

Reading list Nephrology Urology 2012

American Journal of Veterinary Research

Am J Vet Res. 2012 Mar;73(3):409-17.

Prevalence of antimicrobial resistance in relation to virulence genes and phylogenetic origins among urogenital *Escherichia coli* isolates from dogs and cats in Japan.

Harada K, Niina A, Nakai Y, Kataoka Y, Takahashi T.

OBJECTIVE: To assess the status of antimicrobial resistance (AMR), identify extraintestinal virulence factors (VFs) and phylogenetic origins, and analyze relationships among these traits in extraintestinal pathogenic *Escherichia coli* (ExPEC) isolates from companion animals.

SAMPLE: 104 *E coli* isolates obtained from urine or genital swab samples collected between 2003 and 2010 from 85 dogs and 19 cats with urogenital infections in Japan.

PROCEDURES: Antimicrobial susceptibility of isolates was determined by use of the agar dilution method; a multiplex PCR assay was used for VF gene detection and phylogenetic group assessment. Genetic diversity was evaluated via randomly amplified polymorphic DNA analysis.

RESULTS: Of the 104 isolates, 45 (43.3%) were resistant to > 2 antimicrobials. Phylogenetically, 64 (61.5%), 22 (21.2%), 13 (12.5%), and 5 (4.8%) isolates belonged to groups B2, D, B1, and A, respectively. Compared with other groups, group B2 isolates were less resistant to all tested antimicrobials and carried the *pap*, *hly*, and *cnf* genes with higher frequency and the *aer* gene with lower frequency. The *aer* gene was directly associated and the *pap*, *sfa*, *hly*, and *cnf* genes were inversely associated with AMR. Randomly amplified polymorphic DNA analysis revealed 3 major clusters, comprised mainly of group B1, B2, and D isolates; 2 subclusters of group B2 isolates had different VF and AMR status. **CONCLUSIONS AND CLINICAL RELEVANCE;** Prevalences of multidrug resistance and human-like phylogenetic origins among ExPEC isolates from companion animals in Japan were high. It is suggested that VFs, phylogenetic origins, and genetic diversity are significantly associated with AMR in ExPEC.

Am J Vet Res. 2012 Mar;73(3):447-51.

Effects of a urolith prevention diet on urine compositions of glycosaminoglycans, Tamm-Horsfall glycoprotein, and nephrocalcin in cats with calcium oxalate urolithiasis.

Lulich JP, Osborne CA, Carvalho M, Nakagawa Y.

OBJECTIVE: To evaluate urine concentrations of glycosaminoglycans, Tamm-Horsfall glycoprotein, and nephrocalcin in cats fed a diet formulated to prevent calcium oxalate uroliths.

ANIMALS: 10 cats with calcium oxalate urolithiasis.

PROCEDURES: In a previous study conducted in accordance with a balanced crossover design, cats were sequentially fed 2 diets (the diet each cat was consuming prior to urolith detection and a diet formulated to prevent calcium oxalate uroliths). Each diet was fed for 8 weeks. At the end of each 8-week period, a 72-hour urine sample was collected. Concentrations of glycosaminoglycans, Tamm-Horsfall glycoprotein, and the 4 isoforms of nephrocalcin in urine samples collected during that previous study were measured in the study reported here. **RESULTS;** Diet had no effect on the quantity of Tamm-Horsfall glycoprotein and nephrocalcin in urine. However, the urine concentration of glycosaminoglycans was significantly higher during consumption of the urolith prevention diet.

CONCLUSIONS AND CLINICAL RELEVANCE: Feeding a urolith prevention diet increased the urine concentration of glycosaminoglycans, which are glycoprotein inhibitors of growth and aggregation of calcium oxalate crystals.

Am J Vet Res. 2012 Apr;73(4):463-9.

Comparison of glomerular filtration rate determined by use of single-slice dynamic computed tomography and scintigraphy in cats.

Schmidt DM, Scrivani PV, Dykes NL, Goldstein RM, Erb HN, Reeves AP.

Objective-To compare estimation of glomerular filtration rate determined via conventional methods (ie, scintigraphy and plasma clearance of technetium Tc 99m pentetate) and dynamic single-slice computed tomography (CT). **Animals-**8 healthy adult cats. **Procedures-**Scintigraphy, plasma clearance testing, and dynamic CT were performed on each cat on the same day; order of examinations was randomized. Separate observers performed GFR calculations for scintigraphy, plasma clearance testing, or dynamic CT. Methods were compared via Bland-Altman plots and considered interchangeable and acceptable when the 95% limits of agreement (mean difference between methods \pm 1.96 SD of the differences) were \leq 0.7 mL/min/kg. **Results-**Global GFR differed $<$ 0.7 mL/min/kg in 5 of 8 cats when comparing plasma clearance testing and dynamic CT; the limits of agreement were 1.4 and -1.7 mL/min/kg. The mean \pm SD difference was -0.2 ± 0.8 mL/min/kg, and the maximum difference was 1.6 mL/min/kg. The mean \pm SD difference (absolute value) for percentage filtration by individual kidneys was $2.4 \pm 10.5\%$ when comparing scintigraphy and dynamic CT; the maximum difference was 20%, and the limits of agreement were 18% and 23% (absolute value). **Conclusions and Clinical Relevance-**GFR estimation via dynamic CT exceeded the definition for acceptable clinical use, compared with results for conventional methods, which was likely attributable to sample size and preventable technical complications. Because 5 of 8 cats had comparable values between methods, further investigation of dynamic CT in a larger sample population with a wide range of GFR values should be performed.

Am J Vet Res. 2012 Jun;73(6):779-88.

Evaluation of factors that affect analytic variability of urine protein-to-creatinine ratio determination in dogs.

Rossi G, Giori L, Campagnola S, Zatelli A, Zini E, Paltrinieri S.

Objective-To determine whether preanalytic and analytic factors affect evaluation of the urinary protein-to-creatinine (UPC) ratio in dogs. **Sample-**50 canine urine samples. **Procedures-**The UPC ratio was measured to assess the intra-assay imprecision (20 measurements within a single session), the influence of predilution (1:10, 1:20, and 1:100) for urine creatinine concentration measurement, and the effect of storage at room temperature (approx 20°C), 4°C, and -20°C. **Results-**The coefficient of variation at room temperature determined with the 1:20 predilution was $<$ 10.0%, with the highest coefficients of variation found in samples with a low protein concentration or low urine specific gravity. This variability could result in misclassification of samples with UPC ratios close to the thresholds defined by the International Renal Interest Society to classify dogs as nonproteinuric (0.2), borderline proteinuric (0.21 to 0.50), or proteinuric ($>$ 0.51). A proportional bias was found in samples prediluted 1:10, compared with samples prediluted 1:20 or 1:100. At room temperature, the UPC ratio did not significantly increase after 2 and 4 hours. After 12 hours at room temperature and at 4°C, the UPC ratio significantly increased. The UPC ratio did not significantly change during 3 months of storage at -20°C. **Conclusions and Clinical Relevance-**The intra-assay precision of the UPC ratio was sufficiently low to avoid misclassification of samples, except for values close to 0.2 or 0.5. The optimal predilution ratio for urine creatinine concentration measurement was 1:20. A 1:100 predilution is recommended in samples with a urine specific gravity $>$ 1.030. The UPC ratio must be measured as soon as samples are collected. Alternatively, samples should be immediately frozen to increase their stability and minimize the risk of misclassification of proteinuria.

Am J Vet Res. 2012 Sep;73(9):1485-90.

Renal effects of carprofen and etodolac in euvoletic and volume-depleted dogs.

Surdyk KK, Sloan DL, Brown SA.

Objective-To determine the effects of carprofen and etodolac on renal function in euvoletic dogs and dogs with extracellular fluid volume depletion induced via administration of furosemide. Animals-12 female Beagles. Procedures-Dogs received a placebo, furosemide, carprofen, etodolac, furosemide and carprofen, and furosemide and etodolac. The order in which dogs received treatments was determined via a randomization procedure. Values of urine specific gravity, various plasma biochemical variables, glomerular filtration rate (GFR [urinary clearance of creatinine]), and renal plasma flow (urinary clearance of para-aminohippuric acid) were determined before and after 8 days of drug administration. A washout time of approximately 12 days was allowed between treatment periods. Results-Administration of furosemide, furosemide and carprofen, and furosemide and etodolac caused changes in urine specific gravity and values of plasma biochemical variables. Administration of carprofen or etodolac alone did not have a significant effect on renal plasma flow or GFR. Concurrent administration of furosemide and carprofen or furosemide and etodolac caused a significant decrease in GFR. After 12-day washout periods, mean values of GFR were similar to values before drug administration for all treatments. Conclusions and Clinical Relevance-Results indicated GFR decreased after 8 days of concurrent administration of furosemide and carprofen or furosemide and etodolac to dogs. Administration of preferential cyclooxygenase-2 inhibitors to dogs with extracellular fluid volume depletion or to dogs treated with diuretics may transiently impair renal function.

Am J Vet Res. 2012 Oct;73(10):1657-64.

Urodynamic and morphometric characteristics of the lower urogenital tracts of female Beagle littermates during the sexually immature period and first and second estrous cycles.

Noël SM, Farnir F, Hamaide AJ.

Objective-To compare values of lower urogenital tract urodynamic and morphometric variables determined during the prepubertal (sexually immature) period and first and second estrous cycles in healthy female Beagle littermates to determine functional and anatomic changes of the lower urogenital tract during those periods. Animals-5 female Beagle littermates. Procedures-Urethral pressure profilometry, diuresis cystometry, and vaginourethrography were performed when dogs were 3.5, 4.5, 5, 6, 7, 8, 8.5, and 9 months old and during proestrus; estrus; early, middle, and late diestrus; and early and late anestrus of the first and second estrous cycles. Results-At the end of the prepubertal period, values of urodynamic and morphometric variables increased significantly, compared with values at earlier times. Maximum bladder capacity developed when dogs were 9 months old. In all dogs, the bladder was intermittently located in an intrapelvic position during the prepubertal period; the bladder was intra-abdominal from the time dogs were 9 months old until the end of the study. Urethral pressure decreased significantly during estrus and early diestrus of the first and second estrous cycles. Bladder capacity increased significantly during diestrus of both estrous cycles. Urethral and vaginal lengths were significantly longer during proestrus and estrus than they were during anestrus. Conclusions and Clinical Relevance-Values of lower urogenital tract urodynamic and morphometric variables were influenced by age and phases of the estrous cycle of immature and young adult Beagles in this study. Age of dog and phase of estrous cycle should be considered when interpreting urodynamic and vaginourethrography data.

Am J Vet Res. 2012 Nov;73(11):1841-7. doi: 10.2460/ajvr.73.11.1841.

Comparison of pharmacokinetic variables for creatinine and iohexol in dogs with various degrees of renal function.

Collignon CM, Heiene R, Queau Y, Reynolds BS, Craig AJ, Concordet D, Harran NX, Risøen U, Balouka D, Faucher MR, Eliassen KA, Biourge V, Lefebvre HP.

Objective-To compare pharmacokinetics and clearances of creatinine and iohexol as estimates of glomerular filtration rate (GFR) in dogs with various degrees of renal function. **Animals-**50 Great Anglo-Francais Tricolor Hounds with various degrees of renal function. **Procedures-**Boluses of iohexol (40 mg/kg) and creatinine (647 mg/kg) were injected IV. Blood samples were collected before administration and 5 and 10 minutes and 1, 2, 4, 6, and 8 hours after administration. Plasma creatinine and iohexol concentrations were assayed via an enzymatic method and high-performance liquid chromatography, respectively. A noncompartmental approach was used for pharmacokinetic analysis. Pharmacokinetic variables were compared via a Bland-Altman plot and an ANOVA. **Results-**Compared with results for creatinine, iohexol had a significantly higher mean \pm SD plasma clearance (3.4 ± 0.8 mL/min/kg vs 3.0 ± 0.7 mL/min/kg) and a significantly lower mean volume of distribution at steady state (250 ± 37 mL/kg vs 539 ± 73 mL/kg), mean residence time (80 ± 31 minutes vs 195 ± 73 minutes), and mean elimination half-life (74 ± 20 minutes vs 173 ± 53 minutes). Despite discrepancies between clearances, especially for high values, the difference was < 0.6 mL/min/kg for 34 (68%) dogs. Three dogs with a low GFR (< 2 mL/min/kg) were classified similarly by both methods. **Conclusions and Clinical Relevance-**Plasma iohexol and creatinine clearances can be used interchangeably for screening patients suspected of having chronic kidney disease (ie, low GFR), but large differences may exist for dogs with a GFR within or above the reference range.

Am J Vet Res. 2012 Oct;73(10):1626-33.

Expression of microRNAs in urinary bladder samples obtained from dogs with grossly normal bladders, inflammatory bladder disease, or transitional cell carcinoma.

Vinall RL, Kent MS, deVere White RW.

OBJECTIVE: To determine expression of microRNA (miRNA) in urinary bladder samples obtained from dogs with grossly normal urinary bladders, inflammatory bladder disease, or transitional cell carcinoma (TCC) and in cells of established canine TCC cell lines.

SAMPLE: Samples of grossly normal bladders (n = 4) and bladders from dogs with inflammatory bladder disease (13) or TCC (18), and cells of 5 established canine TCC cell lines.

PROCEDURES: Expression of 5 miRNAs (miR-34a, let-7c, miR-16, miR-103b, and miR-106b) that target p53, Rb, or Bcl-2 protein pathways was determined for bladder samples and cells via quantitative real-time PCR assay. Effects of cisplatin (5 μ M) on proliferation and miRNA expression of cells were determined.

RESULTS: Expression of miR-34a and miR-106b was significantly higher in TCC samples than it was in samples of grossly normal bladders. Expression of miR-34a, miR-16, miR-103b, and miR-106b was higher in TCC samples than it was in bladder samples from dogs with inflammatory bladder disease. Cells of established canine TCC cell lines that had the lowest growth after cisplatin treatment had increased miR-34a expression after such treatment.

CONCLUSIONS AND CLINICAL RELEVANCE: Findings of this study indicated results of miRNA expression assays can be used to distinguish between samples of grossly normal bladders and bladders of dogs with inflammatory bladder disease or TCC. This finding may have clinical relevance because currently available diagnostic tests cannot be used to differentiate these tissues, and inflammatory bladder disease and TCC are both prevalent in dogs. Validation of miRNA expression assays as diagnostic tests may be warranted.

Am J Vet Res. 2012 Dec;73(12):1871-80. doi: 10.2460/ajvr.73.12.1871.

Comparison of the diuretic effects of medetomidine hydrochloride and xylazine hydrochloride in healthy cats.

Murahata Y, Hikasa Y.

Objective-To investigate dose-related diuretic effects of medetomidine hydrochloride and xylazine hydrochloride in healthy cats. **Animals-**5 sexually intact cats (4 males and 1 female). **Procedures-**The 5 cats received each of 11 treatments. Cats were treated by IM administration of saline (0.9% NaCl) solution (control treatment), medetomidine hydrochloride (20, 40, 80, 160, and 320 µg/kg), and xylazine hydrochloride (0.5, 1, 2, 4, and 8 mg/kg). Urine and blood samples were collected 9 times during a 24-hour period. Variables measured were urine volume, pH, and specific gravity; plasma arginine vasopressin (AVP) concentration; and creatinine and electrolyte concentrations as well as osmolality in both urine and plasma. **Results-**Both medetomidine and xylazine increased urine production for up to 5 hours after injection. Xylazine had a dose-dependent diuretic effect, but medetomidine did not. Urine specific gravity and osmolality decreased in a dose-dependent manner for both drugs. Free-water clearance increased for up to 5 hours after injection, whereas glomerular filtration rate, osmolar clearance, plasma osmolality, and electrolyte concentrations did not change significantly. Area under the curve for AVP concentrations decreased in a dose-dependent manner for medetomidine but not for xylazine; however, this was not related to diuresis. **Conclusions and Clinical Relevance-**Both medetomidine and xylazine induced profound diuresis in cats by decreasing reabsorption of water in the kidneys. The diuretic effect of medetomidine, including the change in AVP concentration, differed from that of xylazine. Care must be used when administering these drugs to cats with urinary tract obstruction, hypovolemia, or dehydration.

Am J Vet Res. 2012 Dec;73(12):1919-24. doi: 10.2460/ajvr.73.12.1919.

Accuracy of three-dimensional and two-dimensional ultrasonography for measurement of tumor volume in dogs with transitional cell carcinoma of the urinary bladder.

Naughton JF, Widmer WR, Constable PD, Knapp DW.

Objective-To determine the accuracy of 3-D and 2-D ultrasonography for quantification of tumor volume in dogs with transitional cell carcinoma (TCC) of the urinary bladder. **Animals-**10 dogs with biopsy-confirmed TCC. **Procedures-**The urinary bladder of each dog was distended with saline (0.9% NaCl) solution (5.0 mL/kg), and masses were measured via 3-D and 2-D ultrasonography. Masses were also measured via 3-D ultrasonography after bladders were distended with 2.5 and 1.0 mL of saline solution/kg. Subsequently, the bladder was deflated and distended with CO₂ (5.0 mL/kg); CT was performed after IV contrast medium administration. Tumor volumes were calculated via 3-D ultrasonography, 2-D ultrasonography, and CT (reference method) and compared via ANOVA, Deming regression, and Bland-Altman plots. Repeated-measures ANOVA was used to assess effects of bladder distension on 3-D tumor volume measurements. Repeatability of measurements was estimated via the coefficient of variation for each method. **Results-**Repeatability was considered good for all 3 methods. There was no significant difference in tumor volume measurements obtained via 3-D ultrasonography at different degrees of urinary bladder distension. Results of Deming regression and Bland-Altman plots indicated excellent agreement between tumor volume measurement with 3-D ultrasonography and CT, but not between 2-D ultrasonography and CT. **Conclusions and Clinical Relevance-**Tumor volume in dogs with TCC of the urinary bladder was accurately measured via 3-D ultrasonography. Use of 3-D ultrasonography can provide a less expensive and more practical method for monitoring response to treatment than CT and was more accurate than 2-D ultrasonography.

BioMed Central Veterinary Research

BMC Vet Res. 2012 Feb 6;8:14.

Tolerability and efficacy of the intestinal phosphate binder Lantharenol® in cats.

Schmidt BH, Dribusch U, Delpont PC, Gropp JM, van der Staay FJ.

BACKGROUND: Tolerability and efficacy of the intestinal phosphate binder Lantharenol® (lanthanum carbonate octahydrate) were tested in two prospective, randomized and negative controlled laboratory studies with healthy adult cats fed commercial maintenance diets non-restricted in phosphorus. In the first study, the maximal tolerated dose was determined. Starting from a dose of 0.125 g/kg body weight mixed with the daily feed ration, the dose of Lantharenol® was doubled every other week until signs of intolerance were observed (N=10 cats compared to 5 untreated controls). In the second study, the effects of feed supplementation for two weeks with approximately 2, 6, and 20% of the maximal tolerated dose on phosphorus excretion patterns and balance were assessed (N=8 cats per group).

RESULTS: Lantharenol® was found to be safe and well tolerated up to the dose of 1 g/kg bodyweight, corresponding to a concentration of 84 g Lantharenol®/kg complete feed, defined as dry matter with a standard moisture content of 12%. Feed supplementation for two weeks with approximately 2-20% of this dosage (i.e., 1.6, 4.8, and 16 g/kg complete feed) resulted in a shift from urinary to faecal phosphorus excretion. Apparent phosphorus digestibility was dose-dependently reduced compared to the control group fed with diet only (N=8).

CONCLUSIONS: The feed additive was well accepted and tolerated by all cats. Therefore, Lantharenol® presents a well tolerated and efficacious option to individually tailor restriction of dietary phosphorus as indicated, for instance, in feline chronic kidney disease.

BMC Vet Res. 2012 Jul 2;8(1):102. [Epub ahead of print]

Assessment of renal volume by three-dimensional ultrasonography in pregnant bitches: an experimental study using virtual organ computer-aided analysis.

Mendonça DS, Moron RF, Maldonado AL, Araujo Júnior E, Nardoza LM, Moron AF.

BACKGROUND: To assess and to compare the renal volume evolution in bitches during pregnancy by two-dimensional (2D) ultrasonography using the ellipsoid technique (volume = length x width x depth x 0.523) and three-dimensional (3D) ultrasonography using the Virtual Organ Computer-aided AnaLysis (VOCAL) method. A longitudinal prospective study was performed with 17 normal Golden Retrievers bitches during pregnancy from heat to the last third of gestation. The ultrasound scans were performed by two veterinarians. The left and right kidneys were assessed in three moments (day 0 = non-pregnant bitches; days 1st to 20th of pregnancy and days 21st to 40th of pregnancy) by three techniques (ellipsoid; VOCAL 12degrees and VOCAL 30degrees). For reproducibility calculations, we used the intraclass correlation coefficient (ICC).

RESULTS: The inferential result of the volumes in ANOVA revealed the interaction effect between side and moment (p = 0.009). The 3D techniques showed, in average, the same renal volumes (p = 0.137) regardless of the side and moment. Considering the right side, the renal volume in the day 0 was smaller than the day 21st to 40th (p = 0.029). Considering the left side, the renal volume at day 0 was smaller than the day 1st to 20th (p = 0.020) and day 21st to 40th (p = 0.007). It was found good intra observer reproducibility (ICC > 0.9) and none of the three techniques showed a good inter observer reproducibility (ICC < 0.7).

CONCLUSION: The renal volume bitches by 3D ultrasonography using the VOCAL method (12degrees and 30degrees) had good correlation with the volume obtained by 2D ultrasonography method.

BMC Vet Res. 2012 Jul 26;8:124.

A L2HGDH initiator methionine codon mutation in a Yorkshire terrier with L-2-hydroxyglutaric aciduria.

Farias FH, Zeng R, Johnson GS, Shelton GD, Paquette D, O'Brien DP.

BACKGROUND: L-2-hydroxyglutaric aciduria is a metabolic repair deficiency characterized by elevated levels of L-2-hydroxyglutaric acid in urine, blood and cerebrospinal fluid. Neurological signs associated with the disease in humans and dogs include seizures, ataxia and dementia.

CASE PRESENTATION: Here we describe an 8 month old Yorkshire terrier that presented with episodes of hyperactivity and aggressive behavior. Between episodes, the dog's behavior and neurologic examinations were normal. A T2 weighted MRI of the brain showed diffuse grey matter hyperintensity and a urine metabolite screen showed elevated 2-hydroxyglutaric acid. We sequenced all 10 exons and intron-exon borders of L2HGDH from the affected dog and identified a homozygous A to G transition in the initiator methionine codon. The first inframe methionine is at p.M183 which is past the mitochondrial targeting domain of the protein. Initiation of translation at p.M183 would encode an N-terminal truncated protein unlikely to be functional.

CONCLUSIONS: We have identified a mutation in the initiation codon of L2HGDH that is likely to result in a non-functional gene. The Yorkshire terrier could serve as an animal model to understand the pathogenesis of L-2-hydroxyglutaric aciduria and to evaluate potential therapies.

Canadian Journal of Veterinary Research

Can J Vet Res 76(3): 201-208

Acid-base and biochemical stabilization and quality of recovery in male cats with urethral obstruction and anesthetized with propofol or a combination of ketamine and diazepam

Freitas, Gabrielle C.; Monteiro Carvalho Mori da Cunha, Marina G.; Gomes, Kleber; Monteiro Carvalho Mori da Cunha, João P.; Togni, Monique; Pippi, Ney L.; Carregaro, Adriano B

This study compared acid-base and biochemical changes and quality of recovery in male cats with experimentally induced urethral obstruction and anesthetized with either propofol or a combination of ketamine and diazepam for urethral catheterization. Ten male cats with urethral obstruction were enrolled for urethral catheterization and anesthetized with either ketamine-diazepam (KD) or propofol (P). Lactated Ringer's solution was administered by intravenous (IV) beginning 15 min before and continuing for 48 h after relief of urethral obstruction. Quality of recovery and time to standing were evaluated. The urethral catheter was maintained to measure urinary output. Hematocrit (Hct), total plasma protein (TPP), albumin, total protein (TP), blood urea nitrogen (BUN), creatinine, pH, bicarbonate (HCO₃⁻), chloride, base excess, anion gap, sodium, potassium, and partial pressure of carbon dioxide in mixed venous blood (pvCO₂) were measured before urethral obstruction, at start of fluid therapy (0 h), and at subsequent intervals. The quality of recovery and time to standing were respectively 4 and 75 min in the KD group and 5 and 16 min in the P group. The blood urea nitrogen values were increased at 0, 2, and 8 h in both groups. Serum creatinine increased at 0 and 2 h in cats administered KD and at 0, 2, and 8 h in cats receiving P, although the values were above the reference range in both groups until 8 h. Acidosis occurred for up to 2 h in both groups. Acid-base and biochemical stabilization were similar in cats anesthetized with propofol or with ketamine-diazepam. Cats that received propofol recovered much faster, but the ketamine-diazepam combination was shown to be more advantageous when treating uncooperative cats as it can be administered by intramuscular (IM) injection.

The Canadian Veterinary Journal

Can Vet J. 2012 Mar;53(3):250-6.

Iron deficiency anemia.

Naigamwalla DZ, Webb JA, Giger U.

Iron is essential to virtually all living organisms and is integral to multiple metabolic functions. The most important function is oxygen transport in hemoglobin. Iron deficiency anemia in dogs and cats is usually caused by chronic blood loss and can be discovered incidentally as animals may have adapted to the anemia. Severe iron deficiency is characterized by a microcytic, hypochromic, potentially severe anemia with a variable regenerative response. Iron metabolism and homeostasis will be reviewed, followed by a discussion of diagnostic testing and therapeutic recommendations for dogs and cats with iron deficiency anemia.

Can Vet J. 2012 May;53(5):535-8.

Bilateral ureteral obstruction in a cat due to a ureteral transitional cell carcinoma.

Cohen L, Shipov A, Ranen E, Bruchim Y, Segev G.

A 15-year-old cat was presented with a history of lethargy and vomiting. Serum biochemistry revealed severe azotemia. Ultrasonography revealed a small left kidney and hydronephrosis of the right kidney. There was an abdominal mass between the kidneys. Necropsy revealed a mass circumflexing both ureters and histopathology confirmed a diagnosis of transitional cell carcinoma.

Can Vet J. 2012 Jun;53(6):631-8.

Proteinuria in dogs and cats.

Harley L, Langston C.

Proteinuria is defined as the presence of protein in the urine. Normally, circulating serum proteins are blocked by the glomerulus due to size and/or charge. Any small proteins that pass through a healthy glomerulus are reabsorbed by the renal tubules or broken down by renal tubular epithelial cells. Persistent proteinuria, in the absence of lower urinary tract disease or reproductive tract disease, is usually an indication of renal damage or dysfunction. Less commonly persistent proteinuria can be caused by increased circulating levels of low molecular weight proteins. This article reviews mechanisms of proteinuria in dogs and cats and discusses the importance of screening for and ultimately treating proteinuria.

Can Vet J. 2012 Jul;53(7):787-90.

Suture-related urolithiasis following repair of inadvertent prostatectomy in a dog.

Puttick JL, Sereida CW.

A 10-month-old male chow chow mixed breed dog was presented for anuria secondary to inadvertent prostatectomy performed during unilateral cryptorchidectomy. Surgical repair was successfully performed; however, this resulted in suture-associated urolith formation 3 months later, requiring a second surgical intervention and urethrostomy.

Can Vet J. 2012 Aug;53(8):875-9.

Chemotherapy and radiation therapy in 4 dogs with muscle-invasive transitional cell carcinoma of the urinary tract.

Marconato L, Nitzl DB, Melzer-Ruess KJ, Keller MA, Buchholz J.

Résumé Chimiothérapie et radiothérapie comme traitement pour carcinomes à cellules transitionnelles urothéliaux avec infiltration du muscle dans 4 chiens. Quatre chiens avec des carcinomes à cellules transitionnelles du bas tractus urinaire (TNM) ont été traités avec une approche multimodale consistant en chimiothérapie néoadjuvante, radiothérapie externe et chimiothérapie adjuvante. Nous n'avons pas observé une toxicité signifiante. Tous les chiens ont répondu à ce traitement multimodale, défini comme

amélioration des symptômes cliniques et réduction des dimensions de la tumeur, indiqué au scanner. (Traduit par Julia Buchholz).

Four dogs with T(2)N(0)M(0) transitional cell carcinoma of the lower urinary tract underwent multimodal treatment consisting of neoadjuvant chemotherapy, external-beam radiotherapy, and adjuvant chemotherapy. No significant toxicity was documented. All dogs showed clinical improvement and reduction of tumor volume based on computed tomography (CT).

Can Vet J. 2012 Sep;53(9):992-4.

Surgery and radiation therapy for extramedullary plasmacytoma of the penile mucosa in a dog.

Wypij JM, de Lorimier LP.

A 10-year-old neutered male Italian greyhound dog was presented because it had a penile plasmacytoma. Surgery followed by radiation therapy resulted in local control and survival for 1688 days. This is the first report of surgery and definitive radiation therapy for curative intent therapy of extramedullary penile plasmacytoma in a dog.

French

Résumé Plasmocytome extramédullaire du pénis traité avec chirurgie et radiothérapie chez un chien. Un chien petit lévrier italien mâle castré âgé de 10 ans fut présenté suite à un diagnostic de plasmocytome extramédullaire du pénis. La chirurgie, suivie d'une radiothérapie, permit un contrôle local et une survie de plus de 1688 jours. Il s'agit du premier cas rapporté de plasmocytome extramédullaire du pénis chez un chien traité en plurimodalité avec chirurgie et radiothérapie définitive. (Traduit par les auteurs).

A 10-year-old neutered male Italian greyhound dog was presented because it had a penile plasmacytoma. Surgery followed by radiation therapy resulted in local control and survival for 1688 days. This is the first report of surgery and definitive radiation therapy for curative intent therapy of extramedullary penile plasmacytoma in a dog.

Compendium: Continuing education for veterinarians

Compend Contin Educ Vet. 2010;32(12):E1-5.

Feline focus-environmental enrichment for indoor cats.

Herron ME, Buffington CA.

Recommendations to cat owners to house their cats indoors confer the responsibility to provide conditions that ensure good health and welfare. Cats maintain their natural behaviors, such as scratching, chewing, and elimination, while living indoors, and they may develop health and behavior problems when deprived of appropriate environmental outlets for these behaviors. This article divides the environment into five basic "systems" to enable identification of features that may benefit from improvement. It also addresses practical means of meeting cats' needs in each of these systems.

Compendium July 2012 (Vol 34, No 7): E1-E5

Focus on Nutrition: Nutritional Management of Protein-Losing Nephropathy in Dogs

Valerie J. Parker, DVM, DACVIM, Lisa M. Freeman, DVM, PhD, DACVN

Optimal treatment of protein-losing nephropathy (PLN) should address both medical and nutritional issues. In nonazotemic dogs with PLN, the main nutrients of concern are protein, calories, omega-3 fatty acids, and sodium. In azotemic dogs with PLN, requirements for additional nutrients should be addressed. The amount of protein and the specific diet must be individualized for every patient with PLN because commercial dog foods differ greatly in protein and other nutrients. It is critical to avoid

excessive dietary protein restriction, which may contribute to loss of lean body mass. A thorough diet history must be obtained to account for the animal's entire daily intake of protein and other nutrients.

Compendium October 2012 (Vol 34, No 10)

Canine Prostatic Carcinoma

Axiak SM, Bigio A

Canine prostatic carcinoma is locally aggressive with a high rate of metastasis. Common metastatic sites include lymph nodes, lungs, liver, spleen, and bone. Staging relies on chest radiography, abdominal radiography, and abdominal ultrasonography, in addition to radiography of any painful regions. An enlarged, mineralized prostate is a frequent finding; in a castrated male dog, it is predictive of prostatic carcinoma. NSAIDs are an important component of treatment, although additional local and systemic therapies should be considered to improve the quality of life of these patients.

Journal of comparative pathology

J Comp Pathol. 2012 Jul;147(1):11-9. Epub 2011 Oct 19.

Uropathogenic E. coli Promote a Paracellular Urothelial Barrier Defect Characterized by Altered Tight Junction Integrity, Epithelial Cell Sloughing and Cytokine Release.

Wood MW, Breitschwerdt EB, Nordone SK, Linder KE, Gookin JL.

The urinary bladder is a common site of bacterial infection with a majority of cases attributed to uropathogenic *Escherichia coli*. Sequelae of urinary tract infections (UTIs) include the loss of urothelial barrier function and subsequent clinical morbidity secondary to the permeation of urine potassium, urea and ammonia into the subepithelium. To date there has been limited research describing the mechanism by which this urothelial permeability defect develops. The present study models acute uropathogenic *E. coli* infection in vitro using intact canine bladder mucosa mounted in Ussing chambers to determine whether infection induces primarily a transcellular or paracellular permeability defect. The Ussing chamber sustains tissue viability while physically separating submucosal and lumen influences, so this model is ideal for quantitative measurement of transepithelial electrical resistance (TER) to assess alterations of urothelial barrier function. Using this model, changes in both tissue ultrastructure and TER indicated that uropathogenic *E. coli* infection promotes a paracellular permeability defect associated with the failure of umbrella cell tight junction formation and umbrella cell sloughing. In addition, bacterial interaction with the urothelium promoted secretion of cytokines from the urinary bladder with bioactivity capable of modulating epithelial barrier function including tumour necrosis factor- α , interleukin (IL)-6 and IL-15. IL-15 secretion by the infected bladder mucosa is a novel finding and, because IL-15 plays key roles in reconstitution of tight junction function in damaged intestine, this study points to a potential role for IL-15 in UTI-induced urothelial injury.

Journal of feline medicine and surgery

J Feline Med Surg. 2012 Feb;14(2):99-106.

Acceptability and compliance of atenolol tablet, compounded paste and compounded suspension prescribed to healthy cats*.

Khor KH, Campbell F, Rathbone MJ, Greer RM, Mills PC.

This study was designed to evaluate the cats' acceptance and compliance of the owners and cats towards an extemporaneously prepared palatable compounded atenolol (paste and suspension)

formulation in comparison to the commercially obtained tablet, in a randomised, cross-over study design. The three formulations were prescribed twice daily for 6 days to 13 healthy privately-owned cats of 13 different owners, with varying levels of experience in medicating cats. Daily compliance was evaluated via an owner-completed diary, completed after each dose administered. Owner's experience and preference of the formulation was evaluated via questionnaires given prior to, at the end of each treatment protocol, and upon completion of the study. Although compounded suspension was associated with fewest missed doses, the majority of cat owners expressed a preference for the divided tablet. Atenolol tablets, compounded paste and suspension acceptance and compliance were comparable. Further work is now required to assess the amount and stability of the active ingredient and the robustness of the paste and suspension formulations prior to any bioavailability comparisons between the formulations.

J Feline Med Surg. 2012 Apr;14(4):280-4. Epub 2012 Jan 23.

Renal transitional-cell carcinoma in two cats with chronic kidney disease.

Hanzlicek AS, Ganta C, Myers CB, Grauer GF.

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.

J Feline Med Surg. 2012 Jun;14(6):424-7. Epub 2012 Mar 7.

Bilateral fusion of a supernumerary kidney in a cat.

Silva JF, Boelsoni JN, Cima AM, Serakides R, Ocarino NM.

A rare case of bilateral fusion of a supernumerary kidney was found during the necropsy of a female, 8-year-old, mixed breed cat that died as a result of azotemia and chronic enteritis. Apart from enteritis, necropsy revealed four kidneys, two in the sublumbar left region and two in the sublumbar right region, with cortical and medullary regions well individualized and independent; however, the pelvis was partially fused, giving rise to a single ureter. The kidneys were small, whitish and firm, with irregular surfaces. Microscopically, all kidneys displayed normal renal glomeruli and tubules among the immature renal glomeruli and tubules with characteristics of hypoplasia. Foci of glomerulosclerosis, nephrocalcinosis and interstitial fibrosis were also observed.

J Feline Med Surg. 2012 Jun;14(6):428-31. Epub 2012 Mar 8.

Wedge meatoplasty as a treatment for stricture of the urethral meatus in a cat.

Freeman AI.

A three-and-a-half-year-old male neutered Siamese cat presented with idiopathic feline lower urinary tract inflammation and dysuria, which appeared to be caused by stricture of the urethral meatus. Wedge meatoplasty was performed, which relieved the cat's dysuria and restored a normal urine stream. To my knowledge, this is the first report of meatoplasty as a treatment for stricture of the urethral meatus in a cat.

J Feline Med Surg. 2012 Aug;14(8):527-33. Epub 2012 Mar 9.

Clinical features, survival times and COX-1 and COX-2 expression in cats with transitional cell carcinoma of the urinary bladder treated with meloxicam.

Bommer NX, Hayes AM, Scase TJ, Gunn-Moore DA.

Records of 11 cats with transitional cell carcinoma of the urinary bladder, which had been treated with meloxicam, were reviewed for signalment, duration of clinical signs prior to diagnosis, results of diagnostic imaging, whether or not concurrent surgery was performed and survival. Immunohistochemical expression of cyclo-oxygenase-1 (COX-1) and cyclo-oxygenase-2 (COX-2) was assessed in the tumours of seven cats. Tumour location varied greatly. The cats had a mean age of 13 years. Three cats had a previous diagnosis of feline idiopathic cystitis of up to 2008 days duration. Ten of the cats showed clinical improvement (reduction of haematuria and/or dysuria), with a mean survival time (MST) of 311 days (range 10-1064); 1-year survival of 50%. All seven bladders assessed for COX staining were COX-1 positive and five were COX-2 positive. The MST for the COX-2-positive cats was 123 days, the MST for the COX-2-negative cases was 375 days.

J Feline Med Surg. 2012 Oct;14(10):729-40. Epub 2012 Jun 18.

Clinical features and risk factors for development of urinary tract infections in cats.

Martinez-Ruzafa I, Kruger JM, Miller R, Swenson CL, Bolin CA, Kaneene JB.

The clinical and diagnostic features of 155 cats with urinary tract infection (UTI) and 186 controls with negative urine culture/s were characterized retrospectively (signalment, clinical signs, urinalysis, urine culture, concurrent diseases, lower urinary tract diagnostic/therapeutic procedures). Multivariable logistic regression was used to identify risk factors associated with UTI. Cats of all ages were affected by UTI with no sex/breed predisposition. Lower urinary tract signs were absent in 35.5% of cats with UTI. Pyuria and bacteriuria had sensitivities of 52.9% and 72.9%, and specificities of 85.5% and 67.7% for detection of UTI, respectively. Risk factors significantly associated with increased odds of UTI were urinary incontinence [odds ratio (OR) = 10.78, P = 0.0331], transurethral procedures (OR = 8.37, P <0.0001), urogenital surgery (OR = 6.03, P = 0.0385), gastrointestinal disease (OR = 2.62, P = 0.0331), decreased body weight (OR = 0.81, P = 0.0259) and decreased urine specific gravity (OR = 0.78, P = 0.0055). Whilst not independently significant, renal disease and lower urinary tract anatomic abnormalities improved statistical model performance and contributed to UTI.

J Feline Med Surg. 2012 Nov;14(11):773. doi: 10.1177/1098612X12464457.

Less is more - fluid therapy for kidney disease.

[No authors listed]

J Feline Med Surg. 2012 Nov;14(11):775-84. doi: 10.1177/1098612X12464458.

Feline acute Kidney injury: 1. Pathophysiology, etiology and etiology-specific management considerations.

Monaghan K, Nolan B, Labato M.

Practical relevance: Acute kidney injury (AKI) is a frequently recognized disease process in cats that requires immediate and aggressive intervention. A thorough understanding of the pathophysiologic processes underlying AKI and familiarity with the most common etiologies are essential for providing the most effective and timely therapy. Possessing this knowledge will also allow a more accurate prognosis to be given, and afford the best chance of a favorable outcome. Clinical challenges: Feline patients often present with vague signs of AKI, which may delay treatment and adversely affect the prognosis. Their response to injury and treatment is often different to that of other species. Audience: This two-part review article is directed at small animal practitioners as well as specialists. Part 1 reviews mechanisms underlying AKI in the cat, as well as etiologies and treatments related to some specific causes of AKI.

Evidence base: The veterinary literature is limited with regards to the pathophysiology of AKI unique to the cat. However, there are numerous feline studies evaluating causes of AKI.

J Feline Med Surg. 2012 Nov;14(11):785-93. doi: 10.1177/1098612X12464460.

Feline acute kidney injury: 2. Approach to diagnosis, treatment and prognosis.

Monaghan K, Nolan B, Labato M.

Practical relevance: Feline acute kidney injury (AKI) is a commonly recognized problem in small animal practice that requires prompt diagnosis and directed therapy. There are many treatment methods with which practitioners should be familiar, including medical options, surgical interventions and renal replacement therapy (dialysis). It is important to know which option is most appropriate for each cause and stage of AKI to deliver the most effective therapy. Clinical challenges: AKI can cause vague clinical signs, but a vast array of life-threatening sequelae. Rapid recognition of potential complications and knowledge of treatment options is imperative for successful management. Feline patients also require an understanding of their unique physiology as it relates to the therapeutic plan. Audience: This two-part review article is directed at small animal practitioners as well as specialists. Part 2 discusses the diagnosis of AKI in cats using physical examination findings, clinicopathologic results and imaging modalities. The treatment of AKI and its sequelae is also reviewed, with information on recent advances in this area. Evidence base: While there is very limited data comparing the outcomes of various treatment options, there is literature addressing the use of several medications, as well as renal replacement therapy, in cats.

J Feline Med Surg. 2012 Nov;14(11):794-803. doi: 10.1177/1098612X12464461.

Ultrasonography of the feline kidney: Technique, anatomy and changes associated with disease.

Debruyne K, Haers H, Combes A, Paepe D, Peremans K, Vanderperren K, Saunders JH.

Practical relevance: Ultrasonography is an important tool for the detection of kidney disorders, which are among the most common health problems suffered by cats. It is more accurate than radiography for this purpose and is considered to be the reference modality for imaging the feline kidney, providing excellent visualisation of renal size, shape and internal architecture. Compared with more advanced imaging modalities, such as computed tomography or magnetic resonance imaging, ultrasonography is more accessible, less expensive, does not require general anaesthesia and allows real-time procedures to be performed. Clinical challenges: On ultrasound examination, focal or multifocal disorders may be readily identified, but diffuse changes are more challenging. B-mode ultrasonography is of limited use for differentiating between benign and malignant focal lesions. However, based on the presence and pattern of vascularity as an indicator of malignancy, contrast-enhanced ultrasonography allows distinction between benign and malignant focal renal lesions. Audience: This review provides a framework for the ultrasonographic approach to feline renal and perirenal disorders for the general practitioner. Evidence base: Drawing on current literature relating to ultrasonographic examination of feline kidneys, the aim is to summarise ultrasonographic technique, anatomy and changes associated with renal and perirenal diseases.

J Feline Med Surg. 2012 Dec;14(12):876-81. doi: 10.1177/1098612X12454418. Epub 2012 Jul 20.

A retrospective analysis of the effects of meloxicam on the longevity of aged cats with and without overt chronic kidney disease.

Gowan RA, Baral RM, Lingard AE, Catt MJ, Stansen W, Johnston L, Malik R.

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.

J Feline Med Surg. 2012 Dec;14(12):882-8. doi: 10.1177/1753193412454519. Epub 2012 Jul 16.

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.

Hanzlicek AS, Roof CJ, Sanderson MW, Grauer GF.

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.

J Feline Med Surg. 2012 Dec;14(12):895-9. doi: 10.1177/1098612X12459644. Epub 2012 Sep 14.

Prevalence of viral infections in Norwegian cats with and without feline lower urinary tract disease.

Lund HS, Rimstad E, Eggertsdóttir AV.

The prevalence of various viral infections was examined in primary accession cases of feline lower urinary tract disease (FLUTD) and healthy control cats in Norway. Urine samples from 102 cats with clinical signs of FLUTD and 73 healthy control cats were tested for the presence of feline calicivirus (FCV), feline coronavirus (FCoV) and feline herpesvirus-1 (FHV-1) by polymerase chain reaction. All urinary samples were negative for FCV and FCoV. One (1%) of the FLUTD cats was found to be positive for FHV-1. The results did not indicate an association between the viral infections examined and signs of FLUTD in the study sample.

J Feline Med Surg. 2012 Dec;14(12):938-41. doi: 10.1177/1098612X12458102. Epub 2012 Aug 22.

Bilateral ureteropelvic junction stenosis causing hydronephrosis and renal failure in an adult cat.

Foster JD, Pinkerton ME.

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.

The Journal of Small Animal Practice

J Small Anim Pract. 2012 Apr;53(4):198-204.

The effect of neutering on the risk of urinary incontinence in bitches - a systematic review.

Beauvais W, Cardwell JM, Brodbelt DC.

An increased risk of urinary incontinence in bitches has often been associated with previous ovariohysterectomy but remains controversial. The objective of this study was to evaluate the strength of evidence for an association between neutering or age at neutering and urinary incontinence in bitches and to estimate the magnitude of any effect found. A systematic review of peer-reviewed original English analytic journal articles was conducted, based on Cochrane guidelines (Higgins and Green 2009) Of 1,853 records screened, seven studies were identified that examined the effect of neutering or age at neutering on the risk of urinary incontinence but four were judged to be at high risk of bias. Of the remaining three studies, which were at moderate risk of bias, there was some weak evidence that neutering, particularly before the age of three months, increases the risk of urinary incontinence. However, overall the evidence is not consistent nor strong enough to make firm recommendations on the effect of neutering or age at neutering on the risk of urinary incontinence.

J Small Anim Pract. 2012 Apr;53(4):245-8. doi: 10.1111/j.1748-5827.2011.01179.x.

Malignant peripheral nerve sheath tumour of the urinary bladder in a cat.

Pavia PR, Havig ME, Donovan TA, Craft D.

A 14-year-old domestic shorthair cat presented with a 5-month history of urinary incontinence and inappropriate elimination. Ultrasonography revealed a well-marginated, vascular mass of mixed echogenicity extending from the dorsal wall of the urinary bladder into the lumen. Partial cystectomy was performed for removal of the urinary bladder mass; histopathological evaluation revealed a spindle cell neoplasm with a prominent palisading pattern. Histomorphologic features and immunohistochemical demonstration of vimentin, glial fibrillary acidic protein and S-100 protein, combined with negativity for smooth muscle actin and desmin were consistent with malignant peripheral nerve sheath tumour. This case report describes a novel location of malignant peripheral nerve sheath tumour; to the authors' knowledge, the bladder has not been described as a site of origin in the cat or any other domestic species.

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J Small Anim Pract. 2012 May;53(5):254-9

Initial evaluation of canine urinary cystatin C as a marker of renal tubular function.

Monti P, Benchekroun G, Berlato D, Archer J.

OBJECTIVES: To evaluate the performance of a particle-enhanced turbidimetric assay for measuring canine urinary cystatin C and to investigate if the urinary cystatin C to creatinine ratio is higher in dogs with renal disease than in non-renal disease dogs.

METHODS: Urinary cystatin C was measured by particle-enhanced turbidimetric assay using an avian antihuman cystatin C antibody and the performance of this assay was evaluated. Clinical relevance was tested in 46 dogs that were divided into three groups: healthy dogs (n=14), non-renal disease dogs (n=17) and dogs with renal disease (n=15).

RESULTS: The assay was linear ($R^2=0.99$) and precise (mean intra- and inter-assay coefficients of variation were 2.3 and 2.9%, respectively). The recovery was 111.5% and the limit of blank was 0.02 mg/L. Urinary cystatin C and urinary cystatin C to creatinine ratio differed significantly ($P<0.001$) between the three cohorts of dogs.

CLINICAL SIGNIFICANCE: Measurement of cystatin C by particle-enhanced turbidimetric assay performed with high precision and linearity. This assay can be processed on automated clinical chemistry analysers making it widely available to commercial laboratories. Urinary cystatin C to creatinine ratio can differentiate dogs with renal disease from dogs without renal disease. These preliminary results suggest that urinary cystatin C to creatinine ratio is a promising marker for evaluating renal tubular function.

J Small Anim Pract. 2012 May;53(5):304

Primary pyonephrosis in a young dog.

Choi J, Yoon J.

J Small Anim Pract. 2012 Jun;53(6):338-43.

Static hydraulic urethral sphincter for treatment of urethral sphincter mechanism incompetence in 11 dogs.

Delisser PJ, Friend EJ, Chanoit GP, Parsons KJ.

Objective: To review the postoperative results and complications associated with urethral sphincter mechanism incompetence managed with a static hydraulic urethral sphincter. **Methods:** Case records and a telephone owner questionnaire were retrospectively used to assess postoperative urinary continence scores (1 - dripping constantly to 10 - completely dry) and presence and frequency of complications. **Results:** Eleven spayed females were included. Median continence score/10 (range) awarded preoperatively was 3 (2 to 6), and scores at two weeks, three and six months were 8 (4 to 10), 9 (4 to 10) and 8 (4 to 10), respectively. At the last survey, the median continence score of 9 (5 to 10) was significantly better ($P=0.004$) than before surgery. Complete continence was achieved in 36.4% of dogs. The median (range) follow-up time was 412 (118 to 749) days. Complications occurred in 9 of 11 dogs and included dysuria ($n=7$), bacterial cystitis ($n=7$), longer urination time ($n=8$), urinary retention ($n=3$), haematuria ($n=1$), pain ($n=3$) and incisional seroma ($n=3$). **Clinical Significance:** Static hydraulic urethral sphincter was frequently associated with minor complications but no major complications (i.e. those requiring further surgery). Continence scores were significantly improved compared with those before surgery, with the possibility of further improvement following inflation of the sphincter.

J Small Anim Pract. 2012 Jul;53(7):411-5. doi: 10.1111/j.1748-5827.2012.01239.x.

Effect of intraurethral administration of atracurium besylate in male cats with urethral plugs.

Galluzzi F, De Rensis F, Menozzi A, Spattini G.

OBJECTIVE: To evaluate the effect of intraurethral administration of atracurium besylate for urinary obstruction resulting from urethral plugs in male cats.

METHODS: Forty-five male cats were divided into the treatment group ($n=25$), in which 4 mL atracurium besylate solution (0.5 mg/mL) was injected into the urethral lumen, and the control group ($n=20$), treated with saline. All cats were then submitted to retrograde flushing until the removal of the occlusion was obtained.

RESULTS: The percentage of cats in which the plug was removed at the first attempt was significantly ($P<0.05$) higher in the treatment group (64%) than in the control group (15%). Moreover, the mean (\pm SD) time required for the removal of the urethral obstruction was significantly shorter in the treatment group than in the control group (21.1 ± 16.2 seconds versus 235.2 ± 132.4 seconds; $P<0.001$).

CLINICAL SIGNIFICANCE: The results of this study indicate that in adult male cats with urethral plugs, urethral administration of atracurium besylate increases the proportion of animals in which the obstruction is removed at the first attempt and reduces the time required to remove the urethral plugs.

J Small Anim Pract. 2012 Oct;53(10):572-7. doi: 10.1111/j.1748-5827.2012.01254.x. Epub 2012 Aug 2.

Screening of ragdoll cats for kidney -disease: a retrospective evaluation.

Paepe D, Saunders JH, Bavegems V, Paes G, Peelman LJ, Makay C, Daminet S.

OBJECTIVES: To assess the prevalence of renal abnormalities in ragdoll cats. Ragdoll breeders often warn clients to watch for future renal problems, mainly due to chronic interstitial nephritis and polycystic kidney disease. Therefore, ragdoll screening by abdominal ultrasonography, measurement of serum creatinine and urea concentrations and genetic testing is often performed without documented scientific evidence of increased risk of renal disease.

METHODS: Retrospective evaluation of ragdoll screening for renal disease at one institution over an eight-year period.

RESULTS: Renal ultrasonography was performed in 244 healthy ragdoll cats. Seven cats were positive for polycystic kidney disease, 21 were suspected to have chronic kidney disease, 8 had abnormalities of unknown significance and 2 cats had only one visible kidney. Cats suspected to have chronic kidney disease were significantly older and had significantly higher serum urea and creatinine concentrations than cats with normal renal ultrasonography. All 125 genetically tested cats were negative for polycystic

kidney disease. However, only one of the seven ultrasonographically positive cats underwent genetic testing for polycystic kidney disease.

CLINICAL SIGNIFICANCE: Ultrasonographic findings compatible with chronic kidney disease were observed in almost 10% of cats, and polycystic kidney disease occurred at a low prevalence (<3%) in this ragdoll population. Further studies are required to elucidate if ragdoll cats are predisposed to chronic kidney disease.

J Small Anim Pract 53(11) 621-622.

Urolithiasis: past, present and future

Lulich JP, Osborne CA

J Small Anim Pract 53(11):634–640.

Analysis of 14,008 uroliths from dogs in the UK over a 10-year period.

Roe K, Pratt A, Lulich J, Osborne C, Syme HM.

OBJECTIVES: To identify breed-associated risk factors for urolithiasis in dogs from the UK.

METHODS: Records of all canine uroliths submitted to Hills Pet Nutrition UK for analysis at the University of Minnesota Urolith Centre over 10 years (1997 to 2006) were reviewed. The results, along with the request forms completed by the submitting veterinarian, were analysed. The most commonly affected breeds, age and gender of the dogs were identified for each of the most common types of uroliths (struvite, calcium oxalate, urate, cystine and mixed). Pearson's chi-squared tests were performed to assess whether certain breeds of dogs were over-represented relative to a reference population (from an insurance database).

RESULTS: The records of 14,008 urolith submissions were analysed. The relative frequency of struvite remained stable over time, whereas calcium oxalate decreased over the study period. Breeds found to be significantly over-represented for calcium oxalate uroliths included the Chihuahua, miniature poodle and Yorkshire terrier. Staffordshire bull terriers and English bulldogs were at increased risk for cystine uroliths.

CLINICAL SIGNIFICANCE: Associations between breed, gender, age and urolith formation were similar to those reported elsewhere. However, temporal trends and novel breed predispositions were identified.

J Small Anim Pract 53(11):646–651.

Determination of the cause of selected canine urolith formation by advanced analytical methods.

Kaiser J, Stěpánková K, Koř Istková T, Sedo O, Melnyk G, Hartl M, Paloušek D, Kučera J.

OBJECTIVE: The goal of this study was to determine the cause of selected canine urolith formation using less conventional but more advanced analytical methods.

METHODS: A routine laboratory specialising in urinary calculi analysis noticed a special type of core zone in some canine uroliths, which was typically made up of cylindrical holes. Of 4028 canine samples analysed, non-absorbable suture material was detected in 9 (0.22%) cases. A hollow cylindrical central area was found in a further 13 (0.32%) samples. X-ray microtomography (μ CT) was utilised in order to reveal the channel structure inside this urolith sample. Matrix-assisted laser desorption-ionisation - time of flight mass spectrometry was used in order to assess the cause of this urinary stone formation.

RESULTS: The diameter of the channel structure corresponded with the diameter of the previously utilised suture material and indicated that this urolith was formed around residual suture material. Further confirmation was provided by the comparative matrix-assisted laser desorption-ionisation - time of flight mass spectrometry chemical analysis. This channel structure is formed by a surgical thread that serves as a base for the urolith growth.

CLINICAL SIGNIFICANCE: Results of this study confirm the causative role of absorbable suture material in the pathogenesis of hollow channel structures in some canine compound uroliths.

J Small Anim Pract 53(11):657–660.

Successful treatment of bilateral paecilomyces pyelonephritis in a German shepherd dog Tappin SW, Ferrandis I, Jakovljevic S, Villiers E, White RAS

A six-year-old female entire German shepherd dog was investigated for polyuria, polydipsia and lethargy. Investigations revealed a mild azotaemia and abdominal ultrasound revealed marked bilateral dilation of the renal pelvis with echogenic material and proximal left hydronephrosis. Urine cytological examination and aspirates from the right renal pelvis revealed mats of fungal hyphae consistent with fungal bezoar formation. Fungal cultures revealed a profuse growth of *Paecilomyces variotii*. Initial treatment with oral itraconazole was unsuccessful, leading to bilateral nephrotomies to remove the fungal material. Postoperatively the *Paecilomyces* infection persisted despite continued itraconazole therapy. Treatment was commenced with amphotericin B, leading to resolution of the dog's clinical signs. To the authors' knowledge this is the first report of canine *Paecilomyces* pyelonephritis, without disseminated systemic disease, which documents its successful treatment.

J Small Anim Pract. 2012 Oct;53(10):561-71. doi: 10.1111/j.1748-5827.2012.01253.x. Epub 2012 Aug 3.

Calcium and phosphate homeostasis in hyperthyroid cats: associations with development of azotaemia and survival time.

Williams TL, Elliott J, Syme HM.

OBJECTIVES: To evaluate calcium and phosphate homeostasis in hyperthyroid cats and determine if plasma parathyroid hormone and fibroblast growth factor-23 are associated with the presence of azotaemic chronic kidney disease and/or have prognostic significance.

METHODS: Retrospective cohort study. Logistic regression analysis and Cox regression analysis were performed to identify if parathyroid hormone and fibroblast growth factor-23 were predictors of development of azotaemia following treatment and survival time, respectively.

RESULTS: Two hundred and seven hyperthyroid cats were included. Elevated plasma parathyroid hormone concentrations, hyperphosphataemia, decreased plasma fibroblast growth factor-23 concentrations and hypocalcaemia were documented; however, all parameters returned to reference intervals following treatment of hyperthyroid cats without azotaemic chronic kidney disease. After adjustment for plasma creatinine concentration, baseline plasma parathyroid hormone and fibroblast growth factor-23 concentrations were not predictors of the development of azotaemia following treatment. Baseline plasma fibroblast growth factor-23 concentrations were associated with all-cause mortality; however, this association was not maintained after adjustment for packed cell volume.

CLINICAL SIGNIFICANCE: Changes in plasma parathyroid hormone and fibroblast growth factor-23 concentrations which occur in hyperthyroid cats are not mediators of progression of chronic kidney disease; however, fibroblast growth factor-23 would appear to have some prognostic significance in hyperthyroidism.

J Small Anim Pract. 2012 Dec;53(12):709-13. doi: 10.1111/j.1748-5827.2012.01289.x. Epub 2012 Oct 1.

Congenital mesoblastic nephroma in a young basset hound dog.

Soldati S, Radaelli E, Mazzuti A, Scanziani E.

An 18-month-old male basset hound was presented with vomiting, diarrhoea and depression. Abdominal ultrasonography revealed a mass in the left kidney. An ultrasound-guided core-biopsy indicated aggregates of spindle cells, but did not allow a definitive diagnosis. Nephrectomy was performed after a period of six months, when ultrasound examination revealed a slight increase in mass dimensions.

Histologically the mass was composed of neoplastic spindle cells forming interlacing fascicles, bundles and whorls, within a loose myxoid to dense collagenous stroma. Immunohistochemically neoplastic cells were positive for vimentin and smooth muscle actin. Based on these findings the tumour was diagnosed as a congenital mesoblastic nephroma, classical variant. After a two-and-a-half-year follow-up the dog was clinically healthy, indicating a benign behaviour. To the authors' knowledge, this report describes the first case of canine congenital mesoblastic nephroma successfully treated surgically, with a reasonable postsurgical follow-up.

Journal of the American Veterinary Medical Association

J Am Vet Med Assoc. 2012 Jan 1;240(1):51-60.

Palliative ultrasound-guided endoscopic diode laser ablation of transitional cell carcinomas of the lower urinary tract in dogs.

Cerf DJ, Lindquist EC.

OBJECTIVE: To describe the development of ultrasound-guided endoscopic diode laser ablation for palliative management of urinary tract obstruction due to transitional cell carcinoma (TCC).

DESIGN: Prospective case series. Animals-38 dogs with urinary tract obstruction or potential obstruction caused by TCC.

PROCEDURES: Diagnosis of TCC of the urinary bladder and urethra was made by means of transabdominal ultrasonography and transurethral endoscopic biopsy. Transurethral endoscopic near-infrared diode laser ablation was performed to debulk and remove obstructive and potentially obstructive TCC lesions. Transabdominal ultrasonography permitted proper alignment of the endoscope and laser fiber for monitoring laser fiber penetration and subsequent tissue alteration or ablation. The primary outcome measured was median survival time.

RESULTS: Median survival time for all dogs was 380 days, with a range of 11 to 1,906 days. There was no significant difference in survival time between dogs that had TCCs with urethral involvement versus dogs that had TCCs without urethral involvement. Complications were stranguria, hematuria, stenosis at the cystourethral junction, spread of TCC within the lower urinary tract, spread to the urethrostomy site, urethral perforation, and bacterial cystitis.

CONCLUSIONS AND CLINICAL RELEVANCE: Results suggested that ultrasound-guided endoscopic diode laser ablation holds promise as a palliative treatment for dogs with TCC of the urinary tract.

Ultrasonographic guidance and monitoring during laser irradiation was a useful addition to endoscopically applied transurethral diode laser ablation.

J Am Vet Med Assoc. 2012 Jan 1;240(1):65-8.

Comparison of short-term complication rates between dogs and cats undergoing appositional single-layer or inverting double-layer cystotomy closure: 144 cases (1993-2010).

Thieman-Mankin KM, Ellison GW, Jeyapaul CJ, Glotfelty-Ortiz CS.

OBJECTIVE: To compare short-term complication rates in dogs and cats undergoing cystotomy closure by use of an inverting double-layer pattern (group I) versus cystotomy closure by use of an appositional single-layer pattern (group A).

DESIGN: Retrospective case series.

ANIMALS: 144 client-owned dogs and cats that underwent cystotomy between 1993 and 2010.

PROCEDURES: Information on signalment, reason for cystotomy, method of cystotomy closure, complications that developed during hospitalization, and duration of hospitalization were obtained from the medical record. The effect of closure technique on short-term complication rate and duration of hospitalization was examined.

RESULTS: 2 of the 144 animals developed dehiscence and uroabdomen following cystotomy closure: 1 from group A and 1 from group I. Of group A animals, 29 of 79 (37%) developed minor complications such as hematuria and dysuria. Of group I animals, 33 of 65 (50%) developed the same complications. Group A and group I animals did not differ significantly with regard to prevalence of minor or major complications. The mean duration of hospitalization was 4.1 days and did not differ significantly between groups.

CONCLUSIONS AND CLINICAL RELEVANCE: An appositional single-layer suture pattern for cystotomy closure was a safe and effective procedure with minimal risk of urine leakage and a short-term complication rate of 37%. The appositional single-layer suture pattern for cystotomy closure may be recommended for clinical use because the inverting double-layer suture pattern offered no clear advantage.

J Am Vet Med Assoc. 2012 Feb 1;240(3):298-303.

Use of end-to-side arterial and venous anastomosis techniques for renal transplantation in two dogs.

Phillips H, Aronson LR.

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.

J Am Vet Med Assoc. 2012 Feb 15;240(4):446-9.

Transitional cell carcinoma involving the ductus deferens in a dog.

Guerin VJ, Hooft KW, L'eplattenier HF, Petite AF.

Case Description-A 12-year-old neutered male Springer Spaniel was referred with a 1-year history of recurring urinary tract infections. Repeated treatment with appropriate antimicrobials selected on the basis of bacterial culture and antimicrobial susceptibility results would result in clinical improvement, but recurrence of clinical signs was observed within days after discontinuation of treatment. Clinical Findings-Ultrasound examination revealed a tubular, fluid-filled structure dorsal to the bladder that extended from the midlevel of the bladder to the cranial pole of the prostate. Mineralized foci within a heterogeneous prostatic parenchyma were also noted. Dilation of the right ductus deferens (DD) was observed during exploratory laparotomy. Treatment and Outcome-Both DD were surgically removed, and the prostate was biopsied. The histopathological diagnosis was transitional cell carcinoma involving the right DD and the prostate. The dog was treated with meloxicam (0.1 mg/kg [0.05 mg/lb], PO, q 24 h) for 9 months after diagnosis before being euthanized. Clinical Relevance-Because the normal DD is rarely visualized during abdominal ultrasonography in dogs, identification of a tubular, fluid-filled structure dorsal to the bladder may indicate an abnormal DD. Transitional cell carcinoma of the DD should be

included in the differential diagnoses of affected patients examined for clinical signs involving the urinary tract.

J Am Vet Med Assoc. 2012 Mar 1;240(5):532-8.

Evaluation of recipes for home-prepared diets for dogs and cats with chronic kidney disease.

Larsen JA, Parks EM, Heinze CR, Fascetti AJ.

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.

J Am Vet Med Assoc. 2012 Mar 15;240(6):716-25.

Evaluation of cystoscopic-guided laser ablation of intramural ectopic ureters in female dogs.

Berent AC, Weisse C, Mayhew PD, Todd K, Wright M, Bagley D.

OBJECTIVE: To describe and evaluate the short- and long-term outcomes in female dogs after cystoscopic-guided laser ablation of ectopic ureters (CLA-EU).

DESIGN: Prospective case series.

ANIMALS: 32 incontinent female dogs with intramural ectopic ureters.

PROCEDURES: A diagnosis of intramural ectopic ureters was made via cystoscopy and fluoroscopy in all patients. Transurethral CLA-EU (via diode laser [n = 27] or Holmium:yttrium aluminum garnet laser [3]) was performed to relocate the ectopic ureteral orifice cranially into the urinary bladder. All vaginal anomalies were treated with the laser concurrently. Follow-up evaluation was standardized and included urinary continence scoring, serial bacteriologic culture of urine samples, and a follow-up cystoscopy 6 to 8 weeks after CLA-EU.

RESULTS: Ectopic ureteral orifices of all dogs were initially located in the urethra. Eighteen of 30 dogs had bilateral ectopic ureters, and 12 had unilateral ectopic ureters. All dogs had other concurrent urinary anomalies. At the time of last follow-up (median, 2.7 years after CLA-EU, [range, 12 to 62 months]), 14 of 30 (47%) dogs did not require any additional treatments following CLA-EU to maintain urinary continence. For the 16 residually incontinent dogs, the addition of medical management, transurethral bulking-agent injection, or placement of a hydraulic occluder was effective in 3, 2, and 4 dogs, respectively, improving the overall urinary continence rate to 77% (23/30 dogs). One dog had evidence of polypoid cystitis at the neoureteral orifice 6 weeks after CLA-EU that was resolved at 3 months.

CONCLUSIONS AND CLINICAL RELEVANCE: CLA-EU provided an effective, safe, and minimally invasive alternative to surgery for intramural ectopic ureters in female dogs.

J Am Vet Med Assoc. 2012 Apr 1;240(7):842-7.

Risk factors for urate uroliths in cats.

Albasan H, Osborne CA, Lulich JP, Lekcharoensuk C.

Objective-To identify demographic factors associated with urate urolithiasis in cats and determine whether the rate of urolith submission to a laboratory had changed over time. **Design-**Case series and case-control study. **Animals-**Cases consisted of 5,072 cats with urate uroliths submitted to the Minnesota Urolith Center between January 1, 1981, and December 31, 2008. Controls consisted of 437,228 cats without urinary tract diseases identified in records of the Veterinary Medical Database during the same period. **Procedures-**Information on cat breed, age, sex, reproductive status, and location of uroliths was used to identify risk factors. Changes in annual urolith submission rates were evaluated. **Results-**Purebred cats had significantly higher odds of developing urate uroliths than did cats of mixed breeding (reference group). On the other hand, cats of the Abyssinian, American Shorthair, Himalayan, Manx, and Persian breeds had significantly lower odds of developing urate uroliths than did mixed breeds. Neutered cats were 12 times as likely to develop urate uroliths as were sexually intact cats. Cats in all age groups had significantly increased odds of developing urate uroliths, compared with cats < 1 year of age (reference group). Cats ≥ 4 but < 7 years of age had the highest odds of all groups and were 51 times as likely to develop urate uroliths as were cats < 1 year of age. Urolith submission rates did not change significantly with time. **Conclusions and Clinical Relevance-**Findings of this study suggested that the typical cat with urate uroliths was a purebred neutered cat, 4 to 7 years old, with uroliths in the bladder or urethra. This information may be helpful in predicting mineral composition of uroliths in vivo. However, no conclusions can be made regarding cause-and-effect relationships.

J Am Vet Med Assoc. 2012 Apr 1;240(7):863-8.

Lateral approach to nephrotomy in the management of unilateral renal calculi in a rabbit (*Oryctolagus cuniculus*).

Martorell J, Bailon D, Majó N, Andaluz A.

Case Description-A 5-year-old 2.23-kg (4.91-lb) spayed female Lop rabbit (*Oryctolagus cuniculus*) was evaluated because of a history of lethargy, polyuria, and polydipsia of 1 month's duration. The referring veterinarian made a presumptive diagnosis of hypercalcemia of unknown etiology on the basis of a plasma total calcium concentration of 14.0 mg/dL. **Clinical Findings-**Physical examination findings were unremarkable. Hematologic and plasma biochemical analysis revealed nonregenerative, normocytic, normochromic anemia (PCV, 28%) with heteropenia (23%; 1,334 heterophils/mL) and a total plasma calcium concentration of 16 mg/dL. Radiographic and ultrasonographic examination revealed radiodense and hyperechoic structures in both renal pelves and right unilateral nephrolithiasis. **Treatment and Outcome-**Nephrotomy was performed via laparotomy with a right lateral approach. A nephrolith composed of calcium carbonate and carbonate apatite was removed from the right renal pelvis. The rabbit's plasma tested positive for antibodies against *Encephalitozoon cuniculi* by means of an indirect immunofluorescence assay, and fenbendazole (20 mg/kg [9.1 mg/lb], PO, q 24 h) was administered for 28 days. Although plasma calcium concentration was not substantially decreased after treatment (values were 14.1 and 15.1 mg/dL 1 week and 3 months after surgery, respectively), the patient did not have clinical signs of hypercalcemia and died of unrelated causes approximately 1 year after surgery. **Clinical Relevance-**To the authors' knowledge, this is the first report of a nephrotomy performed in a rabbit via a lateral abdominal approach. This approach allowed easy location of the kidney and also reduced manipulation, thus decreasing the risk of damaging the abdominal viscera and potentially decreasing postoperative pain.

J Am Vet Med Assoc. 2012 Apr 15;240(8):962-8.

Comparison of arterial blood pressure measurements and hypertension scores obtained by use of three indirect measurement devices in hospitalized dogs.

Wernick MB, Höpfner RM, Francey T, Howard J.

Objective-To evaluate the agreement of blood pressure measurements and hypertension scores obtained by use of 3 indirect arterial blood pressure measurement devices in hospitalized dogs. **Design-**Diagnostic test evaluation. **Animals-**29 client-owned dogs. **Procedures-**5 to 7 consecutive blood pressure readings were obtained from each dog on each of 3 occasions with a Doppler ultrasonic flow detector, a standard oscillometric device (STO), and a high-definition oscillometric device (HDO). **Results-**When the individual sets of 5 to 7 readings were evaluated, the coefficient of variation for systolic arterial blood pressure (SAP) exceeded 20% for 0% (Doppler), 11 % (STO), and 28% (HDO) of the sets of readings. After readings that exceeded a 20% coefficient of variation were discarded, repeatability was within 25 (Doppler), 37 (STO), and 39 (HDO) mm Hg for SAP. Correlation of mean values among the devices was between 0.47 and 0.63. Compared with Doppler readings, STO underestimated and HDO overestimated SAP. Limits of agreement between mean readings of any 2 devices were wide. With the hypertension scale used to score SAP, the intraclass correlation of scores was 0.48. Linear-weighted inter-rater reliability between scores was 0.40 (Doppler vs STO), 0.38 (Doppler vs HDO), and 0.29 (STO vs HDO). **Conclusions and Clinical Relevance-**Results of this study suggested that no meaningful clinical comparison can be made between blood pressure readings obtained from the same dog with different indirect blood pressure measurement devices.

J Am Vet Med Assoc. 2012 Apr 15;240(8):983-90.

Endoscopic placement of ureteral stents for treatment of congenital bilateral ureteral stenosis in a dog.

Lam NK, Berent AC, Weisse CW, Bryan C, Mackin AJ, Bagley DH.

Case Description-A 5-year-old 8.6-kg (18.9-lb) spayed female Pug was evaluated because of chronic hematuria and recurrent urinary tract infections. **Clinical Findings-**Excretory urography, ultrasonography, and excretory CT urography were performed. Results indicated that the dog had bilateral hydronephrosis and hydroureter and suspected proximal ureteral stenosis. Retrograde ureteropyelography confirmed the presence of stenosis at the ureteropelvic junction of each ureter, along with a large amount of endoluminal ureteral debris. Clinical findings suggested that the dog had a congenital bilateral anomaly of the upper urinary tract. **Treatment and Outcome-**The dog was anesthetized, and 2 double-pigtail ureteral stents were placed cystoscopically with fluoroscopic guidance for immediate relief of the ureteropelvic junction obstructions. Each stent extended from the left or right renal pelvis to the urinary bladder. The procedures and the patient's recovery from anesthesia were uncomplicated. Continuing improvements in severity of hydronephrosis, hydroureter, and dysuria were evident during routine follow-up examinations at 2, 4, 12, 16, and 45 weeks after stent placement. Over the subsequent 12 months, all clinical signs remained resolved other than a urinary tract infection that was successfully treated with antimicrobials. **Clinical Relevance-**Ureteral stenosis should be considered as a differential diagnosis for hydronephrosis in dogs, particularly when urinary tract calculi or neoplasia is not present. Chronic hematuria and recurrent urinary tract infections can be associated with this condition. Placement of ureteral stents may be a successful treatment option for ameliorization of congenital ureteral obstructions.

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J Am Vet Med Assoc. 2012 Aug 1;241(3):348-57.

Use of locking-loop pigtail nephrostomy catheters in dogs and cats: 20 cases (2004-2009).

Berent AC, Weisse CW, Todd KL, Bagley DH.

Objective-To describe the procedure and clinical usefulness of locking-loop pigtail nephrostomy catheter (PNC) placement in dogs and cats. Design-Retrospective case series. Animals-16 cats (18 kidneys) and 4 dogs (4 kidneys) that underwent PNC placement. Procedures-Medical records of patients that underwent PNC placement were reviewed. The PNCs were placed percutaneously with ultrasonographic and fluoroscopic guidance or via a ventral midline laparotomy with fluoroscopic guidance. Either a modified Seldinger technique or a 1-stab trocar introduction technique was used for PNC placement. Preoperative renal pelvic size, postoperative renal pelvic decompression, catheter patency, serum biochemical changes, and results of microbial culture of urine samples were reviewed. Length of time the catheter was in place, reason and method for catheter removal, complications, and clinical outcomes were noted. Results-Reasons for PNC placement were ureterolithiasis (15 kidneys), ureteral stricture (3), malignant obstruction (2), and percutaneous nephrolithotomy (2). Seven of 22 catheters were placed percutaneously, and 15 were placed via a ventral midline laparotomy. Catheters were either size 5F (n = 17) or 6F (5). The PNCs remained indwelling for a median of 7 days (range, 1 to 28 days). Catheter-associated complications included urine leakage (n = 1) and accidental dislodgement by the patient at home (1). All catheters performed successfully by providing temporary urine diversion and drainage for successful renal pelvis decompression. Conclusions and Clinical Relevance-Placement of locking-loop PNCs was safe, effective, and well tolerated in dogs and cats for temporary urine diversion to achieve renal pelvis decompression.

J Am Vet Med Assoc. 2012 Sep 1;241(5):603-7.

Use of fluoroscopically guided percutaneous antegrade urethral catheterization for the treatment of urethral obstruction in male cats: 9 cases (2000-2009).

Holmes ES, Weisse C, Berent AC.

Objective-To describe the technique and determine outcome for male cats with urethral obstruction treated with fluoroscopically guided percutaneous antegrade urethral catheterization (PAUC). Design-

Retrospective case series. Animals-9 client-owned neutered male cats with urethral obstruction and inability to pass a retrograde urinary catheter. Procedures-Information regarding the procedure and hospitalization was obtained from medical records. Long-term follow-up was obtained via medical record review or telephone interview. Results-Diagnoses included iatrogenic urethral tear (n = 6), obstructive urethral calculi (1), urethral ulceration (1), and urethral stricture (1). Seven of the 9 procedures were successful. The 2 patients in which PAUC failed had mechanical obstructions preventing guide wire access across the urethral obstruction. Procedure times ranged from 25 to 120 minutes. No complications were noted in any patients during the procedure. One patient was euthanized because of unrelated disease. Follow-up information was available for 6 of 8 surviving patients. No complications that could be directly attributed to the procedure were noted. All 6 patients had a perineal urethrostomy performed 0 days to 6 weeks following the procedure because of reobstruction of the lower urinary tract. None of these patients had documented urethral strictures and none had recurrence of clinical signs following perineal urethrostomy. Conclusions and Clinical Relevance-Results suggested that PAUC can be a simple, rapid, minimally invasive, and safe technique to facilitate transurethral catheterization in select cases. Patients with iatrogenic urethral tears may be good candidates. Patients with impacted urethral calculi, severe strictures or ulcerations, or a nondistended urinary bladder may be less amenable to PAUC.

J Am Vet Med Assoc. 2012 Nov 1;241(9):1185-9. doi: 10.2460/javma.241.9.1185.

The effect of preoperative antimicrobial administration on culture results in dogs undergoing cystotomy.

Buote NJ, Kovak-McClaran JR, Loar AS, Cherrone KL.

Objective-To evaluate the effect of preoperative antimicrobial administration on culture results in dogs undergoing cystotomy as a treatment for urolithiasis. Design-Prospective controlled study. Animals-41 dogs undergoing cystotomy for cystic calculi removal. Procedures-Urine samples were collected at time of anesthetic induction and during surgery prior to cystotomy, and a mucosal biopsy and culturette swab was collected during surgery from a control group, which received antimicrobials only after surgical culture sample collection, and from an experimental group, which received antimicrobials at the time of anesthetic induction. Results-17 of 41 patients had positive culture results at anesthetic induction. Twenty of 41 patients had positive results of cultures for the surgical sample. No dogs that had positive results before antimicrobial administration had negative results after antimicrobial administration. There were no significant changes to urinalysis results regardless of group. Calcium monohydrate uroliths were the most common stone removed (24/41), followed by magnesium ammonium phosphate uroliths (11/41). Conclusions and Clinical Relevance-There was no difference in culture results (positivity and bacterial type) when antimicrobials were given at anesthetic induction versus after surgical culture sample collection for dogs undergoing cystotomy for cystic calculi removal.

Journal of the American Animal Hospital Association

J Am Anim Hosp Assoc. 2012 May-Jun;48(3):172-5. Epub 2012 Apr 3.

Adverse reactions following administration of an ionic iodinated contrast media in anesthetized dogs.

Vance A, Nelson M, Hofmeister EH.

This retrospective study was conducted to identify hemodynamic alterations associated with the administration of an ionic iodinated contrast media in dogs. Case records of 49 dogs that were anesthetized for computed tomography scanning were reviewed. Values for heart rate (HR) and direct arterial pressure were obtained. Overall, 37% of dogs had a $\geq 20\%$ change in either HR or systolic arterial

pressure from baseline values. Four dogs (8%) became tachycardic and two dogs (4%) became bradycardic. Eight dogs (16%) became hypertensive and two dogs (4%) became hypotensive. A significant proportion of dogs experienced changes in HR and blood pressure following IV administration of an ionic iodinated contrast media under general anesthesia.

J Am Anim Hosp Assoc. 2012 May-Jun;48(3):203-8. Epub 2012 Apr 3.

Cytologic diagnosis of disseminated histoplasmosis in the wall of the urinary bladder of a cat.

Taylor AR, Barr JW, Hokamp JA, Johnson MC, Young BD.

A 10 yr old domestic longhair presented with a 2.5 mo history of recurrent hematuria. Abdominal ultrasound examination demonstrated a thickened urinary bladder, abdominal lymphadenopathy, and a thickened and rounded spleen. Cytologic examination of fine-needle aspirate samples revealed *Histoplasma capsulatum* organisms in the urinary bladder wall and spleen. The cat was treated with itraconazole (10 mg/kg per os q 24 hr for 2.5 wk). The cat was euthanized after 19 days of treatment because of lack of improvement. To the authors' knowledge, this is the first documented case of feline disseminated histoplasmosis diagnosed in the urinary bladder wall.

J Am Anim Hosp Assoc. 2012 Jul;48(4):256-60. Epub 2012 May 18.

Clinical leptospirosis in three cats (2001-2009).

Arbour J, Blais MC, Carioto L, Sylvestre D.

Based on previous research, cats were thought to have been resistant to the development of clinical signs following infection with *Leptospira* spp. This case report presents three confirmed, naturally infected clinical cases of feline leptospirosis. The cases presented were all indoor/outdoor cats that were known to hunt. They were also all presented at different stages of renal insufficiency; however, they did not show any liver involvement. The authors suggest that there may be a longer incubation period in cats than dogs and recommend further research in the form of a large, clinical study.

J Am Anim Hosp Assoc. 2012 Sep;48(5):366-71. Epub 2012 Jul 27.

L-2-hydroxyglutaric Aciduria in Two Female Yorkshire Terriers.

Sanchez-Masian DF, Artuch R, Mascort J, Jakobs C, Salomons G, Zamora A, Casado M, Fernandez M, Recio A, Lujan A.

Two female Yorkshire terrier puppies were presented with generalized tonic-clonic seizures and ataxia. MRI revealed bilaterally symmetrical, diffuse regions of gray matter hyperintensity on T2-weighted and fluid-attenuated inversion recovery sequences. Urinary organic acids were quantified by gas chromatography-mass spectroscopy and were consistent with a diagnosis of L-2-hydroxyglutaric aciduria (L2HGA). The L2HGDH gene encodes for the enzyme L-2-hydroxyglutarate dehydrogenase, which helps break down L-2-hydroxyglutaric acid. In both puppies described in this report, a homozygous mutation at the translation initiation codon of the homolog canine L2HGDH gene was detected (c.1A>G; p.Met1?), confirming the diagnosis of L2HGA at the DNA level. Canine L2HGA is caused by more than one mutation of L2HGDH, as reported in humans.

J Am Anim Hosp Assoc. 2012 Nov;48(6):390-8. doi: 10.5326/JAAHA-MS-5302. Epub 2012 Oct 1.

Ectopic ureters in male dogs: review of 16 clinical cases (1999-2007).

Anders KJ, McLoughlin MA, Samii VF, Chew DJ, Cannizzo KL, Wood IC, Weisman DL.

Ureteral ectopia is a well-described cause of urinary incontinence in female dogs, but this condition has not been completely characterized in male dogs. Sixteen male dogs with ectopic ureters were evaluated between Jan 1999 and Mar 2007. Male dogs were similar to female dogs with ectopic ureters in terms of breed, presenting complaint, age of onset, and bilateral nature of the ectopia. Diagnosis was made by expert interpretation of imaging techniques such as excretory urography and contrast-enhanced computed tomography (CT). Overall, 11 of 13 dogs that had surgical correction of ectopic ureters were incontinent preoperatively. Urinary continence was restored in 82% of those dogs.

Journal of Veterinary Diagnostic Investigation

J Vet Diagn Invest. 2012 Mar;24(2):301-6. Epub 2012 Feb 7.

Urinary clusterin as a renal marker in dogs.

García-Martínez JD, Tvarijonaviciute A, Cerón JJ, Caldin M, Martínez-Subiela S.

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.

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Journal of Veterinary Emergency and Critical Care

J Vet Emerg Crit Care (San Antonio). 2011 Dec;21(6):587-8. doi: 10.1111/j.1476-4431.2011.00701.x.

It's a 'kidney' not a 'renal'.

Labato MA.

J Vet Emerg Crit Care (San Antonio). 2011 Dec;21(6):648-57. doi: 10.1111/j.1476-4431.2011.00689.x.
Epub 2011 Nov 21.

Characterization of acute kidney injury in hospitalized dogs and evaluation of a veterinary acute kidney injury staging system.

Thoen ME, Kerl ME.

OBJECTIVE: To retrospectively apply standards characterizing acute kidney injury (AKI) used in human medicine to a population of critically ill hospitalized dogs in order to identify dogs with potential AKI based on subtle increases in plasma creatinine concentration.

DESIGN: Retrospective study.

SETTING: University Veterinary Medical Teaching Hospital.

ANIMALS: One hundred and sixty-four client-owned dogs admitted to the intensive care unit.

INTERVENTIONS: None.

MEASUREMENTS AND MAIN RESULTS: Medical records of 164 dogs meeting the study inclusion criteria were reviewed to identify age, results of creatinine measurements, discharge status, length of stay, performance of general anesthesia, number of diagnoses, and calculated survival prediction index scores (SPI2). A veterinary AKI (VAKI) staging system was retrospectively applied to classify dogs based on increase in creatinine concentration from baseline as follows: stage 0 (S0; <150%), stage 1 (S1; 150-199% or $\geq 26.5 \mu\text{mol/L}$ [$\geq 0.3 \text{ mg/dL}$]), stage 2 (S2; 200-299%), or stage 3 (S3; $\geq 300\%$). Of the dogs evaluated, 140/164 were VAKI stage S0, 19/164 were classified as S1, 3/164 as S2, and 2/164 were S3. Mortality rate was greater for S1-3 (13/24; 54.2%) compared to S0 dogs (22/140; 15.7%) ($P < 0.0001$). Length of stay, general anesthesia, and number of diagnoses were not associated with survival. In a logistic regression model, stage and age were jointly, significantly associated with mortality ($P = 0.0002$ and $P = 0.0330$, respectively). Mean SPI2 scores were not different between S0 (0.52) and S1 (0.59) dogs ($P = 0.23$). Only 4/19 (21%) of S1 dogs had a peak plasma creatinine concentration above the laboratory reference interval.

CONCLUSIONS: Dogs meeting VAKI stage 1-3 criteria were less likely to survive to discharge. Small increases in plasma creatinine concentration may be clinically relevant even when absolute values are within reference intervals.

J Vet Emerg Crit Care (San Antonio). 2011 Dec;21(6):679-83. doi: 10.1111/j.1476-4431.2011.00688.x.

Propylene glycol intoxication in a dog.

Claus MA, Jandrey KE, Poppenga RH.

OBJECTIVE: To describe the clinical course, treatment, and outcome of a dog with propylene glycol intoxication. **CASE SUMMARY:** An adult castrated male Australian cattle dog presented to an emergency clinic for an acute onset of ataxia and disorientation after roaming a construction site unsupervised. He tested positive for ethylene glycol using a point-of-care test kit. Treatment for ethylene glycol intoxication included intermittent intravenous boluses of 20% ethanol and hemodialysis. Predialysis and postdialysis blood samples were submitted to the toxicology lab to assess for both ethylene and propylene glycol. The patient tested negative for ethylene glycol and positive for propylene glycol at 1100 mg/dL predialysis and 23 mg/dL postdialysis. The dog made a full recovery. **NEW OR UNIQUE INFORMATION PROVIDED:** To the authors' knowledge, this is the first report of documented propylene glycol intoxication in a dog, as well as the first report to describe hemodialysis as treatment for propylene glycol intoxication in a dog.

J Vet Emerg Crit Care (San Antonio). 2012 Jun;22(3):347-54.

Retrospective evaluation of presenting temperature of urethral obstructed male cats and the association with severity of azotemia and length of hospitalization: 243 cats (2006-2009).

Fults M, Herold LV.

OBJECTIVES: To evaluate whether the presenting rectal temperature and level of azotemia predicts the length of hospitalization (LOH) in a population of obstructed male cats. To describe the relationships between physical examination parameters, blood electrolytes, and azotemia in a clinical population of obstructed male cats.

DESIGN: Retrospective clinical study.

SETTING: Emergency and referral specialty hospitals.

ANIMALS: Two hundred and forty-three male cats that presented with urethral obstruction between 2006 and 2009.

INTERVENTIONS: None.

MEASUREMENTS AND MAIN RESULTS: No significant association between the hours of hospitalization and rectal temperature was detected ($P = 0.39$). Blood urea nitrogen (BUN) and creatinine (CREA) concentrations were positively correlated with LOH ($P < 0.01$). BUN and CREA were significantly higher ($P < 0.01$) for the hypothermic group compared to the normothermic group. Potassium was negatively correlated to heart rate and rectal temperature but positively correlated to BUN and CREA.

CONCLUSION: No association with regard to rectal temperature and LOH could be demonstrated in this population of cats. However, the presence of azotemia in obstructed male cats appears to provide the clinician with additional information regarding the necessary LOH and eventual cost to the client.

Journal of Veterinary Internal Medicine

J Vet Intern Med. 2012 Jan-Feb;26(1):3-17. doi: 10.1111/j.1939-1676.2011.00838.x. Epub 2011 Nov 23.

Cachexia and sarcopenia: emerging syndromes of importance in dogs and cats.

Freeman LM.

Cachexia is the loss of lean body mass (LBM) that affects a large proportion of dogs and cats with congestive heart failure (CHF), chronic kidney disease (CKD), cancer, and a variety of other chronic diseases. Sarcopenia, the loss of LBM that occurs with aging, is a related syndrome, although sarcopenia occurs in the absence of disease. As many of the diseases associated with muscle loss are more common in aging, cachexia and sarcopenia often are concurrent problems. Both cachexia and sarcopenia have important clinical implications because they are associated with increased morbidity and mortality. The pathophysiology of these 2 syndromes is complex and multifactorial, but recent studies have provided new information that has helped to clarify mechanisms and identify potential new targets for treatment. Newly identified mechanisms and pathways that mediate cachexia appear to act by increasing energy requirements, decreasing energy intake, impairing nutrient absorption, and causing metabolic alterations. Whereas cachexia and sarcopenia are important areas of research for drug development in people, they are only beginning to be recognized in veterinary medicine. Greater awareness and earlier diagnosis will help provide practical approaches to managing body weight and lean tissue in dogs and cats, as well as more directed targets for treatment.

J Vet Intern Med. 2012 Jan-Feb;26(1):101-8. doi: 10.1111/j.1939-1676.2011.00840.x. Epub 2011 Nov 23.

Renal resistive index in 55 dogs with degenerative mitral valve disease.

Chetboul V, Daste T, Gouni V, Concordet D, Trehiou-Sechi E, Serres F, Pouchelon JL, Germain CA, Laysol-Lamour C, Lefebvre HP.

BACKGROUND: Azotemia occurs frequently in dogs with degenerative mitral valve disease (DMVD). It could indicate changes in renal hemodynamics.

HYPOTHESIS/OBJECTIVES: To assess the renal resistive index (RI) in dogs with DMVD, and the statistical link between heart failure class, azotemia, echo-Doppler parameters, several plasma variables, and RI.

ANIMALS: Fifty-five dogs with naturally occurring DMVD were used (ISACHC class 1 [n = 28], 2 [n = 19], and 3 [n = 8]).

METHODS: Observational, blinded study, performed under standardized conditions. Physical examination, renal ultrasonography, and echo-Doppler examinations were performed in awake dogs. The RI of the renal, interlobar, and arcuate arteries were measured. Plasma creatinine, urea, and N-terminal pro-B-type natriuretic peptide concentrations (NT-proBNP) were determined. Statistical links between variables and RI were tested by means of a general linear model.

RESULTS: Although the RI of renal and arcuate arteries were unaffected by ISACHC class, the left interlobar RI increased ($P < .001$) from 0.62 ± 0.05 (mean \pm SD) in class 1 to 0.76 ± 0.08 in class 3. It was also higher ($P < .001$) in azotemic (0.74 ± 0.08) than in non-azotemic (0.62 ± 0.05) dogs. Similar findings were observed for right interlobar RI. Univariate analysis showed a positive statistical link between NT-proBNP ($P = .002$), urea ($P < .001$), creatinine ($P = .002$), urea-to-creatinine ratio ($P < .001$), left atrium-to-aorta ratio ($P < .001$), regurgitation fraction ($P < .001$), systolic pulmonary arterial pressure ($P < .001$), shortening fraction ($P = .035$), and RI.

CONCLUSION AND CLINICAL IMPORTANCE: In dogs with DMVD, interlobar RI increases with heart failure severity and azotemia but a cause and effect relationship remains to be established.

J Vet Intern Med. 2012 Jan-Feb;26(1):149-52. doi: 10.1111/j.1939-1676.2011.00852.x. Epub 2011 Dec 19. Effects of recent *Leptospira* vaccination on whole blood real-time PCR testing in healthy client-owned dogs.

BACKGROUND: Bacterin-based canine *Leptospira* vaccines could present a challenge for the use of whole blood real-time polymerase chain reaction (PCR) as a diagnostic tool. Recent vaccination could induce positive results if the targeted DNA fragment is present within the vaccine and in the blood of the recently vaccinated dog.

OBJECTIVES: The objective of this study was to assess whether 2 available 4-serovar vaccines induce a positive real-time PCR reaction in the blood of healthy recently vaccinated dogs.

ANIMALS: Twenty healthy dogs.

METHODS: This was a prospective study. Dogs were assigned to 1 of 2 vaccine groups. Both vaccines were culture-based and include *Leptospira interrogans* serovars Pomona, Canicola, and Icterohaemorrhagiae and *Leptospira kirschneri* serovar Grippotyphosa. Whole blood for real-time PCR and serum for the microscopic agglutination test (MAT) were collected prior to and 3 and 7 days after vaccination and weekly thereafter for 8 weeks. Two real-time PCR tests targeting 2 different genes were performed independently in a blinded fashion.

RESULTS: Both *Leptospira* vaccines produced positive real-time PCR reactions when assayed undiluted or diluted 1 : 100 in canine blood. However, blood samples drawn from all dogs at all time points after vaccination were negative on PCR. All dogs developed MAT titers.

CONCLUSIONS AND CLINICAL IMPORTANCE: Recent vaccination with 2 commercially available vaccines does not interfere with the use of real-time PCR for the identification of acute *Leptospira* infection in dogs.

J Vet Intern Med. 2012 Mar;26(2):238-43.

Renal disease in cats infected with feline immunodeficiency virus.

Baxter KJ, Levy JK, Edinboro CH, Vaden SL, Tompkins MB.

BACKGROUND: Feline immunodeficiency virus (FIV) and human immunodeficiency virus (HIV) infection cause similar clinical syndromes of immune dysregulation, opportunistic infections, inflammatory diseases, and neoplasia. Renal disease is the 4th most common cause of death associated with HIV infection.

OBJECTIVE: To investigate the association between FIV infection and renal disease in cats.

ANIMALS: Client-owned cats (153 FIV-infected, 306 FIV-noninfected) and specific-pathogen-free (SPF) research colony cats (95 FIV-infected, 98 FIV-noninfected).

METHODS: A mixed retrospective/prospective cross-sectional study. Blood urea nitrogen (BUN), serum creatinine, urine specific gravity (USG), and urine protein:creatinine ratio (UPC) data were compared between FIV-infected and FIV-noninfected cats. In FIV-infected cats, total CD4+ and CD8+ T lymphocytes were measured using flow cytometry, and CD4+:CD8+ T lymphocyte ratio was calculated. Renal azotemia was defined as a serum creatinine ≥ 1.9 mg/dL with USG ≤ 1.035 . Proteinuria was defined as a UPC > 0.4 with an inactive urine sediment.

RESULTS: Among the client-owned cats, no association was detected between FIV infection and renal azotemia ($P = .24$); however, a greater proportion of FIV-infected cats were proteinuric (25.0%, 16 of 64 cats) compared to FIV-noninfected cats (10.3%, 20 of 195 cats) ($P < .01$). Neither neuter status nor health status were risk factors for proteinuria in FIV-infected cats, but UPC was positively correlated with the CD4+:CD8+ T lymphocyte ratio (Spearman's rho = 0.37, $P = .01$). Among the SPF research colony cats, no association was detected between FIV infection and renal azotemia ($P = .21$) or proteinuria ($P = .25$).

CONCLUSIONS AND CLINICAL IMPORTANCE: Proteinuria but not azotemia was associated with natural FIV infection.

J Vet Intern Med. 2012 Mar;26(2):259-68. doi: 10.1111/j.1939-1676.2011.00878.x. Epub 2012 Jan 23.

Renal Amyloidosis in Dogs: A Retrospective Study of 91 Cases with Comparison of the Disease between Shar-Pei and Non-Shar-Pei Dogs.

Segev G, Cowgill LD, Jessen S, Berkowitz A, Mohr CF, Aroch I.

BACKGROUND: Renal amyloidosis (RA) is a progressive and fatal renal disease.

HYPOTHESIS: Clinical and pathologic manifestations of RA differ between Chinese Shar-Pei (CSPs) and non-Shar-Pei (NSPs) dogs.

ANIMALS: 91 client-owned dogs.

METHODS: Retrospective review of medical records of dogs with a histological diagnosis of RA. Clinical and clinicopathologic data, hospitalization, complications, and outcome were compared between CSPs and NSPs.

RESULTS: Comorbid diseases were present in 64% of all dogs. CSPs were significantly younger compared to NSPs (median, 4.8 years; range: 3.6-17 versus median: 9.0 years; range: 2.4-11.1; $P < .0001$). The frequency of hypoalbuminemia, the most common biochemical abnormality, was higher in NSPs compared to CSPs (100% versus 64.7%, respectively; $P < .001$). Median serum creatinine concentration at presentation was 5.5 mg/dL, and was 3-fold higher in CSPs compared to NSPs ($P = .005$). Increased urine protein : creatinine ratio was present in 96% of all dogs. Nephrotic syndrome was present in 10% of NSPs but not in CSPs. Glomerular amyloid deposition, present in both CSPs (78.6%) and NSPs (95.6%) was most commonly diffuse, global, and severe. Renal medullary amyloidosis was more common in CSPs (100%) compared to NSPs (49.0%, $P = .002$), as was extrarenal amyloid deposition. The median survival time of all dogs was 5 days (range: 0-443 days). Serum creatinine concentration was significantly and negatively associated with survival ($P = .025$).

CONCLUSIONS AND CLINICAL RELEVANCE: The clinical and pathologic manifestations of amyloidosis differ between CSPs and NSPs. The survival time observed herein was unexpectedly low, and argues for early surveillance and management of the underlying predisposing conditions.

J Vet Intern Med. 2012 Mar;26(2):275-81.

Clinicopathological variables predicting progression of azotemia in cats with chronic kidney disease.

Chakrabarti S, Syme HM, Elliott J.

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.

J Vet Intern Med. 2012 Mar;26(2):282-93.

Urinary biomarkers of renal disease in dogs with x-linked hereditary nephropathy.

Nabity MB, Lees GE, Cianciolo R, Boggess MM, Steiner JM, Suchodolski JS.

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), β 2-microglobulin (uB2M), N-acetyl- β -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 uB2M, 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.

J Vet Intern Med. 2012 Mar;26(2):294-301.

Characterization of the genetic basis for autosomal recessive hereditary nephropathy in the english springer spaniel.

Nowend KL, Starr-Moss AN, Lees GE, Berridge BR, Clubb FJ, Kashtan CE, Nabity MB, Murphy KE.

BACKGROUND: Autosomal recessive hereditary nephropathy (ARHN) was diagnosed in 2 English Springer Spaniels (ESS), a breed not previously reported to be affected by hereditary nephropathy (HN).

OBJECTIVE: To identify and characterize the genetic cause of ARHN in ESS.

ANIMALS: Sixty-three ESS (2 with ARHN, 2 obligate carriers, and 59 others), 2 mixed-breed dogs with X-linked HN, and 2 English Cocker Spaniels (ECS) with ARHN were included.

METHODS: ARHN was diagnosed based on transmission electron microscopy and immunostaining of kidney. DNA from affected dogs was screened for the mutation known to cause ARHN in ECS. Quantities of COL4A3, COL4A4, and COL4A5 mRNA transcripts in renal cortex were determined using quantitative reverse transcription-polymerase chain reaction (qRT-PCR) for ARHN-affected dogs and 7 other dogs. The coding regions of COL4A3 and COL4A4 were sequenced for the 2 ARHN-affected ESS and an unaffected dog. Exon 30 of COL4A4 was sequenced for all 63 ESS.

RESULTS: qRT-PCR indicated a significant reduction in transcript levels of both COL4A3 and COL4A4 mRNA in the kidney of ARHN-affected ESS. Sequencing identified a single nucleotide substitution in COL4A4 at base 2806 resulting in a premature stop codon. Thirteen of 25 related dogs were identified as carriers.

CONCLUSIONS AND CLINICAL IMPORTANCE: A mutation highly likely to cause ARHN in ESS has been identified.

J Vet Intern Med. 2012 Mar;26(2):363-9.

The use of darbepoetin to stimulate erythropoiesis in anemia of chronic kidney disease in cats: 25 cases.

Chalhoub S, Langston CE, Farrelly J.

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 ≥ 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 $\mu\text{g}/\text{kg}/\text{wk}$ 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.

J Vet Intern Med. 2012 Mar;26(2):238-43.

Renal disease in cats infected with feline immunodeficiency virus.

Baxter KJ, Levy JK, Edinboro CH, Vaden SL, Tompkins MB.

BACKGROUND: Feline immunodeficiency virus (FIV) and human immunodeficiency virus (HIV) infection cause similar clinical syndromes of immune dysregulation, opportunistic infections, inflammatory diseases, and neoplasia. Renal disease is the 4th most common cause of death associated with HIV infection.

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ANIMALS: 91 client-owned dogs.

METHODS: Retrospective review of medical records of dogs with a histological diagnosis of RA. Clinical and clinicopathologic data, hospitalization, complications, and outcome were compared between CSPs and NSPs.

RESULTS: Comorbid diseases were present in 64% of all dogs. CSPs were significantly younger compared to NSPs (median, 4.8 years; range: 3.6-17 versus median: 9.0 years; range: 2.4-11.1; $P < .0001$). The frequency of hypoalbuminemia, the most common biochemical abnormality, was higher in NSPs compared to CSPs (100% versus 64.7%, respectively; $P < .001$). Median serum creatinine concentration at presentation was 5.5 mg/dL, and was 3-fold higher in CSPs compared to NSPs ($P = .005$). Increased urine protein : creatinine ratio was present in 96% of all dogs. Nephrotic syndrome was present in 10% of NSPs but not in CSPs. Glomerular amyloid deposition, present in both CSPs (78.6%) and NSPs (95.6%) was most commonly diffuse, global, and severe. Renal medullary amyloidosis was more common in CSPs (100%) compared to NSPs (49.0%, $P = .002$), as was extrarenal amyloid deposition. The median survival

time of all dogs was 5 days (range: 0-443 days). Serum creatinine concentration was significantly and negatively associated with survival ($P = .025$).

CONCLUSIONS AND CLINICAL RELEVANCE: The clinical and pathologic manifestations of amyloidosis differ between CSPs and NSPs. The survival time observed herein was unexpectedly low, and argues for early surveillance and management of the underlying predisposing conditions.

J Vet Intern Med. 2012 Mar;26(2):275-81.

Clinicopathological variables predicting progression of azotemia in cats with chronic kidney disease.

Chakrabarti S, Syme HM, Elliott J.

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.

J Vet Intern Med. 2012 Mar;26(2):282-93.

Urinary biomarkers of renal disease in dogs with x-linked hereditary nephropathy.

Nabity MB, Lees GE, Cianciolo R, Boggess MM, Steiner JM, Suchodolski JS.

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), β_2 -microglobulin (uB2M), N-acetyl- β -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, ulgG/c, and uB2M, 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.

J Vet Intern Med. 2012 Mar;26(2):294-301.

Characterization of the genetic basis for autosomal recessive hereditary nephropathy in the english springer spaniel.

Nowend KL, Starr-Moss AN, Lees GE, Berridge BR, Clubb FJ, Kashtan CE, Nabity MB, Murphy KE.

BACKGROUND: Autosomal recessive hereditary nephropathy (ARHN) was diagnosed in 2 English Springer Spaniels (ESS), a breed not previously reported to be affected by hereditary nephropathy (HN).

OBJECTIVE: To identify and characterize the genetic cause of ARHN in ESS.

ANIMALS: Sixty-three ESS (2 with ARHN, 2 obligate carriers, and 59 others), 2 mixed-breed dogs with X-linked HN, and 2 English Cocker Spaniels (ECS) with ARHN were included.

METHODS: ARHN was diagnosed based on transmission electron microscopy and immunostaining of kidney. DNA from affected dogs was screened for the mutation known to cause ARHN in ECS. Quantities of COL4A3, COL4A4, and COL4A5 mRNA transcripts in renal cortex were determined using quantitative reverse transcription-polymerase chain reaction (qRT-PCR) for ARHN-affected dogs and 7 other dogs. The coding regions of COL4A3 and COL4A4 were sequenced for the 2 ARHN-affected ESS and an unaffected dog. Exon 30 of COL4A4 was sequenced for all 63 ESS.

RESULTS: qRT-PCR indicated a significant reduction in transcript levels of both COL4A3 and COL4A4 mRNA in the kidney of ARHN-affected ESS. Sequencing identified a single nucleotide substitution in COL4A4 at base 2806 resulting in a premature stop codon. Thirteen of 25 related dogs were identified as carriers.

CONCLUSIONS AND CLINICAL IMPORTANCE: A mutation highly likely to cause ARHN in ESS has been identified.

J Vet Intern Med. 2012 Mar;26(2):363-9.

The use of darbepoetin to stimulate erythropoiesis in anemia of chronic kidney disease in cats: 25 cases.

Chalhoub S, Langston CE, Farrelly J.

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 ≥ 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 $\mu\text{g}/\text{kg}/\text{wk}$ 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.

J Vet Intern Med. 2012 May;26(3):500-5.

Prognostic factors and a prognostic index for cats with acute kidney injury.

Lee YJ, Chan JP, Hsu WL, Lin KW, Chang CC.

BACKGROUND: The clinical manifestations of acute kidney injury (AKI) range from mild to fatal in cats; however, prognosis factors have been rarely studied.

HYPOTHESIS/OBJECTIVES: To find the clinical factors significantly correlated with the outcome among cats with AKI and to develop a simple prognostic index.

ANIMALS: Seventy cats with AKI were recruited.

METHODS: Demographic and clinicopathological data obtained from 70 cats with AKI were retrospectively collected. Student's t-test or Mann-Whitney U-test and Pearson chi-square test or Fisher's exact were applied to determine the factors associated with survival in cats with AKI. Using logistic regression, the statistically significant factors associated with prognosis were identified and a new prediction model was generated.

RESULTS: The overall case fatality rate was 64% (45/70). The results showed that nonsurviving cats had significantly lower levels of PCV, WBC, RBC, LDH and albumin, a lower albumin/globulin ratio, lower blood glucose, and a reduced body temperature, as well as being older. Serum urea and creatinine concentrations were not statistically significant as prognostic factors, but a decrease in these 2 variables in 3 days was significantly related to a reduction in death. A summary prognostic index including body temperature and LDH and albumin concentrations had area under the receiver-operating characteristic curve (AUROC) for predicting death of 0.86 ($P < .05$) and a cut-off value of 0.82, a sensitivity of 77% and a specificity of 90%.

J Vet Intern Med. 2012 May;26(3):506-12.

Evaluation of the efficacy and safety of high dose short duration enrofloxacin treatment regimen for uncomplicated urinary tract infections in dogs.

Westropp JL, Sykes JE, Irom S, Daniels JB, Smith A, Keil D, Settje T, Wang Y, Chew DJ.

BACKGROUND: Uncomplicated urinary tract infections (UTI) in dogs usually are treated with antimicrobial drugs for 10-14 days. Shorter duration antimicrobial regimens have been evaluated in human patients.

HYPOTHESIS: A high dose short duration (HDS) enrofloxacin protocol administered to dogs with uncomplicated UTI will not be inferior to a 14-day treatment regimen with amoxicillin-clavulanic acid.

ANIMALS: Client-owned adult, otherwise healthy dogs with aerobic bacterial urine culture yielding $\geq 10^3$ CFU/mL of bacteria after cystocentesis.

METHODS: Prospective, multicenter, controlled, randomized blinded clinical trial. Enrolled dogs were randomized to group 1 (enrofloxacin 18-20 mg/kg PO q24h for 3 days) or group 2 (amoxicillin-clavulanic acid 13.75-25 mg/kg PO q12h for 14 days). Urine cultures were obtained at days 0, 10, and 21.

Microbiologic and clinical cure rates were evaluated 7 days after antimicrobial treatment was discontinued. Lower urinary tract signs and adverse events also were recorded.

RESULTS: There were 35 dogs in group 1 and 33 in group 2. The microbiologic cure rate was 77.1 and 81.2% for groups 1 and 2, respectively. The clinical cure rate was 88.6 and 87.9% for groups 1 and 2, respectively. Cure rates between groups did not differ according to the selected margin of noninferiority.

CONCLUSIONS AND CLINICAL IMPORTANCE: HDS enrofloxacin treatment was not inferior to a conventional amoxicillin-clavulanic acid protocol for the treatment of uncomplicated bacterial UTI in

dogs. Further research is warranted to determine if this protocol will positively impact owner compliance and decrease the emergence of antimicrobial resistance.

J Vet Intern Med. 2012 May;26(3):526-31.

Intravesical application of lidocaine and sodium bicarbonate in the treatment of obstructive idiopathic lower urinary tract disease in cats.

Zeza L, Reusch CE, Gerber B.

BACKGROUND: In human patients with interstitial cystitis, intravesical instillation of alkalinized lidocaine sometimes is associated with sustained amelioration of symptoms beyond the acute treatment phase. Interstitial cystitis shares many features in common with feline idiopathic cystitis.

OBJECTIVE: To evaluate whether intravesical instillation of alkalinized lidocaine decreases recurrence of urethral obstruction and severity of clinical signs in cats with obstructive idiopathic LUTD.

ANIMALS: Twenty-six cats with obstructive idiopathic LUTD. Twelve cats in case group (treatment with alkalinized lidocaine) and 14 control cats (treatment with placebo or standard treatment).

METHODS: Cats were randomly assigned to treatment (2 or 4 mg/kg lidocaine and sodium bicarbonate) or placebo groups (0.2 mL/kg saline solution and sodium bicarbonate). The intravesical instillation was done once a day for 3 days. Some cats underwent standard treatment only (indwelling urinary catheter for 3 days without intravesical instillations). A 2-week, 1-month, and 2-month follow-up after treatment was made using a questionnaire. The recurrence rate and amelioration scores of clinical signs were assessed and compared.

RESULTS: Recurrence of urethral obstruction was 58% (7/12) in the case group and 57% (8/14) in the control group. Amelioration scores were similar between the 2 groups.

CONCLUSION AND CLINICAL IMPORTANCE: Intravesical administration of lidocaine for up to 3 consecutive days had no apparent beneficial effect on decreasing recurrence rate and severity of clinical signs in cats with obstructive idiopathic LUTD.

J Vet Intern Med. 2012 May;26(3):565-74.

Long-Term Follow-Up of Renal Function in Dogs after Treatment for ACTH-Dependent Hyperadrenocorticism.

Smets PM, Lefebvre HP, Meij BP, Croubels S, Meyer E, Van de Maele I, Daminet S.

BACKGROUND: Systemic hypertension and proteinuria are frequent complications in dogs with Cushing's syndrome and do not always resolve after treatment of hypercortisolism. Therefore, dogs with Cushing's syndrome may be at risk for renal dysfunction before and after treatment.

HYPOTHESIS/OBJECTIVES: To assess renal function in dogs with ACTH-dependent hyperadrenocorticism (ADHAC) before and after treatment.

ANIMALS: A total of 19 dogs with ADHAC and 12 control dogs.

METHODS: Renal function was assessed before and at 1, 3, 6, and 12 months after treatment. Twelve dogs were treated with trilostane and 7 dogs by transsphenoidal hypophysectomy. Routine renal markers were measured and urinary albumin (uALB), immunoglobulin G (uIgG), and retinol-binding protein (uRBP) were assessed by ELISA. Urinary N-acetyl- β -D-glucosaminidase (uNAG) was determined colorimetrically. All urinary markers were indexed to urinary creatinine concentration (c). Plasma clearance of creatinine (Cl(creat)), exo-iohexol (Cl(exo)), and endo-iohexol (Cl(endo)) was used to measure glomerular filtration rate (GFR). Data were analyzed using a general linear model.

RESULTS: Serum creatinine and urea concentrations increased post-treatment, but remained within reference ranges. Plasma Cl(creat) and Cl(endo) were significantly lower post-treatment, whereas Cl(exo) was not different. Urinary protein-to-creatinine ratio (UPC), uALB/c, uIgG/c, and uRBP/c were decreased

post-treatment, but at 12 months 5/13 dogs remained proteinuric. Urinary NAG/c did not change significantly.

CONCLUSIONS AND CLINICAL IMPORTANCE: A decrease in GFR and persistent proteinuria post-treatment may warrant the clinician's attention. Future research including renal histopathology of dogs with persistent proteinuria or low GFR is needed to further assess renal outcome.

J Vet Intern Med. 2012 May;26(3):688-9.

The prevalence of leptospiral antibodies in free roaming cats in worcester county, massachusetts.

Markovich JE, Ross L, McCobb E.

BACKGROUND: Serosurveys of cats for exposure to or infection with leptospire have been published from other geographic areas, but none for cats in the United States in the past 4 decades.

HYPOTHESIS/OBJECTIVES: The purpose of this pilot study was to determine the prevalence of leptospiral antibodies in a population of free roaming cats in Worcester County, (central) Massachusetts.

ANIMALS: Sixty-three free roaming cats presenting to a trap-neuter-return (TNR) program.

METHODS: Prospective study. Serum was collected from 63 free roaming cats presented to a university associated TNR. Microagglutination titers to *Leptospira interrogans* serovars Autumnalis, Hardjo, Bratislava, Icterohaemorrhagiae, Canicola, Pomona, and *L. kirshneri* Grippotyphosa were determined.

RESULTS: A total of 3 of 63 cats (4.8%) had a titer of 1 : 100 or greater to one or more serovars, with Autumnalis being the most common. None of the cats were seropositive to Hardjo, Grippotyphosa, or Canicola.

CONCLUSIONS AND CLINICAL IMPORTANCE: These results are consistent with previously published seroprevalence rates in feral cats. Additional studies are required to determine the role of leptosporosis in clinical disease in the domestic cat.

J Vet Intern Med. 2012 Sep;26(5):1093-8. doi: 10.1111/j.1939-1676.2012.00985.x. Epub 2012 Aug 7.

Acute azotemia as a predictor of mortality in dogs and cats.

Harison E, Langston C, Palma D, Lamb K.

BACKGROUND: Acute kidney injury (AKI) has been shown to be a predictor of mortality in human medicine. Published studies in the veterinary literature evaluating relative changes in serum creatinine concentration as a prognostic factor are limited.

OBJECTIVE: To evaluate an AKI grading system based on serum creatinine concentration to determine if it correlates with outcome prediction in dogs and cats.

ANIMALS: Six hundred forty-five dogs and 209 cats that had at least 2 serum creatinine concentration measurements measured within 7 days.

METHODS: Retrospective study. Dogs and cats with an initial serum creatinine concentrations of ≤ 1.6 mg/dL and that had more than 1 concentration measured within 2, 3, and 7 days were placed into levels (0-2) based on absolute changes. Mortality then was determined at 30 and 90 days.

RESULTS: Based on odds ratios calculated with a 95% confidence interval, dogs placed in level 1 within 2 days were approximately 3 times more likely to die within 90 days. Dogs placed in level 2 within 2, 3, or 7 days were approximately 3 times more likely to die within 30 or 90 days. Cats placed in level 2 within 3 or 7 days were approximately 3 times more likely to die at 30 days and 4 times more likely to die if placed in this level within 7 days. If placed in level 2 within 2 or 3 days, cats were approximately 3 times more likely to die within 90 days.

CONCLUSIONS AND CLINICAL IMPORTANCE: Detecting increasing severity of azotemia helps predict mortality in dogs and cats.

J Vet Intern Med. 2012 Sep;26(5):1099-106. doi: 10.1111/j.1939-1676.2012.00964.x. Epub 2012 Jul 2.

Pulmonary abnormalities in dogs with renal azotemia.

Le Boedec K, Heng HG, Snyder PW, Pressler BM.

BACKGROUND: Clinical signs associated with respiratory tract disease are regularly encountered in people with kidney failure, and have been anecdotally reported in dogs.

OBJECTIVES: To compare clinical signs indicative of pulmonary disease, clinicopathologic findings, radiographic abnormalities, and histologic findings in dogs with acute kidney injury (AKI) or International Renal Interest Society Stage 3 or 4 chronic kidney disease (CKD) to nonazotemic dogs. To determine associations between abnormalities indicative of pulmonary disease and outcome in azotemic dogs.

ANIMALS: One hundred sixty-seven pet dogs (54 AKI dogs, 50 CKD dogs, 63 nonazotemic control dogs diagnosed with intracranial disease).

METHODS: Retrospective cohort study comparing signalment, clinical signs, clinicopathologic variables, prevalence, and severity of pulmonary radiographic patterns, histopathologic findings, and survival times in AKI, CKD, and control dogs.

RESULTS: Clinical signs of pulmonary disease were significantly more common in AKI dogs. Prevalence of an alveolar lung pattern was greater in AKI and CKD dogs. Alveolar mineralization was the most common pulmonary histologic lesion in AKI dogs (6 of 8 dogs), with concurrent alveolar concretions or mineralization of pulmonary vessels or bronchioles noted in 1 dog each; mineralization of lung tissues was not noted in control dogs. Neither clinical signs nor presence of an alveolar pattern were associated with likelihood of survival to discharge or median number of days from discharge until death.

CONCLUSIONS AND CLINICAL IMPORTANCE: Abnormalities indicative of pulmonary disease are more common in azotemic dogs than in control dogs; however, prognosis is not associated with presence of clinical or radiographic pulmonary dysfunction.

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J Vet Med Sci. 2011 Dec;73(12):1579-84. Epub 2011 Jul 29.

Decreases in podocin, CD2-associated protein (CD2AP) and tensin2 may be involved in albuminuria during septic acute renal failure.

Kato T, Mizuno-Horikawa Y, Mizuno S.

Podocytes have a peculiar structure constituting slit diaphragm (SD) and foot process (FP), and play essential roles in the glomerular filtration barrier. There is now ample evidence that SD- and FP-associated molecules, such as podocin and CD2-associated protein (CD2AP), are down-regulated during albuminuria of chronic kidney disease. However, it is still unclear whether these molecules are altered during acute renal failure (ARF) with albuminuria. Using lipopolysaccharide (LPS)-treated mice as a model of septic ARF, we provide evidence that the expression of SD- and FP-associated molecules becomes faint, along with albuminuria. In the LPS-treated mice, urinary albumin levels gradually increased, associated with the elevation of blood urea nitrogen levels, indicating the successful induction of albuminuria during septic ARF. In this pathological process, glomerular podocin expression became faint, especially at 36 hr post-LPS challenge (i.e., a peak of albuminuria). Likewise, LPS treatment led to a significant decrease in CD2AP, an anchorage between podocin and F-actin. With regard to this, tensin2 is a novel molecule that stabilizes F-actin extension. Interestingly, glomerular tensin2 expression levels were also decreased during the albuminuric phase, associated with losses of glomerular F-actin and synaptopodin under septic states. As a result, there were some lesions of podocytic FP effacement, as shown by electron microscopy. Based on these data, we emphasize the importance of concomitant decreases in podocin, CD2AP and tensin2 during septic ARF-associated proteinuria.

J Vet Med Sci. 2011 Dec;73(12):1669-75. Epub 2011 Aug 11.

Juvenile nephropathy in a Boxer dog resembling the human nephronophthisis-medullary cystic kidney disease complex.

Basile A, Onetti-Muda A, Giannakakis K, Faraggiana T, Aresu L.

A juvenile nephropathy in a 4-year-old male Boxer dog, closely resembling the Nephronophthisis (NPHP)-Medullary Cystic Kidney Disease Complex (MCKD) in humans is described. Gross examination of the kidneys revealed several multiple cysts at the corticomedullary junction and in the medulla. Histological examination was characterized by a widespread tubular atrophy and dilatation, with a marked thickening of the tubular basement membrane, interstitial lymphocytic infiltration and fibrosis. Ultrastructural studies revealed dilated tubules with irregular basement membrane thickening and splitting. Lectin histochemistry investigation revealed that the cysts originated in the distal convoluted tubule and collecting duct. Having excluded all other known cystic diseases of the kidney, and based on the lectin histochemistry results, the macroscopic and histological findings of our case are highly compatible with a diagnosis of the NPHP-MCKD complex. To our knowledge, this is the first report describing this particular lesion.

J Vet Med Sci. 2011 Dec;73(12):1625-8. Epub 2011 Jul 20.

Serum clearance of iodixanol for estimating glomerular filtration rate in calves.

Imai K, Yamagishi N, Kim D, Devkota B, Sato S, Murayama I, Furuhashi K.

To evaluate serum clearance of iodixanol, applicable to the estimation of glomerular filtration rate (GFR), clinically healthy and experimentally-induced nephropathy calves were prepared. Iodixanol was administered intravenously at 40 mg I/kg, and blood was withdrawn 60, 120, and 180 min later. Serum iodixanol concentration was determined by high-performance liquid chromatography. No statistical difference in GFR was noted between strains (Holstein vs. Japanese Black) or sexes, and the $\alpha(2)$ -adrenergic agonist xylazine increased GFR. In calves subjected to right renal vessel ligation, followed by a left nephrectomy, a marked reduction in GFR was observed with renal ischemic changes. These results suggest that the GFR estimation by serum iodixanol clearance is a ready-to-use tool in calf research and practice owing to the ease of monitoring serial renal function.

J Vet Med Sci. 2012 Feb 1;74(1):89-92. Epub 2011 Aug 12.

Histopathological, immunohistochemical and ultrastructural studies of a renal mesenchymal tumor in a young beagle dog.

Suzuki Y, Takaba K, Yamaguchi I, Myoujou K, Kimoto N, Ikegami H, Saeki K, Imaizumi M, Takada C.

A 15-month-old male beagle dog used in a toxicity study had a primary renal mesenchymal tumor. Macroscopically, the tumor was a gray-white mass which was found in the right kidney, and extended from the capsule to a position slightly compressing the medulla. Microscopically, most of the tumor cells showed a myxoid pattern, in which the matrix was positive for alcian blue staining. In the other parts of the tumor, a fascicular and wavy pattern was observed, and the matrix was full of collagen fibrils. Immunohistochemically, tumor cells were positive for vimentin and fibronectin, and negative for cytokeratin, desmin, α -smooth muscle actin, Von Willebrand factor, cyclooxygenase-2 and myelin basic protein. As a result, we diagnosed this case to be a renal mesenchymal tumor. Based on the microscopic findings, interstitial characteristics and immunohistochemical features, the present case was classified as a congenital mesoblastic tumor.

J Vet Med Sci. 2012 Apr 3;74(3):381-4. Epub 2011 Nov 8.

A Case of Renal Oxalosis in a 3-Month-Old Cat Raised under Controlled Conditions.

Suzuki T, Uetsuka K, Doi K, Nunoya T.

The kidneys of a 3-month-old female cat were examined. The cat which had been raised under controlled conditions with no history of any poisoning showed progressive weight loss with increases in blood BUN and creatinine concentrations. At necropsy, both kidneys were firm in consistency with formation of focal scars. Histopathologically, widespread deposition of crystals was observed in the renal tubules (in both dilated lumina and degenerative epithelia) accompanying mild interstitial fibrosis with lymphocyte infiltration. The crystals were colorless or basophilic on the hematoxylin and eosin-stained section and could be visualized with polarized light as doubly fractile crystals. The crystals were identified as calcium oxalate crystals by histochemical examinations using von Kossa stain and alizarin red S stain under different conditions and by ultrastructural examination. Judging from the above-mentioned findings, the present renal lesion detected in an infant cat was diagnosed as renal oxalosis which was suspected to be hereditary in nature.

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J Vet Sci. 2012 Jun;13(2):179-85.

C-reactive protein as an indicator of inflammatory responses to experimentally induced cystitis in dogs.

Seo KW, Lee JB, Ahn JO, Lee HW, Hwang CY, Youn HY, Lee CW.

The aim of this study was to demonstrate and assess C-reactive protein (CRP) changes in dogs with induced bacterial cystitis with or without antibiotics. We also evaluated availability of CRP levels to serve as an indicator for monitoring or diagnosing bacterial cystitis. Serial CRP concentrations in dogs with induced bacterial cystitis were higher than those of controls ($p < 0.001$). CRP concentrations peaked on day 7 and gradually decreased thereafter. In the treatment group, CRP concentrations decreased after medication compared to the untreated group ($p = 0.032$). CRP levels had a linear correlation with urine white blood cell counts among all groups ($r = 0.837$, $p < 0.001$, $n = 140$). Compared to the negative urine culture group, dogs with positive urine culture results had higher CRP concentrations (median 43.8 mg/L vs. 5.9 mg/L; $p < 0.001$). Area under the receiver operating characteristic curve was 0.955; when cut-off value was 12.2 mg/L, CRP measurements were found to have a sensitivity of 92.3% and specificity of 86.4%. This result indicates that rapid increases of CRP occurred after inducing bacterial cystitis and CRP may be a useful indicator for monitoring or diagnosing canine bacterial cystitis together with sediment urinalysis and urine bacterial culture.

J Vet Med Sci. 2012 Aug 4;74(7):863-9. Epub 2012 Feb 10.

A Novel Vitamin K¹ 2,3-Epoxy Reductase (VKOR) Inhibitor, 3-Acetyl-5-Methyltetronic Acid, Reduces Experimental Glomerulonephritis.

Uchida M, Sakaguchi Y, Miyamoto Y.

Excessive proliferation of mesangial cells is observed in various types of glomerular disease including glomerulonephritis (GN), which is progressive in nature and eventually results in end-stage renal disease (ESRD). Vitamin K¹ 2,3-epoxy reductase (VKOR) and the vitamin K-dependent growth arrest-specific gene 6/Axl pathway play a key role in mesangial cell proliferation in GN. In the present study, we indicate the potential of a VKOR inhibitor, 3-acetyl-5-methyltetronic acid (AMT), to prevent the proliferation of glomerular mesangial cells and suppress the progression of GN. AMT was administered intravenously to rats once daily for 12 days and a mouse anti-Thy1 monoclonal antibody was injected intravenously after the AMT treatment on Day 6. Creatinine clearance (CCr) significantly increased and the albumin-to-creatinine ratio (ACR) significantly decreased in the AMT-treated group of the Thy-1 GN rats. In addition, glomerular and tubular damage was improved histopathologically in the AMT-treated group. AMT did not affect blood coagulation due to its unique pharmacokinetic properties. The concentration of AMT reached the IC₅₀ for VKOR in kidney, but not in liver. A novel VKOR inhibitor, AMT, reduced renal mesangial cell proliferation and could be a supportive treatment for GN.

J Vet Med Sci. 2012 Nov 2;74(10):1373-5. Epub 2012 Jun 5.

Simple ectopic kidney in three dogs.

Choi J, Lee H, Lee Y, Choi H.

Simple ectopic kidney was diagnosed in three dogs by means of radiography and ultrasonography. A 2-year-old castrated male Schnauzer, a 13-year-old female Schnauzer and a 9-year-old male Jindo were referred with vomiting, hematuria and ocular discharge, respectively. In all three dogs, oval-shaped masses with soft tissue density were observed in the mid to caudal abdomen bilaterally or unilaterally, and kidney silhouettes were not identified at the proper anatomic places on abdominal radiographs. Ultrasonography confirmed the masses were malpositioned kidney. The ectopic kidneys had relatively small size, irregular shape and short ureter but showed normal function on excretory urography.

J Vet Med Sci. 2012 Sep 14. [Epub ahead of print]

Association between the Intrarenal Renin-Angiotensin System and Renal Injury in Chronic Kidney Disease of Dogs and Cats.

Mitani S, Yabuki A, Taniguchi K, Yamato O.

The association of renin and angiotensin II, which are potent components of the renin-angiotensin system, with the severity of chronic renal disease was investigated immunohistochemically in dogs and cats. Immunoreactivities of renin and angiotensin II were evaluated quantitatively, and their correlations with the degrees of glomerulosclerosis, glomerular hypertrophy, interstitial cell infiltration, and interstitial fibrosis were statistically analyzed. Immunoreactivities for renin were detected in afferent arteries in both dogs and cats. The score of renin-positive signals showed no correlation with plasma creatinine concentration or any of the histopathological parameters, except for the diameter of glomeruli in dogs. Immunoreactivities for angiotensin II were detected in tubules (primarily proximal tubules) and interstitial mononuclear cells in both dogs and cats. The score of tubular angiotensin II correlated with glomerulosclerosis and cell infiltration in cats but not in dogs. The score of interstitial angiotensin II correlated with plasma creatinine concentration, glomerulosclerosis, cell infiltration, and fibrosis in dogs and with glomerulosclerosis and cell infiltration in cats. In conclusion, the results of the study suggest that intrarenal renin-angiotensin system is correlated with the severity of kidney disease, with the underlying mechanism differing between dogs and cats.

Journal of Veterinary Pharmacology and Therapeutics

J Vet Pharmacol Ther. 2012 Feb;35(1):13-8. doi: 10.1111/j.1365-2885.2011.01282.x. Epub 2011 Mar 11.

Evaluating the effects of 14-day oral vedaprofen and tolfenamic acid treatment on renal function, hematological and biochemical profiles in healthy cats.

Khwanjai V, Chuthatep S, Durongphongtorn S, Yibchok-Anun S.

The objective of this study was to evaluate the effects of the nonsteroidal anti-inflammatory drugs vedaprofen and tolfenamic acid on renal function after oral administration for 2 weeks in healthy cats. Experiments were performed using nineteen domestic short-haired cats randomly divided into one control (n=6) and two treatment groups. All cats in the first (n=6) and second treatment groups (n=7) received vedaprofen (0.5 mg/kg/day) and tolfenamic acid (4 mg/kg/day), respectively. During the experiment, renal function was evaluated using percent renal uptakes of (99m)Technetium-diethylenetriamine-pentaacetic acid ((99m)Tc-DTPA) collected from renal scintigraphy and blood samples used to determine complete blood count and biochemical profiles. Renal scintigraphy and blood collections were performed at days 0, 5, 11, 15, and 45. The percent of renal uptake after the administration of vedaprofen and tolfenamic acid were not significantly different compared to pretreatment (day 0) and control group levels. In addition, significant changes were not observed in hematological and biochemical profiles within or between groups, with the exception of slightly lower numbers in red blood cell counts compared to the normal value on day 45 in the tolfenamic acid-treated group. Taken together, we conclude 14-day administration of vedaprofen and tolfenamic acid might not cause any adverse effects on renal function, hematological and serum biochemical variables.

J Vet Pharmacol Ther. 2012 Apr;35(2):193-7.

Oral administration of lanthanum dioxycarbonate does not alter bone morphology of normal cats.

Nunamaker EA, Sherman JG.

Research in Veterinary Science

Res Vet Sci. 2012 Apr;92(2):197-201. Epub 2011 Feb 12.

Adenosine deaminase activity in serum, erythrocytes and lymphocytes of rats infected with *Leptospira icterohaemorrhagiae*.

Tonin AA, Pimentel VC, da Silva AS, de Azevedo MI, Souza VC, Wolkmer P, Rezer JF, Badke MR, Leal DB, Schetinger MR, Monteiro SG, Lopes ST.

Leptospirosis is a systemic disease of humans and domestic animals, mainly dogs, cattle and swine. The course of human leptospirosis varies from mild to severe fatal forms and the most severe form of human leptospirosis is principally caused by *Leptospira interrogans* serovar *icterohaemorrhagiae* (*L. icterohaemorrhagiae*). The enzyme adenosine deaminase (ADA) plays an important role in the production and differentiation of blood cells. The aim of this study was to evaluate the activity of ADA in serum, erythrocytes and lymphocytes of rats infected with *L. icterohaemorrhagiae*, as compared with non-infected rats. Twenty-four adult rats, divided into two uniform groups (A and B) were used for the enzymatic assays. The animals in Group B were inoculated intraperitoneally with 2×10^8 leptospires/rat, and the rodents in Group A (control) were not-inoculated. Blood collection was performed on days 5 and 15 post-infection (PI) and the blood used to assess the ADA activity. The infection by *L. icterohaemorrhagiae* altered erythrocyte count, hemoglobin concentration and hematocrit, causing a decrease in all these parameters on day 15 PI. Lymphocytes decreased significantly on day 15 PI, and

ADA activity in serum was inhibited in infected rats on days 5 and 15 PI and its activity in erythrocytes were increased on day 5 PI. On day 5 PI, we found an increase in ADA activity in erythrocytes of infected rats. No correlation was observed between hematocrit and erythrocyte ADA activity on days 5 and 15 PI. The ADA activity was inhibited in rats infected on day 15 PI. A positive correlation ($r(2)=60$) was also observed between the number of lymphocytes and ADA activity in lymphocytes on day 15 PI ($P<0.05$). In conclusion, our results showed that the ADA activity is altered in serum, lymphocytes and erythrocytes in experimental infection by *L.icterohaemorrhagiae* in rats, concomitantly with hematological parameters.

Res Vet Sci. 2012 Apr;92(2):221-4. Epub 2011 Mar 8.

Sero-epidemiological study of the presence of hantaviruses in domestic dogs and cats from Belgium.

Dobly A, Cochez C, Goossens E, De Bosschere H, Hansen P, Roels S, Heyman P.

Hantaviruses are worldwide rodent-borne pathogens infecting humans and other animals mainly through inhalation of aerosols contaminated with rodent excreta. Few data are available on hantavirus serology and geographical distribution in dogs and cats. We therefore screened sera from pet dogs (N=410) and cats (N=124) in two regions of Belgium, using IgG ELISA and IFA. We analysed the effect of the owner's address as well as pet gender and age on hantavirus status. Hantavirus antibodies were found in both species with a significantly higher seroprevalence in cats than in dogs (16.9% vs. 4.9%, $P=0.001$). More dogs were infected in highly forested southern Belgium (harbouring more rodents) than in northern Belgium (10.5% vs. 3.0%, $P=0.002$). In the south, hantavirus sero-positive cats were found in more densely forested localities than sero-negatives ones were ($P=0.033$). These results are consistent with the ecological variations of hantavirus risks in humans.

Veterinary Clinical Pathology

Vet Clin Pathol. 2012 Mar;41(1):141-6.

Primary ureteral giant cell sarcoma in a Pomeranian.

Rigas JD, Smith TJ, Gorman ME, Valentine BA, Simpson JM, Seguin B.

An 8-year-old male neutered Pomeranian dog was presented to the Veterinary Teaching Hospital at Oregon State University for surgical treatment of hydronephrosis of the left kidney and a left cranial abdominal mass. A primary ureteral mass was found during exploratory surgery, and the mass was resected and ureteral anastomosis was performed. Cytologic evaluation of the mass revealed 3 distinct cell populations, including a large number of multinucleated giant cells, a moderate number of thin spindle-shaped cells, and cohesive clusters of transitional epithelial cells. The cytologic diagnosis was giant cell sarcoma. The diagnosis was confirmed by histologic examination, and immunohistochemical staining was performed. The spindle-shaped cells and multinucleated giant cells were both immunoreactive for vimentin and spindle-shaped cells for S-100. Tumor cells did not express wide-spectrum cytokeratin, broad-spectrum muscle actin, smooth muscle actin, sarcomeric actin, desmin, BLA36, Mac 387, synaptophysin, neuron-specific enolase, glial fibrillary acid protein, or von Willebrand factor. These findings are most consistent with an anaplastic sarcoma with giant cells. This is the first case report of a primary ureteral giant cell sarcoma in a dog.

Veterinary Clinics of North America: Small Animal Practice

Vet Clin North Am Small Anim Pract. 2012 Jul;42(4):669-92, vi. doi: 10.1016/j.cvsm.2012.04.008. Epub 2012 May 19.

Chronic kidney disease in dogs and cats.

Bartges JW.

Chronic kidney disease (CKD) occurs commonly in older dogs and cats. Advances in diagnostics, staging, and treatment are associated with increased quality and quantity of life. Dietary modification has been shown to increase survival and quality of life and involves more than protein restriction as diets modified for use with CKD are lower in phosphorous and sodium, potassium and B-vitamin replete, and alkalinizing, and they contain n3-fatty acids. Additionally, recognition and management of CKD-associated diseases such as systemic arterial hypertension, proteinuria, and anemia benefit patients. This article summarizes staging and management of CKD in dogs and cats.

The Veterinary Journal

Vet J. 2012 Jan;191(1):19-27. Epub 2011 Sep 29.

Stem cells and veterinary medicine: tools to understand diseases and enable tissue regeneration and drug discovery.

Gattegno-Ho D, Argyle SA, Argyle DJ.

New sophisticated laboratory techniques, as well as established interactions between basic science, researchers and veterinarians, have led to an exponential increase in our understanding of the animal body in health and disease. The advent of animal cloning, the identification and characterization of stem cells, and publication of the various mammalian genomes has afforded the opportunity to exploit these technologies to better understand disease and develop new therapies. In human medicine, these medical advances are already being translated into clinical practice, the promise being that previously untreatable or incurable chronic diseases will become a thing of the past. In parallel, the veterinary profession is looking to these technologies to explore novel therapies for chronic diseases, such as osteoarthritis in companion animals, and is applying these technologies to enhance food animal production. This review focuses on the emerging area of stem cell biology and explores the potential applications of stem cell technologies to veterinary medicine.

Vet J. 2012 Feb;191(2):253-6. Epub 2011 Mar 12.

Changes in the serum urea: Creatinine ratio in dogs with babesiosis, haemolytic anaemia, and experimental haemoglobinaemia.

Lobetti R.

The purpose of this study was to determine serum urea and creatinine concentrations, the derived urea : creatinine (UC) ratios, haemoglobin concentrations and glomerular filtration rates (GFR) in dogs with haemolytic anaemia and those with experimentally induced anaemia and/or haemoglobinaemia. There were 25 dogs with babesiosis (group 1), 13 control animals (group 2), six dogs with induced haemoglobinaemia and anaemia (group 3), six with induced haemoglobinaemia (group 4), and 14 with immune-mediated haemolytic anaemia (IMHA) (group 5). The median serum urea concentration was 11.18mmol/L (group 1), 4.3mmol/L (group 2), 4.3mmol/L (group 3), 4.35mmol/L (group 4), and 8.5mmol/L (group 5). Median serum creatinine was 67µmol/L (group 1), 75µmol/L (group 2), 78.5µmol/L (group 3), 84µmol/L (group 4), and 82µmol/L (group 5). Median serum haemoglobin was 1.3g/L (group 1), 0.8g/L (group 2), 9g/L (group 3), 3g/L (group 4), and 1.3g/L (group 5). The median UC ratio was 41.35 (group 1), 15.36 (group 2), 14.18 (group 3), 13.6 (group 4), and 14.15 (group 5). GFR was normal in all five groups. Serum urea concentration and the UC ratio were significantly greater in dogs with babesiosis than in those with IMHA, experimentally induced anaemia and/or haemoglobinaemia.

Vet J. 2012 Apr;192(1):89-95. Epub 2011 Jun 28.

Urodynamic and haemodynamic effects of a single oral administration of ephedrine or phenylpropanolamine in continent female dogs.

Noël S, Massart L, Hamaide A.

This study investigated the effects of a single oral administration of ephedrine (2mg/kg) or phenylpropanolamine (PPA) (1.5mg/kg) on the vesico-urethral and cardiovascular functions in continent female dogs. Urethral pressure profilometry (UPP), arterial blood pressures and heart rate were measured in five control dogs and after single-dose treatment with ephedrine or PPA at T(0), T(2h), T(4h), T(6h), T(12h), T(18h) and T(24h). UPPs were performed under propofol anaesthesia and other measurements were performed on awake dogs. A telemetric urodynamic investigation was performed on three additional dogs for 24h after the administration of each drug. Urethral pressures increased over 4-6h and urethral functional lengths increased 2-6h after administration of both drugs. During micturition, a decrease in detrusor pressure coupled with an increase in bladder volume was observed after ephedrine administration and there was also an increase in bladder volume after PPA had been given. With both drugs increased arterial blood pressures at 4-6h were compensated by a decreased heart rate over 12h. Urethral function was improved after both ephedrine and PPA, and bladder function also improved during micturition following ephedrine.

Vet J. 2012 May;192(2):226-31. Epub 2011 Jul 20.

Blood vitamin levels in dogs with chronic kidney disease.

Galler A, Tran JL, Krammer-Lukas S, Höller U, Thalhammer JG, Zentek J, Willmann M.

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.

Vet J. 2012 Jun;192(3):532-4. Epub 2011 Jul 1.

Hypercortisolism affects glomerular and tubular function in dogs.

Smets PM, Lefebvre HP, Kooistra HS, Meyer E, Croubels S, Maddens BE, Vandenabeele S, Saunders JH, Daminet S.

Renal function was assessed in 25 dogs with Cushing's syndrome and in 12 healthy controls. Routine renal parameters and glomerular filtration rate (GFR) were measured and urinary biomarkers such as urinary albumin (uALB), urinary immunoglobulin G (uIgG), and urinary retinol-binding protein (uRBP) were assessed by ELISA. Urinary N-acetyl- β -D-glucosaminidase activity (uNAG) was determined colorimetrically. All urinary markers were indexed to urinary creatinine concentration (c). Plasma exo-CI(exo) and endo-iohexol CI(endo) clearance were used to measure GFR. Based on a Mann-Whitney U test, urea and CI(exo) did not differ, sCr was significantly lower, and UPC, uALB/c, uIgG/c, uRBP/c, uNAG/c and CI(endo) were higher in the dogs with Cushing's syndrome when compared with controls. The findings indicate that glomerular and tubular function are both altered in dogs with Cushing's syndrome. Further longitudinal studies will be required to elucidate the pathogenesis of the changes in GFR.

Vet J. 2012 Jul;193(1):287-9. Epub 2011 Nov 15.

Kidney-derived proteins in urine as biomarkers of induced acute kidney injury in sheep.

Palviainen M, Raekallio M, Rajamäki MM, Linden J, Vainio O.

Acute kidney injury (AKI) is a life-threatening condition for which an early diagnosis is problematic. The aim of the present study was to identify kidney-derived urinary proteins specific to AKI in sheep. AKI was induced in six sheep by an overdose of ketoprofen. Six untreated sheep served as controls. Urine samples were collected for up to 24h after drug administration and pooled according to time and treatment. Tissue samples from kidney were taken immediately after euthanasia. Urinary proteins were separated by two-dimensional gel electrophoresis (2DE) and the proteins of interest were identified by mass spectrometry. Calbindin-D28k, retinol-binding protein 4 and CD1d were identified in ketoprofen-treated sheep, but not in controls. In addition, calbindin-D28k and CD1d were localized in kidney tissues by immunohistochemical staining. These preliminary results suggest that urinary calbindin-D28k and CD1d represent potential useful biomarkers of AKI, at least in sheep

Veterinary Pathology

Vet Pathol. 2012 Jul;49(4):693-703. Epub 2011 Jun 28.

Localization of canine, feline, and mouse renal membrane proteins.

Brandt LE, Bohn AA, Charles JB, Ehrhart EJ.

Immunohistochemistry allows the localization of proteins to specific regions of the nephron. This article reports the identification and localization of proteins in situ within normal canine, feline, and mouse kidney by immunohistochemistry; maps their distribution; and compares results to previously reported findings in other species. The proteins investigated are aquaporin 1, aquaporin 2, calbindin D-28k, glutathione S-transferase- α , and Tamm-Horsfall protein. Aquaporins are integral membrane proteins involved in water transport across cell membranes. Calbindin D-28k is involved in renal calcium metabolism. Glutathione S-transferase- α is a protein that aids in detoxification and drug metabolism. The role of Tamm-Horsfall protein is not fully understood. Proposed functions include inhibition of calcium crystallization and reduction of bacterial urinary tract infection. The authors' findings in the dog are similar to those in other species: Specifically, the authors localize aquaporin 1 to the proximal convoluted tubule epithelium, vasa recta endothelium, and descending thin limbs; aquaporin 2 to collecting duct epithelium; and calbindin D-28k within distal convoluted tubule epithelium. Glutathione S-transferase- α has variable expression and is found in only the renal transitional epithelium in some individuals, in only the proximal straight tubules in others, or in both locations in others. Tamm-Horsfall protein localizes to thick ascending limb epithelium. These findings are similar in the cat, with the exception that aquaporin 1 is located in glomerular podocytes, in addition to proximal convoluted tubule epithelium, and glutathione S-transferase- α is found solely within the proximal convoluted tubule within all kidney samples examined. The mouse kidney is almost identical to the dog but expresses glutathione S-transferase- α in the glomeruli only.

Veterinary radiology & ultrasound

Vet Radiol Ultrasound. 2012 Jul-Aug;53(4):437-41.

Effect of breed, age, weight and gender on radiographic renal size in the dog.

Lobacz MA, Sullivan M, Mellor D, Hammond G, Labruyère J, Dennis R.

In the adult dog, kidney length has been reported as 2.98 ± 0.44 times the length of L2 on ventrodorsal views and 2.79 ± 0.46 times the length of L2 on lateral radiographs. Our aim was to test the hypothesis that the suggested maximum normal left kidney size is too high, and to evaluate the effect of breed type, gender, weight and age of the dog on kidney size. Abdominal radiographs of 200 dogs with no evidence of concurrent disease that might have an effect on renal size were included in the study. The mean ratio of kidney length to the second lumbar vertebra length was similar to previous reports. For the right lateral view it measured 2.98 ± 0.60 and for the ventrodorsal view 3.02 ± 0.66 . Significant differences of this ratio between skull type were present, especially between brachycephalic and dolichocephalic dogs. On the right lateral view brachycephalic dogs had the highest median LK/L2 ratio of 3.1 (3.20 ± 0.40), whereas for dolichocephalic dogs it was 2.8 (2.82 ± 0.50), and for mesaticephalic dogs it was 2.97 (3.01 ± 0.6). A ratio >3.5 was found only in mesaticephalic dogs on the ventrodorsal view. There was a significant difference in the LK/L2 ratio between small ($\leq 10\text{kg}$) and large breed dogs ($>30\text{kg}$) where small dogs had a significantly higher LK/L2 ratio. There was no statistically significant relation between this ratio and age or gender. The previously reported ratios for kidney size seem valid, but because skull type has an impact on the LK/L2 ratio, a single normal ratio should not be used for all dogs.

Veterinary Record

Vet Rec. 2011 Dec 17;169(25):657. Epub 2011 Oct 2.

Penile amputation and scrotal urethrostomy in 18 dogs.

Burrow RD, Gregory SP, Giejda AA, White RN.

The objective of this study was to report the signalment, indications for surgery, postoperative complications and outcome in dogs undergoing penile amputation and scrotal urethrostomy. Medical records of three surgical referral facilities were reviewed for dogs undergoing penile amputation and scrotal urethrostomy between January 2003 and July 2010. Data collected included signalment, presenting signs, indication for penile amputation, surgical technique, postoperative complications and long-term outcome. Eighteen dogs were included in the study. Indications for surgery were treatment of neoplasia ($n=6$), external or unknown penile trauma ($n=4$), penile trauma or necrosis associated with urethral obstruction with calculi ($n=3$), priapism ($n=4$) and balanoposthitis ($n=1$). All dogs suffered mild postoperative haemorrhage (posturination and/or spontaneous) from the urethrostomy stoma for up to 21 days (mean 5.5 days). Four dogs had minor complications recorded at suture removal (minor dehiscence ($n=1$), mild bruising and swelling around the urethrostomy site and mild haemorrhage at suture removal ($n=2$), and granulation at the edge of stoma ($n=1$)). One dog had a major complication (wound dehiscence and subsequent stricture of the stoma). Long-term outcome was excellent in all dogs with non-neoplastic disease. Local tumour recurrence and/or metastatic disease occurred within five to 12 months of surgery in two dogs undergoing penile amputation for the treatment of neoplasia. Both dogs were euthanased.

Vet Rec. 2012 Feb 4;170(5):125. Epub 2011 Dec 2.

Association of urinary cadmium excretion with feline hypertension.

Finch NC, Syme HM, Elliott J.

Fifty client-owned senior cats (32 normotensive and 18 hypertensive) with renal function ranging from normal to moderately reduced were recruited into a prospective cross-sectional study exploring the association of urinary cadmium excretion and hypertension in cats. Heparinised plasma samples were collected and analysed for routine biochemical parameters. Urine samples were collected via cystocentesis and were analysed for cadmium concentrations using inductively coupled plasma mass spectrometry (ICP-MS). Blood pressure was measured using the Doppler method. Urinary cadmium

concentrations were indexed to urinary creatinine concentration. Comparison of urinary cadmium excretion was made between hypertensive and normotensive cats. The median (range) urinary cadmium concentration standardised to urinary creatinine concentration (UCdCr) in the normotensive and hypertensive cats was 0.08 (0.02 to 0.37) and 0.12 (0.02 to 1.38) nmol/mmol creatinine. The UCdCr was significantly higher in hypertensive compared with normotensive cats ($P=0.016$). UCdCr and plasma creatinine concentration remained independent predictors of hypertensive status in a logistic regression model. UCdCr and plasma creatinine concentration were not correlated ($r=-0.01$, $P=0.956$). These data suggest cadmium exposure and accumulation in cats may play a role in the development of feline hypertension.

Vet Rec. 2012 Apr 21;170(16):415. Epub 2012 Jan 22.

Animal poisoning in Italy: 10 years of epidemiological data from the Poison Control Centre of Milan.

Caloni F, Cortinovia C, Rivolta M, Davanzo F.

From 2000 to 2010, the Poison Control Centre of Milan (CAV), in collaboration with the University of Milan, Faculty of Veterinary Medicine, Department of Veterinary Sciences and Technologies for Food Safety, Toxicology Section, collected epidemiological information related to animal poisoning and classified it in an organised and computerised data bank. Data recorded were predominantly related to small animals and to some extent to horses, ruminants and other food-production animals. Few calls were registered involving exotics and no information was recorded on wildlife. The dog was reported to be the most common species involved in animal poisoning, and pesticides constituted the primary group of toxicants. In the case of pets, 'drugs' including veterinary parasiticide and drugs for human use constituted the second class of toxicants responsible for poisoning followed by household products, plants, zootoxins and metals. With regard to horses and farm animals, the second group consisted of phytotoxins, even if only episodically. In Italy, published data on this subject are scarce but this information is crucial for better management of the poisoning of domestic animals in an effort to reduce mortality.

Vet Rec. 2012 May 5;170(18):463. Epub 2012 Apr 14.

Comparison of a digital and an optical analogue hand-held refractometer for the measurement of canine urine specific gravity.

Paris JK, Bennett AD, Dodkin SJ, Gunn-Moore DA.

Urine specific gravity (USG) is used clinically as a measure of urine concentration, and is routinely assessed by refractometry. A comparison between optical analogue and digital refractometers for evaluation of canine urine has not been reported. The aim of this study was to compare a digital and an optical analogue hand-held refractometer for the measurement of canine USG, and to assess correlation with urine osmolality. Prospective study. Free-catch urine samples were collected from 285 hospitalised adult dogs, and paired USG readings were obtained with a digital and an optical analogue refractometer. In 50 dogs, urine osmolality was also measured using a freezing point depression osmometer. There was a small but statistically significant difference between the two refractometers ($P<0.001$), with the optical analogue refractometer reading higher than the digital refractometer (mean difference 0.0006, sd 0.0012). Paired refractometer measurements varied by <0.002 in 91.5 per cent of cases. The optical analogue and digital refractometer readings showed excellent correlation with osmolality ($r=0.980$ and $r=0.977$, respectively, $P<0.001$ in both cases). Despite statistical significance, the difference between the two refractometers is unlikely to be clinically significant. Both instruments provide an accurate assessment of USG in dogs.

Vet Rec. 2012 Jul 14;171(2):46. Epub 2012 Jun 26.

Dietary and animal-related factors associated with the rate of urinary oxalate and calcium excretion in dogs and cats.

Dijcker JC, Hagen-Plantinga EA, Everts H, Bosch G, Kema IP, Hendriks WH.

This paper reports the results of a cohort study and randomised clinical trial (RCT) in cross-over design. In the cohort study, the range of urinary oxalate (Uox) and calcium (Uca) excretion was determined within a sample of the Dutch population of dogs and cats, and dietary and animal-related factors associated with these urine parameters were identified. Spot urine samples were collected from privately owned dogs (n=141) and cats (n=50). The RCT determined the effect of a commercial raw meat diet versus a dry diet on Uox and Uca excretion rate in 23 dogs. In the cohort study, Uox excretion ranged from 21.1 to 170.6 mmol oxalate/mol creatinine in dogs and 27.5 to 161.6 in cats. Urinary calcium excretion ranged from 3.4 to 462.8 mmol calcium/mol creatinine in dogs and 10.1 to 128.0 in cats. In dogs, increased Uox and Uca excretion was associated with (1) the intake of a dry diet as the primary source of energy, (2) receiving no snacks and (3) breed. Increased Uox excretion was associated with males as well. In cats, urine collection in anaesthetised subjects was identified as a confounder. In the RCT, feeding the dry diet resulted in higher Uox ($P<0.001$) and Uca ($P=0.021$) excretion rates in dogs.

Vet Rec. 2012 Sep 22;171(12):297. Epub 2012 Aug 2.

Serum and urinary adiponectin in dogs with renal disease from leishmaniasis.

Tvarijonaviciute A, Ceron JJ, García-Martinez JD.

The objective of this study was to perform an analytical validation of a commercially available ELISA kit (human adiponectin) for urinary adiponectin determination in dogs, and to evaluate urinary adiponectin in dogs with glomerular injury. For this purpose, urine samples from three healthy dogs and three dogs with diagnosed kidney disease were used for analytical validation of the method. In order to evaluate possible influence of kidney damage on urinary adiponectin, serum and urine samples from six healthy and 58 dogs with leishmaniasis were included. The diseased dogs were allocated to three groups according to their urine protein/creatinine (UPC) ratio as non-proteinuric (NP), borderline proteinuric (BP), and proteinuric (P). Intra- and inter-assay coefficients of variation (CV) were lower than 10 per cent and 12 per cent, respectively. Dilutions of canine urine samples resulted in linear regression equations close to 1. Mean recovery was of 112 per cent. The detection limit was 0.75 ng/ml. Urinary adiponectin and urinary adiponectin/creatinine (UAC) ratio showed significantly higher values in urine of P group dogs compared with healthy, NP and BP dogs. In conclusion, an ELISA kit can be used for precise and accurate urinary adiponectin measurement in dogs. Urinary adiponectin is increased in dogs with proteinuria suggesting its possible use as a marker of kidney damage.

Veterinary Surgery

Vet Surg. 2012 Jan 12; 41(3):319-327

Outcome after Renal Transplantation in 26 Dogs.

Hoppe K, Mehl ML, Kass PH, Kyles A, Gregory CR.

OBJECTIVES: To evaluate clinical outcome in dogs after renal transplantation and determine predictors of outcome.

STUDY DESIGN: Retrospective case series.

ANIMALS: Dogs (n = 26) that had renal allograft transplantation.

METHODS: Medical records (1994-2006) of 26 consecutive cases of dogs that had kidney transplantation were reviewed. History, signalment, pre- and postoperative clinicopathologic and monitoring variables, postoperative complications, immunosuppressive therapy, and survival were recorded.

RESULTS: Median survival was 24 days (range, 0.5 to 4014 days) with a probability of survival to 15 days of 50% and the 100-day survival probability was 36%. Cause of death was attributed to thromboembolic disease in 8 dogs, infection in 6 dogs, and rejection in 1 dog. The only factor significantly associated with an increased likelihood of death was increasing age at time of surgery ($P = .024$).

CONCLUSIONS: Canine renal transplantation in clinical patients is associated with a high morbidity and mortality and increasing recipient age has a negative association with outcome. Thromboembolic complications are a major cause of death in the immediate postoperative period and effective anticoagulation protocols may greatly improve survival in the future.

Vet Surg. 2012 May;41(4):515-22.

Ectopic ureters in dogs: clinical features, surgical techniques and outcome.

Reichler IM, Eckrich Specker C, Hubler M, Alois B, Haessig M, Arnold S.

OBJECTIVE: To compare clinical features of ectopic ureter (EU) in male and female dogs and outcome after neoureterostomy with resection restricted to the intravesical part of the ureter for intramural ectopic ureter (iEU) or of ureteroneocystostomy for extramural ectopic ureter (eEU).

STUDY DESIGN: Retrospective case series.

ANIMALS: Female dogs ($n = 26$) with 32 iEU and 8 eEU; male dogs ($n = 24$) with 25 iEU and 18 eEU.

METHODS: Data were collected from medical records (1992-2008). Long-term follow-up information after surgical correction by modified neoureterostomy or ureteroneocystostomy was gathered by owner questionnaire.

RESULTS: Median age at first occurrence of UI was significantly lower in females (<2 months) than in males with EU (8 months; $P = 0.0015$). Bilateral occurrence and an extramural course of the ureter were more common in males ($n = 19$ and $n = 20$, respectively) compared with females (14 and 12, respectively), but the outcome of surgical treatment was comparable in both genders.

CONCLUSIONS: The prognosis after surgery is fair with a success rate of 72% and a complication rate of 26%. Resection of only the intravesicular ectopic ureter resulted in resolution of incontinence in a high percentage of dogs and thus is an acceptable alternative to removal of the entire ureteral remnant.