elevated levels of PC and PS were exhibited in eight dogs with subcutaneous edema. The increased levels of PC and PS may counterbalance the reduction of AT III and may be related to the magnitude of hypoalbuminemia and proteinuria. These seem to be preventive mechanisms against thromboembolic phenomena. Simple correlations among parameters were determined for the CRF group. The fibrinogen concentration was correlated inversely with the AT III level ( $R = -0.63$ ,  $P < 0.05$ ). A negative correlation between AT III and azotemic parameters (creatinine:  $R = -0.68$ ,  $P < 0.05$ ; blood urea nitrogen (BUN):  $R = -0.65$ ,  $P < 0.05$ ) was observed also. In contrast, the fibrinogen concentration was positively correlated to creatinine ( $R = 0.66$ ,  $P < 0.05$ ) and BUN ( $R = 0.67$ ,  $P < 0.05$ ). The study concluded that there was a significant reduction in AT III and hyperfibrinogenemia, which were predictable parameters for thrombotic tendency in the dogs with CRF. Hypercholesterolemia was the other risk factor.

Publication Type

Journal article.

<415>

Accession Number

20113188870

Author

Chalhoub, S.; Langston, C.

Title

Managing anemia in patients with chronic kidney disease.

Source

Veterinary Medicine; 2011. 106(5):236-241. 44 ref.

Publisher

Advanstar Communications Inc

Location of Publisher

Duluth

Country of Publication

USA

Abstract

This article discusses the pathophysiology of anaemia; minimizing blood loss to help prevent anaemia; treating anaemia using erythropoiesis-stimulating agents (ESA); iron, blood transfusion and vitamin K supplementations; ESA complications; and ESA treatment failure in managing anaemia in dogs and cats with chronic kidney disease (CKD).

Publication Type

Journal article.

<416>

Accession Number

20113165977

Author

Francey, T.

Title

The kidney patient: what's for dinner?

Source

35th World Small Animal Veterinary Association Congress, Geneva, Switzerland, 2-5 June 2010; 2010.

:unpaginated. 3 ref.

Publisher

World Small Animal Veterinary Association  
Location of Publisher  
Geneva  
Country of Publication  
Switzerland  
Publication Type  
Conference paper.

<417>

Accession Number  
20113161746

Author  
Grauer, G. F.

Title  
Chronic kidney disease: tailoring treatment to stage of disease.

Source  
Small animal and exotics. Proceedings of the North American Veterinary Conference, Orlando, Florida, USA, 15-19 January 2011; 2011. :835-837.

Publisher  
The North American Veterinary Conference

Location of Publisher  
Gainesville

Country of Publication  
USA

Publication Type  
Conference paper.

<418>

Accession Number  
20113161745

Author  
Grauer, G. F.

Title  
Early recognition of chronic kidney disease.

Source  
Small animal and exotics. Proceedings of the North American Veterinary Conference, Orlando, Florida, USA, 15-19 January 2011; 2011. :832-834.

Publisher  
The North American Veterinary Conference

Location of Publisher  
Gainesville

Country of Publication  
USA

Publication Type  
Conference paper.

<419>

Accession Number

20113161743

Author

Brown, S. A.

Title

Staging of feline chronic kidney disease.

Source

Small animal and exotics. Proceedings of the North American Veterinary Conference, Orlando, Florida, USA, 15-19 January 2011; 2011. :825-828. 6 ref.

Publisher

The North American Veterinary Conference

Location of Publisher

Gainesville

Country of Publication

USA

Publication Type

Conference paper.

<420>

Accession Number

20113205754

Author

Ferreira, G. S.; Galvao, A. L. B.; Socha, J. J. M.

Title

Polycystic kidney disease in cats: a literature review. [Spanish]

Source

Anales de Veterinaria de Murcia; 2010. 26:23-31. 41 ref.

Publisher

Facultad de Veterinaria, Universidad de Murcia

Location of Publisher

Murcia

Country of Publication

Spain

Abstract

The present review focuses on the ethiology, pathogenesis, epidemiology, diagnosis and treatment of the "Autosomal Dominant Polycystic Kidney Disease" (ADPKD). It is an inheritable genetic disorder traditionally described in Persian cats and presently recognized in crossbreed cats worldwide. Affected animals develop chronic renal insufficiency and failure, and disease has a late onset, usually when cats are over three years old, and there is no specific treatment for it. However, the development in recent times of ultrasound imaging as the main diagnostic tool for ADPKD, is allowing early disease detection, improve prognosis and to implement control measures based on preventing breeding from affected cat to avoid genetically ADPKD susceptible progeny.

Publication Type

Journal article.

<421>

Accession Number

20113203796

Author

Muller, A.; Degorce-Rubiales, F.; Guaguere, E.

Title

Metastatic calcinosis (including calcinosis cutis) in a young dog with multiple urinary tract abnormalities.

Source

Veterinary Dermatology; 2011. 22(3):279-283. 36 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Metastatic calcinosis associated with chronic renal failure and multiple urinary tract abnormalities was diagnosed in a 6-month-old Brittany spaniel that was presented with calcinosis cutis. This case report highlights the importance of skin as an indicator of systemic disease. The aetiopathogenesis of the four main types of tissue calcification is defined and discussed with an emphasis on metastatic calcinosis.

Publication Type

Journal article.

<422>

Accession Number

20113203724

Author

Queau, Y.; Larsen, J. A.; Kass, P. H.; Glucksman, G. S.; Fascetti, A. J.

Title

Factors associated with adverse outcomes during parenteral nutrition administration in dogs and cats.

Source

Journal of Veterinary Internal Medicine; 2011. 25(3):446-452. 35 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

Background: Parenteral nutrition (PN) is increasingly used to support hospitalized dogs and cats. Published assessments of outcome are limited. Objective: Evaluate type and prevalence of complications and risk factors for death and complications in dogs and cats receiving PN. Animals: Three hundred and nineteen dogs and 112 cats that received PN at a teaching hospital between 2000 and 2008. Methods: Retrospective case review. Diagnosis, duration of PN administration, concurrent enteral feeding, death, and mechanical, septic, and metabolic complications were abstracted from medical records. Association of each parameter with complications and death was analyzed by binary logistic regression. Results: Pancreatitis was the most common diagnosis (109/319 dogs, 34/112 cats), and 137/319 dogs and 51/112 cats died. Dogs and cats received 113±or-40% and 103±or-32% of resting energy requirement, respectively. Mechanical (81/319 dogs, 16/112 cats) and septic (20/319 dogs, 6/112 cats) complications were not associated with death ( $P>.05$ ). Hyperglycemia was the most common metabolic complication (96/158 dogs, 31/37 cats). Hypercreatininemia in dogs (8/79) was the only complication associated with death ( $P<.01$ ). Chronic kidney disease in dogs, hepatic lipidosis in cats, and longer duration of inadequate caloric intake before PN in both



species were negatively associated with survival ( $P < .05$ ). Factors positively associated with survival included longer duration of PN administration in both species, enteral feeding in cats with any disease, and enteral feeding in dogs with respiratory disease ( $P < .05$ ). Conclusions and Clinical Importance: PN can be effectively used to provide the energy requirements of most critically ill dogs and cats. Most complications accompanying PN administration do not affect survival.

Publication Type  
Journal article.

<423>

Accession Number  
20113184880

Author

Galvao, A. L. B.; Borges, J. C.; Vieira, M. C.; Ferreira, G. S.; Lega, E.; Pinto, M. L.

Title

Arterial hypertension in the chronic kidney disease in small animals: review. [Portuguese]

Source

Nucleus Animalium; 2010. 2(1):41-52. 42 ref.

Publisher

Fundacao Educacional de Ituverava

Location of Publisher

Sao Paulo

Country of Publication

Brazil

Abstract

This article discusses the pathogenesis and physiopathology of chronic kidney disease (CKD) in dogs and cats. The clinical complications of CKD in the cardiovascular system which cause arterial hypertension and associated renal damage along with the diagnosis and therapeutic management are emphasized.

Publication Type

Journal article.

<424>

Accession Number  
20113184879

Author

Galvao, A. L. B.; Borges, J. C.; Vieira, M. C.; Ferreira, G.; Lega, E.; Pinto, M.

Title

Clinical and laboratory alterations of dogs and cats with chronic kidney disease - revision of literature.

[Portuguese]

Source

Nucleus Animalium; 2010. 2(1):23-40. many ref.

Publisher

Fundacao Educacional de Ituverava

Location of Publisher

Sao Paulo

Country of Publication

Brazil

Abstract

This article discusses the risk factors, pathogenesis, pathological lesions, clinical aspects, diagnosis and diagnostic techniques, prognosis and therapeutic programmes of chronic kidney disease in dogs and cats. The correlation of laboratory results with the clinical status of the animal as an aid in the diagnosis of chronic kidney disease is highlighted.

Publication Type  
Journal article.

<425>

Accession Number  
20113211574

Author  
Heiene, R.; Rumsby, G.; Ziener, M.; Dahl, S. A.; Tims, C.; Teige, J.; Ottesen, N.

Title  
Chronic kidney disease with oxalate-like nephrosis in Ragdoll cats.

Source  
European Journal of Companion Animal Practice; 2010. 20(2):137-143. 17 ref.

Publisher  
Federation of European Companion Animal Veterinary Associations (FECAVA)

Location of Publisher  
Paris

Country of Publication  
France

Abstract

Two unrelated Ragdoll queens in Norway were found dead from renal disease. The histopathology was consistent with oxalate nephrosis with chronic or acute-on-chronic underlying kidney disease. Both cats had offspring and relatives with signs of urinary tract disease, including a kitten dead with urethral gravel. 11 living Ragdoll cats, including 9 relatives of the dead cats and the male father of a litter with similarly affected animals, were tested for primary hyperoxaluria (PH) type 1 and 2 by urine oxalate and liver enzyme analysis. Renal ultrasound revealed abnormalities in 5 living cats. One of these was azotemic at the time of examination and developed terminal kidney disease 9 months later. A diagnosis of PH was excluded in 11 cats tested. The inheritance and aetiological background of the renal disease present in the breed remains unresolved at this point in time.

Publication Type  
Journal article.

<426>

Accession Number  
20113219121

Author  
Quimby, J. M.; Webb, T. L.; Gibbons, D. S.; Dow, S. W.

Title  
Evaluation of intrarenal mesenchymal stem cell injection for treatment of chronic kidney disease in cats: a pilot study.

Source  
Journal of Feline Medicine and Surgery; 2011. 13(6):418-426. 32 ref.

Publisher  
Elsevier Ltd  
Location of Publisher

Oxford  
Country of Publication  
UK

Abstract

The feasibility of autologous intrarenal mesenchymal stem cell (MSC) therapy in cats with chronic kidney disease (CKD) was investigated. Six cats (two healthy, four with CKD) received a single unilateral intrarenal injection of autologous bone marrow-derived or adipose tissue-derived MSC (bmMSC or aMSC) via ultrasound guidance. Minimum database and glomerular filtration rate (GFR) via nuclear scintigraphy were determined pre-injection, at 7 days and at 30 days post-injection. Intrarenal injection did not induce immediate or long-term adverse effects. Two cats with CKD that received aMSC experienced modest improvement in GFR and a mild decrease in serum creatinine concentration. Despite the possible benefits of intrarenal MSC injections for CKD cats, the number of sedations and interventions required to implement this approach would likely preclude widespread clinical application. We concluded that MSC could be transferred safely by ultrasound-guided intrarenal injection in cats, but that alternative sources and routes of MSC therapy should be investigated.

Publication Type  
Journal article.

<427>

Accession Number  
20113219119

Author  
Rishniw, M.; Wynn, S. G.

Title

Azodyl, a synbiotic, fails to alter azotemia in cats with chronic kidney disease when sprinkled onto food.

Source

Journal of Feline Medicine and Surgery; 2011. 13(6):405-409. 15 ref.

Publisher

Elsevier Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

The effect of probiotic therapy in chronic kidney disease (CKD) in cats is poorly defined, but gaining in popularity. However, cat owners often prefer to administer probiotics by combining them with food, rather than administering capsules intact, as is prescribed by the manufacturer. The efficacy of such non-recommended administration is unknown. In this double-blinded, controlled clinical trial, 10 cats with naturally-occurring CKD were randomized to receive either a probiotic-prebiotic combination (synbiotic) or psyllium husk (prebiotic only) for 2 months. Medications were sprinkled and mixed into food or given as a slurry. Blood urea nitrogen (BUN) and creatinine were measured twice prior to administration of medication, and then monthly for 2 months during the medication administration. Owners and clinicians were masked as to treatment. The maximal percentage change in BUN and creatinine was calculated for each cat. No differences in percentage change were detected between groups ( $P=0.8$  for both BUN and creatinine). The synbiotic supplement used in this study, when applied to food or administered as a slurry fails to reduce azotemia in cats with CKD. Therefore, owners should not administer this synbiotic in this manner.

Publication Type  
Journal article.

<428>

Accession Number

20113232493

Author

Myott, M.; Langston, C.

Title

Differentiating between acute and chronic kidney disease.

Source

Veterinary Medicine; 2011. 106(6):296, 298-302. 67 ref.

Publisher

Advanstar Communications Inc

Location of Publisher

Duluth

Country of Publication

USA

Abstract

Identifying whether a patient's kidney-disease is acute or chronic in origin is not always easy. All the clinical evidence must be evaluated. In our experience, a long-standing history of clinical signs consistent with kidney disease, poor body condition, and identification of small, irregular kidneys are the most useful in confirming that kidney disease is chronic. In the absence of these findings, evaluation of other parameters such as PTH concentration or parathyroid gland size, presence of anemia, presence of urinary casts, presence of uroliths, renal ultrasonographic architecture, and renal biopsy may be used to further characterize the disease and may, in aggregate, help differentiate acute from chronic disease. Differentiating between AKI and CKD in each patient will ensure that the patient is getting optimal care and that clients are well-informed about their pets' condition to make optimal decisions.

Publication Type

Journal article.

<429>

Accession Number

20113235468

Author

Roberts, S. F.; Aronson, L. R.; Brown, D. C.

Title

Postoperative mortality in cats after ureterolithotomy.

Source

Veterinary Surgery; 2011. 40(4):438-443. 13 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Objective: To identify preoperative risk factors associated with mortality before discharge in cats having a single or multiple ureterotomy procedures to treat a ureteral obstruction. Study Design: Case series. Animals: Cats (n=47). Methods: Data were obtained from the medical records (2002-2009) of cats that had undergone ureterolithotomy procedures. Multiple preoperative factors were evaluated for association of survival to discharge. Result: Survival to discharge after ureterolithotomy was 79% (37/47). Over 79% of cats were azotemic before surgery and 94% had chronic kidney disease changes at the time of ultrasonographic diagnosis. Six cats required an additional surgical procedure because of complications with ureterolithotomy.

Overall prevalence of postoperative uroabdomen was 6% (3/47). On multivariate analysis, there were no preoperative variables significantly associated with survival to discharge. Conclusions: Ureterolithotomy in cats was associated with a 21% mortality rate before hospital discharge. No preoperative variables associated with mortality were identified; therefore, further studies are needed to identify more discriminating preoperative characteristics for mortality after ureterolithotomy in this population of cats.

Publication Type  
Journal article.

<430>

Accession Number  
20113216965

Author  
Miyagawa, Y.

Title  
Studies on the early diagnosis of chronic kidney disease in dogs and cats.

Source  
Bulletin of Nippon Veterinary and Life Science University; 2010. (59):141-143.

Publisher  
Nippon Veterinary and Life Science University

Location of Publisher  
Tokyo

Country of Publication  
Japan

Publication Type  
Journal article.

<431>

Accession Number  
20113254048

Author  
Bartlett, P. C.; Buren, J. W. van; Bartlett, A. D.; Zhou, C.

Title  
Case-control study of risk factors associated with feline and canine chronic kidney disease.

Source  
Veterinary Medicine International; 2010. 2010:957570. 32 ref.

Publisher  
Sage-Hindawi Access to Research

Location of Publisher  
London

Country of Publication  
UK

Abstract

An age-matched case-control study was initiated to determine the major risk factors associated with CKD in cats and dogs and to determine what clinical signs cat and dog owners observed before their veterinarian diagnosed their pet with CKD. When compared to controls, the feline cases were more likely to have had polydipsia and polyuria in the year before the owners' cats were diagnosed with CKD. In the dogs, increased water intake, increased urination, small size and a recent history of weight loss and bad breath were noticed by the dog owners before veterinary CKD diagnosis. Dog owners recognized abnormal drinking and urination

behavior over half a year before their pet's veterinary diagnosis with CKD, and they recognized weight loss almost 4 months before CKD diagnosis. Bad breath was noticed 1.2 years before recognition of CKD by a veterinarian. Given that earlier CKD diagnosis should have been possible in most cases, clinical trials should proceed to measure the efficacy of early interventions.

Publication Type  
Journal article.

<432>

Accession Number  
20113262911

Author  
Giovannini, L. H.

Title  
Serum intact parathyroid hormone evaluation in cats with chronic kidney disease. [Portuguese]

Source  
Avaliacao da concentracao serica de paratormonio intacto em gatos com doenca renal cronica; 2010. :108 pp. 55 ref.

Publisher  
Faculdade de Medicina Veterinaria e Zootecnia, Universidade de Sao Paulo

Location of Publisher  
Sao Paulo

Country of Publication  
Brazil

Abstract

Chronic kidney disease (CKD) develops gradually, causing several changes and renal secondary hyperparathyroidism (RSHPTH) is one of those alterations, which, besides causing loss of additional nephrons, increases the morbidity and mortality due to the action of parathyroid hormone (PTH) as an important uremic toxin. Evaluation of serum PTH in cats with CKD may add information for the better understanding of RSHPTH pathophysiology, arising possible therapeutic procedures. Cats with CKD (n=40) showed significant increase ( $p<0.05$ ) in serum intact parathyroid hormone (iPTH) as compared with clinically normal cats (n=21, control group). In subgroups of CKD (STAGES II, III and IV of CKD, classified as recommended by International Renal Interest Society - IRIS), significant difference was observed between clinically normal cats and cats with CKD in STAGES III and IV; in reference to the STAGE II, although no significant difference was observed, most of these cats showed an increase in serum iPTH ( $>60.2$  pg/mL). In relation to values of phosphorus and ionized calcium serum concentrations, a trend of progressively higher serum concentrations of phosphorus (hyperphosphatemia) was detected in the late stages of the disease (16.7%, 27.3% and 100% in STAGES II, III and IV, respectively), in opposite, serum concentrations of ionized calcium progressively decreased (respectively, ionized hypocalcemia, 8.3%, 9.1% and 66.7%). Plasma bicarbonate concentrations were significant different between clinically normal cats and cats with CKD (metabolic acidosis observed in 42.5% of the cases), and between clinically normal cats and cats with CKD STAGES II and III (plasma bicarbonate  $<16.8$  mmol/L observed in 40.9% and 33.3% of the cases, respectively). No significant differences were detected for serum concentrations of total calcium and blood pH, in multiple comparisons analysis. In relation to the values of serum concentrations of calcium and phosphorus product, the results were similar to those obtained from phosphorus serum concentrations evaluation. The results suggested that the stimulus for the increase in serum iPTH, and follow development of RSHPTH, observed in cats with CKD STAGE IV, was in consequence of ionized hypocalcemia and hyperphosphatemia, enabling the regulation by the parathyroid. However, for the cats in STAGES II and III of CKD, other factors, beyond hypocalcemia and hyperphosphatemia, may be involved to cause the increase of iPTH synthesis, and calcitriol serum concentrations must be investigated; in cats with DRC STAGE II, 50% of the cases presented ionized hypercalcemia, suggesting the influence of metabolic acidosis in ionized calcium fraction. The correlation observed between serum phosphorus and iPTH may suggest the possibility of indirect evaluation of RSHPTH by means of phosphorus serum concentration; however in cats with DRC,

STAGES II and III, this indirect assessment may not be adequate as normal serum levels of phosphorus as well as increased serum iPTH were observed in those cats, indicating the need for the determination of serum iPTH to evaluate RSHPTH.

Publication Type  
Thesis.

<433>

Accession Number  
20113272538

Author

Ritthikulprasert, S.; Rodphol, M.; Nimrotham, A.; Sattayatham, S.; Komolvanich, S.; Trisiriroy, M.; Buranakarl, C.

Title

Effects of erythropoietin on blood pressure, renal function and red blood cell production in dogs with chronic kidney disease with and without angiotensin converting enzyme inhibitor.

Source

Thai Journal of Veterinary Medicine; 2011. 41(2):227-234. 26 ref.

Publisher

Faculty of Veterinary Science, Chulalongkorn University

Location of Publisher

Bangkok

Country of Publication

Thailand

Abstract

Blood pressure, renal function, urinary protein excretion and red blood cell count were measured in 29 dogs with chronic kidney disease which received hormone recombinant human Erythropoietin (rHuEPO). The experiment was divided into 2 parts. Parts 1 comprised 3 groups of dogs. Group 1 dogs were studied prior to erythropoietin (EPO) injection (pre-EPO). Group 2 dogs received EPO 100 U/kg 2-3 times a week. Group 3 dogs received both EPO and angiotensin converting enzyme inhibitor which was enalapril 5 mg/kg/daily. The duration of medication was between 7 to 40 days. In part 2 of the experiment, all parameters were measured in the same dogs before and after the dogs received EPO alone or EPO with ACEI for 15 days. The results showed that dogs with CKD before EPO injection (group 1) had non regenerative anemia with elevated blood urea nitrogen and plasma creatinine concentrations. The blood pressure was within normal limit while the urinary excretion of protein, Na and K were enhanced. Group 2 and group 3 had no significant differences in all of these parameters except a significant increase in RBC production. Group 2 tended to have higher increase in RBC production more than group 3. In part 2 in which the study was performed in the same dogs, there were no changes in blood pressure and renal function. However, 15 days after EPO or EPO with ACEI, the significant increases in packed cell volume were found in dogs receiving EPO alone ( $p<0.01$ ) and with ACEI ( $p<0.05$ ) and the degree of EPO activated RBC production was greater in dogs receiving EPO alone ( $p<0.05$ ). It is concluded that giving EPO either alone or with ACEI had no effect on blood pressure, renal function and urinary protein excretion in dogs with CKD, suggesting no angiotensin II involvement. However, by comparing with the same EPO intensity, dogs with CKD receiving ACEI required more EPO at the initial phase of treatment in order to yield the same increase in PCV.

Publication Type  
Journal article.

<434>

Accession Number



20113268330

Author

Lees, G. E.; Cianciolo, R. E.; Clubb, F. J., Jr.

Title

Renal biopsy and pathologic evaluation of glomerular disease.

Source

Topics in Companion Animal Medicine; 2011. 26(3):143-153.

Publisher

Elsevier Inc

Location of Publisher

Orlando

Country of Publication

USA

Abstract

Presence of suspected primary glomerular disease is the most common and compelling reason to consider renal biopsy. Pathologic findings in samples from animals with nephritic or nephrotic glomerulopathies, as well as from animals with persistent subclinical glomerular proteinuria that is not associated with advanced chronic kidney disease, frequently guide treatment decisions and inform prognosis when suitable specimens are obtained and examined appropriately. Ultrasound-guided needle biopsy techniques generally are satisfactory; however, other methods of locating or approaching the kidney, such as manual palpation (e.g., in cats), laparoscopy, or open surgery, also can be used. Visual assessment of the tissue content of needle biopsy samples to verify that they are renal cortex (i.e., contain glomeruli) as they are obtained is a key step that minimizes the submission of uninformative samples for examination. Adequate planning for a renal biopsy also requires prior procurement of the fixatives and preservatives needed to process and submit samples that will be suitable for electron microscopic examination and immunostaining, as well as for light microscopic evaluation. Finally, to be optimally informative, renal biopsy specimens must be processed by laboratories that routinely perform the required specialized examinations and then be evaluated by experienced veterinary nephropathologists. The pathologic findings must be carefully integrated with one another and with information derived from the clinical investigation of the patient's illness to formulate the correct diagnosis and most informative guidance for therapeutic management of the animal's glomerular disease.

Publication Type

Journal article.

<435>

Accession Number

20113268328

Author

Vaden, S. L.

Title

Glomerular disease.

Source

Topics in Companion Animal Medicine; 2011. 26(3):128-134.

Publisher

Elsevier Inc

Location of Publisher

Orlando

Country of Publication

USA

Abstract

Glomerular diseases are a leading cause of chronic kidney disease in dogs but seem to be less common in cats. Glomerular diseases are diverse, and a renal biopsy is needed to determine the specific glomerular

disease that is present in any animal. Familial glomerulopathies occur in many breeds of dogs. However, most dogs with glomerular disease have acquired glomerular injury that is either immune-complex mediated or due to systemic factors, both of which are believed to be the result of a disease process elsewhere in the body (i.e., neoplastic, infectious, and noninfectious inflammatory disorders). A thorough clinical evaluation is indicated in all dogs suspected of having glomerular disease and should include an extensive evaluation for potential predisposing disorders. Nonspecific management of dogs with glomerular disease can be divided into 3 major categories: (1) treatment of potential predisposing disorders, (2) management of proteinuria, and (3) management of uremia and other complications of glomerular disease and chronic kidney disease. Specific management of specific glomerular diseases has not been fully studied in dogs. However, it may be reasonable to consider immunosuppressive therapy in dogs that have developed a form of glomerulonephritis secondary to a steroid-responsive disease (e.g., systemic lupus erythematosus) or have immune-mediated lesions that have been documented in renal biopsy specimens. Appropriate patient monitoring during therapy is important for maximizing patient care. The prognosis for dogs and cats with glomerular disease is variable and probably dependent on a combination of factors. The purpose of this article is to discuss the general diagnosis and management of dogs with glomerular disease.

Publication Type

Journal article.

<436>

Accession Number

20113295207

Author

Garcia, J. L.

Title

Is the anemia of CKD always due to erythropoietin deficiency?

Source

Veterinary Medicine; 2011. 106(8):384. 4 ref.

Publisher

Advanstar Communications Inc

Location of Publisher

Duluth

Country of Publication

USA

Abstract

A discussion on the frequently asked questions about chronic kidney disease (CKD) in dogs and cats are presented. Questions answered includes: at what stage of kidney insufficiency does low erythropoietin cause anaemia?, does kidney failure need to be present?, how can you tell if the anaemia is secondary to low erythropoietin or something else?, and can an erythropoietic agent secondary to low erythropoietin such as epoetin alfa (Epogen-Amgen) be given empirically if you are not sure.

Publication Type

Journal article.

<437>

Accession Number

20113325972

Author

Gonul, R.; Koenhems, L.; Oralkan, D.; Erman, M.; Uysal, A.

Title

Detection of the renal vascular resistance with Doppler ultrasonography in a cat with chronic renal disease.

[Turkish]

Source

Yuzuncu Yl Universitesi Veteriner Fakultesi Dergisi; 2011. 22(2):111-113. 7 ref.

Publisher

Yuzuncu Yl Universitesi

Location of Publisher

Van

Country of Publication

Turkey

Abstract

End stage chronic renal failure, which cause disease and death in old cats lead up to uremia and frequently encountered is an important disease. The disease is examined in more detail to keep under control, alterations in renal hemodynamics calculated using coloured doppler ultrasonography in a cat with chronic renal failure. In the checks RI and PI values are 0,64 and 1,75 respectively and the increase in vascular resistance in chronic renal failure from a pulse wave was detected with color doppler techniques first time in our clinic.

Publication Type

Journal article.

<438>

Accession Number

20113322784

Author

Chalhoub, S.; Langston, C. E.; Eatroff, A.

Title

Anemia of renal disease: what it is, what to do and what's new.

Source

Journal of Feline Medicine and Surgery; 2011. 13(9):629-640. 97 ref.

Publisher

Elsevier Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Patient group: It is estimated that 15-30% of geriatric cats will develop chronic kidney disease (CKD), and that 30-65% of these cats will develop anemia as their renal disease worsens. Anemia of renal disease is multifactorial in its pathogenesis, but the main cause is reduced production of erythropoietin, a renal hormone that controls the bone marrow's production of red blood cells, as kidney disease progresses.

Practical relevance: It is important to recognize the presence of anemia of renal disease so that adequate treatment may be instituted to improve quality of life and metabolic function. Erythrocyte-stimulating agents (ESAs), such as epoetin alfa, epoetin beta and darbepoetin alfa, have been developed to counteract the effects of decreased erythropoietin production by the kidneys. These treatments, which are the focus of this review, have 83% similarity in amino acid sequence to the feline hormone. On average, the target packed cell volume (>25%) is reached within 3-4 weeks of ESA therapy. Clinical challenges: The use of ESAs has been associated with a number of complications, such as iron deficiency, hypertension, arthralgia, fever, seizures, polycythemia and pure red cell aplasia (PRCA). Darbepoetin has a prolonged half-life compared with epoetin and thus can be given only once a week, instead of three times a week. The incidence of PRCA appears to be decreased with darbepoetin use when compared with epoetin use in cats. Evidence base: There is limited published evidence to date to underpin the use of ESAs in cats. This review draws on the

relevant publications that currently exist, and the authors' personal experience of using these therapies for over 5 years.

Publication Type  
Journal article.

<439>

Accession Number  
20113331832

Author  
Quimby, J. M.; Gustafson, D. L.; Lunn, K. F.

Title  
The pharmacokinetics of mirtazapine in cats with chronic kidney disease and in age-matched control cats.

Source  
Journal of Veterinary Internal Medicine; 2011. 25(5):985-989. 14 ref.

Publisher  
Wiley-Blackwell

Location of Publisher  
Boston

Country of Publication  
USA

Abstract

Background: Cats with chronic kidney disease (CKD) often experience inappetence, and may benefit from administration of mirtazapine, an appetite stimulant. The pharmacokinetics of mirtazapine in CKD cats is unknown. Hypothesis: CKD delays the clearance/bioavailability (CL/F) of mirtazapine. Animals: Six CKD cats and 6 age-matched controls (AMC) were enrolled. Two CKD cats each from International Renal Interest Society (IRIS) stage II, III and IV were included. Methods: Blood samples were collected before and 0.5, 1, 1.5, 2, 4, 8, 24, and 48 hours after a single PO dose of 1.88 mg of mirtazapine. Mirtazapine concentrations were measured by liquid chromatography coupled to tandem mass spectrometry. Non-compartmental pharmacokinetic modeling was performed. Results: Mean age was 11 years (CKD cats) and 10.8 years (AMC cats). Mean serum creatinine concentration+or-standard deviation (SD) was 3.8+or-1.6 mg/dL (CKD) and 1.3+or-0.4 mg/dL (AMC). Mean half-life+or-SD was 15.2+or-4.2 hours (CKD) and 12.1+or-1.1 hours (AMC). Mean area under the curve (AUC)+or-SD was 770.6+or-225.5 ng/mL.hr (CKD) and 555.5+or-175.4 ng/mL.hr (AMC). Mean CL/F+or-SD was 0.6+or-0.1 L/hr/kg (CKD) and 0.8+or-0.16 L/hr/kg (AMC). A Mann-Whitney test indicated statistically significant differences in AUC (P=0.01) and CL/F (P=0.04) between groups. Calculated accumulation factor for 48-hour dosing in CKD cats was 1.15. Conclusion: CKD may delay the CL/F of mirtazapine. A single low dose of mirtazapine resulted in a half-life compatible with a 48-hour dosing interval in CKD cats.

Publication Type  
Journal article.

<440>

Accession Number  
20113314235

Author  
Carvalho, Y. M. de

Title  
Nutritional approach in chronic kidney disease. [Portuguese]

Source

Clinica Veterinaria; 2011. 16(94):120-123.

Publisher

Editora Guara

Location of Publisher

Sao Paulo

Country of Publication

Brazil

Abstract

This article covers the nutritional approach in modulating the renal damage in animals affected with chronic kidney disease (CKD). The effects of each element of the diet are presented, and application of new nutritional concepts aimed at slowing the progression of CKD in animals (dogs and cats) is discussed. CKD and the main characteristics of renal diets are also outlined. Focus is given on protein, phosphorus, sodium, energy, polyenoic fatty acids, potassium, acid-base balance, fibre, antioxidants and arginine.

Publication Type

Journal article.

<441>

Accession Number

20113343353

Author

Medrano Galarza, C.; Diaz Rojas, C. A.; Dalmau Barros, E. A.

Title

Diagnostic of canine leptospirosis by Dot-ELISA and MAT tests in dogs with renal disease in Bogota.

[Spanish]

Source

Revista de Medicina Veterinaria; 2011. (21):133-145. 33 ref.

Publisher

Universidad de la Salle

Location of Publisher

Bogota

Country of Publication

Colombia

Abstract

Leptospirosis is a zoonotic disease that is caused by species of genus *Leptospira* (Order Spirochaetales, Family Leptospiraceae). This is very important on a global level, due to its widespread distribution and diversity of serogroups and serovars that affect an extensive group of animal species. Canines are one of the most affected species, where this bacterium generates an acute renal or hepatic infection. Chronic kidney disease is a common consequence of the infection and miscarriage can also happen in pregnant females. During the past few years, Leptospirosis has been catalogued as one of the most common differential diagnostics for dogs with acute renal and hepatic disease symptoms. Thirty (30) dogs with renal disease were evaluated during this project, undergoing serological testing for Leptospirosis: the Microscopy Agglutination Test (MAT) for six *Leptospira interrogans* serovars and a diagnostic urine test through Dot-ELISA for serovars canicola, icterohaemorrhagiae, pomona and grippityphosa. The results of both tests came out positive for *Leptospira* as the cause of the renal disease in ten (10) dogs (33.3%), which showed titles on MAT mainly in serovars icterohaemorrhagiae, canicola and grippityphosa. Dot-ELISA was positive in 9 of the 10 dogs, with a homogeneous distribution in the 4 serovars. The remaining 20 dogs (66.7%) came out negative. The association between the Dot-ELISA test and the MAT test was highly significant ( $P<0.01$ ).

Publication Type

Journal article.

<442>

Accession Number

20113340953

Author

Howell, J.

Title

Chronic Renal Disease in cats.

Source

Veterinary Ireland Journal; 2011. 64(5):271-273. 8 ref.

Publisher

Veterinary Ireland

Location of Publisher

Dublin

Country of Publication

Irish Republic

Abstract

This article presents the causes, symptoms, diagnosis and treatment of chronic renal disease in cats. The importance of phosphate in their diet is also discussed.

Publication Type

Journal article.

<443>

Accession Number

20113372996

Author

Dorfelt, R.

Title

Anesthesia and perianaesthetic management in small animals suffering from kidney diseases. [German]

Source

Wiener Tierärztliche Monatsschrift; 2011. 98(9/10):203-212. many ref.

Publisher

BWK Public Relations - Brigitte Weber-Kraus

Location of Publisher

Wien

Country of Publication

Austria

Abstract

Dogs and cats with acute or chronic kidney diseases frequently suffer from uraemia and related problems as severe electrolyte imbalances, anaemia and metabolic acidosis. These patients are at very high risk to decompensate during anaesthesia. To prevent further damage to the kidneys and in order to keep uraemia related deviations controlled, they require intensive management before, during and after general anaesthesia. This article describes pathophysiologic processes in the injured kidney and in the patient, suffering from renal insufficiency. The effects of uraemia on drug metabolism and excretion are reviewed as well as the effect of frequently used drugs on the kidneys. Additionally major monitoring procedures and analgesia concepts for anaesthetized uraemic dogs and cats are summarized. In general uraemic patients should be evaluated and stabilized before anaesthesia. Drugs and protocols should be chosen adequately in order to prevent further kidney damage. Monitoring of blood pressure and guided fluid therapy is essential during anaesthesia in uraemic animals.

Publication Type

Journal article.

<444>

Accession Number

20113361841

Author

Caney, S. M. A.

Title

Chronic kidney disease in cats: causes and treatment methods.

Source

Veterinary Times; 2011. 41(45):12...16. 4 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Abstract

Chronic kidney disease (CKD) is one of the most common diagnoses made in clinical practice. There are many causes of CKD, although in the majority of cases, a cause is not identifiable at the time of diagnosis. In recent years, there have been many advances in treatment options, and long-term home care can be very rewarding for all involved. Treatment aims to help patients compensate for their renal disease, allowing them to live for as long as possible, with as good a quality of life as possible. The most proven treatment is feeding a prescription renal diet, but there are many other treatments that can be beneficial to individual patients.

Publication Type

Journal article.

<445>

Accession Number

20113403587

Author

Parker, V. J.; Freeman, L. M.

Title

Association between body condition and survival in dogs with acquired chronic kidney disease.

Source

Journal of Veterinary Internal Medicine; 2011. 25(6):1306-1311. 45 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Boston

Country of Publication

USA

Abstract

Background: Obesity in people with chronic kidney disease (CKD) is associated with longer survival. The purpose of this study was to determine if a relationship exists between body condition score (BCS) and survival in dogs with CKD. Hypothesis/Objectives: Higher BCS is a predictor of prolonged survival in dogs with CKD. Animals: One hundred dogs were diagnosed with CKD (International Renal Interest Society stages II, III or IV) between 2008 and 2009. Methods: Retrospective case review. Data regarding initial body weight and BCS, clinicopathologic values and treatments were collected from medical records and compared



with survival times. Results: For dogs with BCS recorded (n=72), 13 were underweight (BCS=1-3; 18%), 49 were moderate (BCS=4-6; 68%), and 10 were overweight (BCS=7-9; 14%). For dogs with at least 2 body weights recorded (n=77), 21 gained weight, 47 lost weight, and 9 had no change in weight. Dogs classified as underweight at the time of diagnosis (median survival=25 days) had a significantly shorter survival time compared to that in both moderate (median survival=190 days;  $P<.001$ ) and overweight dogs (median survival=365 days;  $P<.001$ ). There was no significant difference in survival between moderate and overweight dogs ( $P=.95$ ). Conclusions and Clinical Importance: Higher BCS at the time of diagnosis was significantly associated with improved survival. Further research on the effects of body composition could enhance the management of dogs with CKD.

Publication Type  
Journal article.

<446>

Accession Number

20103007586

Author

Kidder, A. C.; Chew, D.

Title

Treatment options for hyperphosphatemia in feline CKD: what's out there?

Source

Journal of Feline Medicine and Surgery; 2009. 11(11):913-924. 68 ref.

Publisher

Elsevier

Location of Publisher

Amsterdam

Country of Publication

Netherlands

Publication Type

Journal article.

<447>

Accession Number

20103008845

Author

Maddison, J.; Syme, H.

Title

Chronic kidney disease in dogs and cats: pathophysiology and diagnosis.

Source

Irish Veterinary Journal; 2010. 63(1):44...50.

Publisher

Irish Veterinary Association

Location of Publisher

Dublin

Country of Publication

Irish Republic

Abstract

This article discusses the aetiology, clinical aspects and physiopathology of chronic kidney disease in small animals. The paper also includes the biochemical derangement of renal failure; diagnosis of renal failure;

and utilization of urinalysis, cast identification, urine-protein analysis, radiology and ultrasound, and renal biopsy in dogs and cats with chronic kidney disease.

Publication Type

Journal article.

<448>

Accession Number

20103042272

Author

Lingard, A. E.; O'Brien, C. R.; Nimmo, J. S.; Gowan, R. A.

Title

Calcinosis cutis in a young cat with acute renal failure.

Source

Australian Veterinary Practitioner; 2009. 39(4):147-151. 21 ref.

Publisher

Australian Small Animal Veterinary Association

Location of Publisher

St. Leonards

Country of Publication

Australia

Abstract

A 10-month-old Ragdoll cat was presented for acute renal failure and multiple, firm, subcutaneous masses within the dorsal inter-scapular and lumbar regions. Histopathologic examination of the subcutaneous lesions demonstrated calcinosis cutis. A metastatic pathogenesis was supported by the findings of hyperphosphataemia and a calcium x phosphorous solubility product in excess of 70 mg/dL. Serum parathyroid hormone and ionised calcium concentrations were within reference intervals. Medical therapy and dietary management of the renal disease resulted in a reduction of the calcium x phosphorous solubility product and subsequent resolution of the calcinosis cutis lesions. Calcinosis cutis is uncommonly reported in cats and most reported cases have been associated with chronic kidney disease, with lesions typically affecting the footpads and interdigital skin. This case serves to illustrate that calcinosis cutis can be associated with acute renal failure, that the dorsal subcutis and dermis may be affected and that lesions are potentially reversible with appropriate management.

Publication Type

Journal article.

<449>

Accession Number

20103053267

Author

Cortadellas, O.; Fernandez del Palacio, M. J.; Talavera, J.; Bayon, A.

Title

Calcium and phosphorus homeostasis in dogs with spontaneous chronic kidney disease at different stages of severity.

Source

Journal of Veterinary Internal Medicine; 2010. 24(1):73-79. 32 ref.

Publisher

Blackwell Publishing

Location of Publisher

Oxford  
Country of Publication  
UK

Abstract

Background: Studies in dogs with experimental chronic kidney disease (CKD) have demonstrated that abnormalities of calcium-phosphorus (Ca-P) homeostasis occur frequently and have a negative effect on kidney function and survival. However, the prevalence of these alterations in dogs with naturally occurring CKD at different stages of severity has not yet been investigated. Hypothesis: Abnormalities of Ca-P metabolism occur early in the course of CKD with an increased prevalence in more severe stages. Animals: Fifty-four dogs with CKD and 22 healthy dogs. Methods: Blood and urine samples were obtained for a CBC, biochemistry, determination of parathyroid hormone (PTH), calcitriol, and ionized calcium concentrations and urinalysis. Based on urine protein/creatinine ratio and serum creatinine concentration, dogs were grouped according to the IRIS classification for CKD. Results: Hyperparathyroidism (HPTH) (PTH  $\geq$ 48 pg/mL) was diagnosed in 41 (75.9%) dogs with CKD. Its prevalence increased from 36.4% (stage 1) to 100% (stage 4). Hyperphosphatemia (P $>$ 5.5 mg/dL) was present in 37 (68.5%) dogs; increasing in prevalence from 18% (stage 1) to 100% (stage 4). Receiver-operating characteristic curve analysis showed that serum phosphorus concentration in the 4.5-5.5 mg/dL range correctly identified the presence of HPTH in most dogs. Calcitriol concentration progressively decreased in dogs with CKD and differences became statistically significant by stage 3. Conclusion and Clinical Relevance: HPTH and hyperphosphatemia occur frequently in dogs with naturally occurring CKD, even at early stages of CKD in some dogs. These findings highlight the importance of monitoring these parameters early in the course of CKD.

Publication Type  
Journal article.

<450>

Accession Number  
20103029316

Author  
Jonkisz, P.; Glinska-Suchocka, K.

Title  
Chronic renal failure. [Polish]

Source  
Weterynaria w Praktyce; 2009. 6(11/12):36-38. 13 ref.

Publisher  
Elamed Wydawnictwo

Location of Publisher  
Katowice

Country of Publication  
Poland

Abstract

Chronic renal failure (CRF) is a progressive disorder most commonly associated with older dogs and cats in which the kidneys slowly lose the ability to concentrate urine and eliminate wastes. The disease is associated with irreversible changes to the kidney structure, such as scarring and loss of nephrons, the functional units of the kidney. The characteristics of chronic renal failure (CRF) are: historical signs (e.g. polyuria, polydipsia, weight loss, poor haircoat), anaemia, small renal size and/or deranged renal architecture. When CRF is suspected, the dog should undergo a complete physical examination, including blood tests and urinalysis.

Publication Type  
Journal article.

<451>

Accession Number

20103049935

Author

Maddison, J.; Syme, H.

Title

Chronic kidney disease in dogs and cats II: principles of management.

Source

Irish Veterinary Journal; 2010. 63(2):106-109.

Publisher

Irish Veterinary Association

Location of Publisher

Dublin

Country of Publication

Irish Republic

Abstract

This paper discusses the principles of managing chronic kidney disease in dogs and cats. Focus is given on fluid therapy, management of acid-base and electrolyte imbalances, feeding of low-protein diets, sodium balance and use of ACE inhibitors and antihypertensive agents. Moreover, non-regenerative anaemia and urinary tract infection and their treatment are discussed.

Publication Type

Journal article.

<452>

Accession Number

20103087429

Author

Nobre e Castro, M. C.; Vieira, A. B.; Santos, M. C. S.; Gershony, L. C.; Soares, A. M. B.; Ferreira, A. M. R.

Title

Body condition score as an indicator of prognosis for cats with chronic renal disease. [Portuguese]

Source

Ciencia Rural; 2010. 40(2):335-340. 25 ref.

Publisher

Centro de Ciencias Rurais, Universidade Federal de Santa Maria

Location of Publisher

Santa Maria

Country of Publication

Brazil

Abstract

Cachexia has been associated with higher mortality in patients with chronic renal disease both in human and veterinary medicine. Body condition score (BCS) can be used along with body weight for a better evaluation of a patient's body composition. The objective of this study was to associate body condition score with prognosis of cats with chronic renal disease. One hundred and ten elderly cats were evaluated; of which 70 were healthy (Group I) and 40 had been diagnosed with chronic renal disease (Group II). In Group I, only 5.7% of the cats presented a BCS below ideal, though none were found to be cachectic. In Group II, 70% of the cats presented a BCS below ideal, where 32.5% were cachectic. Mortality was significantly higher within the cachectic patients of Group II. BCS below ideal indicates a poor prognosis for patients with chronic renal disease.

Publication Type

Journal article.

<453>

Accession Number

20103071178

Author

Blanchard, G.

Title

Nephrology news: nutritional treatment of chronic renal insufficiency in cats. [French]

Source

Bulletin de la Societe Veterinaire Pratique de France; 2009. 93(4):3-6. 17 ref.

Publisher

Societe Veterinaire Pratique de France

Location of Publisher

Paris

Country of Publication

France

Abstract

The diet of cats with chronic renal failure (CRF) must be adapted to improve both welfare and life expectancy. Nutritional adaptations include the coverage of both energy and protein requirement, a phosphorus restriction with a calcium to phosphorus ratio over 2, and the inclusion of omega 3 fatty acids, preferably long chain fatty acids. The diet must include all parameters, but must also be provided in a form that the cat will accept. This double goal can be reached by the prescription of one (or several) canned and/or dry food designed for cats with CKF, or by a balanced home made diet, also designed for cats with CRF. Some examples of home made diets are presented.

Publication Type

Journal article.

<454>

Accession Number

20103071177

Author

Blanchard, G.

Title

New approaches to homemade diets in the nutritional management of cats and dogs. [French]

Source

Bulletin de la Societe Veterinaire Pratique de France; 2009. 93(4):19-26. 19 ref.

Publisher

Societe Veterinaire Pratique de France

Location of Publisher

Paris

Country of Publication

France

Abstract

A home made diet is demanded by some pet owners, but is also sometimes the only option to feed animals refusing the consumption of any ready-to-eat diet adapted to their condition. Finally, a tailored home made diet may be the only option when no ready-to-eat diet is available to correspond to a special condition, like with two diseases simultaneously. The animal can highly benefit from a professional nutritional answer, provided directly or indirectly by the practitioner. Examples are presented to illustrate the diversity of the

situations encountered: when the owners want to make their dog loose weight but with a home made diet, when the cat with chronic renal failure refuses to consume any dry or canned adapted diet but accept an adapted home made diet, and eventually a cat suffering of two diseases simultaneously, like obesity and urolithiasis, which can be treated at once with a specific home made diet. Such adapted diets are possible thanks to the choice of ingredients and to the availability of specific and adapted nutritional supplements.

Publication Type

Journal article.

<455>

Accession Number

20103116485

Author

LeVine, D. N.; Zhang, D. W.; Harris, T.; Vaden, S. L.

Title

The use of pooled vs serial urine samples to measure urine protein:creatinine ratios.

Source

Veterinary Clinical Pathology; 2010. 39(1):53-56. 10 ref.

Publisher

Blackwell Publishing Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Background: Evaluation of serial urine protein:creatinine (UPC) ratios is important in prognosticating chronic kidney disease and monitoring response to therapeutic interventions. Owing to random biologic variation in dogs with stable glomerular proteinuria, multiple determinations of UPC ratios often are recommended to reliably assess urine protein loss. This can be cost-prohibitive. Objective: The purpose of this study was to evaluate agreement between the mean of 3 UPC ratios obtained on 3 separate urine samples per dog and a single UPC ratio obtained when aliquots of the separate samples were pooled and analyzed as 1 sample. Methods: Three separate urine samples were collected from each of 25 dogs, both client-owned and members of a research colony. Protein and creatinine concentrations were measured in the supernatant of each sample using a biochemical analyzer, and the mean of the 3 UPC ratios was calculated. A 1.0 mL aliquot of each of the 3 samples from each dog was pooled to create a fourth sample for that dog, and the UPC ratio of the pooled sample was similarly determined. Agreement and correlation between the mean and pooled UPC ratios were assessed using Bland-Altman difference plots and regression analysis, respectively. Results: The UPC ratio in the pooled samples was highly correlated ( $r=.9998$ ,  $P<.0001$ ) with the mean UPC ratio of the 3 separate samples. Strong agreement between results was demonstrated; a UPC ratio from a pooled sample was at most +or-20% different than the mean UPC ratio obtained from 3 separate samples. Conclusions: Measuring the UPC ratio in a pooled sample containing equal volumes of several different urine specimens from the same dog provides a reliable and cost-effective alternative to assessing multiple UPC ratios on several specimens from the same dog.

Publication Type

Journal article.

<456>

Accession Number

20103116413

Author

Lavoue, R.; Lugt, J. J. van der; Day, M. J.; Georges, M.; Busoni, V.; Merveille, A. C.; Poujade, A.; Peeters, D.

Title

Progressive juvenile glomerulonephropathy in 16 related French Mastiff (Bordeaux) dogs.

Source

Journal of Veterinary Internal Medicine; 2010. 24(2):314-322. 50 ref.

Publisher

Blackwell Publishing Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Background: Familial juvenile glomerulonephropathy (JGN) is reported in several breeds of dogs. The mode of inheritance and spectrum of pathological lesions vary among breeds. A progressive JGN was detected in a pedigree of French Mastiff (FM) dogs. Objectives: To describe clinical, laboratory, and histopathologic findings in related FM dogs suffering from progressive JGN and to determine the mode of inheritance of this condition. Animals: Sixteen affected and 35 healthy related FM dogs. Methods: FM dogs <24 months of age and diagnosed with chronic kidney disease with evidence of proteinuria entered the study. Clinical, laboratory, histopathologic findings, and pedigree data were recorded. Results: Clinical signs were typical of progressive glomerulopathy with resultant renal failure. Increased blood urea nitrogen, creatinine and total cholesterol concentrations, and proteinuria were found in all patients. Affected dogs had abnormal kidney structure on abdominal ultrasound examination. Histopathologic examination revealed extensive cystic glomerular atrophy, glomerular hypercellularity, and capillary wall thickening without immune complex deposition when tested with immunohistochemistry or immunofluorescence. Electron microscopy did not disclose specific primary glomerular lesions. Mean age at death was 20 months and mean length of survival after diagnosis was 6 months. Both males and females from healthy parents were affected. An autosomal recessive mode of transmission is suspected, but a more complex mode of inheritance cannot be excluded. Conclusions and Clinical Importance: Progressive familial JGN occurs in FM dogs. Characterization of the pathogenesis and mode of inheritance of this disease warrants additional study.

Publication Type

Journal article.

<457>

Accession Number

20103121105

Author

Morar, D.; Falca, C.; Mot, T.; Petruse, C.; Galbenu, P. L.; Ciulan, V.

Title

Effect of amlodipine on blood pressure in cats with chronic renal failure.

Source

Lucrari Stiintifice - Universitatea de Stiinte Agricole a Banatului Timisoara, Medicina Veterinara; 2009. 42(2):231-235. 11 ref.

Publisher

Facultatea de Medicina Veterinara

Location of Publisher

Timisoara

Country of Publication

Romania

Abstract



The study was made on seven cats aged between seven and fourteen years, diagnosed with chronic renal failure and secondary arterial hypertension. The blood pressure was measured by oscilometric method at the level of the median artery, with cuffs width of between 30-40% of the limb circumference, placed in the forearm region. For each cat, the systemic blood pressure value was calculated as the mean of five consecutive measurements. Amlodipine was administrated in all cats in dose of 0.625 mg/cat once daily (0.1-0.2 mg/kg), and blood pressure was measured before drug administration and after seven and thirty days of therapy. Amlodipine decreased blood pressure gradually and significantly ( $p<0,05$ ) in cats with chronic renal failure and had no significant influence on the renal blood biochemical profile in the present study.

Publication Type  
Journal article.

<458>

Accession Number

20103115169

Author

Carr, A.

Title

Improving outcomes with chronic renal disease.

Source

Ontario Veterinary Medical Association 2010 Conference Proceedings. Toronto, Canada, January 28-30, 2010.; 2010. :66-69. 16 ref.

Publisher

Ontario Veterinary Medical Association (OVMA)

Location of Publisher

Milton

Country of Publication

Canada

Publication Type

Conference paper.

<459>

Accession Number

20103146167

Author

Galvao, A. L. B.

Title

Oxidative stress in end-stage chronic kidney disease in small animals. [Portuguese]

Source

Archives of Veterinary Science; 2009. 14(3):178-186. 34 ref.

Publisher

Universidade Federal do Parana, CEPPA

Location of Publisher

Curitiba

Country of Publication

Brazil

Abstract

The chronic kidney disease (CKD) it is characterized by irreversible structural lesions that can develop progressively for uremia and chronic renal failure (CRF). In the CRF it happens the incapacity of executing the functions of maintenance of the electrolyte balance and acid-base, catabolitos excretion and hormonal regulation appropriately. When the mechanism basic physiopathology of the renal upset is analyzed, it is observed that present factors, predispose to the unbalance oxidative. Most of the time, the renal patient comes badly nurtured, with lack in reservations of vitamins and minerals, what reduces the antioxidant defense mechanisms, what favors the installation of the renal oxidative stress, with the formation of species you reactivate of reactive oxygen species (ROS), substances these potentially harmful to the organism. The reduction of the glomerular filtration rate (GFR) in the evolution of CKD in dogs and cats is a component for the installation of the renal oxidative stress. The ROS possesses important action in the kidneys, and these substances are highly reactivate, and when presents in excess damage lipids, proteins, DNA and carbohydrate, driving functional and structural abnormalities taking the cellular apoptosis and necrosis. Against the harmful potential action of these substances you reactivate, she becomes fundamental a delicate control of his production and consumption in the half intracellular, in other words, a balance of his concentration intra and extracellular. That is possible due to the activity of the antioxidants. Like this, to present literature revision had as objective describes the participation of the oxidative stress in CRF, as well as the mechanisms defenses against the harmful action of those substances.

Publication Type

Journal article.

<460>

Accession Number

20103112713

Author

Ross, S.

Title

Diagnosis and management of chronic kidney disease in dogs and cats.

Source

Food safety: veterinary roles for the world kitchen. Proceedings of the 15th Congress of the Federation of Asian Veterinary Associations FAVA-OIE Joint Symposium on emerging diseases, Bangkok, Thailand, 27-30 October, 2008; 2008. :S89-S95.

Publisher

Federation of Asian Veterinary Associations (FAVA)

Location of Publisher

Bangkok

Country of Publication

Thailand

Abstract

This article discusses the definition and classification of chronic kidney diseases (CKD); diagnosing chronic kidney diseases; diagnostic evaluation of CKD; management of CKD; dietary modifications for CKD; hydration; diet therapy; and monitoring of dogs and cats with CKD.

Publication Type

Conference paper.

<461>

Accession Number

20103161001

Author

Pusoonthornthum, R.; Pusoonthornthum, P.; Krishnamra, N.

Title

Calcium-phosphorus homeostasis and changes in parathyroid hormone secretion in cats with various stages of spontaneous chronic renal failure.

Source

Comparative Clinical Pathology; 2010. 19(3):287-293.

Publisher

Springer Science + Business Media

Location of Publisher

London

Country of Publication

UK

Abstract

Feline chronic renal failure was recognized with increased frequency in Maine coon, Abyssinian, Siamese, Russian blue, and Burmese cats. The objective of this study was to investigate the relationship between parathyroid hormone (PTH) level, calcium, and phosphorus homeostasis and the development of various stages of the naturally occurring chronic renal failure (CRF) in cats. Thirty-two CRF cats without history of receiving special diet for renal diseases that were presented to the Small Animal Hospital, Faculty of Veterinary Science, Chulalongkorn University were studied. Nineteen CRF cats were followed prospectively for 60 days and divided into two groups: uremic group (11 cats) and end-stage group (eight cats). The control group (13 cats) were normal cats, which were brought for vaccination at the same hospital within the same period. CRF cats with blood urea nitrogen concentrations of more than 50 mg/dl, serum creatinine level of more than 2.1 mg/dl, and urine specific gravity of between 1.008 and 1.014 were included into the study. Completed blood count, blood chemistry, electrolytes, including sodium, potassium, total calcium, and phosphorus, and PTH levels were measured on days 0, 14, 30, and 60 after the first diagnosis. The results showed that cats with CRF had significantly lower red blood cells, hemoglobin, and pack cell volume than control cats ( $p < 0.01$ ) on days 0, 14, 30, and 60. PTH levels on first day of diagnosis were  $50.51 \pm 19.65$ ,  $79.41 \pm 28.12$ , and  $183.37 \pm 50.12$  pg/ml in controls, uremic, and end-stage groups, respectively. Cats in end-stage group had significantly increased levels of PTH when compared to control ( $p < 0.01$ ) and uremic groups ( $p < 0.05$ ) on days 0, 14, and 30. Serum phosphorus levels also increased significantly in end-stage group ( $p < 0.001$ ), indicating the presence of renal secondary hyperparathyroidism. This study reveals that PTH level is significantly increased in end-stage CRF cats who did not received special diet for renal diseases. The development of renal secondary hyperparathyroidism in end-stage CRF cats significantly decreased its survival rate.

Publication Type

Journal article.

<462>

Accession Number

20103166661

Author

Roudebush, P.; Polzin, D. J.; Adams, L. G.; Towell, T. L.; Forrester, S. D.

Title

An evidence-based review of therapies for canine chronic kidney disease.

Source

Journal of Small Animal Practice; 2010. 51(5):244-252. many ref.

Publisher

Blackwell Publishing Ltd

Location of Publisher

Oxford

Country of Publication

UK

## Abstract

Successful treatment and prevention of kidney disease in dogs requires a multi-dimensional approach to identify and eliminate causes or exacerbating factors, provide professional evaluation on a regular basis and implement a comprehensive treatment programme when necessary. Over the years, many therapeutic and preventive interventions have been developed or advocated for chronic kidney disease in dogs, but evidence of efficacy or effectiveness is often lacking or highly variable. Accordingly, the main objective of this systematic review was to identify and critically appraise the evidence supporting various aspects of managing canine chronic kidney disease.

Publication Type

Journal article.

<463>

Accession Number

20103174694

Author

Segev, G.; Fascetti, A. J.; Weeth, L. P.; Cowgill, L. D.

Title

Correction of hyperkalemia in dogs with chronic kidney disease consuming commercial renal therapeutic diets by a potassium-reduced home-prepared diet.

Source

Journal of Veterinary Internal Medicine; 2010. 24(3):546-550. 19 ref.

Publisher

Blackwell Publishing Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Background: Hyperkalemia occurs in dogs with chronic kidney disease (CKD). Objectives: (1) To determine the incidence of hyperkalemia in dogs with CKD, (2) to determine the proportion of hyperkalemic dogs that required modification of dietary potassium intake, (3) to evaluate the response to dietary modification. Methods: The hospital database was reviewed retrospectively to identify dogs with CKD and persistent ( $>5.3$  mmol/L on at least 3 occasions) or severe ( $K \geq 6.5$  mmol/L) hyperkalemia while consuming a therapeutic renal diet. Records of dogs with hyperkalemia that were prescribed a home-prepared, potassium-reduced diet were evaluated further. Response was evaluated by changes in body weight, BCS, and serum potassium concentration. Results: One hundred and fifty-two dogs were diagnosed with CKD, of which 47% had  $\geq 1$  documented episode of hyperkalemia, 25% had  $\geq 3$  episodes of hyperkalemia, and 16% had  $\geq 1$  episodes of severe hyperkalemia ( $K > 6.5$  mmol/L). Twenty-six dogs (17.2%) with CKD and hyperkalemia were prescribed a potassium-reduced, home-prepared diet. The potassium concentration of all hyperkalemic dogs on therapeutic diets (potassium content,  $1.6 \pm 0.23$  g/1,000 kcal of metabolizable energy [ME]) was  $6.5 \pm 0.5$  mmol/L but decreased significantly to  $5.1 \pm 0.5$  mmol/L in 18 dogs available for follow-up in response to the dietary modification ( $0.91 \pm 0.14$  g/1,000 kcal of ME,  $P < .001$ ). Potassium concentration normalized in all but 1 dog. Conclusions and Clinical Importance: Hyperkalemia is a potential complication of CKD. In a subset of CKD dogs, hyperkalemia can be associated with commercial renal diets and could restrict use of these diets. Appropriately formulated, potassium-reduced, diets are an effective alternative to correct hyperkalemia.

Publication Type

Journal article.

<464>

Accession Number

20103174689

Author

Keegan, R. F.; Webb, C. B.

Title

Oxidative stress and neutrophil function in cats with chronic renal failure.

Source

Journal of Veterinary Internal Medicine; 2010. 24(3):514-519. 38 ref.

Publisher

Blackwell Publishing Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Background: Oxidative stress is an important component in the progression of chronic renal failure (CRF) and neutrophil function may be impaired by oxidative stress. Hypothesis: Cats with CRF have increased oxidative stress and decreased neutrophil function compared with control cats. Animals: Twenty cats with previously diagnosed renal failure were compared with 10 age-matched control cats. Methods: A biochemical profile, CBC, urinalysis, antioxidant capacity, superoxide dismutase (SOD) enzyme activity, reduced to oxidized glutathione ratio (GSH:GSSG), and neutrophil phagocytosis and oxidative burst were measured. Statistical comparisons (2-tailed t-test) were reported as mean+or-standard deviation. Results: The CRF cats had significantly higher serum blood urea nitrogen, creatinine, and phosphorus concentrations than control cats, and significantly lower PCV and urine specific gravity than control cats. The GSH:GSSG ratio was significantly higher in the CRF group (177.6+or-197, 61.7+or-33;  $P<.02$ ) whereas the antioxidant capacity was significantly less in the CRF group (0.56+or-0.21, 0.81+or-0.13 Trolox units;  $P<.005$ ). SOD activity was the same in control and CRF cats. Neutrophil oxidative burst after *Escherichia coli* phagocytosis, measured as an increase in mean fluorescence intensity, was significantly higher in CRF cats than controls (732+or-253, 524+or-54;  $P<.05$ ). Conclusions: The higher GSH:GSSG ratio and lower antioxidant capacity in CRF cats is consistent with activation of antioxidant defense mechanisms. It remains to be determined if supplementation with antioxidants such as SOD beyond the level of control cats would be of benefit in cats with CRF.

Publication Type

Journal article.

<465>

Accession Number

20103160592

Author

Brettas, P. K. de M.; Freitas, K. P. de; Bortoli, J. de; Lacerda, M. S. de

Title

Polycystic kidney disease in cats - case report. [Portuguese]

Source

Clinica Veterinaria; 2010. 15(86):54...60. 25 ref.

Publisher

Editora Guara

Location of Publisher

Sao Paulo

Country of Publication

Brazil

## Abstract

Polycystic kidney disease (PKD) is a serious hereditary disease of autosomal dominant origin, which is characterized by severe cystic degeneration of the renal parenchyma. The diagnosis of PKD can be established by abdominal ultrasound, in combination with clinical and laboratory findings. This diagnosis can also be achieved prior to the appearance of symptoms, through an ultrasound examination and genetic testing of DNA, which must be used by the breeder to remove affected animals from breeding pools. There is no specific treatment; the establishment of the same therapy adopted for chronic renal patients is recommended. This article describes the case of a 14-year-old male bobtail cat presented at the Veterinary Hospital of the University of Uberaba, Minas Gerais (MG). The animal was suffering from abdominal distention, constipation, polyuria and polydipsia, as well as progressive numbness and anorexia for 4 days. Laboratory tests showed a severe azotemia and exploratory abdominal ultrasound revealed the presence of multiple cysts in both renal parenchyma, which is a characteristic feature of PKD.

Publication Type

Journal article.

<466>

Accession Number

20103159761

Author

Dibartola, S. P.

Title

Medical management of chronic renal failure in the cat.

Source

AAHA Long Beach 2010 Proceedings, 18-21 March, 2010. Scientific, management and technician programs; 2010. :419-421. 7 ref.

Publisher

American Animal Hospital Association

Location of Publisher

Denver

Country of Publication

USA

Publication Type

Book chapter

Conference paper.

<467>

Accession Number

20103139071

Author

Polzin, D. J.

Title

Staged management of chronic kidney disease in dogs and cats.

Source

34th World Small Animal Veterinary Association Congress, Sao Paulo, Brazil, 21-24 July 2009; 2009. :unpaginated.

Publisher

World Small Animal Veterinary Association

Location of Publisher

Sao Paulo  
Country of Publication  
Brazil  
Publication Type  
Conference paper.

<468>

Accession Number  
20103139158

Author  
Polzin, D. J.

Title  
How I treat uremic crises in dogs and cats with chronic kidney disease.

Source  
34th World Small Animal Veterinary Association Congress, Sao Paulo, Brazil, 21-24 July 2009; 2009.  
:unpaginated.

Publisher  
World Small Animal Veterinary Association

Location of Publisher  
Sao Paulo

Country of Publication  
Brazil

Publication Type  
Conference paper.

<469>

Accession Number  
20103139151

Author  
Polzin, D. J.

Title  
Diagnosing & staging of chronic kidney disease.

Source  
34th World Small Animal Veterinary Association Congress, Sao Paulo, Brazil, 21-24 July 2009; 2009.  
:unpaginated.

Publisher  
World Small Animal Veterinary Association

Location of Publisher  
Sao Paulo

Country of Publication  
Brazil

Publication Type  
Conference paper.



<470>

Accession Number

20103138827

Author

Villaverde, C.

Title

Nutritional management of chronic kidney disease.

Source

34th World Small Animal Veterinary Association Congress, Sao Paulo, Brazil, 21-24 July 2009; 2009.

:unpaginated.

Publisher

World Small Animal Veterinary Association

Location of Publisher

Sao Paulo

Country of Publication

Brazil

Publication Type

Conference paper.

<471>

Accession Number

20103181441

Author

Adams, L. G.

Title

Evidence-based medicine approach to management of chronic kidney disease.

Source

Small animal and exotics. Proceedings of the North American Veterinary Conference, Orlando, Florida, USA, 16-20 January 2010; 2010. :803-806. 20 ref.

Publisher

The North American Veterinary Conference

Location of Publisher

Gainesville

Country of Publication

USA

Publication Type

Conference paper.

<472>

Accession Number

20103181393

Author

Chew, D. J.; Kidder, A. C.

Title

Which phosphorus binder would you choose for treatment of chronic kidney diseases?

Source

Small animal and exotics. Proceedings of the North American Veterinary Conference, Orlando, Florida, USA, 16-20 January 2010; 2010. :821-823. 11 ref.

Publisher  
The North American Veterinary Conference  
Location of Publisher  
Gainesville  
Country of Publication  
USA  
Publication Type  
Conference paper.

<473>  
Accession Number  
20103192896  
Author  
Gogny, M.  
Title  
What about the "nephroprotector"? [French]  
Source  
Point Veterinaire; 2010. 41(306):74.  
Publisher  
Editions du Point Veterinaire  
Location of Publisher  
Maisons-Alfort  
Country of Publication  
France  
Abstract

This paper describes the case and treatment of a cat (9 years of age) with chronic renal insufficiency. The initial therapy consisted of perinodril, an angiotensin converting enzyme; this was changed to Rubenal Renalzin at the suggestion of the owner. The blood and urine parameters showed presence of proteinuria, creatinine levels at 250 pmol/litre, urea levels at 0.9 g/litre and systolic blood pressure at 165 mmHg.  
Publication Type  
Journal article.

<474>  
Accession Number  
20103179250  
Author  
Forrester, S. D.; Burns, K. M.  
Title  
Chronic kidney disease - getting your picky patients to eat.  
Source  
Veterinary technician. Proceedings of the North American Veterinary Conference, Orlando, Florida, USA, 16-20 January 2010; 2010. :47-50. 8 ref.  
Publisher  
The North American Veterinary Conference  
Location of Publisher  
Gainesville  
Country of Publication  
USA

Publication Type  
Conference paper.

<475>

Accession Number  
20103246901

Author  
Seiler, G. S.; Rhodes, J.; Cianciolo, R.; Casal, M. L.

Title  
Ultrasonographic findings in Cairn terriers with preclinical renal dysplasia.

Source  
Veterinary Radiology & Ultrasound; 2010. 51(4):453-457. 19 ref.

Publisher  
Blackwell Publishing  
Location of Publisher  
Boston

Country of Publication  
USA

Abstract

Renal dysplasia is a hereditary disease characterized by abnormal differentiation of renal tissue. The ultrasonographic appearance of dysplastic canine kidneys has been reported in the late stage of the disease where inflammatory and degenerative changes are already present and the dogs are in chronic renal failure. In this study, we describe the ultrasonographic appearance of the kidneys of five related Cairn Terriers affected with renal dysplasia before the onset of clinical or laboratory evidence of renal failure. Common findings included poor corticomedullary definition and multifocal hyperechoic speckles in the renal medulla, or a diffusely hyperechoic medulla. Severity of ultrasonographic changes was related to the severity of histopathologic findings. The ability to detect dysplastic changes before clinical signs develop makes ultrasound a potentially useful screening method for canine renal dysplasia.

Publication Type  
Journal article.

<476>

Accession Number  
20103264807

Author  
Avila, A.

Title  
Occurrence of chronic kidney disease in cats naturally infected with feline. [Portuguese]

Source  
Estudo da ocorrencia da doenca renal cronica em gatos naturalmente infectados pelo virus da imunodeficiencia felina; 2009. :86 pp. 78 ref.

Publisher  
Faculdade de Medicina Veterinaria e Zootecnia, Universidade de Sao Paulo

Location of Publisher  
Sao Paulo

Country of Publication  
Brazil

Abstract

Cats naturally infected with the feline immunodeficiency virus (FIV) develop a syndrome that share common characteristics with the human immunodeficiency virus (HIV) infection. For this reason, felines are considered a promising model for the study of HIV infection. HIV associated nephropathy is a common and concerning complication in human beings, resulting in progressive renal insufficiency. Likewise clinico-pathological findings in naturally infected cats suggest a renal involvement. To evaluate the occurrence of chronic kidney disease (CKD) in cats infected with FIV and to verify a possible association between both diseases, a population of 44 cats submitted to the same sanitary handling, diet and exposure to infectious agents was studied. Of these cats, 20 were naturally infected with FIV and 24 were free of FIV infection. Animals were periodically accompanied for a 18-month period through serum creatinine and urinary protein:creatinine ratio measures. The occurrence of CKD in cats infected with FIV was 45%, a value higher than the observed in non-infected cats (25%), but no statistical difference was found. Proteinuria in at least one moment of evaluation was observed in 60% of infected cats and in 26,1% of non-infected cats ( $p=0,037$ ). Considering the criterion of persistent proteinuria as the observation of urinary protein excretion in at least 3 consecutive moments, infected cats exhibited occurrence of 30,8% compared with 6,7% in the non-infected group ( $p>0,05$ ). It was observed an association between death and CKD only in the cats infected with FIV ( $p=0,02$ ). In conclusion, despite occurrence of CKD and proteinuria have not been statistically higher in infected cats than in non-infected one, the association between death and CKD in FIV-infected cats suggests FIV may contribute for the worsening of CKD, resulting in a quicker organic dysfunction and marked reduction of survival.

Publication Type

Thesis.

<477>

Accession Number

20103249606

Author

Donato, L. J.

Title

Acupuncture, Chinese herbal medicine, Tul-na and food therapy integrated with other treatments for chronic renal disease of a cat.

Source

American Journal of Traditional Chinese Veterinary Medicine; 2010. 5(2):61-69. 22 ref.

Publisher

American Association of Traditional Chinese Veterinary Medicine

Location of Publisher

Gainesville

Country of Publication

USA

Abstract

A 10-year-old 2.77-kg neutered male Abyssinian cat was presented for lethargy, vomiting and anorexia due to renal failure. He had been treated with intravenous fluid therapy, an anti-emetic drug and an appetite stimulant, but his clinical signs and laboratory tests did not appreciably improve. Treatment with a dry needle acupuncture technique and aqua-acupuncture using the homotoxicologic formula Berberis Homaccord and vitamin B-12 was instituted. In addition, Tui-na, Food therapy and conventional medications were also administered. In subsequent treatment sessions the Chinese herbal formulas Shen Qi Wan and Rehmannia 6 were added. With the addition of these treatments, the cat's renal function significantly improved and his clinical signs resolved. It has been over three and one-half years since the cat's initial presentation and he continues to have acupuncture treatments every six weeks and is doing well. This case demonstrates that acupuncture, Chinese herbal medicine and other TCVM treatments can be an important adjunct to the treatment of cats with chronic kidney disease and may significantly increase the length and quality of life for cats presented in renal failure.

Publication Type

Journal article.

<478>

Accession Number

20103269496

Author

Ibarrola, P.; Battersby, I.

Title

Chronic renal insufficiency in cats and dogs under spotlight.

Source

Veterinary Times; 2010. 40(34):22-29. 14 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Publication Type

Journal article.

<479>

Accession Number

20103301595

Author

Khoshnegah, J.; Movassaghi, A. R.

Title

A very severe case of feline amyloidosis with spontaneous hepatic rupture and chronic renal failure.

Source

Comparative Clinical Pathology; 2010. 19(5):519-522.

Publisher

Springer Science + Business Media

Location of Publisher

London

Country of Publication

UK

Abstract

A 3.5-year-old neutered male domestic shorthaired cat presenting with inappetence, depression, polydipsia, and severe icteric mucous membranes was diagnosed as having systemic amyloidosis with spontaneous hemorrhage from the liver and chronic renal failure. Laboratory findings were remarkable for anemia, thrombocytopenia, mature neutrophilia, hyperbilirubinemia, azotemia, and hyperphosphatemia. Little treatment was possible and the cat was euthanased later. At necropsy, the entire abdominal cavity was filled with intra-abdominal hemorrhage. Histopathological examination revealed extensive deposition of eosinophilic homogenous material in the parenchyma of the liver and sinusoids. Hepatic amyloid was detected primarily in periportal regions associated with atrophy of adjacent hepatocytes. In the kidney, marked eosinophilic homogenous material was found in numerous glomeruli and outer medullary area. Amyloid deposits were demonstrated by the Congo red stain. Whether underlying diseases present as risk factors for the severity of clinical and biochemical picture of generalized amyloidosis in this case is unclear.

Publication Type

Journal article.

<480>

Accession Number

20103284498

Author

Dorfelt, R.

Title

Diagnosis of acute uremia. [German]

Source

Praktische Tierarzt; 2010. 91(9):736...751. 41 ref.

Publisher

Schlutersche Verlagsgesellschaft mbH & Co. KG

Location of Publisher

Hannover

Country of Publication

Germany

Abstract

It is often difficult to discover the underlying cause of uremia in veterinary patients. The combination of results from history, physical examination, blood work, urine analysis, radiography, ultrasound and biopsy is often necessary for diagnostic assessment of acute uremia. Prerenal, intrinsic and postrenal causes have to be differentiated by clinical examination and urin specific gravity (USG). The body condition index of animals suffering from uremia due to acute kidney injury is normal in the most cases. Sometimes the abdomen and especially the kidneys are painful. The USG is often more than 1012 g/l, glucosuria and active urine sediment are often present. Normothermia or hyperthermia and leukocytosis are commonly seen in infectious kidney injury. Patients suffering from chronic kidney disease are commonly cachectic with pale mucous membranes, isosthenuria, proteinuria and inactive urinary sediment. Urine and blood values are unpredictable except for elevated urea, creatinine and phosphorus and an occasionally developing anemia.

Publication Type

Journal article.

<481>

Accession Number

20103332642

Author

Steiner, J. M.; Finco, D. R.; Williams, D. A.

Title

Serum lipase activity and canine pancreatic lipase immunoreactivity (cPLI) concentration in dogs with experimentally induced chronic renal failure.

Source

Veterinary Research (Pakistan); 2010. 3(3):58-63. 27 ref.

Publisher

Medwell Publishing

Location of Publisher

Faisalabad

Country of Publication

Pakistan

Abstract

Assays for the measurement of pancreatic lipase concentration in dog serum (cPLI) have been suggested to be useful for the diagnosis of canine pancreatitis. Clinical signs of pancreatitis and renal failure can overlap. Previously, serum lipase activity has been reported to be increased in dogs with renal failure but the influence of renal failure on serum cPLI concentration has not been evaluated. The goal of this project was to examine the influence of experimentally induced Chronic Renal Failure (CRF) on serum lipase activity and cPLI concentration. Serum samples were collected from 17 dogs with experimentally-induced CRF and were analyzed for creatinine concentration, lipase activity and cPLI concentration. One of the dogs showed extreme results for both serum lipase activity and cPLI concentration but was shown to have histological evidence of pancreatitis and was removed from further analysis. Serum lipase activities and cPLI concentrations of the 16 remaining dogs were compared to the reference intervals for these parameters. Serum lipase activity was within the reference interval in all 16 dogs with experimentally induced chronic renal failure. Serum cPLI concentration was outside the reference interval for serum cPLI (2.2-02.1 micro g L-1) concentration for two dogs but below the suggested diagnostic cut-off value for pancreatitis (200 micro g L-1) in all 16 dogs. Dogs with experimentally induced chronic renal failure studied here did not have clinically relevant increases in serum lipase activity or serum cPLI concentration. Further studies in dogs with spontaneous renal failure are necessary and ongoing.

Publication Type  
Journal article.

<482>

Accession Number  
20103337797

Author  
Sox, E. M.; Chiotti, R.; Goldstein, R. E.

Title  
Use of gadolinium diethylene triamine penta-acetic acid, as measured by ELISA, in the determination of glomerular filtration rates in cats.

Source  
Journal of Feline Medicine and Surgery; 2010. 12(10):738-745. 26 ref.

Publisher  
Elsevier Ltd  
Location of Publisher  
Oxford

Country of Publication  
UK

Abstract

The goal of this study was to evaluate a commercially available assay for gadolinium diethylene triamine penta-acetic acid (Gd-DTPA) for use in estimating glomerular filtration rate (GFR) in cats (Gd-DTPA GFR) with a wide range of GFRs. Eighteen adult cats (11 healthy and seven with chronic kidney disease) were included. Plasma concentrations of Gd-DTPA following intravenous injection were measured with an ELISA kit (FIT-GFR). Results for Gd-DTPA GFR were compared with simultaneously obtained values for plasma clearance of iothexol (iothexol GFR), plasma blood urea nitrogen (BUN) and creatinine concentrations. A negative correlation existed between iothexol GFR and plasma concentrations of BUN and creatinine. A positive correlation existed between Gd-DTPA GFR and iothexol GFR. There was no correlation between Gd-DTPA GFR and plasma concentrations of BUN and creatinine. In this study plasma clearance of Gd-DTPA assayed by FIT-GFR did not appear to provide a sufficiently accurate estimation of GFR in cats when compared with plasma clearance of iothexol, and plasma concentrations of BUN and creatinine.

Publication Type  
Journal article.



<483>

Accession Number

20103337791

Author

Miyagawa, Y.; Takemura, N.; Hirose, H.

Title

Assessments of factors that affect glomerular filtration rate and indirect markers of renal function in dogs and cats.

Source

Journal of Veterinary Medical Science; 2010. 72(9):1129-1136. 44 ref.

Publisher

Japanese Society of Veterinary Science

Location of Publisher

Tokyo

Country of Publication

Japan

Abstract

Chronic kidney disease is one of the most common disorders in dogs and cats. The plasma urea nitrogen (P-UN) and creatinine (P-Cre) concentrations are not sufficiently sensitive for early diagnosis of renal dysfunction. Although urine and plasma clearance methods allow earlier detection of reductions in the GFR, it is difficult to estimate a mildly reduced GFR from the values obtained by these methods, as they are also affected by physiological factors, such as body weight (BW) and age. The present study is a retrospective survey designed to assess the factors that affect markers of kidney function and to reevaluate the clinical utility of the markers, including P-UN, P-Cre and GFR determined by plasma iothexol clearance (PCio) in dogs and cats. The P-UN, P-Cre and PCio values in dogs and the P-Cre and PCio values in cats were significantly correlated with BW ( $P < 0.001$ ). PCio in smaller dogs ( $\leq 15.0$  kg) was significantly and inversely correlated with age. In smaller dogs, increase of P-UN alone might warrant a suspicion of a decreased GFR, but in contrast, P-Cre may be inefficient for detecting renal dysfunction or determining the severity of CKD compared with that in larger dogs ( $\geq 15.1$  kg). P-Cre in larger dogs correlated better with PCio than in smaller dogs, suggesting that P-Cre in larger dogs was a more sensitive marker of reduced GFR.

Publication Type

Journal article.

<484>

Accession Number

20103364714

Author

Waki, M. F.; Martorelli, C. R.; Mosko, P. E.; Kogika, M. M.

Title

Classification into stages of chronic kidney disease in dogs and cats - clinical, laboratorial and therapeutic approach. [Portuguese]

Source

Ciencia Rural; 2010. 40(10):2226-2234. 34 ref.

Publisher

Centro de Ciencias Rurais, Universidade Federal de Santa Maria

Location of Publisher

Santa Maria

Country of Publication

Brazil

Abstract

A terminology review was proposed in order to describe renal alterations as well as to suggest a classification according to the stages of chronic kidney disease by IRIS (International Renal Interest Society) which is similar to human medicine. That classification considers the stage of evolution of the disease and urinary markers of kidney damage findings. The main objective is to help to establish the diagnostic, the prognosis and the adequate therapy corresponding to each stage of the disease in order to delay loss of renal function and its progression, and then providing better quality of patient's life.

Publication Type  
Journal article.

<485>

Accession Number  
20103367972

Author  
Steinbach, S.; Binkert, B.; Schweighauser, A.; Reynolds, B.; Seguela, J.; Lefebvre, H.; Francey, T.

Title  
Quantitative assessment of urea generation and elimination in healthy dogs and in dogs with chronic kidney disease.

Source  
Journal of Veterinary Internal Medicine; 2010. 24(6):1283-1289. 32 ref.

Publisher  
Blackwell Publishing Ltd

Location of Publisher  
Oxford

Country of Publication  
UK

Abstract

Background: Kinetic assessment of urea, the main end product of protein metabolism, could serve to assess protein catabolism in dogs with chronic kidney disease (CKD). Protein malnutrition and catabolism are poorly documented in CKD and they often are neglected clinically because of a lack of appropriate evaluation tools. Hypothesis: Generation and excretion of urea are altered in dogs with CKD. Animals: Nine dogs with spontaneous CKD (IRIS stages 2-4) and 5 healthy research dogs. Methods: Endogenous renal clearance (C<sub>renal</sub>) of urea and creatinine was measured first. Exogenous plasma clearance (C<sub>plasma</sub>, total body clearance) of the 2 markers then was determined by an IV infusion of urea (250-1,000 mg/kg over 20 minutes) and an IV bolus of creatinine (40 mg/kg). Extrarenal clearance (C<sub>extra</sub>) was defined as the difference between C<sub>plasma</sub> and C<sub>renal</sub>. Endogenous urea generation was computed assuming steady-state conditions. Results: Median C<sub>renal</sub> and C<sub>extra</sub> of urea were 2.17 and 0.21 mL/min/kg in healthy dogs and 0.37 and 0.28 mL/min/kg in CKD dogs. The proportion of urea cleared by extrarenal route was markedly higher in dogs with glomerular filtration rate <1 mL/kg/min than in normal dogs, reaching up to 85% of the total clearance. A comparable pattern was observed for creatinine excretion, except in 1 dog, C<sub>extra</sub> remained <20% of C<sub>plasma</sub>. Conclusion: Extrarenal pathways of urea excretion are predominant in dogs with advanced CKD and justify exploring adjunctive therapies based on enteric nitrogen excretion in dogs. A trend toward increased urea generation may indicate increased catabolism in advanced CKD.

Publication Type  
Journal article.

<486>

Accession Number  
20093026312

Author

Hoek, I. van; Lefebvre, H. P.; Peremans, K.; Meyer, E.; Croubels, S.; Vandermeulen, E.; Kooistra, H.; Saunders, J. H.; Binst, D.; Daminet, S.

Title

Short- and long-term follow-up of glomerular and tubular renal markers of kidney function in hyperthyroid cats after treatment with radioiodine.

Source

Domestic Animal Endocrinology; 2009. 36(1):45-56. 51 ref.

Publisher

Elsevier

Location of Publisher

New York

Country of Publication

USA

Abstract

Hyperthyroidism can mask co-existing chronic kidney disease (CKD). Previous studies showed that post-treatment renal azotemia can be predicted by pre-treatment assessment of glomerular filtration rate (GFR). We hypothesized that treatment of hyperthyroidism may have different effects on glomerular and tubular function and these changes might be predicted by additional pre-treatment variables than GFR. Serum total T4 (TT4), creatinine and blood urea nitrogen (BUN), blood pressure (BP), body weight (BW), GFR, urine specific gravity (USG), urinary protein/creatinine ratio (UPC) and retinol binding protein/creatinine ratio (uRBP/c) were evaluated before and 1, 4, 12 and 24 weeks post-treatment with radioiodine (<sup>131</sup>I) in 21 non-azotemic hyperthyroid cats. Cats were divided 24 weeks post-treatment into group A (normal kidney function, n=16) and group B (impaired kidney function, n=5). Serum TT4, GFR, UPC and uRBP/c decreased significantly after treatment for the complete group and group A (P<0.05), although GFR and uRBP/c did not change in group B. Serum creatinine and BW increased significantly from 1 week after treatment (P<0.05). There was no change in BUN, USG or BP. Pre-treatment serum TT4, GFR and USG differed significantly between group A and B (P<0.05). GFR at 4 weeks after treatment and maximum decrease in GFR could be partially predicted by a formula using pre-treatment GFR, serum TT4, serum creatinine, BUN and/or USG. Significant changes in kidney function occur within 4 weeks post-treatment and none thereafter. Pre-treatment measurement of GFR, USG and serum TT4 can have possible predictive value regarding the development of post-treatment renal azotemia.

Publication Type

Journal article.

<487>

Accession Number

20083206466

Author

Grauer, G. F.; Atkins, C. E.; Keene, B.

Title

Heart failure and chronic kidney disease: when worlds collide.

Source

Small animal and exotics. Proceedings of the North American Veterinary Conference, Volume 22, Orlando, Florida, USA, 2008; 2008. :205-207. 10 ref.

Publisher

The North American Veterinary Conference

Location of Publisher

Gainesville

Country of Publication

USA

Publication Type

Conference paper.

<488>

Accession Number

20093073571

Author

Brown, S. A.; Rickertsen, M.; Sheldon, S.

Title

Effects of an intestinal phosphorus binder on serum phosphorus and parathyroid hormone concentration in cats with reduced renal function.

Source

International Journal of Applied Research in Veterinary Medicine; 2008. 6(3):155-160. 15 ref.

Publisher

Veterinary Solutions LLC

Location of Publisher

Apopka

Country of Publication

USA

Abstract

Young adult cats, 6 intact males and 4 intact females, with reduced renal mass were randomized to receive either normal feline maintenance diet alone or diet plus phosphorus binder in a crossover design with each treatment period of 56 days in duration (Dietary Trial A). For Dietary Trial B, following a 3-month withdrawal period, 6 cats were placed on the intestinal phosphorus binder for 9 months to determine the long-term effects of this approach. During both Dietary Trials A and B, cats were studied by serum and urine biochemical testing and renal clearance studies. In Dietary Trial A, compared to diet alone, serum phosphorus and plasma parathyroid hormone concentrations were significantly lower when intestinal phosphorus binder was provided. There were no significant differences in blood urea nitrogen, serum creatinine concentration, glomerular filtration rate, or renal plasma flow. In Dietary Trial B, serum phosphorus and plasma parathyroid hormone concentrations were reduced at the 6- and 9-month time points of the treatment period compared to measurements obtained before intestinal phosphorus binder administration. We conclude that the addition of an intestinal phosphorus binder to a normal maintenance feline diet can lower serum phosphorus and parathyroid hormone concentrations in cats with International Renal Interest Society stages I and II chronic kidney disease. The effect of the binder to reduce serum phosphorus concentration was present by Day 56 in Dietary Trial A and persisted at 6 and 9 months in Dietary Trial B.

Publication Type

Journal article.

<489>

Accession Number

20093086966

Author

Ponnuswamy, K. K.; Prathaban, S.; Dhanapalan, P.

Title

Endoscopic evaluation of upper gastrointestinal tract in canine renal failure.

Source

Indian Veterinary Journal; 2009. 86(3):310-311. 8 ref.

Publisher

Indian Veterinary Association

Location of Publisher  
Chennai  
Country of Publication  
India

Abstract

In this study upper gastrointestinal endoscopy was used in identifying the nature and severity of uremic gastropathy at different levels of azotemia in dogs. 10 healthy dogs served as control and were compared with dogs (N=35) with signs of chronic renal failure. Gastroendoscopic examination was then carried out in both the control and affected animals. Results after endoscopic evaluation showed that in the control group, the oesophagus was observed to be collapsed and upon insufflation, the mucosa was pale pink and fine submucosal vessels were evident. Pale oesophageal mucosa with hyperemia and erosions and erosions in the caudal oesophagus was observed in 1 case from group and another 2 cases for groups 2 and 3. In group 4, pale oesophageal mucosa, mucosal irregularity and erosions was noticed in 6 cases. The results therefore showed that 11 out of 35 dogs with renal failure (31.11%) has gastric and duodenal mucosal abnormalities. Mucosal irregularity, erosions in caudal oesophagus, hyperemia of lower oesophageal sphincter, hyperemia and erosions of fundus, erosions and ulcers in pyloric antrum and duodenal ulcers were the consistent findings in dogs with renal failure. Severe gastroduodenoscopic abnormalities were observed in dogs with severe azotemia.

Publication Type  
Journal article.

<490>

Accession Number  
20093109312

Author  
Syme, H. M.

Title  
Proteinuria cats. Assessment and clinical relevance.

Source  
Journal of Feline Medicine and Surgery; 2009. 11(3):211-218. 23 ref.

Publisher  
Elsevier  
Location of Publisher  
Amsterdam  
Country of Publication  
Netherlands

Abstract

Practical relevance: Numerous tests are available to the practitioner for quantifying proteinuria. It is important to understand the advantages and limitations of these tests and how the information gained can contribute to optimal patient management. Patient group: Cats with chronic kidney disease or systemic hypertension, as well as geriatric cats without overt evidence of disease (including renal dysfunction), are at particular risk of proteinuria. Evidence base: Several longitudinal studies of cats seen in first opinion clinics have shown an association between proteinuria and decreased survival time. However, it is unknown whether the deaths that occur in proteinuric cats are due to progression of renal disease because it is often difficult to ascribe a cause of death to a single underlying aetiology in clinical patients. It is also unknown whether proteinuria is contributing to disease progression in these cats or whether proteinuric renal disease is intrinsically more rapidly progressive. Clinical significance: More aggressive investigation and management of patients with proteinuria may be appropriate since they are more likely to have progressive disease and/or increased mortality.

Publication Type  
Journal article.

<491>

Accession Number

20093109311

Author

Roudebush, P.; Polzin, D. J.; Ross, S. J.; Towell, T. L.; Adams, L. G.; Forrester, S. D.

Title

Therapies for feline chronic kidney disease. What is the evidence?

Source

Journal of Feline Medicine and Surgery; 2009. 11(3):195-210. 109 ref.

Publisher

Elsevier

Location of Publisher

Amsterdam

Country of Publication

Netherlands

Abstract

Practical relevance: Successful treatment and prevention of kidney disease in pet animals requires a multidimensional approach to identify and eliminate causes or exacerbating factors, provide professional examination and care on a regular basis, and plan and implement a comprehensive treatment program when necessary. Evidence base: Over the years, many therapeutic and preventive interventions have been developed or advocated for chronic kidney disease (CKD), but evidence of efficacy or effectiveness is often lacking or highly variable. Accordingly, the main objective of this systematic review was to identify and critically appraise the evidence supporting various approaches to managing feline CKD; namely, fluid therapy, calcitriol therapy, antihypertensive therapy, ACE inhibitor therapy, erythropoietic hormone replacement therapy, potassium supplementation, antioxidant supplementation, alkalinization therapy, dietary phosphorus restriction and intestinal phosphate binders, therapeutic renal foods, assisted feeding, dialysis and renal transplantation.

Publication Type

Journal article.

<492>

Accession Number

20093104588

Author

Cortadellas, O.; Fernandez-del Palacio, M. J.; Talavera, J.; Bayon, A.

Title

Serum phosphorus concentrations in dogs with leishmaniosis at different stages of chronic kidney disease.

Source

Veterinary Record; 2009. 164(16):487-490. 26 ref.

Publisher

British Veterinary Association

Location of Publisher

London

Country of Publication

UK

Abstract

Serum phosphorus concentrations were measured in 155 dogs with leishmaniosis at different stages of chronic kidney disease (CKD), and in 54 healthy dogs. CKD was classified into six stages, as follows: stage

0 (dogs with no evidence of CKD), serum creatinine (SCr) less than 125 micro mol/l and urine protein:creatinine ratio (UPC) less than 0.2; stage IA, SCr less than 125 micro mol/l and UPC 0.2 to 0.5; stage IB, SCr less than 125 micro mol/l and UPC over 0.5; stage 2, SCr 125 micro mol/l to 180 micro mol/l; stage 3, SCr 181 micro mol/l to 440 micro mol/l; stage 4, SCr over 440 micro mol/l. The dogs' serum phosphorus concentrations correlated significantly with the severity of CKD ( $P < 0.001$ ), and hyperphosphataemia ( $> 1.8$  mmol/l) affected 12 per cent, 11.8 per cent, 50 per cent, 76.9 per cent and 100 per cent of the dogs at stages IA, IB, 2, 3 and 4, respectively.

Publication Type

Journal article.

<493>

Accession Number

20093115216

Author

Polzin, D. J.

Title

Staged management of chronic kidney disease - meeting therapeutic targets.

Source

Small animal and exotics. Proceedings of the North American Veterinary Conference, Orlando, Florida, USA, 17-21 January, 2009; 2009. :761-764.

Publisher

The North American Veterinary Conference

Location of Publisher

Gainesville

Country of Publication

USA

Publication Type

Conference paper.

<494>

Accession Number

20093115215

Author

Polzin, D. J.

Title

Diagnosing & staging of chronic kidney disease - what's that creatinine really mean?

Source

Small animal and exotics. Proceedings of the North American Veterinary Conference, Orlando, Florida, USA, 17-21 January, 2009; 2009. :758-760.

Publisher

The North American Veterinary Conference

Location of Publisher

Gainesville

Country of Publication

USA

Publication Type

Conference paper.



<495>

Accession Number

20093115147

Author

Elliott, J.

Title

Chronic kidney disease: myths, realities, and practical tips.

Source

Small animal and exotics. Proceedings of the North American Veterinary Conference, Orlando, Florida, USA, 17-21 January, 2009; 2009. :741-743. 10 ref.

Publisher

The North American Veterinary Conference

Location of Publisher

Gainesville

Country of Publication

USA

Publication Type

Conference paper.

<496>

Accession Number

20093115145

Author

Chew, D. J.

Title

Clinical management of a cat with chronic kidney disease.

Source

Small animal and exotics. Proceedings of the North American Veterinary Conference, Orlando, Florida, USA, 17-21 January, 2009; 2009. :735-737.

Publisher

The North American Veterinary Conference

Location of Publisher

Gainesville

Country of Publication

USA

Publication Type

Conference paper.

<497>

Accession Number

20093115144

Author

Chew, D. J.

Title

Latest thoughts on care of cats with chronic kidney disease.

Source

Small animal and exotics. Proceedings of the North American Veterinary Conference, Orlando, Florida, USA, 17-21 January, 2009; 2009. :731-734. 15 ref.

Publisher

The North American Veterinary Conference

Location of Publisher

Gainesville

Country of Publication

USA

Publication Type

Conference paper.

<498>

Accession Number

20093135243

Author

Forrester, S. D.

Title

Chronic kidney disease - getting those finicky felines to eat.

Source

Veterinary technicians. Proceedings of the North American Veterinary Conference, Orlando, Florida, USA, 17-21 January, 2009; 2009. :45-48. 7 ref.

Publisher

The North American Veterinary Conference

Location of Publisher

Gainesville

Country of Publication

USA

Publication Type

Conference paper.

<499>

Accession Number

20093162957

Author

Tenhundfeld, J.; Wefstaedt, P.; Nolte, I. J. A.

Title

A randomized controlled clinical trial of the use of benazepril and heparin for the treatment of chronic kidney disease in dogs.

Source

Journal of the American Veterinary Medical Association; 2009. 234(8):1031-1037. 35 ref.

Publisher

American Veterinary Medical Association

Location of Publisher

Schaumburg

Country of Publication

USA

## Abstract

**Objective** - To investigate the effects of benazepril and heparin on renal function and blood pressure in dogs with chronic kidney disease. **Design** - Randomized controlled clinical trial. **Animals** - 26 dogs with chronic kidney disease. **Procedures** - Dogs were randomly assigned to receive benazepril hydrochloride (0.5 mg/kg [0.23 mg/lb], PO, q 24 h; n=10), benazepril and heparin (150 U/kg [68 U/lb], SC, q 8 h, for the first 6 days; 10), or a placebo (6) and were followed up for 180 days. **Results** - Health status score at the end of the study (ie, day 180) was significantly higher for dogs in the 2 treatment groups than for dogs in the placebo group. In addition, glomerular filtration rate was significantly increased and the urine protein-to-creatinine ratio was significantly decreased, compared with baseline rates, at the end of the study for dogs in both treatment groups but not for dogs in the placebo group. Systolic and diastolic blood pressures were significantly decreased on day 6 for dogs in both treatment groups. **Conclusions and Clinical Relevance** - Results suggested that administration of benazepril had beneficial effects in dogs with chronic kidney disease but that short-term administration of heparin in conjunction with benazepril did not appear to provide any additional benefit.

**Publication Type**

Journal article.

<500>

**Accession Number**

20093168036

**Author**

Laflamme, D. P.

**Title**

Pet food safety: dietary protein. (Special Issue: Controversies in small animal nutrition: pet food safety)

**Source**

Topics in Companion Animal Medicine; 2008. 23(3):154-157. 46 ref.

**Publisher**

Elsevier Inc

**Location of Publisher**

Orlando

**Country of Publication**

USA

**Abstract**

The goal of this article was to review the evidence surrounding the risks posed by insufficient or excessive dietary protein. Dietary protein is required to provide essential amino acids and replenish protein reserves. When intake is deficient, protein turnover slows and lean body mass is gradually depleted. These changes lead to increased morbidity and mortality. Dogs can maintain nitrogen balance (typically used to define minimum requirements in adults), yet be in a protein-depleted state due to physiologic adaptations. Preservation of protein turnover and lean body mass requires about threefold more protein than nitrogen balance. The ability of excess dietary protein to induce renal pathology was studied in both dogs with chronic kidney failure and older dogs without kidney failure. Numerous studies have confirmed that protein does not adversely affect the kidneys. However, phosphorus- and protein-restricted diets are clinically beneficial in dogs with existing chronic kidney failure. Protein restriction for healthy older dogs is not only unnecessary, it can be detrimental. Protein requirements actually increase by about 50% in older dogs, while their energy requirements tend to decrease. When insufficient protein is provided, it can aggravate the age-associated loss of lean body mass and may contribute to earlier mortality. Older dogs should receive at least 25% of their calories from protein, typically provided by diets containing at least 7 g protein/100 Kcal ME.

**Publication Type**

Journal article.

<501>

Accession Number

20093093179

Author

Dorfelt, R.; Nickel, R.

Title

Acute or chronic? Diagnostics in canine and feline renal failure. [German]

Source

Praktische Tierarzt; 2009. 90(4):304-315. 30 ref.

Publisher

Schlutersche Verlagsgesellschaft mbH & Co. KG

Location of Publisher

Hannover

Country of Publication

Germany

Abstract

Differentiating acute from chronic renal failure is very important in regard to the prognosis but may be difficult for the veterinarian. A combination of different single findings may be necessary, all of which are not specific alone. However, helpful in the diagnosis are common findings in animals suffering from chronic renal failure, such as weight loss, hypothermia, anemia, an inactive urine sediment, a urine protein/creatinine ratio (UPC) >3, and sonographic images of small kidneys with a loss of normal structure. In acute renal failure the patient often shows no weight loss, anorexia, normo- or hyperthermia, leucocytosis, an active urine sediment, glucosuria, proteinuria with an UPC <3 and sonographic images of normal kidneys.

Publication Type

Journal article.

<502>

Accession Number

20093177274

Author

Adamama-Moraitou, K. K.; Pardali, D.

Title

Staging and management of feline chronic renal insufficiency. [Greek]

Source

Deltion tes Ellenikes Kteniatrikes Etaireias = Journal of the Hellenic Veterinary Medical Society; 2008. 59(4):297-307. 31 ref.

Publisher

Hellenic Veterinary Medical Society

Location of Publisher

Athens

Country of Publication

Greece

Abstract

Feline chronic renal insufficiency (CRI) is a common clinical entity that is characterized by irreversible structural damage of the kidneys and subsequent loss of its functional capacity. It causes haemodynamic filtration and excretory failure of the kidneys which leads to metabolic toxin accumulation and dysregulation of fluid, electrolyte and acid-base balance, as well as inability of the kidneys to excrete and respond to various hormones. Main laboratory findings of CRI are increased concentration of urea and creatinine in serum. Serum creatinine is the principle factor for staging the disease. Four stages are recognized. In addition, substaging uses two other diagnostic parameters, including borderline or severe proteinuria and

systemic hypertension which are considered among the risk factors of renal injury progression. These parameters determine therapy strategies and prognosis of the disease. Management is mainly conservative and is focused on improving the quality of the life of the cat, prolonging its life expectancy and preventing progression of renal damage. Haemodialysis and kidney transplantation are not feasible in our country, but are successfully performed in cats in referral centres of USA and Europe. Dietary modification is considered the mainstay of treatment in cats with stable CRI. It is mainly based on restriction of protein, for reduction of their metabolic waste products in the body fluids, and phosphorus, in order to prevent renal secondary hyperparathyroidism. Adequate calorie intake is crucial in cats with CRI and it is achieved by increasing dietary fat. Furthermore, clinical diets must be restricted in salt, in order to prevent systemic arterial hypertension. Cats must be supplemented with potassium in order for hypokalaemia to be amended, omega-3 polyunsaturated fatty acids which had shown beneficial renal effects and fermentable fibres that serve as a nitrogen trap in the intestine. Moist food is preferred over dry food due to its partial contribution to the management of dehydration. It may be necessary to try several different diets before selecting the one the cat prefers or to apply various tricks in order to stimulate the cat's appetite. The renoprotective action of angiotensin I converting enzyme (ACE) inhibitors is mainly considered. Apart from diet salt restriction, arterial hypertension can be managed by ACE inhibitors and calcium channel blockers administration; the latter is considered the antihypertensive therapy of choice. The first step in correcting hyperphosphataemia for the management of renal secondary hyperparathyroidism is the restriction of dietary phosphorus. However, this seems to be insufficient to normalize serum parathormone levels. The combination of intestinal phosphorus binding agents should be used and they are of proved efficacy in most cases. Among others, blood transfusion and recombinant human erythropoietin administration may be needed in order for severe anaemia to be managed. Potassium is supplemented if hypokalaemia is evident, while alkalization therapy should be administered for metabolic acidosis. Prognosis is generally considered guarded to poor. Cats with stabilized renal function show substantially better short-term prognosis.

Publication Type

Journal article.

<503>

Accession Number

20093183722

Author

Lee JoonSeok; Hyun ChangBaig

Title

Hypertensive cardiomyopathy in a Pomeranian dog complicated with chronic kidney disease.

Source

Journal of Veterinary Clinics; 2009. 26(2):170-175. 17 ref.

Publisher

Korean Society of Veterinary Clinics

Location of Publisher

Seoul

Country of Publication

Korea Republic

Abstract

A 7-year-old, intact male Pomeranian (weighing 2.2 kg), was presented with clinical signs of prolonged anorexia, polydipsia/polyuria, severe azotemia, proteinuria and heart murmur. Diagnostic studies found chronic kidney disease, severe hypertension and hypertrophic cardiomyopathy. The dog was treated with 2-day peritoneal dialysis, blood transfusion, anti-hypertensive therapy with amlodipine and conservative therapies direct to chronic renal failure. This is a rare case of hypertensive cardiomyopathy complicated with chronic kidney disease in dogs.

Publication Type

Journal article.

<504>

Accession Number

20093183353

Author

Lalor, S. M.; Connolly, D. J.; Elliott, J.; Syme, H. M.

Title

Plasma concentrations of natriuretic peptides in normal cats and normotensive and hypertensive cats with chronic kidney disease. (Supplement Issue: Biomarkers in veterinary cardiology.)

Source

Journal of Veterinary Cardiology; 2009. 11(Suppl. 1):S71-S79. 36 ref.

Publisher

Elsevier

Location of Publisher

Amsterdam

Country of Publication

Netherlands

Abstract

**Objectives:** To determine if natriuretic peptide concentrations are increased in cats with systemic hypertension and/or chronic kidney disease (CKD). **Animals:** 22 normal cats, 13 normotensive cats with mild-moderate CKD (NT-CKD), 15 hypertensive cats with mild-moderate CKD (HT-CKD) and 8 normotensive cats with severe CKD (NT-CKD-severe). **Methods:** N-terminal pro-B-type (NT-proBNP) and pro-A-type (NT-proANP) natriuretic peptides were measured in plasma samples from all cats using commercially available assays and concentrations in the normal and diseased groups compared using non-parametric statistical tests. Spearman's rank correlation was used to test for an association between natriuretic peptide and creatinine concentrations. **Results:** NT-proANP was significantly higher in the NT-CKD-severe than the normal group of cats ( $P=0.006$ ) but there were no other differences between groups. NT-proBNP concentrations were significantly higher in the HT-CKD group than both the normal ( $P<0.001$ ) and the NT-CKD ( $P<0.001$ ) groups. NT-proBNP concentrations were also higher in the NT-CKD-severe ( $P<0.001$ ) and the NT-CKD ( $P=0.005$ ) groups than the normal group. NT-proANP but not NT-proBNP was significantly and positively associated with plasma creatinine concentration. **Conclusions:** Measurement of NT-proBNP shows promise as a diagnostic marker for systemic hypertension in the cat. Its concentration is not significantly increased in cats with mild-moderate normotensive CKD.

Publication Type

Journal article.

<505>

Accession Number

20093190138

Author

Heiene, R.; Rumsby, G.; Ziener, M.; Dahl, S. A.; Tims, C.; Teige, J.; Ottesen, N.

Title

Chronic kidney disease with three cases of oxalate-like nephrosis in Ragdoll cats.

Source

Journal of Feline Medicine and Surgery; 2009. 11(6):474-480. 17 ref.

Publisher

Elsevier

Location of Publisher

Amsterdam

Country of Publication

Netherlands

Abstract

Two unrelated Ragdoll cat mothers in Norway were found dead from renal disease. The histopathology was consistent with oxalate nephrosis with chronic or acute-on-chronic underlying kidney disease. Both cats had offspring and relatives with signs of urinary tract disease, including a kitten dead with urethral gravel. Eleven living Ragdoll cats, including nine relatives of the dead cats and the male father of a litter with similarly affected animals, were tested for primary hyperoxaluria (PH) type 1 and 2 by urine oxalate and liver enzyme analysis. Renal ultrasound revealed abnormalities in five living cats. One of these was azotaemic at the time of examination and developed terminal kidney disease 9 months later. A diagnosis of PH was excluded in 11 cats tested. The inheritance and aetiological background of the renal disease present in the breed remains unresolved at this point in time.

Publication Type

Journal article.

<506>

Accession Number

20093204656

Author

Jepson, R. E.; Brodbelt, D.; Vallance, C.; Syme, H. M.; Elliott, J.

Title

Evaluation of predictors of the development of azotemia in cats.

Source

Journal of Veterinary Internal Medicine; 2009. 23(4):806-813. 51 ref.

Publisher

Blackwell Publishing

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Background: Chronic kidney disease (CKD) is a common condition in geriatric cats. Diagnosis is based on the development of persistent azotemia with inadequate urine concentrating ability. Biomarkers are sought for early identification. Hypothesis: Clinical variables, urine concentrating ability, proteinuria, and N-acetyl-beta-D-glucosaminidase (NAG) index will be predictive of cats at risk of developing azotemia within 12 months. Animals: Client-owned nonazotemic geriatric ( $\geq 9$  years) cats. Methods: Prospective longitudinal cohort study monitoring a population of healthy nonazotemic geriatric cats every 6 months until development of azotemia, death, or the study end point (September 30, 2007). Multivariable logistic regression analysis was used to assess baseline clinical, biochemical, and urinalysis variables, urine protein to creatinine ratio (UP/C), urine albumin to creatinine (UA/C) ratio, and urinary NAG index as predictors of development of azotemia. Results: One hundred and eighteen cats were recruited with a median age of 13 years. Ninety-five cats (80.5%) had been followed or reached the study end point by 12 months of which 30.5% (29/95) developed azotemia. Age, systolic blood pressure, plasma creatinine concentration, urine specific gravity, UP/C, UA/C, and NAG index were significantly associated with development of azotemia in the univariable analysis ( $P \leq .05$ ). However, in the multivariable analysis, only plasma creatinine concentration with either UP/C (Model 1) or UA/C (Model 2) remained significant. Conclusions and Clinical Importance: This study demonstrates a high incidence of azotemia in a population of previously healthy geriatric cats. Proteinuria at presentation was significantly associated with development of azotemia although causal association cannot be inferred. Evaluation of NAG index offered no additional benefit.

Publication Type

Journal article.



<507>

Accession Number

20093251353

Author

Hosseininejad, M.; Vajhi, A.; Marjanmehr, H.; Hosseini, F.

Title

Polycystic kidney in an adult Persian cat: clinical, diagnostic imaging, pathologic, and clinical pathologic evaluations.

Source

Comparative Clinical Pathology; 2009. 18(1):95-97. 7 ref.

Publisher

Springer Science + Business Media

Location of Publisher

London

Country of Publication

UK

Abstract

In the Persian cat, polycystic kidney disease is inherited as an autosomal dominant trait. Affected Persian cats usually do not develop chronic renal failure until later in adult life (3-10 years; average, 7 years). An affected 4.5-year-old male Persian cat referred with depression, lethargy, and anorexia that were present for 2 months before referring to us. Weight loss was one of the problems reported by the owner. In physical examination, pale mucus membranes, tachycardia, and stomatitis prevailed. Laboratory findings were compatible to that of chronic renal diseases. In ultrasonographic examination, right and left kidneys were 4.3x2 and 4.3x2.5 cm, respectively. Multiple renal cysts were seen in both kidneys. Cysts had thin walls with anechoic contents and strong distal echo enhancement. The cat died after 2 months probably due to uremia. Necropsy findings showed small locations of hemorrhage in the stomach. Severe Stomatitis was also noted. Necropsic examination of the kidneys showed several cysts in the cortex and medulla of both kidneys. Most of these cysts were filled with fluids. Microscopic examination showed many cysts of 800-8,000- micro m diameters. Some cellular infiltrates were also seen in some regions. Interstitial connective tissues were developed around cysts.

Publication Type

Journal article.

<508>

Accession Number

20093251319

Author

Assarasakorn, S.; Kaewthamasorn, M.; Niwetpathomwat, A.

Title

A retrospective study of clinical use of recombinant human erythropoietin for treatment of anemia in dogs with renal failure in Bangkok, Thailand.

Source

Comparative Clinical Pathology; 2008. 17(3):165-170.

Publisher

Springer Science + Business Media

Location of Publisher

London

Country of Publication

UK

Abstract

The administration of recombinant human erythropoietin (r-HuEPO) for treatment of anemia in dogs with renal failure is practical in most of veterinary hospitals, but there is a variation in clinical use among them. However, the determination of r-HuEPO in dogs has never been addressed in Thailand. Therefore, the objective of the present study was to evaluate the clinical efficacy of r-HuEPO to recover the hematology in dogs that had developed chronic renal failure-induced anemia at the Chulalongkorn Small Animal Teaching Hospital, Thailand. The medical records of the anemic dogs admitted to the hospital were reviewed only in case of treatment with r-HuEPO during the period from January to November 2006. The hematologic and serum biochemical data pre and post-treatment with r-HuEPO were assessed. The results were found that means of packed cell volume (PCV), red blood cell count, and hemoglobin concentration were significantly different from the values at week 0 after only 1 week of r-HuEPO treatment until week 8 of treatment. Erythrocyte indices indicated normocytic and normochromic. Other parameters were insignificant during treatment. In conclusion, treatment with r-HuEPO stimulated erythrocyte production in dogs with naturally developing anemia of chronic renal failure during 8-week treatment period. PCV reached the target range within 6 weeks of treatment. Exogenous r-HuEPO had no effect on leukocyte, platelet counts, and serum biochemistry in these uremic dogs.

Publication Type

Journal article.

<509>

Accession Number

20093244981

Author

Kralova, S.

Title

Management of chronic renal disease in dogs and cats - a review. [Czech]

Source

Veterinarstvi; 2009. 59(1):25-28. 25 ref.

Publisher

Profi Press, s.r.o.

Location of Publisher

Praha

Country of Publication

Czech Republic

Abstract

Chronic renal failure represents severe problem especially in senior dogs and cats. This status is characterized by irreversible changes that have negative effect on renal functions. We have at disposal mainly conservative therapeutic possibilities today that may markedly influence the clinical status of the patient and the time of survival. This article summarizes basic therapeutical routes for patient with chronic renal failure.

Publication Type

Journal article.

<510>

Accession Number

20093145520

Author

Leopold-Temmler, B.

Title

The International Renal Interest Society (IRIS) system: a current support for more effective therapy of chronic renal failure in dogs and cats. [German]

Source

Praktische Tierarzt; 2009. 90(4):316-322. 18 ref.

Publisher

Schlutersche Verlagsgesellschaft mbH & Co. KG

Location of Publisher

Hannover

Country of Publication

Germany

Publication Type

Journal article.

<511>

Accession Number

20093308374

Author

Miyagawa, Y.; Takemura, N.; Hirose, H.

Title

Evaluation of the measurement of serum cystatin C by an enzyme-linked immunosorbent assay for humans as a marker of the glomerular filtration rate in dogs.

Source

Journal of Veterinary Medical Science; 2009. 71(9):1169-1176. 29 ref.

Publisher

Japanese Society of Veterinary Science

Location of Publisher

Tokyo

Country of Publication

Japan

Abstract

The serum cystatin C (Cys-C) concentration is a better filtration marker than plasma creatinine (Cre) concentration in humans. In veterinary medicine, a few studies have shown that the serum Cys-C concentration in dogs is also a better marker than the plasma Cre concentration. The purpose of this study is to evaluate the applicability of measuring the serum Cys-C concentration by an enzyme-linked immunosorbent assay (ELISA) as a marker of the glomerular filtration rate in dogs with various renal dysfunctions. The serum Cys-C concentration in dogs with chronic kidney disease (CKD) was significantly higher (1.23±0.21 mg/L) than that in 76 control dogs (0.85±0.15) ( $P<0.001$ ). The reference range of the serum Cys-C concentrations in samples from the 76 control dogs was 0.55-1.15 mg/l. Serum Cys-C concentration was more strongly correlated with plasma iothexol clearance ( $r=-0.704$ ,  $P<0.001$ ) than plasma Cre concentration in dogs ( $r=-0.598$ ,  $P<0.001$ ). In a receiver operating characteristics analysis, significant differences between the serum Cys-C and plasma Cre concentrations were found with regard to their AUC (0.949, [SE, 0.019] and 0.849 [SE, 0.029]) and diagnostic sensitivity (90.3% and 73.6%) for detecting decreased PCio ( $P<0.05$ ). Therefore, the measurement of serum Cys-C concentration by ELISA is more useful for the detection of early CKD than measuring the plasma Cre concentration.

Publication Type

Journal article.

<512>

Accession Number

20093290683

Author

Baum, B.; Rieksmeier, I.

Title

Metastatic calcification of the paws in cats with chronic renal failure. [German]

Source

Kleintierpraxis; 2009. 54(10):553...557. 4 ref.

Publisher

Verlag M. & H. Schaper

Location of Publisher

Alfeld (Leine)

Country of Publication

Germany

Abstract

Three cats between 5 and 14 years of age with renal insufficiency developed ulcerative dermatitis on their paws months to years after the original diagnosis. Macroscopically, coarse granular white material was discharged. Histological examination of a paw pad, performed in one cat, revealed deposits of calcified material and granulomatous inflammation of the foreign body type. The crystals perforated the epidermis multifocally, resulting in ulceration that did not heal because of continual mechanical challenge. Tissue samples from the lungs of this cat were also available for examination and multifocal calcification of the media of arterial vessels was found histologically. Metastatic calcification of the footpad dermis in cats with renal insufficiency has been detected with increasing frequency in the last years.

Publication Type

Journal article.

<513>

Accession Number

20093321292

Author

Uren, N.; Fidanc, U. R.; Krmzgul, A. H.; Fidanc, V.; Pekcan, M.

Title

Homocysteine levels in cats with chronic renal failure. [Turkish]

Source

Kafkas Universitesi Veteriner Fakultesi Dergisi; 2009. 15(4):543-546. 32 ref.

Publisher

Kafkas Universitesi, Veteriner Fakultesi Dergisi

Location of Publisher

Kars

Country of Publication

Turkey

Abstract

This study was conducted to determine the serum homocysteine levels of female cats diagnosed with chronic renal failure (CRF) and its correlation with serum urea and creatinine levels. The study included a total of 21 female cats (13 diseased and 8 healthy cats) admitted to the Department of Internal Medicine Clinics, School of Veterinary Medicine, University of Ankara, Turkey diagnosed as CRF upon clinical examination and laboratory results. Serum samples collected from cats were analysed for urea, creatinine and homocysteine. Results revealed that the urea, creatinine and homocysteine in healthy cats were 37.74±4.47 mg/dl, 1.46±0.14 mg/dl and 13.03±2.81 pmol/L, while in cats with CRF were 278.81±45.68 mg/dl, 6.14±0.80 mg/dl and 41.68±9.97 pmol/L, respectively. It is concluded that determination of

serum homocysteine levels in CRF cases occurring in cats could significantly contribute to the early diagnosis of the disease.

Publication Type

Journal article.

<514>

Accession Number

20093350089

Author

Castro, M. C. N.; Marcello, G. C. G.; Alencar, N. X.; Ferreira, A. M. R.

Title

Urinary protein/creatinine ratio measurement in cats with chronic renal failure. [Portuguese]

Source

Pesquisa Veterinaria Brasileira; 2009. 29(8):605-609. 34 ref.

Publisher

Colegio Brasileiro de Patologia Animal

Location of Publisher

Rio de Janeiro

Country of Publication

Brazil

Abstract

Chronic renal disease (CRD) is the most common form of renal disease in cats. Several factors contribute to disease progression. Proteinuria is an important marker of renal disease progression. The protein-creatinine ratio in a single urine sample correlates well with urinary protein loss in 24 hours. The aim of this investigation was to determine the urine protein-creatinine (UPC) ratio in cats with natural acquired chronic renal disease. The UPC ratio was performed in nine clinically normal cats and in 30 cats with chronic renal disease. Mean UPC ratio in normal cats was 0.16+or-0.10, and mean UPC ratio in the cats with chronic renal disease was 0.53+or-0.59. In the group with renal disease there was positive correlation between UPC ratio and serum creatinine levels. The results obtained from this study demonstrate that UPC ratio in cats with CRD is variable and that, in accordance to what has previously been described, approximately one third of the cats with CRD are considered proteinuric according to the criteria established in literature (UPC ratio >0.4).

Publication Type

Journal article.

<515>

Accession Number

20093336506

Author

Bars, C. F. le

Title

Chronic renal difficulties in focus.

Source

Veterinary Times; 2009. 39(11):12-13.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Abstract

This article discusses chronic renal disease in cats and the management options that can improve the quality and length of life of the animals affected with this condition. The causes, stages and management (through adequate hydration maintenance and dietary modifications) of the disease are presented.

Publication Type

Journal article.

<516>

Accession Number

20083075739

Author

Worwag, S.; Langston, C. E.

Title

Acute intrinsic renal failure in cats: 32 cases (1997-2004).

Source

Journal of the American Veterinary Medical Association; 2008. 232(5):728-732. 20 ref.

Publisher

American Veterinary Medical Association

Location of Publisher

Schaumburg

Country of Publication

USA

Abstract

Objective - To determine patient demographics, clinicopathologic findings, and outcome associated with naturally acquired acute intrinsic renal failure (ARF) in cats. Design - Retrospective case series. Animals - 32 cats with ARF. Procedures - Cats were considered to have ARF if they had acute onset of clinical signs (<7 days), serum creatinine concentration >2.5 mg/dL (reference range, 0.8 to 2.3 mg/dL) and BUN >35 mg/dL (reference range, 15 to 34 mg/dL) in conjunction with urine specific gravity <1.025 or with anuria or increasing serum creatinine concentration despite fluid therapy and normal hydration status, and no signs of chronic renal disease. Cases were excluded if cats had renal calculi or renal neoplasia. Results - Causes of ARF included nephrotoxins (n=18 cats), ischemia (4), and other causes (10). Eighteen cats were oliguric. For each unit (mEq/L) increase in initial potassium concentration, there was a 57% decrease in chance of survival. Low serum albumin or bicarbonate concentration at initial diagnosis was a negative prognostic indicator for survival. Initial concentrations of BUN, serum creatinine, and other variables were not prognostic. Seventeen (53%) cats survived, of which 8 cats had resolution of azotemia and 9 cats were discharged from the hospital with persistent azotemia. Conclusions and Clinical Relevance - Results suggested that survival rates of cats with ARF were similar to survival rates in dogs and that residual renal damage persisted in approximately half of cats surviving the initial hospitalization.

Publication Type

Journal article.

<517>

Accession Number

20083089454

Author

Jepson, R. E.; Syme, H. M.; Vallance, C.; Elliott, J.

Title

Plasma asymmetric dimethylarginine, symmetric dimethylarginine, L-arginine, and nitrite/nitrate concentrations in cats with chronic kidney disease and hypertension.

Source

Journal of Veterinary Internal Medicine; 2008. 22(2):317-324. 39 ref.

Publisher

Blackwell Publishing

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Background: Chronic kidney disease (CKD) and hypertension have been associated with decreased bioavailability of nitric oxide (NO) and endothelial dysfunction. Increased concentrations of the endothelial nitric oxide synthase (eNOS) inhibitor asymmetric dimethylarginine (ADMA) are implicated. Hypothesis: Plasma ADMA concentration is increased in cats with CKD and systemic hypertension corresponding to a decrease in total plasma nitrate/nitrite (NOx) availability. Decrease in systolic blood pressure (SBP) and proteinuria during treatment of hypertension with amlodipine besylate may be associated with increased NOx availability. Animals: Sixty-nine client-owned normotensive and hypertensive cats with variable azotemia. Methods: Plasma ADMA, symmetric dimethylarginine (SDMA), and L-arginine were measured simultaneously by hydrophilic-interaction liquid chromatography-electrospray tandem mass spectrometry in cats from 6 groups: normotensive nonazotemic (n=10), normotensive mildly azotemic (n=10), hypertensive mildly azotemic with hypertensive retinopathy (n=20), hypertensive mildly azotemic without hypertensive retinopathy (n=10), normotensive moderately azotemic cats (n=10), and hypertensive nonazotemic cats (n=9). Plasma NOx concentrations were measured. Results: A moderate correlation between plasma creatinine and ADMA (n=69,  $r=.608$ ,  $P<.001$ ), SDMA (n=69,  $r=.741$ ,  $P<.001$ ), and NOx concentrations (n=69,  $r=.589$ ,  $P<.001$ ) was observed. There was no association among plasma ADMA, SDMA, and NOx concentrations and SBP. Conclusions and Clinical Importance: Plasma ADMA and SDMA concentrations are increased in cats with CKD and correlate with plasma creatinine concentration. This may imply the presence of endothelial dysfunction in cats with CKD. Plasma ADMA concentrations were not associated with systemic hypertension. Treatment of systemic hypertension with amlodipine besylate did not affect plasma ADMA or NOx concentrations.

Publication Type

Journal article.

<518>

Accession Number

20083089451

Author

Cortadellas, O.; Fernandez del Palacio, M. J.; Talavera, J.; Bayon, A.

Title

Glomerular filtration rate in dogs with leishmaniasis and chronic kidney disease.

Source

Journal of Veterinary Internal Medicine; 2008. 22(2):293-300. 32 ref.

Publisher

Blackwell Publishing

Location of Publisher

Oxford

Country of Publication

UK

Abstract



**Background:** Glomerular filtration rate (GFR) measurement is an indicator of kidney function. However, its usefulness in dogs at early stages of spontaneous chronic kidney disease (CKD) of glomerular origin, where routine laboratory techniques are not sufficiently sensitive, remains unproved. **Hypothesis:** That GFR is reduced in proteinuric nonazotemic or mildly azotemic dogs with CKD secondary to leishmaniasis. **Animals:** Twenty-six dogs with CKD secondary to leishmaniasis and 10 healthy dogs (control group). **Methods:** CBC, serum biochemistry, and urinalysis (microalbuminuria and urine protein/creatinine ratio [UPC]) were performed in all dogs. GFR was calculated by measuring exogenous creatinine clearance. Based on degree of proteinuria and serum creatinine concentration (SCr), dogs were classified as group A (control; n=10): UPC<0.2, SCr<1.4 mg/dL; group B (n=8): UPC, 0.2-0.5, SCr<1.4 mg/dL; group C (n=10): UPC>0.5, SCr<1.4 mg/dL; group D (n=5): SCr, 1.4-2 mg/dL; group E (n=3): SCr>2 mg/dL. **Results:** GFR (mL/kg/min) was 3.9+or-0.29, 4.4+or-0.74, 4.5+or-1.44, 2.8+or-0.97, and 1.5+or-0.43 for groups A, B, C, D, and E, respectively. Eleven dogs (1 from group B, 3 from group C, 4 from group D, and all 3 dogs from group E) had an abnormally low GFR. Four dogs from group B and 5 dogs from group C had a GFR above the upper reference range (>4.5 mL/min/kg). **Conclusion and Clinical Relevance:** Some proteinuric nonazotemic or mildly azotemic dogs with leishmaniasis have low GFR, but glomerular hyperfiltration occurs in other dogs.

**Publication Type**  
Journal article.

<519>

Accession Number

20083071116

Author

Petsch, M.

Title

The role of exogenous creatinine clearance in the early diagnosis of the chronic renal diseases.

[Hungarian]

Source

KisallatPraxis; 2008. 9(1):2...8. 13 ref.

Publisher

BetuVet

Location of Publisher

Budapest

Country of Publication

Hungary

Abstract

The aim of this study focused on the role of exogenous creatinine clearance in the early detection of chronic renal disease in dogs. 10 dogs received intravenous injections of 5% creatine solution after which blood samples were taken and analysed. Results showed that three of the examined dogs showed decreased glomerular filtration rate while plasma urea and creatinine levels were in the reference range.

**Publication Type**

Journal article.

<520>

Accession Number

20083103849

Author

Brown, S. A.

Title

Oxidative stress and chronic kidney disease. (Oxidative Stress: The Role of Mitochondria, Free Radicals, and Antioxidants.)

Source

Veterinary Clinics of North America, Small Animal Practice; 2008. 38(1):157-166. 16 ref.

Publisher

W.B. Saunders

Location of Publisher

Philadelphia

Country of Publication

USA

Abstract

Slowing the rate of progression of chronic kidney disease (CKD) is a critical part of the management of affected dogs and cats. Renal oxidant stress is a previously unrecognized factor in the progression of canine CKD and is likely to be similarly important in feline CKD. Renin-angiotensin antagonism, calcium channel antagonism, n-3 polyunsaturated fatty acid, and antihypertensive and antiproteinuric therapy are commonly recommended for dogs and cats with CKD. These therapies would be expected to reduce renal oxidant stress by decreasing reactive oxygen species generation. Newer data indicate that dietary supplementation with specific antioxidants is an important consideration for limiting renal oxidant stress and progression of CKD.

Publication Type

Journal article.

<521>

Accession Number

20083109469

Author

Hoek, I. van; Daminet, S.; Notebaert, S.; Janssens, I.; Meyer, E.

Title

Immunoassay of urinary retinol binding protein as a putative renal marker in cats.

Source

Journal of Immunological Methods; 2008. 329(1/2):208-213. 15 ref.

Publisher

Elsevier

Location of Publisher

Amsterdam

Country of Publication

Netherlands

Abstract

The presence of low molecular weight retinol binding protein (RBP) in urine reflects tubular damage. Therefore, RBP has been used as a renal marker in humans and dogs. Using an anti-human RBP antibody (Ab), this study first demonstrates feline urinary RBP by Western blot analysis and then evaluates its potential as a renal marker in cats by enzyme-linked immunosorbent assay (ELISA). Urine was taken by cystocentesis, centrifuged and stored at -80 degrees C until analysis. Urinary RBP levels were compared in clinically healthy cats (H), chronic renal failure patients (CRF) and cats with hyperthyroidism (HT). The detection of a band at the same position as the human RBP standard with Western blot analysis, indicated that RBP was present in the urine of CRF and HT patients but minimally present in H cats. The data obtained with ELISA were in accordance with these observations. RBP levels were expressed as RBP:creatinine (RBP:c) ratios following normalisation with urinary creatinine. The functional assay sensitivity was 1.37 micro g/l RBP. Parallelism between the trend lines of the human RBP standard curve and the curves obtained from sequentially diluted urine samples indicated that feline RBP was recovered. The mean intra-assay coefficient of variance was 7% and the standardised agreement index revealed satisfactory day-to-day repeatability. The RBP:c ratio in all H cats (n=10) was below the assay sensitivity. The groups of CRF and HT patients had

increased mean RBP:c ratios of  $1.6 \pm 0.5 \times 10^{-2}$  micro g/mg (mean  $\pm$  SEM,  $n=10$ ) and  $1.4 \pm 0.4 \times 10^{-2}$  micro g/mg ( $n=13$ ), respectively. Both groups showed a large variation in the relative RBP concentrations of individual cats. In conclusion, RBP is demonstrated for the first time in urine from most CRF and HT patients and the validated ELISA allows its evaluation as a putative renal marker in cats.

Publication Type  
Journal article.

<522>

Accession Number  
20083095255

Author  
Maroti-Agots, A.; Marko, A.; Zoldag, L.

Title  
Modified molecular genetic diagnosis of feline polycystic kidney disease. [Hungarian]

Source  
Magyar Allatorvosok Lapja; 2008. 130(4):205-211. 15 ref.

Publisher  
Magyar Mezogazdasag Kiado KFT

Location of Publisher  
Budapest

Country of Publication  
Hungary

Abstract

Polycystic kidney disease (PKD) is one of the most common inherited feline diseases nowadays, affecting 38% of Persian and Persian-related cats worldwide, including the British Shorthair, Maine Coon, Exotic Shorthair, Himalaya and Siamese. The mode of inheritance of PKD is proven to be autosomal dominant. During the pathogenesis of the disease, fluid-filled cysts evolve in the kidney and sometimes in other organs such as the liver, uterus or pancreas. The cysts cause the atrophy of the kidney's matter followed by chronic renal failure. The aim of this study was to determine the value of molecular diagnosis of feline PKD, from both new and fixed histological samples. Total genomic DNA was extracted and purified. The mutated sequences (PKD1 gene, exon29) were amplified, sequenced and digested by restriction endonuclease (RFLP) then finally separated by electrophoresis. The developed allele-specific PCR reaction was successfully applied for diagnosis in a special 3 primer-containing PCR reaction. Molecular examination of PKD was well-suited for practical application and could be used for routine early diagnosis, screening and reducing the incidence of cases.

Publication Type  
Journal article.

<523>

Accession Number  
20083171068

Author  
Wakeling, J.; Moore, K.; Elliott, J.; Syme, H.

Title  
Diagnosis of hyperthyroidism in cats with mild chronic kidney disease.

Source  
Journal of Small Animal Practice; 2008. 49(6):287-294. 33 ref.

Publisher

Blackwell Publishing  
Location of Publisher  
Oxford  
Country of Publication  
UK

#### Abstract

**Objectives:** In cats with concurrent hyperthyroidism and non-thyroidal illnesses such as chronic kidney disease, total thyroxine concentrations are often within the laboratory reference range (19 to 55 nmol/l). The objective of the study was to determine total thyroxine, free thyroxine and/or thyroid-stimulating hormone concentrations in cats with mild chronic kidney disease. **Methods:** Total thyroxine, free thyroxine and thyroid-stimulating hormone were measured in three groups. The hyperthyroidism-chronic kidney disease group (n=16) had chronic kidney disease and clinical signs compatible with hyperthyroidism but a plasma total thyroxine concentration within the reference range. These cats were subsequently confirmed to be hyperthyroid at a later date. The chronic kidney disease-only group (n=20) had chronic kidney disease but no signs of hyperthyroidism. The normal group (n=20) comprised clinically healthy senior (>8 years) cats. **Results:** In 4 of 20 euthyroid chronic kidney disease cats, free thyroxine concentrations were borderline or high ( $\geq 40$  pmol/l). In the hyperthyroidism-chronic kidney disease group, free thyroxine was high in 15 of 16 cats, while thyroid-stimulating hormone was low in 16 of 16 cats. Most hyperthyroidism-chronic kidney disease cats (14 of 16) had total thyroxine greater than 30 nmol/l, whereas all the chronic kidney disease-only cats had total thyroxine less than 30 nmol/l. **Clinical Significance:** The combined measurement of free thyroxine with total thyroxine or thyroid-stimulating hormone may be of merit in the diagnosis of hyperthyroidism in cats with chronic kidney disease.

Publication Type  
Journal article.

<524>

Accession Number  
20083172696

Author  
Klainbart, S.; Segev, G.; Loeb, E.; Melamed, D.; Aroch, I.

Title  
Resolution of renal adenocarcinoma-induced secondary inappropriate polycythaemia after nephrectomy in two cats.

Source  
Journal of Feline Medicine and Surgery; 2008. 10(3):264-268. 28 ref.

Publisher  
Elsevier

Location of Publisher  
Amsterdam

Country of Publication  
Netherlands

#### Abstract

Two cases of secondary, inappropriate polycythaemia caused by renal adenocarcinoma in domestic shorthair cats, are described. The cats were 9 and 12 years old and both were presented because of generalised seizures presumably due to hyperviscosity. Both cats had a markedly increased haematocrit (0.770 and 0.632 l/l) and thrombocytosis (744x10<sup>9</sup>/l and 926x10<sup>9</sup>/l). An abdominal ultrasound revealed a mass in the cranial pole of one kidney in both cats. Serum erythropoietin (EPO) concentration was within the reference interval (RI) in both cats but was inappropriately high considering the markedly increased haematocrit. The cats were initially stabilised and managed by multiple phlebotomies and intravenous fluid therapy and underwent nephrectomy of the affected kidney later on. Both the polycythaemia and thrombocytosis resolved following surgery. Postoperative serum EPO concentration, measured in one cat, decreased markedly. Histopathology of the affected kidneys confirmed a diagnosis of renal adenocarcinoma.

Both cats were stable for an 8-month follow-up period; however, one cat had developed a stable chronic kidney disease (CKD), while the other was represented 8 months postoperatively due to dyspnoea, and had radiographic evidence of lung metastasis, presumably because of the spread of the original renal tumour and was euthanased. Initial stabilisation of polycythaemic cats should include multiple phlebotomies.

Nephrectomy should be considered in cats with secondary, inappropriate, renal adenocarcinoma-related polycythaemia when only one kidney is affected by the tumour, and provided that the other kidney's function is satisfactory. Nephrectomy should be expected to resolve the polycythaemia and lead to normalisation of serum EPO concentration.

Publication Type

Journal article.

<525>

Accession Number

20083236471

Author

Elliott, J.

Title

Hyperphosphataemia and CKD.

Source

Veterinary Times; 2008. 38(35):12...16. 16 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Abstract

This article describes phosphate balance, its role in the pathogenesis of feline chronic kidney disease (CKD) and its dietary management by restriction of phosphate intake.

Publication Type

Journal article.

<526>

Accession Number

20083255345

Author

Diehl, S. H.; Seshadri, R.

Title

Use of continuous renal replacement therapy for treatment of dogs and cats with acute or acute-on-chronic renal failure: 33 cases (2002-2006).

Source

Journal of Veterinary Emergency and Critical Care; 2008. 18(4):370-382. 31 ref.

Publisher

Blackwell Publishing

Location of Publisher

Oxford

Country of Publication

UK

## Abstract

**Objective:** To describe the indications, clinical features, outcomes and complications associated with use of continuous renal replacement therapy (CRRT) in 17 client-owned dogs and 16 client-owned cats with acute or acute-on-chronic renal failure refractory to aggressive medical management. **Series summary:** Twenty-nine percent of dogs and 44% of cats had evidence of pre-existing chronic kidney disease (CKD). Median duration of CRRT was 16.3 hours (range 0.3-83.0 hours) in dogs and 11.5 hours (range 1.0-35.5 hours) in cats. Median canine blood urea nitrogen (BUN) improved from 41.0 mmol/L (115.0 mg/dL) to 11.8 mmol/L (33.0 mg/dL) and creatinine from 636.5 mmol/L (7.2 mg/dL) to 274 mmol/L (3.1 mg/dL). Median feline BUN improved from 46.4 mmol/L (130 mg/dL) to 13.9 mmol/L (39.0 mg/dL) and creatinine from 1069.6 mmol/L (12.1 mg/dL) to 291.7 mmol/L (3.3 mg/dL). Metabolic acidosis resolved in 80% of affected dogs and 71% of affected cats. hyperkalaemia resolved in 100% of affected dogs and 88% of affected cats. Complications noted with CRRT included iatrogenic hypokalaemia, iatrogenic metabolic alkalosis, clinical hypocalcaemia, total hypercalcaemia, filter clotting, anaemia, hypothermia, and neurologic complications. Forty-one percent of dogs and 44% of cats survived to discharge. No dogs and only 1 cat developed newly diagnosed CKD. **New or unique information provided:** CRRT can be a viable option for the management of acute or acute-on-chronic renal failure in dogs and cats that are refractory to aggressive medical management. The frequency of complications associated with CRRT in this study warrants further experience with this modality before its widespread use can be recommended.

**Publication Type**

Journal article.

<527>

**Accession Number**

20083283364

**Author**

McGrotty, Y.

**Title**

Diagnosis and management of chronic kidney disease in dogs and cats.

**Source**

In Practice; 2008. 30(9):502-507.

**Publisher**

British Veterinary Association

**Location of Publisher**

London

**Country of Publication**

UK

**Abstract**

Chronic kidney disease is a commonly encountered problem in small animal practice and is typically progressive, resulting in significant morbidity and mortality in both cats and dogs. Initial renal damage can result from a large number of infectious, immune-mediated, congenital, metabolic, neoplastic, traumatic and obstructive disease processes, and some forms (eg, urinary tract obstruction) can be reversed if treated promptly. Common causes of renal damage include renal ischaemia or exposure to nephrotoxins (eg, aminoglycosides, ethylene glycol). As chronic renal disease progresses, more and more nephrons become non-functional and clinical signs of renal failure become apparent. This article highlights the key markers of renal function, discusses the common consequences of chronic kidney disease and outlines some renoprotective therapies.

**Publication Type**

Journal article.

<528>

Accession Number

20083319928

Author

Boyd, L. M.; Langston, C.; Thompson, K.; Zivin, K.; Imanishi, M.

Title

Survival in cats with naturally occurring chronic kidney disease (2000-2002).

Source

Journal of Veterinary Internal Medicine; 2008. 22(5):1111-1117. 23 ref.

Publisher

Blackwell Publishing

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Background: Duration of survival of cats with naturally occurring chronic kidney disease (CKD) is poorly characterized. Hypothesis: Stage of kidney disease based on serum creatinine concentration (SCr) at the time of diagnosis and after correction of prerenal azotemia is strongly associated with duration of survival in cats. Animals: Two hundred and eleven client-owned cats with naturally occurring CKD evaluated between April 2000 and January 2002. Methods: Retrospective case review of 733 cats with SCr>2.3 mg/dL. Examination of the medical records identified 211 cats that met all other inclusion and exclusion criteria for this study. Clinical characteristics, clinicopathologic data, and survival times were extracted from the medical record. Owners and referring veterinarians were contacted by phone to obtain follow-up if it was not documented in the record. Kaplan-Meier survival curves were performed to determine survival times for International Renal Interest Society (IRIS) stage both at diagnosis and at baseline (ie, after correction of prerenal azotemia). Results: Median survival for cats in IRIS stage IIb at the time of diagnosis was 1,151 days (range 2-3,107), and was longer than survival in stage III (median 778, range 22-2,100) or stage IV (median 103, range 1-1,920) (P-value <.0001). P-value for effect of stage at diagnosis was <.0001. Conclusions and Clinical Importance: IRIS stage of CKD based on serum creatinine at the time of diagnosis is strongly predictive of survival in cats with naturally occurring CKD.

Publication Type

Journal article.

<529>

Accession Number

20083319927

Author

Lapointe, C.; Belanger, M. C.; Dunn, M.; Moreau, M.; Bedard, C.

Title

N-acetyl- beta -D-glucosaminidase index as an early biomarker for chronic kidney disease in cats with hyperthyroidism.

Source

Journal of Veterinary Internal Medicine; 2008. 22(5):1103-1110. 39 ref.

Publisher

Blackwell Publishing

Location of Publisher

Oxford

Country of Publication

UK

Abstract



Background: Hyperthyroid cats are at risk of developing azotemic chronic kidney disease (CKD) and diagnostic tools currently used to screen for CKD in hyperthyroid cats are either unreliable or impractical. Hypothesis: Urine N-acetyl- beta -D-glucosaminidase index (NAGi) is a good biomarker for azotemic CKD in hyperthyroid cats. Animals: Twenty-four newly diagnosed nonazotemic hyperthyroid cats and 10 healthy cats. Methods: All cats were evaluated for hyperthyroidism at baseline. Hyperthyroid cats were treated with methimazole and reevaluated once euthyroid. At the end of the study, cats were divided into 3 groups: healthy cats, nonazotemic, and azotemic euthyroid cats. Baseline group characteristics were compared to predict azotemic CKD. The influence of treatment on NAGi was evaluated. Results: Baseline NAGi was significantly different among groups ( $P=.004$ ). Azotemic cats had a higher median value (13.12 U/g) when compared with healthy cats (1.38 U/g). With  $\text{NAGi} > 2.76$  U/g, negative and positive predictive values for development of azotemia were 77.7 and 50%, whereas the combination of a urine specific gravity (USG)  $\leq 1.035$  and  $\text{T4} > 7.80$  micro g/dL enhanced predictive values to 88.9 and 83.3%, respectively. NAGi values decreased significantly over time in treated nonazotemic cats. Conclusions and Clinical Relevance: Baseline NAGi did not differentiate azotemic from nonazotemic euthyroid cats. NAGi could be used to assess renal function during medical therapy allowing the clinician to adjust methimazole dosage accordingly. The combination of USG and T4 could optimize identification of appropriate candidates for permanent treatment of hyperthyroidism.

Publication Type

Journal article.

