

Abstracts 2007- 2008

[American Journal of Veterinary Research \(Apr 07 – March 08\)](#)

[Journal of the American Animal Hospital Association \(Apr 07 – Apr 08\)](#)

[Journal of the American Veterinary Medical Association \(Apr 07– Apr 08\)](#)

[Journal of the Feline Medicine and Surgery \(Apr 07– Apr 08\)](#)

[Journal of Comparative Pathology \(Apr 07– Apr 08\)](#)

[Journal of Small Animal Practice \(Apr 07 – Apr 08\)](#)

[Journal of Veterinary Internal Medicine \(Apr 07– May 08\)](#)

[Journal of Veterinary Medical Science \(Apr 07 – Apr 08\)](#)

[Journal of Veterinary Pharmacology and Therapeutics \(Apr 07- Apr 08\)](#)

[Journal of Veterinary Science \(March 07 – May 08\)](#)

[Mammalian Genome \(Apr 07 – Apr 08\)](#)

[Research in Veterinary Science \(Apr 07 – May 08\)](#)

[Veterinary Clinical Pathology \(March 07 – March 08\)](#)

[Veterinary Record \(Apr 07 – May 08\)](#)

[Veterinary Research Communications \(Apr 07 – May 08\)](#)

[Veterinary Radiology and Ultrasound \(Apr 05 – Apr 06\)](#)

American Journal of Veterinary Research (Apr 07 – March 08)

[Am J Vet Res.](#) 2007 Oct;68(10):1058-63

Effects of oral administration of furosemide and torsemide in healthy dogs.

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OBJECTIVE: To investigate the diuretic effects, tolerability, and adverse effects of furosemide and torsemide after short- and long-term administration in healthy dogs. **ANIMALS:** 8 mixed-breed dogs. **PROCEDURES:** In a crossover study, furosemide (2 mg/kg), torsemide (0.2 mg/kg), or placebo (bifidobacterium [1 mg/kg]) was administered orally to each dog every 12 hours for 14 days. Blood and urine samples were collected before the study (baseline data) and at intervals on the 1st (short-term administration) and 14th day (long-term administration) of treatment for assessment of urine volume and specific gravity and selected clinicopathologic variables including BUN, creatinine, and aldosterone concentrations, and creatinine clearance. **RESULTS:** Compared with the baseline value, short-term administration of furosemide or torsemide immediately increased urine volume significantly; after long-term administration of either drug, urine specific gravity decreased significantly. Compared with the effect of placebo, the 24-hour urine volume was significantly increased after short-term administration of furosemide or torsemide. In addition, it was significantly increased after long-term administration of torsemide, compared with that of short-term administration. Long-term administration of furosemide or torsemide increased the BUN and plasma creatinine concentrations, compared with the baseline value. Compared with the baseline value, plasma aldosterone concentration was significantly increased after long-term administration of either drug and was significantly higher after torsemide treatment than after furosemide treatment. **CONCLUSIONS AND CLINICAL RELEVANCE:** In dogs, diuretic resistance developed after 14 days of furosemide, but not torsemide, administration; however, both loop diuretics were associated with increased BUN and plasma creatinine concentrations, compared with values before treatment.

[Am J Vet Res.](#) 2007 Aug;68(8):807-11

Influence of three anesthetic protocols on glomerular filtration rate in dogs.

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OBJECTIVE: To investigate renal function in clinically normal dogs when awake and during anesthesia with medetomidine; xylazine, ketamine, and halothane (XKH) combination; or propofol. **ANIMALS:** 10 adult female Beagles. **PROCEDURES:** At intervals of 15 days, dogs were administered medetomidine (0.05 mg/kg, IV); XKH combination (xylazine [1 mg/kg, IV], ketamine [5 mg/kg, IV], and halothane [1% end-tidal concentration]); or propofol (6 mg/kg, IV) to induce anesthesia or no treatment. Glomerular filtration rate was assessed on the basis of renal uptake (RU; determined via renal scintigraphy) and plasma clearance (CL) of technetium 99m-labeled diethylenetriamine pentaacetic acid ((99m)Tc-DTPA). **RESULTS:** In awake dogs, mean \pm SEM RU was $9.7 \pm 0.4\%$ and CL was 3.86 ± 0.23 mL/min/kg. Renal uptake and CL of (99m)Tc-DTPA were not significantly modified by administration of XKH (RU, $11.4 \pm 0.9\%$; CL, 4.6 ± 0.32 mL/min/kg) or propofol (RU, $9.7 \pm 0.3\%$; CL, 3.78 ± 0.37 mL/min/kg). Half-life elimination time of plasma (99m)Tc-DTPA decreased significantly in XKH-anesthetized dogs, compared with the value in awake dogs (14.4 minutes and 28.9 minutes, respectively). However, glomerular filtration rate was significantly decreased by administration of medetomidine (RU, $3.9 \pm 0.1\%$), and the time to maximum kidney activity

was significantly increased (867 +/- 56 seconds vs 181 +/- 11 seconds without anesthesia).
CONCLUSIONS AND CLINICAL RELEVANCE: Results indicated that anesthesia with propofol or an XKH combination did not alter renal function in healthy Beagles, but anesthesia with medetomidine decreased early RU of (99m)Tc-DTPA.

[Am J Vet Res.](#) 2007 Jun;68(6):579-80

Developments continue in recall of pet food.

[Am J Vet Res.](#) 2007 May;68(5):459-60

How to submit samples, report cases related to adulterated pet food.

Journal of the American Animal Hospital Association (Apr 07 – Apr 08)

[J Am Anim Hosp Assoc.](#) 2008 Mar-Apr;44(2):90-4.

Prostatic abscess in a neutered cat.

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A 6-year-old, male castrated domestic shorthair cat was presented for evaluation of lethargy, vomiting, anorexia, and constipation. Physical examination revealed an elevated body temperature and an extramural colonic mass. Abdominal ultrasonography demonstrated a hypoechoic mass measuring 2.2 cm in maximum dimension immediately caudal to the bladder. Cytological evaluation of a fine-needle aspirate confirmed the mass was a prostatic abscess. Abdominal celiotomy and prostatic omentalization were successful in resolving clinical abnormalities. Feline prostatic abscessation is a rare condition that has not been previously reported and may have a good outcome if treated early and appropriately.

[J Am Anim Hosp Assoc.](#) 2008 Jan-Feb;44(1):2-4

Aerobic bacterial culture of used intravenous fluid bags intended for use as urine collection reservoirs.

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Numerous studies have shown a relationship between indwelling urinary catheters and bacterial urinary tract infection. Some veterinary hospitals utilize stored, used intravenous (IV) fluid bags as part of the urine collection system. The authors cultured 95 such bags to see if they were potential sources of bacterial contamination. Forty-two unused IV bags were emptied of their contents for use as controls. Results indicated no aerobic bacterial growth in either group. The authors conclude that properly stored, used IV bags are unlikely sources of aerobic bacterial contamination when used in a urine collection system.

[Am Anim Hosp Assoc.](#) 2007 Nov-Dec;43(6):352-5

Chronic vaginitis associated with vaginal foreign bodies in a cat.

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A 2-year-old, spayed female, domestic shorthaired cat was presented for evaluation of a chronic, purulent vulvar discharge. Survey radiographs of the abdomen and pelvis revealed bone fragments in the pelvic canal. A vaginoscopy was performed, and five bony foreign bodies were removed from the vaginal lumen. Using anatomical landmarks, the bones were identified as remnants of a fetal kitten.

[J Am Anim Hosp Assoc.](#) 2007 May-Jun;43(3):163-7

Refractory seizures associated with an organic aciduria in a dog.

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A 6-month-old, female Cavalier King Charles spaniel exhibited seizures that were difficult to control with standard anticonvulsants over a 12-month period. The diagnosis of an organic aciduria with excessive excretion of hexanoylglycine was determined when the dog was 20 months old. Recurrent and cluster seizures were eventually controlled with the addition of levetiracetam to potassium bromide and phenobarbital.

[J Am Anim Hosp Assoc.](#) 2007 Mar-Apr;43(2):112-6

Ultrasound-assisted drainage and alcoholization of hepatic and renal cysts: 22 cases.

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Twenty-two dogs and cats with symptomatic renal or hepatic cysts that had undergone ultrasound-assisted drainage and alcoholization were retrospectively evaluated. Common presenting complaints were anorexia, reluctance to move, and vomiting. Abdominal pain was observed in all cases. Systemic hypertension was identified in four dogs and four cats with renal cysts. Cyst drainage and alcoholization were achieved without complications in 19 animals, and all clinical signs resolved after the procedure. In three cases, transient bleeding was observed during alcoholization, and the procedure was interrupted. Blood pressure normalized in the four dogs with renal cysts, but it remained elevated in the four cats.

Journal of the American Veterinary Medical Association (Apr 07–Apr 08)

[J Am Vet Med Assoc.](#) 2008 Apr 1;232(7):1026-34.

Use of cystoscopic-guided laser ablation for treatment of intramural ureteral ectopia in male dogs: four cases (2006-2007).

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Objective-To describe and evaluate the outcome of cystoscopic-guided laser ablation of intramural ureteral ectopia in male dogs. **Design-**Retrospective case series. **Animals-**4 incontinent male dogs with intramural ureteral ectopia. **Procedures-**Intramural ectopic ureters were diagnosed via preoperative computed tomography-IV urography and subsequent cystoscopy. Transurethral cystoscopic-guided laser ablation (diode laser [n = 3 dogs] and holmium:yttrium aluminum garnet laser [1]) was performed to proximally relocate the ectopic ureteral orifice to the urinary bladder. Fluoroscopy was used during the procedures to confirm that the ureteral tract was intramural and the ureteral orifice was intravesicular after the procedure. In 1 dog with bilateral ureteral ectopia, staged laser ablation was performed at 6-week intervals because of difficulty viewing the second ureter on the first attempt. All ureteral orifices were initially located in the middle to proximal portion of the prostatic portion of the urethra. Six weeks after surgery, imaging was repeated in 3 of 4 dogs. **Results-**Postoperative dysuria or hematuria did not develop. All dogs were immediately continent after laser treatment and remained so at a median follow-up

period of 18 months (range, 15 to 20 months) without medical management. Conclusions and Clinical Relevance-Ureteral ectopia can cause urinary incontinence in male dogs and is usually associated with other urinary tract abnormalities. Cystoscopic-guided laser ablation provided an effective and minimally invasive alternative to surgical management of intramural ureteral ectopia.

[J Am Vet Med Assoc.](#) 2008 Apr 1;232(7):1010-2

Pyogranulomatous cystitis associated with *Toxoplasma gondii* infection in a cat after renal transplantation.

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Case Description-An 8-year-old spayed female domestic shorthair cat was evaluated for azotemia and a suspected mass in the urinary bladder 6 weeks after receiving a renal transplant. Ultrasonography revealed a mass at the ureteroneocystostomy site, and the mass was excised. Both the donor and recipient cats were seronegative for *Toxoplasma gondii*-specific IgG antibodies prior to transplantation. Clinical Findings-Histologic evaluation of the mass revealed lesions indicative of extensive necrotizing pyogranulomatous cystitis with numerous intralésional *T gondii* tachyzoites and bradyzoite cysts. Treatment and Outcome-Treatment with clindamycin was initiated; however, the cat's clinical condition continued to decline, and it was euthanized 9 days after the mass was excised. Necropsy revealed *T gondii* cysts within the renal allograft and the transplanted ureter, with no evidence of systemic spread of organisms. Clinical Relevance-Toxoplasmosis should be considered as a differential diagnosis for azotemia in feline renal transplant recipients regardless of the results of assays for *T gondii* antibodies in the serum of donors or recipients. This report illustrated the need for improved screening of donor and recipient cats and the importance of minimizing exposure to potential sources of *T gondii* after transplantation.

[J Am Vet Med Assoc.](#) 2008 Mar 1;232(5):728-32

Acute intrinsic renal failure in cats: 32 cases (1997-2004).

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OBJECTIVE: To determine patient demographics, clinicopathologic findings, and outcome associated with naturally acquired acute intrinsic renal failure (ARF) in cats. DESIGN: Retrospective case series. ANIMALS: 32 cats with ARF. PROCEDURES: Cats were considered to have ARF if they had acute onset of clinical signs (< 7 days), serum creatinine

concentration > 2.5 mg/dL (reference range, 0.8 to 2.3 mg/dL) and BUN > 35 mg/dL (reference range, 15 to 34 mg/dL) in conjunction with urine specific gravity < 1.025 or with anuria or increasing serum creatinine concentration despite fluid therapy and normal hydration status, and no signs of chronic renal disease. Cases were excluded if cats had renal calculi or renal neoplasia. RESULTS: Causes of ARF included nephrotoxins (n = 18 cats), ischemia (4), and other causes (10). Eighteen cats were oliguric. For each unit (mEq/L) increase in initial potassium concentration, there was a 57% decrease in chance of survival. Low serum albumin or bicarbonate concentration at initial diagnosis was a negative prognostic indicator for survival. Initial concentrations of BUN, serum creatinine, and other variables were not prognostic. Seventeen (53%) cats survived, of which 8 cats had resolution of azotemia and 9 cats were discharged from the hospital with persistent azotemia. CONCLUSIONS AND CLINICAL RELEVANCE: Results suggested that survival rates of cats with ARF were similar to survival rates in dogs and that residual renal damage persisted in approximately half of cats surviving the initial hospitalization.

[J Am Vet Med Assoc.](#) 2007 Dec 1;231(11):1647

Additional information on melamine in pet food.

Nestle M, Nesheim MC.

[J Am Vet Med Assoc.](#) 2007 Oct 1;231(7):1056-60.

Evaluation of cisplatin administered with piroxicam in dogs with transitional cell carcinoma of the urinary bladder.

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OBJECTIVE: To evaluate the antitumor activity and toxic effects of a conservative dose of cisplatin administered in combination with piroxicam to dogs with transitional cell carcinoma (TCC) of the urinary bladder. DESIGN: Clinical trial (nonrandomized, noncontrolled). ANIMALS: 14 client-owned dogs with histologically confirmed TCC of the urinary bladder. PROCEDURES: Each dog was treated with cisplatin (50 mg/m², i.v., q 21 d [reduced to 40 mg/m², i.v., q 21 d because of toxic effects]) and piroxicam (0.3 mg/kg [0.14 mg/lb], PO, q 24 h). A CBC, serum biochemical analyses, and urinalysis were performed prior to each cisplatin treatment. Tumor staging (determined from thoracic and abdominal radiographic and urinary bladder ultrasonographic findings) was performed before treatment and at 6-week intervals during treatment. RESULTS: 5 dogs received only 1 dose of cisplatin because of the rapid progression of disease (n = 2) or toxic effects (3). With regard to the neoplastic disease among the other 9 dogs, 1 had partial remission, 5 had stable disease, and 3 had progressive disease after 6 weeks of treatment. Median progression-free interval was 78 days (range, 20 to 112 days). Median survival time was 307 days (range, 29 to 929 days).

Moderate to severe renal toxicosis and moderate to severe gastrointestinal toxicosis developed in 5 and 8 dogs, respectively. **CONCLUSIONS AND CLINICAL RELEVANCE:** Because of minimal efficacy and associated renal and gastrointestinal toxicosis, administration of cisplatin (40 to 50 mg/m²) with piroxicam cannot be recommended for treatment of dogs with TCC of the urinary bladder.

[J Am Vet Med Assoc.](#) 2007 Sep 15;231(6):893-9

Frequency of urinary tract infection in catheterized dogs and comparison of bacterial culture and susceptibility testing results for catheterized and noncatheterized dogs with urinary tract infections.

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OBJECTIVE: To determine frequency of urinary tract infections (UTIs) in catheterized dogs that had intervertebral disk disease (IVDD) or disease other than IVDD and compare bacterial culture and susceptibility testing results for catheterized and noncatheterized dogs with UTIs. **DESIGN:** Retrospective cohort study. **ANIMALS:** 147 catheterized dogs (105 with IVDD and 42 with other diseases) and 99 noncatheterized dogs with UTIs. **PROCEDURES:** Medical records were reviewed for signalment, history, clinical problem, duration of urinary tract catheterization, administration of drugs, and urine bacterial culture and susceptibility testing results. **RESULTS:** Forty-two percent (44/105) of dogs with IVDD and 55% (23/42) of dogs with other diseases had UTIs; this difference was not significant. For catheterized dogs, the odds of UTI were increased by 20% for each year increase in age, 27% for each day increase in duration of catheterization, and 454% with antimicrobial administration. *Escherichia coli* and *Proteus* spp were more frequently isolated from noncatheterized dogs, whereas *Enterobacter* spp and *Staphylococcus* spp were more frequently isolated from catheterized dogs. There was no significant difference in frequency of 1, 2, or 3 isolates between groups. Proportions of antimicrobials to which the most frequently isolated bacteria were resistant were not significantly different between groups. **CONCLUSIONS AND CLINICAL RELEVANCE:** Results suggested that urinary tract catheterization is a reasonable alternative for management of dogs with urinary bladder dysfunction, but that duration of catheterization should be minimized and indiscriminate antimicrobial administration to dogs with indwelling urinary catheters should be avoided.

[J Am Vet Med Assoc.](#) 2007 Aug 15;231(4):570-6

Evaluation of trends in urolith composition in cats: 5,230 cases (1985-2004).

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OBJECTIVE: To determine trends in urolith composition in cats. **DESIGN:** Retrospective case series. **SAMPLE POPULATION:** 5,230 uroliths. **PROCEDURES:** The laboratory database for the Gerald V. Ling Urinary Stone Analysis Laboratory was searched for all urolith submissions from cats from 1985 through 2004. Submission forms were reviewed, and each cat's age, sex, breed, and stone location were recorded. **RESULTS:** Minerals identified included struvite, calcium oxalate, urates, dried solidified blood, apatite, brushite, cystine, silica, potassium magnesium pyrophosphate, xanthine, and newberyite. During the past 20 years, the ratio of calcium oxalate stones to struvite stones increased significantly. When only the last 3 years of the study period were included, the percentage of struvite stones (44%) was higher than the percentage of calcium oxalate stones (40%). The most common location for both types of uroliths was the bladder. The number of calcium oxalate-containing calculi in the upper portion of the urinary tract increased significantly during the study period. The number of apatite uroliths declined significantly and that of dried solidified blood stones increased significantly, compared with all other stone types. No significant difference in the number of urate stones was detected. **CONCLUSIONS AND CLINICAL RELEVANCE:** The increasing proportion of calcium oxalate uroliths was in accordance with findings from other studies and could be a result of alterations in cats' diets. However, the decreased percentage of calcium oxalate calculi and increased percentage of struvite calculi observed in the last 3 years may portend a change in the frequency of this type of urolith.

[J Am Vet Med Assoc.](#) 2007 Jul 1;231(1):101-6 . Erratum in: J Am Vet Med Assoc. 2007 Nov 15;231(10):1533.

Clinical signs, treatments, and outcome in cats with transitional cell carcinoma of the urinary bladder: 20 cases (1990-2004).

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OBJECTIVE: To characterize demographics and clinical signs and evaluate outcomes of treatments in cats with transitional cell carcinoma (TCC) of the urinary bladder. **DESIGN:** Retrospective case series. **ANIMALS:** 20 cats with TCC. **PROCEDURES:** Medical records of 20 cats with a bladder mass identified as a TCC that were examined at 2 veterinary institutions between 1990 and 2004 were evaluated. Signalment, treatments, and outcome were assessed. **RESULTS:** Breeds included domestic short hair (n=14), long hair (2), and medium hair (2) cats, Siamese (1), and Abyssinian (1). All cats had been neutered at an early age (< 1 year old; 13 neutered males and 7 spayed females). The median age at diagnosis of TCC was 15.2 years. The trigone region was affected in 9 cats. Treatments included piroxicam administration, chemotherapy, or surgery as single interventions or in combination; 6 cats were not treated. At the time of diagnosis, 3 cats had pulmonary metastasis and 1 cat had metastasis to local lymph nodes. Median survival time for all 20 cats was 261 days. Nearly all deaths were attributable to progressive disease in the urinary tract. Five cats were lost to

follow-up. **CONCLUSIONS AND CLINICAL RELEVANCE:** In cats, TCC of the urinary bladder appears to be a rare and aggressive disease that is more prevalent in male cats and frequently develops at sites distant from the trigone (unlike TCC in dogs). Nevertheless, initial clinical signs of TCC in cats in this study were similar to those reported for affected dogs.

[J Am Vet Med Assoc.](#) 2007 Jul 1;231(1):71-3

Reconstruction of the urethra by use of an inverse tubed bipediced flap in a dog with hypospadias.

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CASE DESCRIPTION: A 1-year-old castrated male German Shepherd Dog was evaluated because of a history of hematuria and stranguria secondary to recurrent urinary tract infections. **CLINICAL FINDINGS:** Physical examination revealed hypospadias with penile and preputial aplasia. The urethral orifice was just ventral to the ventral aspect of the anocutaneous junction. Ascending urinary tract infections, secondary to fecal contamination of the urethral orifice, were the presumed source of recurrent bouts of cystitis that developed despite periodic antimicrobial treatment. **TREATMENT AND OUTCOME:** A 1-cm-diameter urethral extension was constructed from the urethral mucosal remnant located along the midline of the perineum (urethral trough). Two parallel 4-cm incisions (3 cm apart) were made lateral to that urethral trough. The borders were sutured to form an inverted, epithelium-lined tube (bipediced flap) attached to the dorsal urethral orifice. The lateral skin margins were sutured over the reconstructed urethral extension, completing the procedure. Postoperative swelling necessitated temporary catheterization of the urinary bladder. After closure of a small fistula from the reconstructed urethral segment, the dog subsequently had only 2 episodes of cystitis during a 3-year period. To minimize skin irritation secondary to urine exposure, the dog's owner regularly trimmed the hair around the new urethral orifice. **CLINICAL RELEVANCE:** In dogs, correction of perineal (subanal) hypospadias via urethral reconstruction should be considered among treatment options. By use of an inverse tubed urethral extension, direct fecal contamination to the lower urinary tract may be effectively eliminated, dramatically reducing the incidence of ascending urinary tract infections in dogs with hypospadias.

[J Am Vet Med Assoc.](#) 2007 Jun 15;230(12):1854-9

A case-control study of the effects of nephrolithiasis in cats with chronic kidney disease.

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OBJECTIVE: To determine whether nephrolithiasis was associated with an increase in mortality rate or in the rate of disease progression in cats with naturally occurring stage 2 (mild) or 3 (moderate) chronic kidney disease. **DESIGN:** Retrospective case-control study. **ANIMALS:** 14 cats with stage 2 (mild) or 3 (moderate) chronic kidney disease (7 with nephroliths and 7 without). **PROCEDURES:** All cats were evaluated every 3 months for up to 24 months. Possible associations between nephrolithiasis and clinicopathologic abnormalities, incidence of uremic crises, death secondary to renal causes, and death secondary to any cause were evaluated. **RESULTS:** There were no clinically important differences in biochemical, hematologic, or urinalysis variables between cats with and without nephroliths at baseline or after 12 and 24 months of monitoring. No associations were detected between nephrolithiasis and rate of disease progression, incidence of uremic crises, or death. **CONCLUSIONS AND CLINICAL RELEVANCE:** Results suggested that in cats with mild or moderate chronic kidney disease, nephrolithiasis was not associated with an increase in mortality rate or in the rate of disease progression. Findings support recommendations that cats with severe kidney disease and nephrolithiasis be managed without surgery.

[J Am Vet Med Assoc.](#) 2007 Jun 1;230(11):1653-6

Evaluation of clinical status, renal function, and hematopoietic variables after unilateral nephrectomy in canine kidney donors.

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OBJECTIVE: To determine clinical status and renal and hematopoietic function after kidney donation and identify risks associated with kidney donation in dogs. **DESIGN:** Prospective study. **ANIMALS:** 14 dogs that underwent unilateral nephrectomy for kidney donation. **PROCEDURES:** Records were reviewed retrospectively to collect data regarding pre-nephrectomy clinicopathologic variables. Dogs were reexamined prospectively at various times after nephrectomy, and pre- and post-nephrectomy CBC, serum biochemical analyses, urinalysis, and urine protein-to-urine creatinine ratio were compared. Six dogs had post-nephrectomy renal volume determined ultrasonographically, and 4 of those dogs also underwent scintigraphic determination of glomerular filtration rate and renal biopsy. **RESULTS:** All dogs were clinically normal at the time of reevaluation. There were no significant differences between pre-nephrectomy and post-nephrectomy values for BUN concentration or urine specific gravity. Mean post-nephrectomy serum creatinine concentration was significantly greater than pre-nephrectomy concentration. Mean serum phosphorus concentration was significantly decreased after nephrectomy, and mean Hct, corpuscular volume, and corpuscular hemoglobin concentration were significantly increased after nephrectomy. Post-nephrectomy renal volume was greatest in dogs < 12 months old at

the time of surgery. Mean postnephrectomy glomerular filtration rate was 2.82 +/- 1.12 mL/kg/ min (1.28 +/- 0.51 mL/lb/min). Renal biopsy specimens obtained during and after nephrectomy were histologically normal. **CONCLUSIONS AND CLINICAL RELEVANCE:** Renal and hematopoietic variables were within reference ranges in dogs examined up to 2.5 years after unilateral nephrectomy. Compensatory renal hypertrophy was greatest in dogs < 1 year of age at donation. Donor age, along with histocompatibility, may be an important factor in selecting dogs for kidney donation.

[J Am Vet Med Assoc.](#) 2007 Apr 15;230(8):1184-9

Outcome of and complications associated with tube cystostomy in dogs and cats: 76 cases (1995-2006).

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OBJECTIVE: To determine indications for cystostomy tube use in dogs and cats, complications associated with their use, and outcome of dogs and cats in which cystostomy tubes had been inserted. **DESIGN:** Retrospective case series. **ANIMALS:** 37 dogs and 39 cats. **PROCEDURES:** Information was obtained from medical records. Long-term follow-up information was obtained by use of a client questionnaire. **RESULTS:** Indications for cystostomy tube placement were bladder dysfunction, urinary tract rupture, obstructive urinary tract neoplasia, urinary diversion following urogenital surgery, obstructive urolithiasis, and feline lower urinary tract disease. Median time tubes were in place was 11 days, but duration of tube use was significantly longer for animals with bladder dysfunction than for animals with urinary tract trauma, urinary diversion, or urinary tract obstruction. Thirty-seven (49%) animals had tube complications. Development of complications was not significantly associated with species, age, body weight, duration of tube use, or tube type, except that animals were significantly more likely to develop complications following long- rather than short-term use. In 42 animals, the underlying condition resolved and the tube was removed; 22 animals died or were euthanized with the tube in place. **CONCLUSIONS AND CLINICAL RELEVANCE:** Results suggested that cystostomy tubes may be used for animals with various conditions related to problems with urine outflow. Nearly half the animals in the study developed complications related to the cystostomy tube, suggesting that potential complications should be discussed with owners prior to tube placement. However, most complications were easily resolved.

[J Am Vet Med Assoc.](#) 2007 Apr 15;230(8):1165-9

Association of microalbuminuria and the urine albumin-to-creatinine ratio with systemic disease in cats.

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OBJECTIVE: To determine the diagnostic usefulness of semiquantitative and quantitative microalbuminuria assays and urine albumin-to-creatinine (UAC) ratio for detecting disease in cats. **DESIGN:** Prospective study. **ANIMALS:** 441 cats evaluated at a veterinary teaching hospital. **PROCEDURES:** Urine samples from cats for which a complete medical record was available were included. Urine dipstick results, urine protein-to-creatinine ratios (cutoffs, 0.1 and 0.4), semiquantitative and quantitative microalbuminuria assay results (cutoff, 1 mg/dL), and UAC ratio values (cutoffs, 100 and 200 mg/g) were determined. Clinical diagnoses determined within 3 months of enrollment were recorded. Sensitivity and specificity were determined with disease status used as the standard. The influences of clinical diagnosis, sex, age, serum urea nitrogen and creatinine concentrations, blood pressure, bacterial urine culture results, rectal temperature, pyuria, hematuria, and bacteriuria were evaluated by means of logistic regression. **RESULTS:** Of 441 cats that were eligible for inclusion, 40 were healthy and 401 had ≥ 1 disease. Results of logistic regression indicated that significant associations existed for age, presence of disease, presence of urinary tract disease, azotemia, hematuria, and pyuria and results of 1 or both of the microalbuminuria assays. **CONCLUSIONS and CLINICAL RELEVANCE:** Microalbuminuria was associated with underlying disease. Sensitivity and specificity of the microalbuminuria assays for detection of systemic disease were superior to those of other tests. Microalbuminuria testing in conjunction with other screening procedures may increase identification of occult disease. A prospective study evaluating the predictive values of screening tests with and without microalbuminuria determination is needed to validate this recommendation.

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[J Feline Med Surg](#). 2008 Feb 5 [Epub ahead of print

Unilateral improvement in glomerular filtration rate after permanent drainage of a perinephric pseudocyst in a cat.

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A 12-year-old, 6kg, castrated male Siamese-cross cat was referred for investigation of an abdominal mass. The cat was found to have a left perinephric pseudocyst (PNP), accompanied by azotemia, with a small right kidney detected on ultrasound. Glomerular filtration rate (GFR) was determined by renal scintigraphy and was found to be low, with the left kidney contributing 64% of the total GFR. Percutaneous ultrasound-guided drainage of the PNP did not improve the GFR, and fluid reaccumulated within a short period of time. Laparoscopic fenestration of the cyst capsule was performed to allow for permanent drainage. The PNP did not recur, renal values progressively improved, and 8 months after

the capsulotomy the GFR of the left kidney had increased by 50%, while renal function remained static on the right side.

[J Feline Med Surg.](#) 2008 Feb 1

Corynebacterium urealyticum urinary tract infection in a cat with urethral obstruction.

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Corynebacterium urealyticum is an uncommon cause of urinary tract infections in cats. However, it is difficult to diagnose and if left untreated it may result in irreversible bladder lesions. *C. urealyticum* is a multiantibiotic-resistant bacterium whose culture requires special care. Risk factors for the occurrence of this infection include urological procedures, foreign bodies, bladder mucosa abnormalities, immuno-suppressed states and antibiotic treatment. This report describes an unusual case of *C. urealyticum* urinary infection in a young cat with pre-existing urethral obstruction. *C. urealyticum* was isolated in pure cultures from two urine samples. Clinical and ultrasound features, results of the urinalysis and urine culture are described as well as therapeutic treatment and eventual favourable outcome to treatment with amoxicillin-clavulanic acid.

[J Feline Med Surg.](#) 2007 Dec;9(6):481-6.

Catheter-induced urethral trauma in cats with urethral obstruction.

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Fifteen cats were evaluated with urethral obstruction. Penile trauma by catheterization was the major indication for perineal urethrostomy. Ten cats had developed a urethral stricture and five had rupture of the urethra following medical management. All cats had abnormalities in penis and/or prepuce and/or scrotal sacs including hyperemia or swelling. Perineal urethrostomy was performed in all cases and they were evaluated for 6 months after surgery. Few complications were noted. Urinary tract infection was the most frequent complication observed. The clients considered their cats to have a good quality of life following surgery.

[J Feline Med Surg.](#) 2008 Apr;10(2):115-9.

Polycystic kidney disease: a review and occurrence in Slovenia with comparison between ultrasound and genetic testing.

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Polycystic kidney disease (PKD) is an inherited autosomal kidney disease which is most commonly identified in Persian and Persian related cats. Positive cats have multiple cysts of various sizes that occur in the renal cortex and medulla and occasionally in other abdominal organs. PKD often leads to renal failure which occurs from mid to late in life. Renal cysts can be diagnosed ultrasonographically after 7 weeks of age by an experienced ultrasonographer and a high resolution machine. However, ultrasonography is now being replaced by genetic screening. A total of 340 cats of variable breeds aged from 5 months to 18 years were ultrasonographically examined in the past 7 years at the University Veterinary Small Animal Clinic. Of these, 13.8% were PKD positive with very high prevalence in Persian cats (36%). There was no sex predilection identified. The C>A transversion at position 3284 on exon 29 of PKD1 gene, resulting in a stop mutation has been identified in the heterozygous state in eight affected cats examined (Persian breed). All heterozygous cats were also ultrasonographically positive.

[J Feline Med Surg.](#) 2008 Feb;10(1):102-5.

Renal cystadenoma in a domestic shorthair.

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An 11-year-old domestic shorthair was examined after an enlarged left kidney was palpated by the referring veterinarian. No abnormalities were noted on complete blood count, serum biochemical profile and total thyroxine concentration, and the urine specific gravity was 1.039. An abdominal ultrasound identified the presence of a large cystic structure on the caudal pole of the left kidney. No abnormalities of the right kidney were seen. A left ureteronephrectomy was performed, and the cat recovered uneventfully from the procedure and was discharged from the hospital 5 days after surgery. The cat remains clinically normal 16 months postoperatively. Histopathology of the removed kidney demonstrated the presence of a renal cystadenoma. This report describes the successful surgical treatment of a renal cystadenoma. Renal cystadenoma should be considered as a differential diagnosis when renomegaly is noted. To the author's knowledge, a renal cystadenoma has not been previously reported in a cat.

[J Feline Med Surg.](#) 2008 Feb;10(1):16-23.

Guarded long-term prognosis in male cats with urethral obstruction.

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The aim of this study was to evaluate the course of urethral obstruction in cats. Forty-five male cats with urethral obstruction or lower urinary tract signs referable to urethral obstruction were included in the study. Follow-up information was gained by telephone interview in most cases and was available in 39 cats. Of the 22 cats with idiopathic urethral obstruction, eight (36%) re-obstructed after 3-728 days (median 17 days). Of 10 cats with urolithiasis, three (30%) re-obstructed after 10, 13 and 472 days, respectively. Of the seven cats with urethral plugs, three (43%) re-obstructed after 4, 34 and 211 days, respectively. Recurrent signs of lower urinary tract disease including obstruction were common in cats with urethral obstruction (20/39; 51%) and occurred in the same frequency irrespective of the primary cause of the obstruction. Recurrent obstruction (14/39; 36%) was the most common reason for euthanasia and was performed in 8/39 (21%) cats.

[J Feline Med Surg.](#) 2007 Dec;9(6):458-65.

Bacteriuria in cats with feline lower urinary tract disease: a clinical study of 134 cases in Norway.

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Feline lower urinary tract disease (FLUTD) is considered to be one of the most common diagnoses in feline patients. Several authors have concluded that feline idiopathic cystitis is the most common cause of FLUTD, whereas infectious cystitis is diagnosed in only 2% of the cases. In the period from January 2003 to February 2005, 134 cats that presented with signs of lower urinary tract disorders were included in a study at the Norwegian School of Veterinary Science. Ninety-seven percent were first opinion cases. All the cats went through a physical examination, and blood samples were collected for haematology and clinical chemistry. The urine analysis included urine stix, specific gravity, microscopic examination of the sediment and microbiological culturing. The urine samples were collected as voided mid-stream urine samples, by catheter or by cystocentesis and the method used was registered. Of the 134 cats included in the study, 37% were diagnosed as having obstructive and 63% as having non-obstructive FLUTD. In total 44 cats (33%) were diagnosed with bacteriuria, exceeding 10(3) colony forming units per millilitre (cfu/ml) and 33 (25%) of these cats had bacterial growth exceeding 10(4) cfu/ml, either alone or in combination with crystals and/or uroliths. Six cats (18%) with bacterial growth exceeding 10(4) cfu/ml were older than 8 years. No significant difference was found between the sampling methods performed with regard to bacteriuria. This study indicates that bacteriuria may have been underdiagnosed in Norwegian cats with clinical signs of FLUTD. It also confirms the importance of

microbiological culturing in first opinion cases with FLUTD and that a skilled operator can get representative samples regardless the choice of method.

[J Feline Med Surg.](#) 2007 Dec;9(6):503-8.

Xanthine urolithiasis in a cat: a case report and evaluation of a candidate gene for xanthine dehydrogenase.

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Xanthine urolithiasis was found in a 4-year-old spayed female Himalayan cat with a 10-month history of intermittent haematuria and dysuria. Ultrasonographs indicated the existence of several calculi in the bladder that were undetectable by survey radiographic examination. Four bladder stones were removed by cystotomy. The stones were spherical brownish-yellow and their surface was smooth and glossy. Quantitative mineral analysis showed a representative urolith to be composed of more than 95% xanthine. Ultrasonographic examination of the bladder 4.5 months postoperatively indicated the recurrence of urolithiasis. Analysis of purine concentration in urine and blood showed that the cat excreted excessive amounts of xanthine. In order to test the hypothesis that xanthinuria was caused by a homozygote of the inherited mutant allele of a gene responsible for deficiency of enzyme activity in purine degradation pathway, the allele composition of xanthine dehydrogenase (XDH) gene (one of the candidate genes for hereditary xanthinuria) was evaluated. The cat with xanthinuria was a heterozygote of the polymorphism. A single nucleotide polymorphism analysis of the cat XDH gene strongly indicated that the XDH gene of the patient cat was composed of two kinds of alleles and ruled out the hypothesis that the cat inherited the same recessive XDH allele suggesting no activity from a single ancestor.

[J Feline Med Surg.](#) 2007 Oct;9(5):387-91.

Prevalence of the polycystic kidney disease and renal and urinary bladder ultrasonographic abnormalities in Persian and Exotic Shorthair cats in Italy.

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The ultrasonographic findings of kidneys, liver and urinary bladder of 288 Persian and 44 Exotic Shorthair clinically normal cats that underwent screening for polycystic kidney disease (PKD) between July 2003 and December 2005 were reviewed. Cats were divided into two groups, one including cats aged <9 months (group 1) and one cats aged \geq 9 months (group 2). Cats were classified as PKD-positive when at least one renal cyst was found. One hundred

and thirty-six cats (41.0%) had more than one cyst in at least one kidney. The prevalence of PKD was similar in both groups. Eight PKD-positive cats had cystic livers (5.9%). Other renal abnormalities included a pelvic calculus and a medullary rim sign (MRS). The difference in prevalence of an MRS in group 2 compared to group 1 and the difference between PKD-positive and -negative cats in group 2 were not significant. There was no difference in mean kidney length between PKD-positive and -negative cats in group 2. Urinary bladder anomalies were principally represented by urinary sediment, with prevalence significantly higher in group 2. No difference was detected in group 2 between PKD-positive and -negative cats. In conclusion feline PKD is common in Italy. The ultrasonographic findings of MRS and urinary bladder sediment did not correlate with feline PKD. Urinary bladder sediment is common in Persians and Exotic Shorthairs and more likely in adults.

[J Feline Med Surg.](#) 2007 Apr;9(2):124-32.

Urinary tract infections in cats with hyperthyroidism, diabetes mellitus and chronic kidney disease.

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The prevalence of urinary tract infections (UTIs) in cats with hyperthyroidism (n=90), diabetes mellitus (DM) (n=57) and chronic kidney disease (CKD) (n=77) was evaluated retrospectively. It was found to be 12% in cats with hyperthyroidism and DM, respectively, and 22% in cats with CKD. Associations between UTIs and clinical signs, biochemical markers in serum and urinalyses were investigated. Many of the cats with UTIs had no clinical signs of lower urinary tract disease or changes in their laboratory values indicative of infection. Therefore, a urinalysis alone should not be used to exclude UTIs in these cats. UTIs are relatively common in cats with hyperthyroidism, DM and CKD, and urine cultures are recommended as part of the basic diagnostic plan for cats suspected of suffering from these conditions.

Journal of Comparative Pathology (Apr 07– Apr 08)

[J Comp Pathol.](#) 2007 May;136(4):279-82.

Canine necrotizing encephalitis associated with anti-glomerular basement membrane glomerulonephritis.

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A 2-year-old male West Highland white terrier with a 4-month history of seizures was referred for investigation. Depressed mentation, proprioceptive deficit and decreased menace response were noted at neurological examination. Post-mortem examination of the brain revealed multifocal lesions located principally in the left side of the diencephalon and mesencephalon. The lesions consisted of non-suppurative inflammation and large areas of cavitation. The clinical evaluation and histopathological findings were consistent with a diagnosis of necrotizing meningoencephalitis (NME). Immunofluorescence performed on frozen sections of kidney revealed strong smooth linear labelling of the glomerular basement membrane with anti-IgG serum as well as weaker linear labelling with anti-IgM serum. This histomorphological pattern was consistent with anti-glomerular basement membrane glomerulonephritis. The association of this type of glomerulonephritis with a necrotizing encephalitis would support the hypothesis of an immune-mediated aetiology for NME.

Journal of Small Animal Practice (Apr 07 – Apr 08)

[J Small Anim Pract.](#) 2008 Apr 14

Efficacy and safety of cefovecin for the treatment of urinary tract infections in cats.

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Objectives: To determine the efficacy and safety of cefovecin (Convenia((R)); Pfizer Animal Health) in the treatment of urinary tract infections in cats. **Method:** A multi-centre, masked, randomised study was conducted in cats presenting with clinical signs indicative of urinary tract infections. Cephalexin (Rilexine((R)); Virbac) administered orally twice daily at 15 mg/kg bodyweight for 14 days was compared with a single subcutaneous injection of cefovecin in cats. The primary efficacy parameter assessed was bacterial elimination of the pretreatment uropathogen. **Results:** Four hundred and thirty-four cats were screened for urinary tract infections. One hundred and eighty-five cats were treated with either cefovecin (n=124) or cephalexin (n=61). Ninety-seven cats (22.2 per cent) had confirmed bacteriuria and 82 cats were included in efficacy analysis. *Escherichia coli* was eliminated in 76.7 per cent (23 of 30) of cefovecin-treated cats compared with 62.5 per cent (10 of 16) of cephalexin-treated cats. Cefovecin demonstrated statistical non-inferiority compared with cephalexin for bacterial elimination. There were no suspected adverse drug reactions attributable to treatment with cefovecin or cephalexin. **Clinical Significance:** Cefovecin was demonstrated to be an effective and safe treatment for urinary tract infections.

[J Small Anim Pract.](#) 2008 Apr 16

Diagnosis of hyperthyroidism in cats with mild chronic kidney disease.

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Objectives: In cats with concurrent hyperthyroidism and non-thyroidal illnesses such as chronic kidney disease, total thyroxine concentrations are often within the laboratory reference range (19 to 55 nmol/l). The objective of the study was to determine total thyroxine, free thyroxine and/or thyroid-stimulating hormone concentrations in cats with mild chronic kidney disease. **Methods:** Total thyroxine, free thyroxine and thyroid-stimulating hormone were measured in three groups. The hyperthyroidism-chronic kidney disease group (n=16) had chronic kidney disease and clinical signs compatible with hyperthyroidism but a plasma total thyroxine concentration within the reference range. These cats were subsequently confirmed to be hyperthyroid at a later date. The chronic kidney disease-only group (n=20) had chronic kidney disease but no signs of hyperthyroidism. The normal group (n=20) comprised clinically healthy senior (>8 years) cats. **Results:** In 4 of 20 euthyroid chronic kidney disease cats, free thyroxine concentrations were borderline or high (≥ 40 pmol/l). In the hyperthyroidism-chronic kidney disease group, free thyroxine was high in 15 of 16 cats, while thyroid-stimulating hormone was low in 16 of 16 cats. Most hyperthyroidism-chronic kidney disease cats (14 of 16) had total thyroxine greater than 30 nmol/l, whereas all the chronic kidney disease-only cats had total thyroxine less than 30 nmol/l. **Clinical Significance:** The combined measurement of free thyroxine with total thyroxine or thyroid-stimulating hormone may be of merit in the diagnosis of hyperthyroidism in cats with chronic kidney disease.

[J Small Anim Pract.](#) 2008 Mar 26 .

Primary prostatic haemangiosarcoma causing severe haematuria in a dog.

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A 10-year-old, entire, male, mixed-breed dog was presented for severe haematuria and stranguria. Ultrasound revealed a large intraluminal urinary bladder blood clot and a prostatic space-occupying lesion. Invasion of the lesion into the prostatic urethra was detected ultrasonographically during compression of the urinary bladder. Post-mortem examination revealed primary prostatic haemangiosarcoma infiltrating the urethra. Haemangiosarcoma should be considered as a rare cause of prostatic mass lesions, haematuria or lower urinary tract signs in dogs.

[J Small Anim Pract.](#) 2007 Dec;48(12):702-4.

Ureteral spindle cell sarcoma in a dog.

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A five-year-old, female spayed Labrador retriever was presented for further investigation of an intra-abdominal mass. Abdominal exploration showed a large mass arising from the right ureter and a ureteronephrectomy was performed. Histopathology of the ureteral mass was consistent with a spindle cell sarcoma. The patient recovered well, but five months later was diagnosed with another tumour, this time in her left abdominal wall. The owners decided not to pursue further treatment and euthanasia was performed a month later.

[J Small Anim Pract.](#) 2008 Mar;49(3):144-7.

Transitional cell carcinoma forming a perirenal cyst in a cat.

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An eight-year-old, neutered male Burmese cat presented with five days vomiting and anorexia. Physical examination, clinical pathology and diagnostic imaging findings suggested a perirenal pseudocyst. After partial resection of the perirenal capsule clinical signs temporarily resolved, but the cat was euthanased 34 days postoperatively as a result of seizures and recurrence of vomiting. Postoperative histopathology showed neoplastic transitional cells within and lining the resected perirenal capsule; a diagnosis of transitional cell carcinoma was confirmed post-mortem. To the authors' knowledge, this is the first report of this presentation of transitional cell carcinoma. Transitional cell carcinoma should be a differential diagnosis for the aetiology of perirenal pseudocyst.

[J Small Anim Pract.](#) 2007 Dec;48(12):690-4.

Juvenile nephropathy in 37 boxer dogs.

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OBJECTIVES: The purpose of this study was to review and characterise the clinical presentation of young boxer dogs with chronic kidney disease referred to the authors' institutions. **METHODS:** Records were collected retrospectively from 37 boxer dogs, less than five years of age, which had presented with azotaemia, inappropriately low urine concentrating ability, and ultrasound or radiographic evidence of abnormal kidneys. **RESULTS:** Clinicopathological findings included azotaemia, hyperphosphataemia, anaemia, isosthenuria and proteinuria. Ultrasonographic findings included hyperechoic renal cortices, loss of corticomedullary junction definition, dilated pelves and irregularly shaped small kidneys. Renal histopathological findings included pericapsular and interstitial fibrosis, inflammatory cell infiltration, dilated tubules, sclerotic glomeruli and dystrophic calcification. Survival time of the dogs varied from zero to over five years after diagnosis. **CLINICAL SIGNIFICANCE:** This paper documents features of the presentation and progression of juvenile nephropathy in boxer dogs. While juvenile nephropathy has been reported in individual cases of boxer dogs previously, this is the first reported case series.

[J Small Anim Pract.](#) 2007 Nov;48(11):654-7.

First record of natural *Tritrichomonas foetus* infection of the feline uterus.

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Tritrichomonas foetus was found in the uterus of a cat with pyometra and in the faeces of three other cats in the same household, one of which had chronic diarrhoea. This is the first report of a feline uterine infection with *T. foetus* and also the first time *T. foetus* has ever been diagnosed in animals in Norway. The diagnosis was made by microscopic examination and sequencing studies.

[J Small Anim Pract.](#) 2007 Dec;48(12):705-8.

Traumatic diaphragmatic rupture in a cat with partial kidney displacement into the thorax.

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A two-year-old, male, neutered, domestic shorthair cat was presented after suspected trauma. Diaphragmatic rupture with concomitant displacement of the right kidney into the thorax was diagnosed using ultrasound and intravenous urography. Avulsion of the renal pedicle and diaphragmatic rupture were confirmed and treated surgically with excellent outcome.

[J Small Anim Pract.](#) 2007 Jun;48(6):324-8.

Canine leptospirosis infections - clinical signs and outcome with different suspected *Leptospira* serogroups (42 cases).

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OBJECTIVES: The aim of the study was to investigate the presence of serum antibodies to different *Leptospira* serogroups in dogs with a clinical diagnosis of leptospirosis in southern Germany and to compare seroreactivity to different serogroups with history, clinical signs, laboratory findings and survival rate. **METHODS:** In this study, the data of 42 dogs with the diagnosis of leptospirosis were evaluated retrospectively. Dogs were presented to the Small Animal Medicine Teaching Hospital (Medizinische Kleintierklinik) of the Ludwig Maximilians University Munich, Germany, between 1990 to 2003. **RESULTS:** Reactivity to the serogroup grippotyphosa (13/42) was most frequently present, followed by reactivity to the serogroup saxkoebing (10/42). There was no difference in the clinical picture and the laboratory changes between dogs whose sera were reactive to different serogroups. **CLINICAL SIGNIFICANCE:** Most of the dogs with leptospirosis in southern Germany had sera reacting to serogroups other than icterohaemorrhagiae and canicola, which are contained in the vaccine. Thus, currently available vaccines in Europe do not protect against the most common *Leptospira* organisms associated with clinical disease.

[J Small Anim Pract.](#) 2007 Dec;48(12):699-701.

Ureteral sarcoma in a dog.

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A ureteral sarcoma was diagnosed in a nine-year-old Weimaraner dog with gross haematuria, severe unilateral hydronephrosis, and hydroureter. Treatment consisted of unilateral nephrectomy and ureterectomy. This case was compared with 14 other ureteral tumours reported in the veterinary literature. Only three previous reports concerned a malignant ureteral tumour. Urinary tract neoplasms mainly involve the bladder and the kidney, and more rarely the urethra. The purpose of this paper is to report a rare case of malignant ureteral tumour in a dog.

Journal of Veterinary Internal Medicine (Apr 07– May 08)

[J Vet Intern Med.](#) 2008 May 2

Holmium : YAG Laser Lithotripsy for Urolithiasis in Dogs.

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Background: Laser lithotripsy has been used as an alternative to surgical removal of uroliths in a number of species. Objectives: To determine the effectiveness of laser lithotripsy for removing urocystoliths, urethroliths, or both in dogs, and to determine the influence of dog (chronological order of lithotripsy, endoscope type, sex, body weight) and urolith (total urolith and urocystolith number, presence or absence of urethroliths, largest urolith dimension, and urolith composition) factors on outcome. Animals: Twenty-five client-owned dogs with urocystoliths, urethroliths, or both were included. Male dogs were required to weigh ≥ 6.8 kg. Methods: A single-arm prospective clinical trial. Laser lithotripsy was performed under general anesthesia. Main outcomes included procedure success and lithotripsy time. Predictors of procedure success and lithotripsy time were selected using logistic and linear regression modeling, respectively. Results: The procedure was successful in 21 of 25 dogs. The procedure was successful more often and in less time in female spayed than in male neutered dogs. Sex was identified as a predictor of success. Univariable analysis showed that sex, endoscope type, and chronological order in which the dog received lithotripsy were significantly associated with lithotripsy time. Stepwise linear regression modeling identified sex, body weight, >10 uroliths, and largest urolith dimension as predictors of lithotripsy time. Conclusions and Clinical Importance: Laser lithotripsy is an effective procedure for the removal of urocystoliths, urethroliths, or both with rare important adverse effects and some limitations in male dogs.

[J Vet Intern Med.](#) 2008 Mar-Apr;22(2):317-24

Plasma Asymmetric Dimethylarginine, Symmetric Dimethylarginine, L-Arginine, and Nitrite/Nitrate Concentrations in Cats with Chronic Kidney Disease and Hypertension.

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Background: Chronic kidney disease (CKD) and hypertension have been associated with decreased bioavailability of nitric oxide (NO) and endothelial dysfunction. Increased concentrations of the endothelial nitric oxide synthase (eNOS) inhibitor asymmetric dimethylarginine (ADMA) are implicated. Hypothesis: Plasma ADMA concentration is

increased in cats with CKD and systemic hypertension corresponding to a decrease in total plasma nitrate/nitrite (NO(x)) availability. Decrease in systolic blood pressure (SBP) and proteinuria during treatment of hypertension with amlodipine besylate may be associated with increased NO(x) availability. Animals: Sixty-nine client-owned normotensive and hypertensive cats with variable azotemia. Methods: Plasma ADMA, symmetric dimethylarginine (SDMA), and L-arginine were measured simultaneously by hydrophilic-interaction liquid chromatography-electrospray tandem mass spectrometry in cats from 6 groups: normotensive nonazotemic (n = 10), normotensive mildly azotemic (n = 10), hypertensive mildly azotemic with hypertensive retinopathy (n = 20), hypertensive mildly azotemic without hypertensive retinopathy (n = 10), normotensive moderately azotemic cats (n = 10), and hypertensive nonazotemic cats (n = 9). Plasma NO(x) concentrations were measured. Results: A moderate correlation between plasma creatinine and ADMA (n = 69, r = .608, P < .001), SDMA (n = 69, r = .741, P < .001), and NO(x) concentrations (n = 69, r = .589, P < .001) was observed. There was no association among plasma ADMA, SDMA, and NO(x) concentrations and SBP. Conclusions and Clinical Importance: Plasma ADMA and SDMA concentrations are increased in cats with CKD and correlate with plasma creatinine concentration. This may imply the presence of endothelial dysfunction in cats with CKD. Plasma ADMA concentrations were not associated with systemic hypertension. Treatment of systemic hypertension with amlodipine besylate did not affect plasma ADMA or NO(x) concentrations.

[J Vet Intern Med.](#) 2008 Mar-Apr;22(2):301-8

A novel clinical scoring system for outcome prediction in dogs with acute kidney injury managed by hemodialysis.

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Background: No reliable tool to predict outcome of acute kidney injury (AKI) exists. Hypothesis: A statistically derived scoring system can accurately predict outcome in dogs with AKI managed with hemodialysis. Animals: One hundred and eighty-two client-owned dogs with AKI. Methods: Logistic regression analyses were performed initially on clinical variables available on the 1st day of hospitalization for relevance to outcome. Variables with $P \leq .1$ were considered for further analyses. Continuous variables outside the reference range were divided into quartiles to yield quartile-specific odds ratios (ORs) for survival. Models were developed by incorporating weighting factors assigned to each quartile based on the OR, using either the integer value of the OR (Model A) or the exact OR (Models B or C, when the etiology was known). A predictive score for each model was calculated for each dog by summing all weighting factors. In Model D, actual values for continuous variables were used in a logistic regression model. Receiver-operating curve analyses were performed to assess sensitivities, specificities, and optimal cutoff points for all models. Results: Higher scores were associated with decreased probability of survival (P < .001). Models A, B, C, and D correctly classified outcomes in 81, 83, 87, and 76% of cases, respectively, and optimal sensitivities/specificities were 77/85, 81/85, 83/90 and 92/61%, respectively. Conclusions and Clinical Relevance: The models allowed outcome prediction that corresponded with

actual outcome in our cohort. However, each model should be validated further in independent cohorts. The models may also be useful to assess AKI severity.

[J Vet Intern Med.](#) 2008 Mar-Apr;22(2):293-300

Glomerular filtration rate in dogs with leishmaniasis and chronic kidney disease.

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Background: Glomerular filtration rate (GFR) measurement is an indicator of kidney function. However, its usefulness in dogs at early stages of spontaneous chronic kidney disease (CKD) of glomerular origin, where routine laboratory techniques are not sufficiently sensitive, remains unproved. Hypothesis: That GFR is reduced in proteinuric nonazotemic or mildly azotemic dogs with CKD secondary to leishmaniasis. Animals: Twenty-six dogs with CKD secondary to leishmaniasis and 10 healthy dogs (control group). Methods: CBC, serum biochemistry, and urinalysis (microalbuminuria and urine protein/creatinine ratio [UPC]) were performed in all dogs. GFR was calculated by measuring exogenous creatinine clearance. Based on degree of proteinuria and serum creatinine concentration (SCr), dogs were classified as group A (control; n = 10): UPC < 0.2, SCr < 1.4 mg/dL; group B (n = 8): UPC, 0.2-0.5, SCr < 1.4 mg/dL; group C (n = 10): UPC > 0.5, SCr < 1.4 mg/dL; group D (n = 5): SCr, 1.4-2 mg/dL; group E (n = 3): SCr > 2 mg/dL. Results: GFR (mL/kg/min) was 3.9 +/- 0.29, 4.4 +/- 0.74, 4.5 +/- 1.44, 2.8 +/- 0.97, and 1.5 +/- 0.43 for groups A, B, C, D, and E, respectively. Eleven dogs (1 from group B, 3 from group C, 4 from group D, and all 3 dogs from group E) had an abnormally low GFR. Four dogs from group B and 5 dogs from group C had a GFR above the upper reference range (>4.5 mL/min/kg). Conclusion and Clinical Relevance: Some proteinuric nonazotemic or mildly azotemic dogs with leishmaniasis have low GFR, but glomerular hyperfiltration occurs in other dogs.

[J Vet Intern Med.](#) 2008 Mar-Apr;22(2):450-5.

Renal amyloidosis in cattle with inflammatory diseases.

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Background: The association of inflammatory diseases such as traumatic reticuloperitonitis (TRP), mastitis, metritis, and pododermatitis with renal amyloidosis in cattle is poorly described. Hypothesis: Serum amyloid A (SAA) levels are elevated during inflammatory diseases, and renal amyloidosis is formed as a complication. Animals: This study was conducted with 82 crossbred cattle with mastitis (n = 18 cows), metritis (n = 11 cows), TRP (n = 30 cows), and pododermatitis (n = 23 : 15 cows and 8 beef cattle). Ten clinically healthy

cows served as controls. Methods: Hematological, urinary, and blood parameters, including SAA, were measured by an automated procedure provided with trade kits. Determination of amyloidal structures was made by histopathological examination of renal biopsy specimens. Results: At the end of this trial, amyloidosis was detected in 5 cows displaying typical nephrotic syndrome, with hypoproteinemia and proteinuria in combination with polyuria and weight loss. Furthermore, it was observed that cows with renal amyloidosis had significantly higher ($P < .01$) total leukocyte counts, serum and urine enzyme activities, and urea and creatinine concentrations, with lower serum total protein concentrations, when compared with animals without renal amyloidosis. Conclusions and Clinical Importance: The incidence of AA amyloidosis in cattle in this study suggests that cattle with mastitis, metritis, and pododermatitis have a high prevalence of systemic amyloidosis in response to inflammation.

[J Vet Intern Med.](#) 2008 Mar-Apr;22(2):266-72.

A single sample method for evaluating (51)chromium-ethylene diaminic tetraacetic Acid clearance in normal and hyperthyroid cats.

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Background: Chronic kidney failure is frequently seen in middle-aged and elderly cats. (51)Chromium-ethylene diaminic tetraacetic acid ((51)Cr-EDTA) clearance and single blood sample (SBS) method are used in several species to estimate the glomerular filtration rate (GFR). Hypothesis: The hypothesis of this study was that (51)Cr-EDTA clearance could be determined using an SBS method in normal and hyperthyroid cats. Animals: Forty-six cats were included in this study, with an average age of 9.5 years. Of these cats, 27 had hyperthyroidism; 19 were healthy. Methods: After IV injection of (51)Cr-EDTA (average dose: 4.25 MBq), 7 blood samples were obtained between 5 and 240 minutes. Reference clearance was calculated in mL/min and mL/min/kg body weight, using a 2-compartment model. Optimal time for clearance measurement with SBS was then determined by systematically comparing each individual plasma concentration to the reference multisample clearance. Results: The average reference plasma clearance of (51)Cr-EDTA for all cats was 14.9 mL/min (3.7 mL/min/kg). The clearance in hyperthyroid cats averaged 16.4 mL/min (4.3 mL/min/kg) and in normal cats averaged 10.3 mL/min (2.4 mL/min/kg). The optimal time for the SBS was 48 minutes after injection of tracer (51)Cr-EDTA ($R(2) = 0.9414$), giving the following converting equation: $\text{clearance} = (0.0066 \times \text{DV}(48 \text{ minutes})) - 0.9277$ (in mL/min). Conclusions and Clinical Importance: In this study, the single sample (51)Cr-EDTA clearance method was used to estimate the global GFR in cats. The method identified differences in clearance between normal and hyperthyroid cats. The optimal time for an SBS was 48 minutes.

[J Vet Intern Med.](#) 2008 Mar-Apr;22(2):273-81.

The effects of hydrocortisone on systemic arterial blood pressure and urinary protein excretion in dogs.

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Background: Hypertension and proteinuria are commonly recognized in dogs with spontaneous hypercortisolism. There is, however, little information regarding the effect of exogenous glucocorticoids on blood pressure (BP) and proteinuria and whether these changes are reversible. Hypothesis: Hydrocortisone administration increases systemic BP and urinary protein excretion, and these effects are reversible after hydrocortisone withdrawal. Animals: Six control dogs and 6 dogs treated with hydrocortisone. Methods: BP, urine protein : creatinine ratio (UPC), microalbuminuria (MALB), urine albumin : creatinine ratio (UAC), and urine gel electrophoresis were evaluated before, during, and after administration of hydrocortisone (8 mg/kg PO q12h for 12 weeks) or placebo. Results: BP and UPC increased substantially during hydrocortisone administration from 123 mmHg (range 114-136 mmHg) and 0.17 (0.15-0.28) to a maximum of 143 mmHg (128-148 mmHg) and 0.38 (0.18-1.78), respectively, on day 28. MALB developed in 4 dogs and UAC significantly increased in all dogs during hydrocortisone administration with the maximum on day 84. Both increases in BP and proteinuria were reversible and completely resolved within 1 month after stopping hydrocortisone administration. SDS-AGE revealed the proteinuria to be primarily albuminuria with a pronounced increase during hydrocortisone treatment. Furthermore, a protein of 25-30 kDa was found in male dogs, identified by mass spectrometry to be arginine esterase, the major secretory prostatic protein. Conclusions and Clinical Importance: Long-term hydrocortisone treatment results in significant but only mild increases in systemic BP and urinary protein excretion, which are both reversible within 1 month after discontinuation of hydrocortisone.

[J Vet Intern Med.](#) 2008 Jan-Feb;22(1):66-73

Glomerular filtration rate estimated by 3-sample plasma clearance of iohexol in 118 healthy dogs.

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BACKGROUND: Glomerular filtration rate (GFR) decreases in the aging human kidney, but limited data exist in dogs. HYPOTHESIS: There is an effect of age and body size on estimated GFR in healthy dogs. ANIMALS: One hundred and eighteen healthy dogs of various breeds, ages, and body weights presenting to 3 referral centers. METHODS: GFR was estimated in clinically healthy dogs between 1 and 14 years of age. GFR was estimated from the plasma

clearance of iohexol, by a compartmental model and an empirical correction formula, normalized to body weight in kilograms or liters of extracellular fluid volume (ECFV). For data analysis, dogs were divided into body weight quartiles 1.8-12.4, 13.2-25.5, 25.7-31.6, and 32.0-70.3 kg. RESULTS: In the complete data set, there was no trend toward lower estimated GFR/kg or GFR/ECFV with increasing age. GFR decreased with age in dogs in the smallest weight quartile only. A significant negative linear relationship was detected between body weight and estimated GFR/kg and GFR/ECFV. Reference ranges in different weight quartiles were 1.54-4.25, 1.29-3.50, 0.95-3.36, and 1.12-3.39 mL/min/kg, respectively. Standardization to ECFV rather than kilogram body weight did not produce substantial changes in the relationships between GFR estimates and age or weight. CONCLUSIONS AND CLINICAL IMPORTANCE: Interpretation of GFR results for early diagnosis of renal failure should take into account the weight and the age of the patient for small dogs.

[J Vet Intern Med.](#) 2007 Nov-Dec;21(6):1198-202.

Microalbuminuria is not associated with cisplatin-induced azotemia in dogs.

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BACKGROUND: Cisplatin is an effective antineoplastic agent but its use is limited by renal toxicity. Microalbuminuria is a marker of renal damage and might be an indicator of cisplatin-induced azotemia. NULL HYPOTHESIS: Microalbuminuria is not associated with azotemia in dogs treated with cisplatin. ANIMALS: This study used 32 client-owned dogs. METHODS: This was a prospective observational study in which cancer-bearing dogs were treated with cisplatin chemotherapy. Cisplatin-induced azotemia was defined as an increase of serum creatinine concentration above the reference range. Serum creatinine concentration, other routine tests of renal function, and microalbuminuria were measured after each cisplatin treatment. Variables potentially associated with azotemia were compared by use of Fisher's exact test and Wilcoxon's rank-sum test. RESULTS: Cisplatin-induced azotemia occurred in 10 (31%) dogs after 1-5 treatments. At each of the first 3 treatments, the proportions of dogs with microalbuminuria were similar between dogs with and without azotemia. CONCLUSIONS AND CLINICAL IMPORTANCE: Microalbuminuria measured after each treatment was not associated with azotemia through the first 3 treatments. Testing for microalbuminuria as a marker for cisplatin-induced renal damage is insensitive and not recommended.

[J Vet Intern Med.](#) 2007 Sep-Oct;21(5):990-5.

Clinical efficacy and palatability of pradofloxacin 2.5% oral suspension for the treatment of bacterial lower urinary tract infections in cats.

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BACKGROUND: Pradofloxacin is a 3rd generation veterinary fluoroquinolone designed to restrict the emergence of antimicrobial resistance during therapy. **HYPOTHESIS:** Pradofloxacin 2.5% oral suspension is a safe, efficacious, and palatable treatment for bacterial urinary tract infections (UTI) in cats. **ANIMALS:** Seventy-eight cats presented with lower urinary tract signs and were positive on bacterial culture of urine. **METHODS:** Cats were allocated into 3 treatment groups depending on bacterial susceptibility results: pradofloxacin (n = 27), doxycycline (n = 23), or amoxicillin-clavulanic acid (n = 28). All antimicrobials were presented in palatable liquid form. Posttreatment urine specimens were collected after completion of the course of treatment and submitted for bacterial culture and sensitivity. Owners were questioned before and after treatment about their experiences with administering oral medication to their cats. **RESULTS:** Posttreatment urine culture was negative in all cats in the pradofloxacin group, but there were 3 treatment failures in each of the other groups. Owners' perceptions of the difficulty of administering oral medication to their cats was more positive posttreatment than pretreatment (P = .001; P < .001). There was no difference in palatability among the treatment groups (P > .05). **CONCLUSIONS AND CLINICAL IMPORTANCE:** We conclude that pradofloxacin 2.5% oral suspension is a highly effective and safe antimicrobial treatment for bacterial lower urinary tract infection in cats, and that the palatable formulation optimizes owner compliance. These findings make pradofloxacin a useful addition to the veterinary formulary.

[J Vet Intern Med.](#) 2007 Sep-Oct;21(5):950-8.

Comparison and reproducibility of plasma clearance of exogenous creatinine, exo-iohexol, endo-iohexol, and 51Cr-EDTA in young adult and aged healthy cats.

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BACKGROUND: Important characteristics determining the usefulness of a method for glomerular filtration rate (GFR) measurement are convenience, availability, and reproducibility. **HYPOTHESIS:** The use of different plasma clearance methods could lead to different results and differences in reproducibility. **ANIMALS:** Twelve healthy cats: 6 young adult cats (age 7-12 months), and 6 aged cats (age 9-12 years) were included in this study. **METHODS:** A cross-over design was used to compare the plasma clearance of exogenous creatinine (PECCT), exo-iohexol (PexICT), endo-iohexol (PenICT), and chromium-51 ethylenediaminetetraacetic acid (51Cr-EDTA), and to investigate reproducibility of these methods. Cats of different ages were included to determine if differences in GFR in young adult versus aged cats would be detected with these methods. The PECCT, PexICT, and PenICT were performed in a combined manner. Plasma data were subjected to noncompartmental (creatinine, exo-iohexol, and endo-iohexol) or bicompartamental (51Cr-EDTA) analysis with a statistical moment approach. Area under the concentration-time curve

was calculated using the trapezoidal rule with extrapolation to infinity. Statistical analyses were carried out using a random effects model. RESULTS: Globally, the 4 methods differed significantly ($P < .0001$) in GFR assessment. Clearance of exo-iohexol and chromium-51 ethylenediaminetetraacetic acid (^{51}Cr -EDTA) showed the highest and lowest reproducibility, respectively. Only plasma clearance of creatinine differed significantly between young adult and aged cats. CONCLUSION AND CLINICAL IMPORTANCE: We found considerable differences in reproducibility of different GFR measurements. These findings should be taken into account not only in practice but also in future studies involving GFR measurement.

[J Vet Intern Med.](#) 2007 Sep-Oct;21(5):943-9.

Azotemia and glomerular filtration rate in dogs with chronic valvular disease.

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BACKGROUND: Little information is available about the prevalence of renal dysfunction in dogs with chronic valvular heart disease (CVD). HYPOTHESIS: Azotemia and a decrease in glomerular filtration rate (GFR) are more severe with increased severity of CVD. ANIMALS: 124 (study No. 1) and 24 (study No. 2) client-owned dogs with CVD. METHODS: A retrospective study (study No. 1) was performed to assess the prevalence of azotemia in the New York Heart Association (NYHA) classes of heart failure in dogs with CVD. A prospective study (study No. 2) was then designed to determine GFR in dogs with different degrees of CVD severity. Complete physical examination, electrocardiography, blood pressure measurement, thoracic radiographs, echocardiography, and plasma and urine analyses were also performed. RESULTS: In study No. 1, 50% of the dogs were azotemic and the percentage of azotemic dogs increased with functional class (up to 70% in NYHA class IV patients). In study No. 2, 8/24 dogs were azotemic. Plasma urea and creatinine were higher in NYHA class III-IV dogs compared with class I-II dogs. The GFR was lower ($P < .001$) in NYHA class III-IV dogs (1.7 ± 0.7 mL/min/kg) than in class I to II dogs (3.1 ± 0.8 mL/min/kg). Only 1 dog in class I-II had a GFR below 2 mL/min/kg and only 2/9 class III-IV dogs had a GFR above 2 mL/min/kg. CONCLUSION AND CLINICAL RELEVANCE: Azotemia and renal impairment increase with the severity of congestive heart failure and are frequent findings in dogs with CVD. It remains to be shown if deterioration of renal function is a direct result of progression of the heart disease.

[J Vet Intern Med.](#) 2007 Sep-Oct;21(5):936-42.

Evaluation of biological variance of cystatin C in comparison with other endogenous markers of glomerular filtration rate in healthy dogs.

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BACKGROUND: The aim of the study was to investigate and compare components of variance of endogenous markers of glomerular filtration rate (GFR) in healthy dogs and impact on the interpretation of results. **HYPOTHESIS:** Cystatin C (cysC) in the dog is superior to creatinine (crea) and urea in detecting decreased renal function because of a high index of individuality (Iol). **ANIMALS AND METHOD:** Variance components of cysC, crea (2 methods: creaE, creaJ), urea, and inorganic phosphate (Pi) in plasma were determined in a longitudinal study over 6 months in 24 healthy dogs (6 German Shorthair Pointers, 18 Beagles). Iol and critical differences (CD) were calculated, as well as the numbers of measurements necessary to determine the individual's homeostatic set point. **Results:** Mean concentrations of cysC, creaJ, creaE, urea, and Pi (mean +/- SD) were 0.93 +/- 0.19 mg/L, 0.94 +/- 0.17 mg/dL, 0.76 +/- 0.18 mg/dL, 35.34 +/- 9.08 mg/dL, and 3.74 +/- 0.68 mg/dL, respectively. The Iol for cysC, creaJ, creaE, urea, and Pi were 0.96, 0.89, 0.80, 0.90, and 1.16, respectively. The C(D) for cysC, creaJ, creaE, urea, and Pi were 0.37 mg/L, 0.26 mg/dL, 0.27 mg/dL, 16.94 mg/dL, and 1.45 mg/dL, respectively. **CONCLUSION:** In dogs, components of biological variance of cysC and crea are in the same range. Analytical precision requirements were fulfilled by crea(both), urea, and Pi. All parameters had an intermediate Iol, which allowed the application of population-based reference limits. The application of the CD for crea or cysC might be useful in detecting a decrease of GFR, when sequential measurements in an individual reveal an increase exceeding the CD but not the upper reference limit.

[J Vet Intern Med.](#) 2007 Sep-Oct;21(5):906-16.

Prognostic factors in cats with chronic kidney disease.

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BACKGROUND: Chronic kidney disease (CKD) is a common cause of morbidity and mortality in cats. **HYPOTHESIS:** Some baseline variables are associated with shorter survival times in cats with CKD. **ANIMALS:** Client-owned cats. **METHODS:** Cats with CKD with initial plasma creatinine concentration \geq 2.0 mg/dL and urine specific gravity (USG) \leq 1.025 were recruited into a prospective clinical trial that compared benazepril with a placebo. We describe baseline variables in 190 cats and their influence on renal survival time in the placebo group (95 cats), which was followed for up to 1,097 days. Renal survival time was defined as the time from initiation of therapy to the need for parenteral fluid therapy, euthanasia, or death related to renal failure. **RESULTS:** Of the 95 cats treated with a placebo, 58 were censored and 37 reached the renal survival end point (died, n = 0; euthanized, n = 17; parenteral fluids, n = 12; parenteral fluids followed by euthanasia, n = 8). Increased plasma creatinine concentration, increased urine protein-to-creatinine ratio (UPC), and

increased blood leukocyte count were significantly ($P < .01$) associated with a shorter renal survival time and were independent risk factors. Increased concentrations of plasma phosphate or urea, and lower blood hemoglobin concentration or hematocrit were significantly ($P < .01$) associated with a shorter renal survival time and were dependent risk factors, because they also were significantly ($P < .01$) correlated with plasma creatinine concentration at baseline. **CLINICAL IMPORTANCE:** Several variables were significantly associated with a shorter renal survival time in cats with CKD.

[J Vet Intern Med.](#) 2007 Jul-Aug;21(4):776-82

Regulation of COX-2 expression in canine prostate carcinoma: increased COX-2 expression is not related to inflammation.

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BACKGROUND: Cyclooxygenase-2 (COX-2) expression has been documented in human and canine prostate carcinoma (PCA). Canine PCA is a histologically heterogeneous tumor, sometimes including inflammatory infiltrates. However, it is unknown whether COX-2 expression in canine PCA is related to the histologic type of tumor, to the presence of inflammation, or to both. Moreover, little is known about the mechanisms regulating COX-2 expression in neoplastic tissue. **HYPOTHESIS:** COX-2 expression is related to the presence of inflammation in canine PCA and correlates with the degree of tumor differentiation. **METHODS:** The expression of COX-2 was examined in 28 cases of canine PCA by immunohistochemistry. In addition, a neoplastic and a nonneoplastic canine prostatic cell line were used to investigate the effects of interleukin-6 (IL-6), tumor necrosis factor-alpha (TNF-alpha), phorbol 12-myristate 13-acetate (PMA), epithelial growth factor (EGF), and specific signal transduction pathway inhibitors on COX-2 expression. **RESULTS:** Twenty-four of the 28 prostate tumors showed COX-2 expression. The presence of inflammatory infiltrates in tumor tissue was associated with lower COX-2 expression scores. In vitro, TNF-alpha, IL-6, and EGF increased COX-2 expression in nonneoplastic cells but not in PCA cells, where baseline expression was high. COX-2 expression in PCA cells could be suppressed by means of specific phosphatidylinositol-3 kinase (PI3K), protein kinase C (PKC), or inhibitor of extracellular signal-related kinase (ERK/MAPK) inhibitors. **CONCLUSIONS AND CLINICAL IMPORTANCE:** COX-2 is expressed in canine PCA; however, expression is not related to the presence of inflammatory infiltrates. This conclusion is further supported by the finding that the cytokines TNF-alpha and IL-6 and their involved signaling pathways do not stimulate COX-2 expression in malignant canine prostate cells.

[J Vet Intern Med.](#) 2007 May-Jun;21(3):542-58.

Guidelines for the identification, evaluation, and management of systemic hypertension in dogs and cats.

Brown S, Atkins C, Bagley R, Carr A, Cowgill L, Davidson M, Egner B, Elliott J, Henik R, Labato M, Littman M, Polzin D, Ross L, Snyder P, Stepien R; American College of Veterinary Internal Medicine.

[J Vet Intern Med.](#) 2007 May-Jun;21(3):425-30.

Day-to-Day variation of the urine protein: creatinine ratio in female dogs with stable glomerular proteinuria caused by X-linked hereditary nephropathy.

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BACKGROUND: Interpretation of serial urine protein:creatinine (UPC) values is confounded by a lack of data regarding random biologic variation of UPC values in dogs with stable glomerular proteinuria. **HYPOTHESIS:** That there is minimal day-to-day variability in the UPC of dogs with unchanging proteinuria and the number of measurements needed to reliably estimate UPC varies with the magnitude of proteinuria. **ANIMALS:** Forty-eight heterozygous (carrier) female dogs with X-linked hereditary nephropathy (XLHN) causing stable proteinuria. **METHODS:** Urine samples were obtained daily by cystocentesis for 3 consecutive days on 183 occasions (549 samples). The UPC was measured for each sample with a single dry-film chemistry auto-analyzer. Data were analyzed retrospectively by a power of the mean model because the variance of UPC values within the 3-day evaluation periods increased as the magnitude of proteinuria increased. **RESULTS:** To demonstrate a significant difference ($P < .05$) between serial values in these proteinuric dogs, the UPC must change by at least 35% at high UPC values (near 12) and 80% at low UPC values (near 0.5). One measurement is adequate to reliably estimate the UPC when $UPC < 4$, but 2-5 determinations are necessary at higher UPC values. **CONCLUSIONS AND CLINICAL IMPORTANCE:** These guidelines for interpretation of serial UPC values in female dogs with XLHN may also be helpful for interpretation of UPC values in dogs with other glomerulopathies.

[J Vet Intern Med.](#) 2007 May-Jun;21(3):402-9.

Effect of control of systolic blood pressure on survival in cats with systemic hypertension.

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BACKGROUND: Systemic hypertension is a common clinical problem, often occurring in association with renal disease in cats. Limited information is available to assess the effect of blood pressure and the treatment of hypertension on survival. **HYPOTHESIS:** That adequacy

of blood pressure control is associated with the duration of survival in cats with systolic hypertension. **ANIMALS:** One hundred and forty-one client-owned cats with systolic hypertension. **METHODS:** Hypertensive cats were treated with amlodipine besylate and were followed until death or the study end point. Time-averaged systolic blood pressure (SBPOT) after implementation of antihypertensive medication and stabilization of systolic blood pressure (SBP) was calculated by using the equation (area under the curve/survival [days]). Cats were divided into quartiles based on their SBPOT, representing varying levels of blood pressure control (median [25th, 75th percentile]: Q1 = 137 [132, 141] mm Hg, Q2 = 148 [145, 151] mm Hg, Q3 = 157 [155, 158] mm Hg, Q4 = 170 [164, 175] mm Hg). Survival and clinical variables were compared between the quartiles. Cox proportional hazard regression analysis was used to determine the association of age, renal function, proteinuria, SBPOT, and the presence of hyperthyroidism on survival. Urine protein to creatinine ratio (UP:C) was compared at diagnosis of hypertension and after initiating treatment. **RESULTS:** Only UP:C and SBP at diagnosis differed significantly between SBPOT quartiles. Proteinuria was the only variable significantly related to survival in hypertensive cats. A significant decline in UP:C was found in cats treated with amlodipine besylate. **CONCLUSIONS AND CLINICAL IMPORTANCE:** Proteinuria before and after treatment of hypertension is strongly associated with survival in cats with systolic hypertension. Treatment with amlodipine besylate can result in a significant reduction in UP: C.

[J Vet Intern Med.](#) 2007 May-Jun;21(3):394-401. Comment in: [J Vet Intern Med.](#) 2007 May-Jun;21(3):364-6.

Genetic cause of autosomal recessive hereditary nephropathy in the English Cocker Spaniel.

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BACKGROUND: Autosomal recessive hereditary nephropathy (ARHN) in the English Cocker Spaniel is caused by a type IV collagen defect, but the underlying mutation is unknown. **ANIMALS:** One hundred thirty-four English Cocker Spaniels (12 with ARHN, 8 obligate carriers, and 114 others), 3 mixed breed dogs with X-linked hereditary nephropathy (XLHN), and 7 other dogs without hereditary nephropathy were included. **METHODS:** Diagnosis of ARHN was based on transmission electron microscopy and immunostaining of kidney. Quantitative real time reverse transcriptase polymerase chain reaction (qRT-PCR) was used to compare COL4A3, COL4A4, and COL4A5 mRNA concentrations in the renal cortex from ARHN-affected English Cocker Spaniels, XLHN-affected dogs, and dogs without hereditary nephropathy. The entire coding region of COL4A4 was sequenced in 2 ARHN-affected dogs, 2 obligate carriers, 2 English Cocker Spaniels of unknown status, and 2 healthy mixed breed dogs. The exon containing the mutation was sequenced for all 134 English Cocker Spaniels. **RESULTS:** Quantitative real time RT-PCR implicated COL4A4 as the gene harboring the mutation, and sequencing identified a single nucleotide substitution at base 115 as the cause of ARHN in English Cocker Spaniels. This mutation, which causes a premature stop codon in exon 3 of COL4A4, was segregated with clinical status in all affected dogs and obligate

carriers. The mutation also was identified in 39 of 114 other English Cocker Spaniels with previously unknown status. **CONCLUSIONS AND CLINICAL IMPORTANCE:** The cause of this disease has been identified, and use of a test for the mutation will permit eradication of ARHN in the English Cocker Spaniel.

[J Vet Intern Med.](#) 2007 May-Jun;21(3):388-93.

Urinary catecholamine and metanephrine to creatinine ratios in healthy dogs at home and in a hospital environment and in 2 dogs with pheochromocytoma.

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BACKGROUND: Measurement of high concentrations of urine catecholamines and metanephrines is useful in diagnosing pheochromocytoma in humans. Stress increases catecholamine excretion in urine. **HYPOTHESIS:** Stress of a hospital visit increases urinary catecholamine and metanephrine excretion in dogs. **ANIMALS:** Fourteen clinically normal dogs, 2 dogs with pheochromocytoma. **METHODS:** Voided urine samples were collected by the owners 7 days before (t-7), during the hospital visit immediately after diagnostic procedures (t0), as well as 1 (t1) and 7 days (t7) after the hospital visit. Urine catecholamine and metanephrine concentrations were measured using high-pressure liquid chromatography and expressed as ratios to urine creatinine concentration. **RESULTS:** In client-owned dogs epinephrine and norepinephrine ratios at t0 were significantly higher compared with ratios at t7. Metanephrine and normetanephrine ratios at t-7, t0, and t1 did not differ significantly from each other; however, at t7 they were significantly lower compared to values at t-7. In staff-owned dogs no significant differences were detected among the different collecting time points for any variable. Metanephrine and normetanephrine ratios were significantly higher in client-owned dogs compared to staff-owned dogs at t-7, t0, and t1 but not at t7. **CONCLUSIONS AND CLINICAL IMPORTANCE:** Stress associated with a hospital visit and with the sampling procedure causes increases in urine catecholamine and metanephrine excretion. Urine collection for the diagnosis of pheochromocytoma probably should take place at home after adaptation to the sampling procedure.

[J Vet Intern Med.](#) 2007 May-Jun;21(3):363; author reply 363. Comment on: [J Vet Intern Med.](#) 2006 Sep-Oct;20(5):1065-73.

Re: Vestibular, vaginal and urethral relations in spayed dogs with and without lower urinary tract signs.

Holt PE.

Journal of Veterinary Medical Science (Apr 07 – Apr 08)

[J Vet Med Sci](#). 2008 Mar;70(3):289-91

Polypoid eosinophilic cystitis with pseudosarcomatous proliferative tissue in a dog.

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A dog presented with hematuria, and two small polypoid masses were detected in the urinary bladder. Histopathologically, the masses were located in the mucosal or submucosal layer. That tissue consisted of a random proliferation of spindle-shaped, round and pleomorphic cells with single or multiple large atypical nuclei and abundant cytoplasm, and eosinophil infiltration. These large cells were confirmed by immunohistochemical staining as fibroblasts, myofibroblasts and macrophages. Mitotic figure was rarely seen. These masses were diagnosed as eosinophilic polypoid cystitis with pseudosarcomatous proliferative tissue, since they consisted of a wide variety of cells and showed low growth activity.

[J Vet Med Sci](#). 2007 Oct;69(10):1015-23.

Effects of benazepril hydrochloride in cats with experimentally induced or spontaneously occurring chronic renal failure.

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We examined effects of an angiotensin converting-enzyme inhibitor, benazepril hydrochloride (BH), on renal hypertension and chronic renal failure (CRF) in cats. For experimental CRF, healthy cats (n=5) underwent 7/8 renal ablation. After renal insufficiency and hypertension were confirmed by blood urea nitrogen (BUN), serum creatinine, creatinine clearance and telemetric recording of systemic blood pressure, BH was administered orally once daily at 0.9 to 2.0 mg/kg/day for 2 to 3 weeks. Within 2 months after renal ablation, renal failure and hypertension developed as evidenced by significant increases in BUN, serum creatinine and systemic blood pressure ($p < 0.01$ or 0.05) and significantly decreased creatinine clearance accompanied by elevated plasma renin activity, angiotensin I and II, and aldosterone ($p < 0.01$ or 0.05). BH administration corrected systemic hypertension ($p < 0.05$) and significantly reduced angiotensin II and aldosterone ($p < 0.05$). Upon discontinuation of BH, these values returned to the pre-administration levels. Studies on spontaneous CRF enrolled 11 cats with spontaneously occurring CRF. BH was administered orally to 6 cats once daily for 24 weeks at a final dose of 1.0 mg/kg/day, while

5 cats served as control. BH administration reduced serum creatinine and urinary protein concentration in every cat. Results demonstrate that in cats, loss of renal mass leads to activation of the renin-angiotensin-aldosterone system and associated renal hypertension, and indicate that BH is effective in correcting renal hypertension and may provide renal benefits to cats with CRF.

[J Vet Med Sci.](#) 2007 Jul;69(7):713-5.

Comparison of excretory urographic contrast effects of dimeric and monomeric non-ionic iodinated contrast media in dogs.

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In excretory urography, the osmolarity of contrast media has rarely been treated as important in veterinary medicine. In this study, the contrast effect of two contrast media (monomeric iohexol and dimeric iodixanol) in the renal cortex and aorta were compared using computed tomography (CT). Five beagle dogs were used and the study employed a cross-over method for each contrast media. The results showed that there was no difference between the media in the aorta, but iodixanol showed higher CT value and a longer contrast effect than iohexol in the renal cortex, in spite of having the same iodine dosage. It is believed that iodixanol, with its low osmolarity, is diluted less by osmotic diuresis than monomeric iohexol. It is important to consider the osmolarity of the contrast media when evaluating the contrast effect, and it is essential to use the same contrast media for each examination, or the renal excretory speed will be under/overestimated.

[J Vet Med Sci.](#) 2007 Apr;69(4):373-7

Effects of pimobendan for mitral valve regurgitation in dogs.

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Pimobendan has a dual mechanism of action: it increases myocardial contractility by increasing calcium sensitization to troponin C and it promotes vasodilation by inhibiting PDEIII. This study examined the effects of pimobendan on cardiac function, hemodynamics, and neurohormonal factors in dogs with mild mitral regurgitation (MR). The dogs were given 0.25 mg/kg of pimobendan orally every 12 hr for 4 weeks. With pimobendan, the heart rate and stroke volume did not change, but the systolic blood pressure gradually decreased and the degree of mitral valve regurgitation tended to decrease. Renal blood flow was significantly increased and the glomerular filtration rate was slightly increased at 2 and 4

weeks. Furthermore, over the 4-week period, the plasma norepinephrine concentration decreased significantly, the systolic index increased slightly, the left atrial diameter and the left ventricular diameters decreased significantly, and the heart size improved. Given these results, pimobendan appears to be useful for treating MR in dogs. However, further long-term studies of pimobendan involving a larger number of dogs with mild and moderate MR are needed to establish the safety of pimobendan and document improvements in quality of life.

Journal of Veterinary Pharmacology and Therapeutics (Apr 07- Apr 08)

[J Vet Pharmacol Ther.](#) 2008 Apr;31(2):150-5

Effect of short-term treatment with meloxicam and pimobendan on the renal function in healthy beagle dogs.

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The aim of the study was to investigate the renal function in clinically normal dogs receiving meloxicam and pimobendan alone or in combination. Ten adult female beagle dogs were administered the treatment for 7 days in a randomized crossover trial (control/meloxicam/pimobendan/meloxicam and pimobendan). Renal function was assessed by blood urea, creatinine, sodium, potassium and chloride concentrations and by glomerular filtration rate, measured by means of renal scintigraphy [renal uptake of (99m)Tc-diethylenetriaminepentacetic acid (DTPA)] and plasma clearance of (99m)Tc-DTPA. As compared with the control group, renal uptake and plasma clearance of (99m)Tc-DTPA were not significantly modified after a 7-day period of treatment with meloxicam or pimobendan alone, or meloxicam and pimobendan in combination. Furthermore, urea, creatinine, sodium, potassium and chloride levels in the serum of the dogs during the 7-day period treatment were not significantly modified in relation to the treatments. It was therefore concluded that meloxicam and pimobendan alone or in combination did not alter renal function in healthy dogs.

[J Vet Pharmacol Ther.](#) 2007 Oct;30(5):477-81

Effect of silymarin and vitamin E on gentamicin-induced nephrotoxicity in dogs.

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Drug-induced nephrotoxicity is an important cause of renal failure in dogs. Aminoglycoside antibiotics, such as gentamicin, can produce nephrotoxicity in dogs, due to in part to an imbalance of pro- and antioxidants (oxidative stress). Silymarin (the mixture of flavonolignans extracted from *Silybum marianum*) has potentially beneficial antioxidant properties. A control group (saline, group 1, n = 5) was compared with dogs that were administered gentamicin by intramuscular injection, at dosage of 20 mg/kg, once daily for 9 days (groups 2-5, n = 5 per group). The effects of vitamin E (group 3) and silymarin (group 4) alone and in combination (group 5) were compared for induced nephrotoxicity. Renal function was assessed using serum biochemical markers (creatinine and urea). Malondialdehyde (MDA) concentration were measured as a marker of lipid peroxidation. The activity of total serum antioxidants (TSAO) was assessed as a marker of antioxidant defences. Serum creatinine and urea concentrations were increased significantly and TSAO was decreased significantly in group 2 compared with group 1. Serum creatinine concentrations but not urea concentrations were significantly lower in groups 3 and 4 than in group 2 (P = 0.001). Serum MDA concentrations was significantly different between groups 2 and 3 (P = 0.01), 2 and 4 (P < 0.001) and 4 and 5 (P = 0.01). TSAO activity was significantly in group 4 (silymarin) than in group 2 (P = 0.002). Silymarin and vitamin E decreased gentamicin-induced nephrotoxicity in dogs.

[J Vet Pharmacol Ther.](#) 2007 Oct;30(5):394-400

The effect of amlodipine and the combination of amlodipine and enalapril on the renin-angiotensin-aldosterone system in the dog.

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Excessive aldosterone secretion is detrimental to the heart, vessels and kidneys, contributing to hypertension and the signs and progression of heart failure. Aldosterone secretion, abnormally elevated in heart failure and hypertension, can be blunted with angiotensin-converting enzyme inhibitors. Amlodipine, used to treat hypertension and heart failure, was hypothesized to activate the renin-angiotensin-aldosterone system (RAAS). A study was conducted with six normal adult male beagle dogs. Each dog received amlodipine (0.57 mg/kg b.i.d.) for 6 days, followed by amlodipine (0.57 mg/kg b.i.d.) and enalapril (0.57 mg/kg b.i.d.) for 4 days. Blood pressure, heart rate, serum chemistries and urinary aldosterone excretion, as a measure of RAAS activation, were compared with baseline values. Blood pressure fell by approximately 7% with amlodipine (P = 0.05) and a further 7% with the combination of amlodipine and enalapril (P < 0.01). Blood urea nitrogen increased with the combination (P < 0.05) but only one dog became mildly azotemic. Renin-angiotensin-aldosterone system activation, based on 24 h urinary aldosterone excretion and by aldosterone:creatinine ratio was increased by approximately threefold (P < 0.05) with amlodipine administration. This effect was blunted by enalapril, such that aldosterone

excretion was no longer different from that observed under control conditions, although values for 24-h aldosterone excretion did not return to pretreatment levels.

[J Vet Pharmacol Ther.](#) 2007 Aug;30(4):314-9

Comparative disposition of pharmacologic markers for cytochrome P-450 mediated metabolism, glomerular filtration rate, and extracellular and total body fluid volume of Greyhound and Beagle dogs.

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The purpose of the study was to compare the disposition of pharmacologic markers for cytochrome P-450 (CYP) metabolism, glomerular filtration rate (GFR), and extracellular (ECFV) and total body fluid volumes (TBFV) of Greyhounds and Beagles. Six healthy Greyhound and six healthy Beagle dogs were studied. Antipyrine, a marker for CYP metabolism and TBFV, and inulin, a marker for the GFR and ECFV, were administered i.v. Samples were collected at predetermined times and plasma was analyzed by validated high-pressure liquid chromatography (HPLC) methods. There were no differences in the disposition or pharmacokinetic parameters for inulin between the dog breeds. However, the clearance of antipyrine (mean = 8.33 mL/min/kg) in Greyhounds was significantly slower than Beagles (13.42 mL/min/kg, $P = 0.004$). The volume of distribution of antipyrine was significantly larger in Greyhounds (0.789 L/kg) than in Beagles (0.644 L/kg, $P = 0.01$). The half-life of antipyrine was significantly longer in Greyhounds (1.09 h) compared with Beagles (0.55 h, $P = 0.002$). The in vitro plasma protein binding of antipyrine was significantly less in Greyhounds (28%) compared with Beagles (40.3%, $P = 0.008$). Greyhounds exhibited significantly slower CYP metabolism, higher TBFV, and lower in vitro protein binding of antipyrine compared with Beagles. No differences in GFR or ECFV were found.

Journal of Veterinary Science (March 07 – May 08)

[J Vet Sci.](#) 2007 Dec;8(4):427-9

A Gartner duct cyst of the vagina causing dysuria and dyschezia in a Yorkshire terrier.

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A 5 year-old, intact female Yorkshire terrier was referred for dysuria and dyschezia. The radiographic and ultrasound examination showed a round shaped mass caudal to the urinary

bladder that contained anechoic fluid within the thin walls. During surgery, the cyst was noted to be attached to the outer wall of the vagina, not connected to the vaginal lumen. Cystic fluid was removed and the cystic wall was resected. Then the remaining cystic wall was omentalized to prevent a recurrence. Histological examination confirmed that the cyst was of Wolffian duct origin. In this case, a large Gartner duct cyst causing urological problems was diagnosed and removed by surgical resection.

Mammalian Genome (Apr 07 – Apr 08)

[Mamm Genome](#). 2008 Feb;19(2):121-6. Epub 2008 Jan 25.

Second hits in the FLCN gene in a hereditary renal cancer syndrome in dogs.

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In this study, samples from multifocal renal tumors from two dogs affected with renal cystadenocarcinoma and nodular dermatofibrosis (RCND) were collected for detection of putative second hits in the FLCN gene. Genomic DNA from the samples was typed at the previously identified disease-associated missense mutation and cDNA representing the entire coding region of the FLCN gene was sequenced for mutation detection. Second hits with predicted functional implications for the wild-type FLCN allele were observed in 12 of 17 (71%) of the kidney tumor samples. The type of mutation of the second hits varied between the tumors. Different alternative splice mutations were detected, as well as loss of heterozygosity at the germline mutation and loss of transcription product of the wild-type FLCN allele. In total, the frequency and wide spectrum of second hits identified in the tumor samples suggests a tumor suppressor function of FLCN in the kidneys of RCND-affected dogs. No mutations were detected in skin nodules sampled from the two dogs. This shows that the skin tumors of RCND-affected dogs may be caused by haploinsufficiency of the FLCN gene product.

[Mamm Genome](#). 2007 Jul;18(6-7):444-51.

Understanding hereditary diseases using the dog and human as companion model systems.

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Animal models are requisite for genetic dissection of, and improved treatment regimens for, human hereditary diseases. While several animals have been used in academic and industrial research, the primary model for dissection of hereditary diseases has been the many strains of the laboratory mouse. However, given its greater (than the mouse) genetic similarity to the human, high number of naturally occurring hereditary diseases, unique population structure, and the availability of the complete genome sequence, the purebred dog has emerged as a powerful model for study of diseases. The major advantage the dog provides is that it is afflicted with approximately 450 hereditary diseases, about half of which have remarkable clinical similarities to corresponding diseases of the human. In addition, humankind has a strong desire to cure diseases of the dog so these two facts make the dog an ideal clinical and genetic model. This review highlights several of these shared hereditary diseases. Specifically, the canine models discussed herein have played important roles in identification of causative genes and/or have been utilized in novel therapeutic approaches of interest to the dog and human.

[Mamm Genome](#). 2007 Jul;18(6-7):452-62.

Comparative functional analysis of aquaporins/glyceroporins in mammals and anurans.

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Maintenance of fluid homeostasis is critical to establishing and maintaining normal physiology. The landmark discovery of membrane water channels (aquaporins; AQPs) ushered in a new area in osmoregulatory biology that has drawn from and contributed to diverse branches of biology, from molecular biology and genomics to systems biology and evolution, and from microbial and plant biology to animal and translational physiology. As a result, the study of AQPs provides a unique and integrated backdrop for exploring the relationships between genes and genome systems, the regulation of gene expression, and the physiologic consequences of genetic variation. The wide species distribution of AQP family members and the evolutionary conservation of the family indicate that the control of membrane water flux is a critical biological process. AQP function and regulation is proving to be central to many of the pathways involved in individual physiologic systems in both mammals and anurans. In mammals, AQPs are essential to normal secretory and absorptive functions of the eye, lung, salivary gland, sweat glands, gastrointestinal tract, and kidney. In urinary, respiratory, and gastrointestinal systems, AQPs are required for proper urine concentration, fluid reabsorption, and glandular secretions. In anurans, AQPs are important in mediating physiologic responses to changes in the external environment, including those that occur during metamorphosis and adaptation from an aquatic to terrestrial environment and thermal acclimation in anticipation of freezing. Therefore, an understanding of AQP function and regulation is an important aspect of an integrated approach to basic biological research.

Research in Veterinary Science (Apr 07 – May 08)

[Res Vet Sci.](#) 2008 Mar 3. [Epub ahead of print]

Anti-histone antibodies in dogs with leishmaniasis and glomerulonephritis.

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The association between serum anti-histone antibodies and glomerulonephritis was studied in 43 dogs with leishmaniasis (*Leishmania infantum*). Dogs with increased serum creatinine levels and urine protein-creatinine ratio >1 were considered to have glomerulonephritis. Moderately elevated anti-histone antibodies were found in 38.89% (7/18) of infected dogs without glomerulonephritis, whereas 88% of dogs with glomerulonephritis (22/25) showed moderate or strongly elevated anti-histone antibodies. Prevalence of positive anti-histone antibodies reactions and mean serum concentration was significantly higher ($P<0.001$; $P<0.0001$) in infected dogs with glomerulonephritis. Correlation between anti-histone antibodies and urine protein-creatinine ratio was significant when groups were analysed together ($P<0.046$). Positive predictive value for glomerulonephritis of positive anti-histone antibodies was 88%. In conclusion, high anti-histone antibodies are significantly associated with glomerulonephritis. Although other factors must be involved, dogs with moderate or strong positive anti-histone antibodies reactions may have a higher probability to develop glomerular lesions in canine leishmaniasis.

[Res Vet Sci.](#) 2008 Feb 4.

Response of cats to familiar and unfamiliar human contact using continuous direct arterial blood pressure measurement.

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Continuous direct measurement of feline arterial blood pressure (ABP) was carried out via a modified method with percutaneous, ultrasound guided catheterization of the common carotid artery. In 21 healthy, conscious cats the ABP was measured during rest, alertness and activity. Furthermore, the ABP response to being petted by familiar and unfamiliar persons was assessed. Linear mixed modelling revealed that the mean blood pressure (MBP) in resting cats (114.6mmHg) was lower ($P<0.001$) than in alert cats (122.7mmHg), which was lower ($P<0.001$) than that of active cats (136.8mmHg). The MBP during petting by a familiar person (144.7mmHg) tended to be higher ($P=0.065$) than that during petting by an

unfamiliar person (139.4mmHg). The MBP of active cats was lower ($P=0.003$) than MBP of cats petted by a familiar person, but not different from MBP of cats petted by an unfamiliar person. The MBP returned to resting values between 16 and 20min after the familiar person had left, whereas resting values were reached between 11 and 15min after the unfamiliar person had left. The complications of the described method were limited considering the potential risks of continuous direct ABP measurement. In conclusion, the described technique enables accurate measurement of feline ABP, which is influenced by the cat's activity level and the familiarity of persons.

[Res Vet Sci.](#) 2007 Oct 23.

The development of a real-time PCR to detect pathogenic *Leptospira* species in kidney tissue.

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A LightCycler((R)) real-time PCR hybridization probe-based assay that detects a conserved region of the 16S rRNA gene of pathogenic but not saprophytic *Leptospira* species was developed for the rapid detection of pathogenic leptospires directly from processed tissue samples. In addition, a differential PCR specific for saprophytic leptospires and a control PCR targeting the porcine beta-actin gene were developed. To assess the suitability of these PCR methods for diagnosis, a trial was performed on kidneys taken from adult pigs with evidence of leptospiral infection, primarily a history of reproductive disease and serological evidence of exposure to pathogenic leptospires ($n=180$) and aborted pig foetuses ($n=24$). Leptospire DNA was detected by the 'pathogenic' specific PCR in 25 tissues (14%) and the control beta-actin PCR was positive in all 204 samples confirming DNA was extracted from all samples. No leptospires were isolated from these samples by culture and no positives were detected with the 'saprophytic' PCR. In a subsidiary experiment, the 'pathogenic' PCR was used to analyse kidney samples from rodents ($n=7$) collected as part of vermin control in a zoo, with show animals with high microagglutination titres to *Leptospira* species, and five were positive. Fifteen PCR amplicons from 1 mouse, 2 rat and 14 pig kidney samples, were selected at random from positive PCRs ($n=30$) and sequenced. Sequence data indicated *L. interrogans* DNA in the pig and rat samples and *L. inadai* DNA, which is considered of intermediate pathogenicity, in the mouse sample. The only successful culture was from this mouse kidney and the isolate was confirmed to be *L. inadai* by classical serology. These data suggest this suite of PCRs is suitable for testing for the presence of pathogenic leptospires in pig herds where abortions and infertility occur and potentially in other animals such as rodents.

[Res Vet Sci.](#) 2007 Oct 22.

Naturally occurring bacteriophages lyse a large proportion of canine and feline uropathogenic *Escherichia coli* isolates in vitro.

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We investigated the feasibility of bacteriophage therapy to combat canine and feline *Escherichia coli* urinary tract infections (UTIs) by testing the in vitro lytic ability of 40 naturally occurring bacteriophages on 53 uropathogenic *E. coli* (UPEC). The mean number of UPEC strains lysed by an individual bacteriophage was 21/53 (40%, range 17-72%). In total, 50/53 (94%) of the UPEC strains were killed by one or more of the bacteriophages. Ten bacteriophages lysed 51% of UPEC strains individually and 92% of UPEC strains as a group. Electron microscopy and DNA sequencing of 5 'promising' bacteriophages revealed that 4 bacteriophages belonged to the lytic T4-like genus, while one displayed morphologic similarity to temperate P2-like bacteriophages. Overall, these results indicate that the majority of UPEC are susceptible to lysis by naturally occurring bacteriophages. Thus, bacteriophages show promise as therapeutic agents for treatment of canine and feline *E. coli* UTIs.

[Res Vet Sci.](#) 2007 Oct 18.

Antigenicity of a whole parasite vaccine as promising candidate against canine leishmaniasis.

Giunchetti RC, Reis AB, da Silveira-Lemos D, Martins-Filho OA, Corrêa-Oliveira R, Bethony J, Vale AM, da Silva Quetz J, Bueno LL, França-Silva JC, Nascimento E, Mayrink W, Fujiwara RT.

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Human visceral leishmaniasis, one of the most important zoonoses, is caused by the protozoa *Leishmania chagasi* (syn. *L. infantum*) and is present as a fatal disease common in South America and Europe where dogs and wild canids are the main reservoirs. A vaccine against visceral leishmaniasis would be an important tool in the control of this disease in dogs. Although the current strategies for vaccination against leishmaniasis are based on the use of recombinant antigens, killed vaccines are still attractive in terms of stability of their biochemical composition and antigenicity, cost, and safety. Here we evaluate the immunogenicity of a whole parasite vaccine as a promising candidate against canine leishmaniasis, demonstrated by cellular reactivity, changes in the cellular profile of the peripheral blood and by the differential production of immunoglobulins. Our results showed that immunization elicited mainly a strong cellular reactivity and increase in T-lymphocytes, particularly the subpopulation CD8(+) that would be related to the control of tissue

parasitism. In addition, a higher production of anti-Leishmania total IgG, characterized by mixed isotypes profile (IgG1 and IgG2), was demonstrated.

[Res Vet Sci.](#) 2007 Oct 15.

Characterization of sex, age, and breed for a population of canine leishmaniosis diseased dogs.

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Our study of a large canine population investigated whether the development of symptomatic canine leishmaniosis revealed any predilection for sex, age, or breed. Included in the study were 390 leishmaniosis-affected dogs that had been treated at the Hospital Clínic Veterinari attached to the Universitat Autònoma de Barcelona. Of the diseased dogs, 238 were male (61%) and 152 were females (39%), whereas percentages for males and females in the overall reference population of dogs treated at this unit were 53% and 47%, respectively, ($P < 0.05$). Age distribution was bimodal, with the highest prevalence of the disease occurring at 2-4 years of age and a secondary peak occurring at seven years or over. The over represented breeds were the German shepherd (13.6% versus 6.35%, $P < 0.001$), the Rottweiler (13.1% versus 3.0%, $P < 0.001$), and the Boxer (7.9% versus 4.7%, $P = 0.002$), whereas the underrepresented breeds were the Yorkshire terrier (0.5% versus 6.5%, $P < 0.001$), and the Poodle (0.3% versus 3.0%, $P < 0.001$).

[Res Vet Sci.](#) 2007 Aug;83(1):105-8.

Evaluation of renal and hepatic functions in dogs naturally infected by visceral leishmaniasis submitted to treatment with meglumine antimoniate.

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The present study aimed to evaluate the renal and hepatic responses in eight dogs with visceral leishmaniasis submitted to treatment with meglumine antimoniate and to verify the occurrence of possible side effects. Urinalysis, hepatic and renal function tests were carried out in all animals at up to seven moments. After the end of a six-month observation period, all dogs were euthanized. Before the beginning of the experiment urinary and biochemical alterations were observed in four dogs due to the changes caused by the parasite itself. These alterations included the presence of renal cells, cylindruria, proteinuria, azotemia, hyperproteinemia and hypoalbuminemia. One dog died on the third day after treatment because an aggravation of the clinical picture, probably due to the medication. During the

course of the study, an increase in hepatic enzymes was verified in two animals. Sixty days after the beginning of the treatment four dogs showed remission of clinical signs. The other three were asymptomatic with persistent biochemical alterations. From these, two presented recurrence of clinical signs about 150 days after the beginning of the treatment while in the other, hyperproteinemia persisted. Meglumine antimoniate was not efficient to treat dogs with severe renal dysfunction and the side effects observed were pain at the site of injection and the probable transient hepatotoxicity, evidenced by biochemical examinations, but without the presence of clinical signs.

[Res Vet Sci.](#) 2007 Apr;82(2):195-201.

Influence of aging on adrenal responsiveness in a population of eleven healthy beagles.

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The present study aimed at investigating the effects of aging on the adrenal cortex response of cortisol and aldosterone in dogs. A population of healthy adult Beagles was evaluated twice at a five-year interval. At each evaluation, plasma basal cortisol and aldosterone, cortisol and aldosterone following ACTH-stimulation, sodium, and potassium concentrations and arterial blood pressure were measured. We observed significantly ($p < 0.05$) greater sodium, urea and creatinine concentrations with aging. Nevertheless urea and creatinine remained within our laboratory reference ranges. This study showed a highly significant age-related elevation of basal cortisol ($p < 0.01$). Inversely, both aldosterone following ACTH-stimulation levels and difference between aldosterone following ACTH-stimulation and basal aldosterone values plummeted significantly ($p < 0.01$) with aging. In conclusion, the evaluation of the adrenal cortex function in dogs should take in consideration the age of the individuals.

Veterinary Clinical Pathology (March 07 – March 08)

[Vet Clin Pathol.](#) 2008 Mar;37(1):96-103.

A multicentric retrospective study of serum/plasma urea and creatinine concentrations in dogs using univariate and multivariate decision rules to evaluate diagnostic efficiency.

Concordet D, Vergez F, Trumel C, Diquélou A, Lanore D, Le Garrères A, Pagès JP, Péchereau D, Médaille C, Braun JP.

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BACKGROUND: Urea and creatinine are the most frequently used indirect markers in plasma and serum of glomerular filtration rate in dogs. Both have been shown to lack sensitivity but their diagnostic efficiency for the diagnosis of kidney disease has been minimally investigated. **OBJECTIVE:** The purpose of this retrospective study was to investigate the influence of possible factors of variation on both analytes and to determine whether specific decision rules should be drawn up for subpopulations of dogs. **METHODS:** The results of urea and creatinine measurements, breed, sex, age, and health status (healthy, renal disease, or nonrenal disease) of 3822 dogs were collected from the archives of 5 veterinary clinics. Data were analyzed with univariate and multivariate decision rules with and without adjustment. **RESULTS:** There were significant effects and interactions of almost all of the sources of variation. Slight improvements in diagnostic efficiency were obtained by adjusting the decision rules to these sources of variations. Univariate decision rules gave approximately the same diagnostic efficiency for urea and creatinine concentrations, with sensitivity and specificity in the range of 70% and 90%, respectively, using the upper limit of the reference interval as the threshold value. Multivariate decision rules provided only minor improvements in diagnostic efficiency. **CONCLUSION:** Simultaneous measurement of both urea and creatinine is of limited diagnostic value over the analysis of a single variable. Creatinine is the preferred analyte as it is affected by fewer extrarenal factors of variation.

[Vet Clin Pathol.](#) 2008 Mar;37(1):4-20.

Fractional excretion tests: a critical review of methods and applications in domestic animals.

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The fractional excretion (FE) of a constituent by the kidney is the fraction of the amount filtered by the glomerulus, which is excreted into urine. It is mostly determined for electrolytes, and is expressed as the ratio of the clearance of a given electrolyte to creatinine clearance. The main physiologic factors affecting FE variation are species, age, and the alimentary supply of electrolytes. The value of FE tests in the diagnosis of kidney disease is limited, except in canine Fanconi's syndrome. FEs of many constituents often are increased in chronic kidney disease, but their diagnostic value is no greater than that of plasma creatinine concentration. FEs also are altered in nonrenal diseases such as diabetes mellitus and rhabdomyolysis, and during treatment with xylazine, rehydration fluids, and diuretics. FEs, especially of calcium, phosphates, and magnesium, are useful in clinical nutrition to assess mineral balance. FE is difficult to measure, so its use should be limited to nutritional investigations and nephrology research.

[Vet Clin Pathol.](#) 2007 Sep;36(3):240-4.

Comparison of a semiquantitative point-of-care assay for the detection of canine microalbuminuria with routine semiquantitative methods for proteinuria.

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BACKGROUND: It has been speculated that renal disease can be identified through the detection and quantification of microalbuminuria, however, reliable measurement of albuminuria in any quantity can be challenging. Recently, a new point-of-care immunoassay was validated for the specific detection of microalbuminuria and early renal disease in dogs. **OBJECTIVES:** The goal of this study was to determine if measurement of microalbuminuria by the point-of-care immunoassay correlated with results from routine semiquantitative methods for detecting proteinuria in dogs. **METHODS:** One hundred and thirty-eight urine samples, from 133 different dogs, submitted for urinalysis to the Clinical Pathology Laboratory at the University of Missouri-Columbia Veterinary Medical Teaching Hospital were eligible for the study. Samples that contained >20 RBC/high power field (hpf) or >20 WBC/hpf were excluded, as were samples with insufficient volume to complete all tests. All samples were evaluated with a urinary dipstick with or without a sulfosalicylic acid turbidimetric test, a urine protein:creatinine (UPC) ratio, and the immunoassay for microalbuminuria. Data were analyzed by the Spearman rank order correlation. **RESULTS:** Microalbuminuria results correlated significantly with those of the dipstick ($r = 0.715$), sulfosalicylic acid test ($r = 0.742$), and UPC ratio ($r = 0.830$). Correlation between the immunoassay and UPC ratio was the same ($r = 0.830$) when only samples with trace or 1+ proteinuria by dipstick were analyzed ($n = 51$). **CONCLUSIONS:** The point-of-care immunoassay results for microalbuminuria correlated with the results of semiquantitative methods for detecting total proteinuria in dogs. Routine methods for canine proteinuria appear to be adequate for determining whether further testing for renal disease is warranted.

Veterinary Record (Apr 07 – May 08)

[Vet Rec.](#) 2008 Apr 5;162(14):431-5.

Low ratios of sodium to potassium in the serum of 238 dogs.

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Serum sodium:potassium (Na:K) ratios are often reported in biochemical studies of dogs, although their value has not been assessed. The aims of this study were to identify diseases associated with a low Na:K ratio in dogs and to compare their prevalence with the prevalence in dogs from the same referral hospital with normal Na:K ratios. A total of 238 dogs with a Na:K ratio less than 27 were identified from medical records. Sample contamination with edta was suspected in 74 cases (31 per cent) and these and two cases that had been supplemented with potassium were removed from the analysis. The remaining 162 cases and 147 control dogs were divided into five categories depending on the organ system affected. Among the cases there were significantly more in the endocrine category than among the control dogs. Hypoadrenocorticism was the most single common cause of a low Na:K ratio and affected 27 (16.7 per cent) of the cases. Other clinical problems associated with low Na:K ratios included different urogenital, cardiorespiratory and gastrointestinal diseases.

[Vet Rec.](#) 2008 Feb 16;162(7):215-6.

Comparison of plasma creatinine values measured by different veterinary practices.

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[Vet Rec.](#) 2008 Feb 2;162(5):141-7. **Associations between proteinuria, systemic hypertension and glomerular filtration rate in dogs with renal and non-renal diseases.**

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Proteinuria and systemic hypertension are well recognised risk factors in chronic renal failure (CRF). They are consequences of renal disease but also lead to a further loss of functional kidney tissue. The objectives of this study were to investigate the associations between proteinuria, systemic hypertension and glomerular filtration rate (GFR) in dogs with naturally occurring renal and non-renal diseases, and to determine whether proteinuria and hypertension were associated with shorter survival times in dogs with CRF. Measurements of exogenous creatinine plasma clearance (ECPC), urine protein:creatinine ratio (UPC), and Doppler sonographic measurements of systolic blood pressure (SBP) were made in 60 dogs with various diseases. There was a weak but significant inverse correlation between UPC and ECPC, a significant inverse correlation between SBP and ECPC and a weak but significant positive correlation between UPC and SBP. Some of the dogs with CRF were proteinuric and almost all were hypertensive. Neoplasia was commonly associated with proteinuria in the dogs with a normal ECPC. CRF was the most common cause leading to hypertension. In the

dogs with CRF, hypertension and marked proteinuria were associated with significantly shorter survival times.

[Vet Rec.](#) 2007 Nov 24;161(21):711-5

Changes in the glomerular filtration rate of 27 cats with hyperthyroidism after treatment with radioactive iodine.

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Hyperthyroidism is a common endocrinopathy of older cats and is associated with an increased glomerular filtration rate (gfr). Renal dysfunction is also common in older cats and may develop after they have been treated for hyperthyroidism. This paper describes the changes in the gfr of 27 hyperthyroid cats in the six months after their treatment with radioactive iodine (^{131}I), and evaluates whether any commonly measured pretreatment parameters (serum biochemistry, systolic blood pressure, urine specific gravity) could predict a clinically significant decline in renal function. The gfr of all the cats had decreased one month after treatment, and the mean gfr was significantly lower. There was no further significant change in gfr between one and six months. The only independent variable associated with the final gfr was the pretreatment plasma glucose concentration ($P=0.003$).

Veterinary Research Communications (Apr 07 – May 08)

[Vet Res Commun.](#) 2008 Apr;32(4):291-304. Epub 2007 Dec 11

Immunohistochemical study of the pre- and postnatal innervation of the dog lower urinary tract: morphological aspects at the basis of the consolidation of the micturition reflex.

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Immunohistochemical studies were performed on male and female bladder and urethra collected from 4 adult dogs and 10 foetal specimens with crown-rump length from 53 to 155 mm (medium-sized breeds, presumptive 38 days of gestation to term). A panel of antisera was tested, including PGP 9.5 to describe the general intramural innervation, ChAT and TH to depict the cholinergic and nor-adrenergic components and NOS1, CGRP, SP, NPY, VIP, SOM, GAL, 5-HT to investigate the possible nitroergic, peptidergic and aminergic ones. A rich cholinergic innervation was present in adult bladder and urethra, along with a lesser

number of adrenergic nerves and a small number of nitrergic ones. Either bladder or urethra received numerous CGRP-, SP-, NPY-, VIP-containing nerve fibres which were distributed throughout the muscle layers. All over the lower urinary tract strong to weak ChAT-, CGRP-, SP- and NPY-immunoreactivity was detected in intramural ganglia, in peripheral nerve bundles and around blood vessels. 5-HT-immunoreactive endocrine cells were present in the urethral epithelium. Early foetal organs were supplied only by cholinergic nerve fibres. Few NOS-, CGRP- and SP-ergic components appeared at the end of pregnancy. It can be guessed that sensory mediators such as CGRP and SP increase in postnatal ages while other neuropeptides, such as NPY and VIP, appear only after birth, as the urinary reflex consolidates.

[Vet Res Commun.](#) 2008 Jan;32(1):93-106.

Avermectin transepithelial transport in MDR1- and MRP-transfected canine kidney monolayers.

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Fluxes of the anti-parasitic agents, [(3)H]-ivermectin, [(3)H]-selamectin and [(3)H]-moxidectin were studied across non-transfected and transfected canine kidney epithelial monolayers, MDCK II/wt, MDCK II-MDR1, MDCK II-MRP1 and MDCK II-MRP2. All four lines surprisingly expressed significant levels of P-glycoprotein (P-gp), coded for by MDR1, but MDCK II-MDR1 expressed increased levels compared to the other lines. MDCK II-MRP1 and MDCK II-MRP2 expressed increased levels of MRP1 and MRP2 respectively. Fluxes of [(3)H]-ivermectin, [(3)H]-selamectin, [(3)H]-moxidectin, and the P-gp substrates, rhodamine-123 and DiOC(2), were polarized in the basolateral-to-apical (secretory) direction across the four lines. Selected MRP inhibitors used in relevant pharmacological concentrations did not block the secretory fluxes of either [(3)H]-ivermectin or [(3)H]-selamectin in either the non-transfected or MRP-transfected lines. In contrast, secretory fluxes of ivermectin and selamectin were inhibited in all four lines by the P-gp inhibitor, verapamil. These data confirm that ivermectin and selamectin are substrates for P-gp in four additional cell lines, but suggest that they are not significant substrates for MRP1 or MRP2 where there is background expression of P-gp. Since this pattern of expression also pertains on the blood-brain barrier, it is unlikely that MRP1 and MRP2 play a significant role in ivermectin and selamectin blood: brain distribution in vivo.

Veterinary Radiology and Ultrasound (Apr 07 – Apr 08)

[Vet Radiol Ultrasound.](#) 2008 Jan-Feb;49(1):73-80.

Ultrasonographic determination of resistive index and graft size for evaluating clinical feline renal allografts.

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Ultrasonographic examination is a commonly employed technique for postoperative renal allograft evaluation after transplantation. Allograft size and resistive index (RI) are two objective ultrasonographic measures that may help establish a diagnosis and direct postoperative management for grafts with suboptimal function but their diagnostic efficacy has not been evaluated in clinical veterinary patients. Results of 69 feline renal transplant ultrasonographic examinations and RI determinations were studied. Based on clinical parameters at the time of the ultrasonographic examination, patients were grouped into six clinical/functional categories including evaluations of clinically normal grafts, delayed graft function, ureteral obstruction, uroabdomen, graft thrombosis, and rejection. RI, graft size (length, cross-sectional area, and volume), cyclosporine A whole blood trough concentration, Doppler blood pressure, creatinine concentration, and days from transplantation were compared between these categories and associations with each other were examined. RI was of little value in differentiating among the clinical categories with the exception of graft thrombosis. Graft volume and time from transplantation were significantly greater in grafts with signs of rejection and ureteral obstruction compared to clinically normal ultrasound examinations. Graft volume, cross-sectional area and length were generally associated. Cyclosporine A blood concentrations was associated with RI in both the pooled data and in the delayed graft function category. These results indicate RI should be used only as part of a larger clinical picture and in light of other factors including cyclosporine A concentration and the timing of the study relative to the implantation surgery for the diagnosis of postoperative transplantation complications. Graft volume may provide a more sensitive, albeit, nonspecific, indicator of allograft dysfunction.

[Vet Radiol Ultrasound](#). 2008 Jan-Feb;49(1):65-7

Imaging diagnosis--Ultrasound-guided ethanol sclerotherapy for a simple renal cyst.

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Solitary renal cysts are benign and in the majority of instances asymptomatic and do not require treatment. Nevertheless, treatment may be required if abdominal discomfort or pain, hypertension, infection or renal outflow obstruction occur. Under these circumstances, percutaneous management of the cyst is the easiest and fastest procedure, and no major complications are generally encountered. In this report we describe a patient with a solitary renal cyst treated successfully by a single injection of ethanol into the cyst. The sonographic appearance of the cyst changed from a well-defined hypoechoic structure to an ill-defined

hyperechoic region. Canine renal cysts may be successfully managed in some instances by a single ethanol injection.

[Vet Radiol Ultrasound](#). 2007 Nov-Dec;48(6):585-93.

Effects of measurement of plasma activity input on normalization of glomerular filtration rate to plasma volume in dogs.

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Glomerular filtration rate (GFR) normalized to body fluid volumes to adjust for differing body size and conformation is more physiologically correct than a relationship with body weight (BW). GFR can be normalized to plasma volume by a renographic method that uses the Rutland-Patlak plot with plasma activity and kidney activity inputs. A plasma time-activity curve is obtained from a region of interest (ROI) of the left ventricle (LV), the size of which is in theory not critical. The aims of the study were to evaluate the effect of different LV ROI sizes, the effect of extravascular activity in the thorax over the LV ROI, and different time intervals for the semilogarithmic LV plot. Seventy-two scintigrams were used, with three different-sized automatic and a manual LV ROI, all with and without subtracting extravascular activity, and with LV curve time intervals of 30-120 s and 60-240 s. GFR/plasma volume was not affected by LV ROI sizes but significantly affected by extravascular activity subtraction and different time intervals. Subtracting extravascular activity from the LV ROI did not improve precision, but increased variability caused by different LV ROI sizes and time intervals chosen for the LV plot. The ROI for measuring extravascular activity apparently contained a considerable and variable intravascular component, which when subtracted, created noisy and unreliable LV curves. Manual LV ROI, without extravascular subtraction, and a time interval for LV input between 1 and 4 min are recommended as they gave the least variability determined by statistical analysis. With these methods, normal individual GFR/plasma volume in normal beagle dogs was 29.2 +/- 6.5 ml/min/l.

[Vet Radiol Ultrasound](#). 2007 Nov-Dec;48(6):574-9.

Perirenal effusion in dogs and cats with acute renal failure.

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Perirenal fluid accumulation has been described as an ultrasonographic feature of urine leakage, hemorrhage, abscessation, or neoplasia. The purpose of this retrospective study was to report perirenal effusion as an additional ultrasonographic finding in canine and

feline patients with acute renal failure. The causes of acute renal failure in 18 patients included nephrotoxicity (4), leptospirosis (3), ureteral obstruction (2), renal lymphoma (2), ureteronephrolithiasis (2), prostatic urethral obstruction (1) and interstitial nephritis and ureteritis (1). An underlying cause was not identified in three patients. The sonographic finding of perirenal fluid was bilateral in 15 patients. Unilateral perirenal fluid was identified ipsilateral to the site of ureteric obstruction in two patients. Large effusions extended into the caudal retroperitoneal space. Additional sonographic findings suggestive of renal parenchymal disease included mild (5), moderate (5) or severe (2) pyelectasia, increased renal echogenicity (11), increased (9) or decreased renal size (2) and ureteral and/or renal calculi (3). There did not appear to be an association between the volume of perirenal fluid and the severity of renal dysfunction. All patients with large effusions underwent euthanasia. Perirenal fluid developing in acute renal failure is thought to be an ultrafiltrate associated with tubular back-leak into the renal interstitium that overwhelms lymphatic drainage within the perirenal and retroperitoneal connective tissues although obstruction to urine flow may also play a role. Localized perirenal retroperitoneal free fluid may be a useful ultrasonographic feature to assist with the characterization of, and determination of prognosis in, patients with suspected renal disease.

[Vet Radiol Ultrasound](#). 2007 Sep-Oct;48(5):434-8.

Ultrasonographic measurement of kidney-to-aorta ratio as a method of estimating renal size in dogs.

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Renal size is an important parameter in the assessment of renal disease in dogs. However, because of the great variability in body conformation, absolute renal measurements cannot solely be used when evaluating kidneys with ultrasonography. The use of a ratio comparing renal length and aortic luminal diameter (K/Ao) was investigated. After confirming the reproducibility of these measurements, K/Ao ratios were obtained in 92 dogs without clinical evidence of renal disease. Left and right K/Ao ratios were statistically similar. Based on 95% confidence intervals, renal size should be considered reduced if the K/Ao ratio is < 5.5 and increased when > 9.1.

[Vet Radiol Ultrasound](#). 2007 Jul-Aug;48(4):373-7.

Quantitative contrast ultrasound analysis of renal perfusion in normal dogs.

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Eight normal dogs with no evidence of renal disease, weighing between 8 and 25 kg were imaged using contrast harmonic ultrasound after injection of a microbubble contrast medium. All dogs received three separate bolus injections of 0.05 ml of commercial contrast medium (Definity). Time/mean pixel value (MPV) curves were generated for selected regions in the cortex and medulla of the left kidney in each dog. Upslope, downslope, baseline, peak intensity, and time to peak were calculated for each zone. For a bolus injection, within the renal cortex (averaging all subjects) the upslope was 7.4 +/- 1.5 MPV/s, downslope was -0.4 +/- .2 MPV/s, baseline was 66.8 +/- 9.3 MPV, peak was 103.6 +/- 8.2 MPV, time to peak (from injection) was 12.8 +/- 5.3 s and from time of contrast medium reaching the kidney was 5.1 +/- 2.0 s. Within the renal medulla (averaging all subjects), upslope was 2.8 +/- 1.7 MPV/s, downslope was -0.3 +/- .2 MPV/s, baseline was 39.3 +/- 6.0 MPV, peak was 65.2 +/- 14.3 MPV, time to peak from injection was 20.9 +/- 6.4 s and from time of contrast reaching the kidney was 11.6 +/- 4.1 s. These baseline data may prove useful in the evaluation of dogs with diffuse disease or vascular compromise.

[Vet Radiol Ultrasound](#). 2007 May-Jun;48(3):276-80.

Effects of sedation with midazolam and butorphanol on resistive and pulsatility indices in healthy dogs.

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Resistive index (RI) and pulsatility index (PI) are indirect measurements of blood flow resistance that may be measured by pulsed wave Doppler ultrasonography. Chemical restraint may potentially alter the indices although it is required to perform ultrasonography in some patients. The purpose of this study was to describe values for both intrarenal and ocular RI and PI within the same subject in clinically normal dogs sedated with a midazolam and butorphanol combination and evaluate if there are any significant changes between sedated and nonsedated dogs. Fifteen healthy Beagle dogs were studied by Duplex Doppler interrogation in interlobar or arcuate arteries of the kidney and long posterior ciliary artery. Pulse rate and systolic blood pressure were also determined. All measurements were recorded before and after the administration of a sedative combination of midazolam (0.2 mg/kg) and butorphanol (0.2 mg/kg). Mean comparison tests (paired t-tests or Wilcoxon's rank-sum test) were used to determine if any significant differences existed between right and left renal values or right and left ocular values. A correlation study (Pearson or Spearman) was applied between RI, PI, and systolic pressure, and pulse rate. RI and PI were significantly higher in sedated Beagles than in unsedated Beagles. There was neither correlation between index and systolic blood pressure nor pulse rate. In conclusion, provided that normal RI and PI increase in sedated animals, then reference ranges should be higher when sedated--healthy or ill--animals are evaluated.