Abstracts 2005-2006

American Journal of Veterinary Research (Feb 05 – Apr 06)

Am J Vet Res. 2006 Apr;67(4):731-6

Evaluation of the effects of stress in cats with idiopathic cystitis.

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OBJECTIVE: To determine the effects of stress in cats with feline idiopathic cystitis (FIC) by evaluating bladder permeability, sympathetic nervous system function, and urine cortisol:creatinine (C:Cr) ratios during periods of stress and after environmental enrichment. DESIGN: Prospective study. ANIMALS: 13 cats with FIC and 12 healthy cats. PROCEDURE: Cats subjected to an acute-onset moderate stressor for 8 days received IV injections of fluorescein. Serum fluorescein concentrations were determined and compared with those of

controls to evaluate bladder permeability, and urine C:Cr ratios were compared to evaluate function of the hypothalamic-pituitary-adrenal (HPA) axis. Plasma catecholamine concentrations were analyzed in a subset of cats. After 8 days of moderate stress, cats were moved to an enriched environment, and tests were repeated after 21 days. RESULTS: Serum fluorescein concentrations were significantly higher in cats with FIC at all time points. In the cats in which plasma catecholamine concentrations were determined, concentrations of dihydroxyphenylalanine, norepinephrine, and dihyroxyphenylglycol were significantly higher in cats with FIC at all time points, whereas no differences in urine C:Cr ratio between groups were observed. CONCLUSION AND CLINICAL RELEVANCE: Cats with FIC appeared to have altered bladder permeability, most notably during the period of initial stress. The increase in plasma dihydroxyphenylalanine concentration suggests that there may be stress-induced increase in the activity of tyrosine hydroxylase, which catalyzes the rate-limiting step in catecholamine synthesis. In contrast, no effects of stress on C:Cr ratios were observed, which suggests there was dissociation between the sympathetic nervous system and HPA-axis responses to stress.

Am J Vet Res. 2006 Apr;67(4):723-30

Evaluation of the urodynamic and hemodynamic effects of orally administered phenylpropanolamine and ephedrine in female dogs.

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OBJECTIVE: To compare the urodynamic and hemodynamic effects of different dosages of phenylpropanolamine and ephedrine and determine effective dosages in increasing urethral resistance in female dogs. ANIMALS: 20 sexually intact female Beagles. PROCEDURE: Dogs were allocated into 4 groups and received phenylpropanolamine once, twice, or 3 times daily, or ephedrine twice daily, for 14 days. On days 0, 7, and 14, urethral pressure profiles were performed while dogs were anesthetized with propofol. Variables recorded included maximum urethral pressure, maximum urethral closure pressure, integrated pressure, functional profile length, anatomic profile length, plateau distance, distance before maximum urethral pressure, and maximum meatus pressure. Arterial and central venous pressures were measured before anesthetic induction and 10 and 35 minutes after induction. RESULTS: Administration of phenylpropanolamine once daily or ephedrine twice daily significantly increased maximum urethral pressure and maximum urethral closure pressure. Values for integrated pressure were significantly increased after 14 days of once-daily administration of phenylpropanolamine. Variables did not change significantly from day 7 to day 14. Diastolic and mean arterial blood pressures increased significantly during the treatment periods, and arterial pressure decreased during propofol infusion. CONCLUSIONS AND CLINICAL RELEVANCE: Oral administration of phenylpropanolamine once daily or ephedrine twice daily increased urethral resistance in clinically normal dogs and may be recommended for management of urethral sphincter mechanism incompetence. Treatment efficacy may be assessed after 1 week. Dogs with concurrent cardiovascular disease should

be monitored for blood pressure while receiving alpha-adrenergic agents because of the effects on diastolic and mean arterial pressure.

Am J Vet Res. 2006 Apr;67(4):715-22

Effects of administration of fluids and diuretics on glomerular filtration rate, renal blood flow, and urine output in healthy awake cats.

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OBJECTIVES: To determine effects of commonly used diuretic treatments on glomerular filtration rate (GFR), renal blood flow (RBF), and urine output (UO) and compare 2 methods of GFR measurement in healthy awake cats. ANIMALS: 8 healthy cats. PROCEDURE: In a randomized crossover design, cats were randomly allocated to 4 groups: control; IV administration of fluids; IV administration of fluids and mannitol; and IV administration of fluids, dopamine, and furosemide. Inulin and para-aminohippuric acid were used for determination of plasma clearance for GFR and RBF, respectively. Plasma clearance of technetium-Tc-99m-diethylenetriaminepentacetic acid (99mTc-DTPA) was also used for GFR determination. RESULTS: Furosemide-dopamine induced the largest UO, compared with other groups. Both mannitol and fluid therapy increased RBF, compared with the control group. Mannitol, and not fluid therapy, increased RBF, compared with furosemide-dopamine. There were significant differences in GFR values calculated from 99mTc-DTPA and inulin clearances between the 2 groups. In all groups, use of 99mTc-DTPA caused underestimation of GFR, compared with use of inulin. CONCLUSIONS AND CLINICAL RELEVANCE: In healthy awake cats, administration of furosemide-dopamine did not increase GFR or RBF despite increased UO. Fluid therapy and fluid therapy plus mannitol improved RBF. Determination of GFR by use of 99mTc-DTPA cannot always be substituted for inulin clearance when accurate measurement is required.

Am J Vet Res. 2006 Jan;67(1):78-83

Measurement of urinary 11-dehydro-thromboxane B2 excretion in dogs with gastric dilatation-volvulus.

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OBJECTIVE: To measure 11-dehydro-thromboxane B2 (11-dTXB2) in urine of healthy control dogs, dogs undergoing ovariohysterectomy, and dogs with gastric dilatation-volvulus (GDV) and assess the relationship between urinary 11-dTXB2 concentrations in dogs with GDV and

postoperative outcomes. SAMPLE POPULATION: Urine samples from 15 nonsurgical control dogs, 12 surgical control dogs, and 32 dogs with GVD. PROCEDURE: Urine samples were obtained from healthy pet dogs (ie, nonsurgical control dogs), dogs undergoing ovariohysterectomy at anesthetic induction and 1 hour following surgery (ie, surgical control dogs), and dogs with GDV at hospital admission and 1 hour following surgical derotation of the stomach (ie, GDV dogs). Urinary 11-dTXB2 concentrations were determined with an ELISA and normalized to urinary creatinine (Cr) concentrations by calculation of the 11-dTXB2 -to-Cr ratio. Differences in median 11-dTXB2 -to-Cr ratios among dogs and before and after surgery were analyzed. RESULTS: Urinary 11-dTXB2-to-Cr ratios did not differ between nonsurgical control dogs and surgical control dogs before or after surgery. Urinary 11-dTXB2-to-Cr ratios were significantly higher in GDV dogs at the time of hospital admission and 1 hour after surgery, compared with those of nonsurgical control dogs. Postoperative urine samples from GDV dogs had significantly higher 11-dTXB2-to-Cr ratios than postoperative urine samples from surgical control dogs. Median urinary 11-dTXB2-to-Cr ratios increased significantly in GDV dogs that developed postoperative complications. CONCLUSIONS AND CLINICAL RELEVANCE: Urinary 11-dTXB2 concentration is increased in GDV dogs at the time of hospital admission and after surgical derotation of the stomach, compared with that of healthy dogs. An increased urinary 11-dTXB2-to-Cr ratio following surgery is associated with an increased incidence of postoperative complications in dogs with GDV.

Am J Vet Res. 2006 Jan;67(1):51-5

Measurement of urinary glycosaminoglycans in dogs.

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OBJECTIVES: To measure urine concentrations of sulfated glycosaminoglycans (GAGs), determine optimal storage conditions for urine samples, establish a reference range, and determine whether there is correlation between 24-hour total urine GAG excretion and the GAG-to-creatinine ratio (GCR). ANIMALS: 14 healthy adult dogs. PROCEDURE: Single urine sample GAG concentrations and GCRs were measured in samples collected from 14 healthy dogs at the start of the 24-hour collection period. Twenty-four-hour total urine GAG excretions were determined from urine collected during a 24-hour period in the same 14 dogs. Total sulfated GAG concentrations were also measured in urine from these dogs after the urine had been stored at 4 degrees C and -20 degrees C for 1, 7, and 30 days. RESULTS: Urine GAG concentrations were not significantly different from baseline values after urine was stored at 4 degrees C for up to 1 day and -20 degrees C for up to 30 days. Neither single urine sample GAG concentration (R2, 0.422) nor GCR (R2, 0.084) was an adequate predictor of 24-hour total urine GAG excretion. CONCLUSIONS AND CLINICAL RELEVANCE: Results of this study provide data that can be used to establish a reference range for 24-hour total urine GAG excretion in dogs and adequate conditions for sample storage. Contrary to findings in humans, there was no significant linear correlation between 24-hour total urine

GAG excretion and single urine sample GCR in dogs, limiting clinical use of the single urine sample test.

Am J Vet Res. 2005 Oct;66(10):1816-22

Experimental canine leptospirosis caused by Leptospira interrogans serovars pomona and bratislava.

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OBJECTIVE: To evaluate gross, histopathologic, and serum biochemical findings caused by Leptospira interrogans serovars pomona and bratislava inoculated in dogs. ANIMALS: Twenty-seven 8-week-old female Beagles. PROCEDURE: Dogs were randomly assigned to challenge or control groups. Challenge groups were conjunctivally inoculated on 3 successive days with 5 x 10(7) L interrogans serovar pomona (n = 12) or serovar bratislava (11). Clinical signs were recorded throughout the experiment, and clinical pathology assays, bacteriologic culture, and necropsies (6 or 7 dogs necropsied at each time point) were done on postinoculation day (PID) 7, 10, 14, and 20. RESULTS: Infection could not be confirmed in any serovar bratislava-inoculated dog, and control dogs remained healthy throughout the experiment. Positive culture and fluorescent antibody test results were confirmed in 11 of 12 serovar pomona-inoculated dogs. Fever and lethargy starting at PID 7 were the most common clinical signs in serovar pomona-infected dogs. On day 10, gross lesions included multifocal renal and pulmonary hemorrhage and perirenal edema. Serovar pomona-inoculated dogs had histopathologic lesions including hepatitis, interstitial nephritis, and pneumonia at PID 7, 10, 14, and 20. Increases in BUN, anion gap, and bilirubin concentration occurred on PID 10, 14, and 20. Platelet counts in dogs with positive results of bacteriologic culture were decreased from baseline values on PID 10, 12, and 14. CONCLUSIONS AND CLINICAL RELEVANCE: Conjunctival inoculation with L interrogans serovar pomona resulted in a high rate of infection with concomitant hemorrhagic and inflammatory lesions of the kidneys, liver, and lungs.

Am J Vet Res. 2005 Oct;66(10):1780-4

Serologic responses of dogs given a commercial vaccine against Leptospira interrogans serovar pomona and Leptospira kirschneri serovar grippotyphosa.

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OBJECTIVE: To evaluate serum titers obtained by use of the microscopic agglutination test

(ie, MAT titers) to Leptospira interrogans serovar pomona and autumnalis and Leptospira kirschneri serovar grippotyphosa in dogs given a commercial vaccine against serovars pomona and grippotyphosa. ANIMALS: Forty 12-week-old puppies and 20 mature Beagles. PROCEDURE: Puppies received a commercial vaccine against serovars pomona and grippotyphosa at 12 weeks of age, then received a booster vaccine and 3 weeks later; mature dogs received the vaccine once. Serum MAT titers to serovars pomona, autumnalis, and grippotyphosa were measured before vaccination and at 2, 4, 6, 10, and 16 weeks after the first or only vaccination. RESULTS: Of the 40 puppies vaccinated, 40, 0, and 40 developed MAT titers of > 100 after vaccination to serovars pomona, grippotyphosa, and autumnalis, respectively. Microscopic agglutination test titers to serovar autumnalis were higher than MAT titers to serovars pomona and grippotyphosa and persisted in some dogs for 16 weeks (6 weeks longer than for titers to serovar pomona). Of the 20 mature dogs, 13, 5, and 20 developed MAT titers of > 100 at 2 weeks to serovars pomona, grippotyphosa, and autumnalis, respectively. Titers to serovar pomona were higher and persisted in some dogs beyond 16 weeks after vaccination, compared with titers to serovars pomona and grippotyphosa, which persisted for 10 and 6 weeks, respectively. CONCLUSIONS AND CLINICAL RELEVANCE: Subunit vaccines against serovars pomona and grippotyphosa induce MAT titers not only to homologous antigens but also to serovar autumnalis, which could lead to a misdiagnosis of leptospirosis caused by serovar autumnalis.

Am J Vet Res. 2005 Sep;66(9):1651-4

In vitro evaluation of canine and feline calcium oxalate urolith fragility via shock wave lithotripsy.

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OBJECTIVE: To test the hypothesis that feline calcium oxalate uroliths are intrinsically more resistant to comminution via shock wave lithotripsy (SWL) than canine calcium oxalate uroliths through comparison of the fragility of canine and feline uroliths in a quantitative in vitro test system. SAMPLE POPULATION: Calcium oxalate uroliths (previously obtained from dogs and cats) were matched by size and mineral composition to create 7 pairs of uroliths (1 canine and 1 feline urolith/pair). PROCEDURE: Uroliths were treated in vitro with 100 shock waves (20 kV; 1 Hz) by use of an electrohydraulic lithotripter. Urolith fragmentation was quantitatively assessed via determination of the percentage increase in projected area (calculated from the digital image area of each urolith before and after SWL). RESULTS: After SWL, canine uroliths (n = 7) fragmented to produce a mean +/- SD increase in image area of 238 +/- 104%, whereas feline uroliths (7) underwent significantly less fragmentation (mean image area increase of 78 +/- 97%). The post-SWL increase in fragment image area in 4 of 7 feline uroliths was < 50%, whereas it was > 150% in 6 of 7 canine uroliths. CONCLUSIONS AND CLINICAL RELEVANCE: Results indicate that feline calcium oxalate uroliths are less susceptible to fragmentation via SWL than canine calcium oxalate uroliths. In some cats, SWL may not be efficacious for fragmentation of calcium oxalate nephroliths or ureteroliths

because the high numbers of shock waves required to adequately fragment the uroliths may cause renal injury.

Am J Vet Res. 2005 Aug;66(8):1400-7

Evaluation of the effects of nephrotomy on renal function in clinically normal cats.

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OBJECTIVE: To evaluate the effects of nephrotomy on renal function in clinically normal cats. ANIMALS: 20 specific-pathogen-free, 9- to 11-month-old female mixed-breed cats. PROCEDURE: Serum chemistry analyses, CBC determinations, urinalyses, microbiologic urine cultures, renal ultrasonography, abdominal radiography, and single-kidney and total glomerular filtration rate (GFR) determinations by use of renal scintigraphy and measurements of plasma disappearance of technetium 99m-diethylenetriaminepentaacetic acid were performed before surgery and at 3, 12, 26, 52, and 78 weeks after surgery in 10 cats that underwent unilateral nephrotomy and in 10 control cats that underwent a sham surgical procedure. RESULTS: Two cats (1 from each group) did not complete the study, and their data were eliminated from analyses. Unilateral nephrotomy resulted in a 10% to 20% reduction in mean single-kidney GFR, compared with that of nephrotomy contralateral control kidneys. However, mean total GFR in nephrotomy-group cats was not significantly different from that of sham-group cats. Over the 78 weeks of study, mean total GFR declined 34% and 40% in nephrotomy- and sham-group cats, respectively. Adverse events associated with nephrotomy included persistent microscopic hematuria, renal pelvis hyperechogenicity with distant shadowing on ultrasonographic evaluation, dilatation of renal pelves, and hydronephrosis. CONCLUSIONS AND CLINICAL RELEVANCE: Nephrotomy in normal functioning feline kidneys results in a modest relative reduction in renal function, compared with contralateral kidney controls, but has minimal effect on total GFR when compared with sham-operated control cats. However, any detrimental effects of nephrotomy may be magnified in cats with diseased kidneys, which may have little or no capacity for repair or compensation.

Am J Vet Res. 2005 Jun;66(6):1075-83

Influence of the estrous cycle on urodynamic and morphometric measurements of the lower portion of the urogenital tract in dogs.

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OBJECTIVES: To compare the values of the urodynamic parameters of the lower portion of the urinary tract and vaginourethral measurements obtained during the phases of the estrous cycle in dogs and determine possible functional or anatomic modifications of the lower portion of the urinary tract associated with those phases. ANIMALS: 7 adult female Beagles. PROCEDURE: Urethral pressure profilometry, diuresis cystometry, and vaginourethrography were performed in each dog during proestrus; estrus; early, mid, and late diestrus; and early and late anestrus. The maximum urethral pressure (MUP), maximum urethral closure pressure (MUCP), urethral functional and anatomic profile lengths (UFPL and UAPL, respectively), integrated pressure, threshold pressure, threshold volume, compliance, urethral length, and vaginal length and width were measured. RESULTS: For all measurements, significant interindividual variation was detected. Integrated and threshold pressures, APL, and each morphometric value significantly increased from late anestrus to proestrus. Compared with other phases, MUP, MUCP, and integrated pressure values were significantly lower in estrus and early diestrus; UAPL and UFPL values were significantly lower in late diestrus. At each cycle phase in old dogs, MUP, MUCP, threshold pressure, and vaginal length and width were significantly lower (except in proestrus for vaginal measurements) and threshold volume and compliance values were significantly higher, compared with middle-aged dogs. CONCLUSIONS AND CLINICAL RELEVANCE: Urodynamic and morphometric measurements of the lower portion of the urogenital tract are affected by the changes in hormonal balance that occur during the estrous cycle. In sexually intact female dogs, estrous phase determination is important for the interpretation of urodynamic data.

Am J Vet Res. 2005 Jun;66(6):1046-55

Measurement of glomerular filtration rate via urinary clearance of inulin and plasma clearance of technetium Tc 99m pentetate and exogenous creatinine in dogs.

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OBJECTIVE: To compare glomerular filtration rate (GFR) measured via urinary clearance of inulin (UCI) with plasma clearance of technetium Tc 99m pentetate (99mTc-pentetate) and creatinine in dogs. ANIMALS: 6 healthy Beagles and 18 Beagles with reduced renal function. PROCEDURE: 13 blood samples were obtained between 5 and 600 minutes after i.v. bolus injections of (99m)Tc-pentetate and creatinine. Plasma clearance of (99m)Tc-pentetate was computed on the basis of 1, 2, or 13 samples, and plasma clearance of creatinine was computed on the basis of 2, 5, or 13 samples. During plasma clearance procedures, constant i.v. infusion of carboxyl carbon 14 inulin was begun and UCI was determined in urine collected from 90 to 120, 120 to 180, and 180 to 240 minutes. Clearance procedures were repeated in 12 dogs to evaluate reproducibility of results. RESULTS: Significant association between UCI and plasma clearance was determined via all methods. However, plasma clearances were moderately to markedly different from UCI, depending on test substance, GFR, and sample numbers used for plasma clearance computations. Comparisons were

particularly discordant when some methods of limiting samples were used to define plasma clearance. CONCLUSIONS AND CLINICAL RELEVANCE: Values derived from plasma clearance methods for (99m)Tc-pentetate and creatinine were not interchangeable with UCI results, which raises questions about their reliability as clinical research tools for measurement of GFR. Plasma clearance methods that are relative indices of renal function should not be interpreted as accurate measures of GFR without validation.

Am J Vet Res. 2005 May;66(5):915-20

In vitro comparison of RNA preparation methods for detection of feline calicivirus in urine of cats by use of a reverse transcriptase-polymerase chain reaction assay.

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OBJECTIVE: To compare 5 methods of preparation of RNA from feline urine samples for use in a feline calicivirus (FCV), p30 gene-based, real-time reverse-transcriptase polymerase chain reaction (RT-PCR) assay. SAMPLE POPULATION: Urine and blood samples from 6 specific-pathogen-free cats. PROCEDURES: Aliquots of each urine sample (unmodified, centrifuged, or mixed with whole or hemolyzed blood) were spiked with FCV and serially diluted in urine. Serial dilutions of FCV in tissue culture medium were used as positive controls. Viral RNA was prepared via dilution and thermal inactivation (DT method), polyethylene glycol precipitation (PEG method), isolation with oligo(dT)25-coated magnetic beads (dTMB method), or extraction by use of 2 silica gel-based columns (RN or QA method). Lower detection limits and mean RT-PCR threshold cycle (Ct) values associated with each RNA preparation method and sample type were compared. RESULTS: Because DT-prepared samples yielded negative results via RT-PCR assay, this method was not evaluated. Lower detection limits (TCID50/sample) for the assay in urine were 1950, 104, 11, and 7 for PEG-, dTMB-, RN-, and QA-prepared samples, respectively. For RN and QA preparations, Ct values were similar and significantly lower than those for dTMB and PEG preparations. Overall, urine modifications did not affect FCV RNA detection in dTMB-, QA-, and RN-prepared samples. CONCLUSIONS AND CLINICAL RELEVANCE: Of the methods evaluated, the RN and QA methods of RNA preparation were most appropriate for the FCV RT-PCR assay. An RT-PCR assay optimized for detection of FCV in feline urine may aid investigations of FCV-induced urinary tract diseases in cats.

Am J Vet Res. 2005 Apr;66(4):695-9

Evaluation of a selective neurectomy model for low urethral pressure incontinence in female dogs.

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OBJECTIVE: To develop a model of low urethral pressure incontinence and compare the relative contributions of the pudendal and hypogastric nerves with urethral function by performing selective neurectomy and ovariohysterectomy in dogs. ANIMALS: 19 healthy Foxhounds. PROCEDURE: Dogs were allocated into 2 groups. The first group (10 dogs) underwent bilateral hypogastric neurectomy and ovariohysterectomy and subsequent bilateral pudendal neurectomy. The second group (9 dogs) underwent bilateral pudendal neurectomy and subsequent hypogastric neurectomy and ovariohysterectomy. Urethral pressure profilometry and leak point pressure (LPP) tests were performed before and after each neurectomy. RESULTS: Before surgery, mean +/- SD LPP and maximal urethral closure pressure (MUCP) in all dogs were 169.3 +/- 24.9 cm H2O and 108.3 +/- 19.3 cm H2O, respectively; these values decreased to 92.3 +/- 27 cm H2O and 60.7 +/- 20.0 cm H2O, respectively, after both selective neurectomy surgeries. There was a progressive decline of LPP after each neurectomy; however, MUCP decreased only after pudendal neurectomy. Fifteen dogs had mild clinical signs of urinary incontinence. All dogs appeared to have normal bladder function as indicated by posturing to void and consciously voiding a full stream of urine. Urinary tract infection did not develop in any dog. CONCLUSIONS AND CLINICAL RELEVANCE: Hypogastric and pudendal neurectomy and ovariohysterectomy caused a maximum decrease in LPP whereas pudendal neurectomy caused a maximum decrease in MUCP. IMPACT ON HUMAN MEDICINE: This model may be useful for evaluation of treatments for improving urinary control in postmenopausal women.

Am J Vet Res. 2005 Mar;66(3):506-11

Investigation of the induction of antibodies against Crandell-Rees feline kidney cell lysates and feline renal cell lysates after parenteral administration of vaccines against feline viral rhinotracheitis, calicivirus, and panleukopenia in cats.

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OBJECTIVE: To determine whether administration of Crandell-Rees feline kidney (CRFK) cell lysates or vaccines against feline viral rhinotracheitis, calicivirus, and panleukopenia (FVRCP vaccines) that likely contain CRFK cell proteins induces antibodies against CRFK cell or feline renal cell (FRC) lysates in cats. ANIMALS: 14 eight-week-old cats. PROCEDURE: Before and after the study, renal biopsy specimens were obtained from each cat for histologic evaluation. Each of 4 FVRCP vaccines was administered to 2 cats at weeks 0, 3, 6, and 50. Between weeks 0 and 50, another 3 pairs of cats received 11 CRFK cell lysate inoculations SC (10, 50, or 50 microg mixed with alum). Clinicopathologic evaluations and ELISAs to detect serum antibodies against CRFK cell or FRC lysates were performed at intervals. RESULTS: Cats had no antibodies against CRFK cell or FRC lysates initially. All cats administered CRFK cell lysate had detectable antibodies against CRFK cell or FRC lysates on multiple occasions. Of 6 cats vaccinated parenterally, 5 had detectable antibodies against CRFK cell lysate at least

once, but all 6 had detectable antibodies against FRC lysate on multiple occasions. Cats administered an intranasal-intraocular vaccine did not develop detectable antibodies against either lysate. Important clinicopathologic or histologic abnormalities were not detected during the study. CONCLUSIONS AND CLINICAL RELEVANCE: Parenteral administration of vaccines containing viruses likely grown on CRFK cells induced antibodies against CRFK cell and FRC lysates in cats. Hypersensitization with CRFK cell proteins did not result in renal disease in cats during the 56-week study.

Am J Vet Res. 2005 Mar;66(3):450-6

Expression of erythropoietin in cats treated with a recombinant adeno-associated viral vector.

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OBJECTIVE: To characterize the biological effects of IM administration of a recombinant adeno-associated virus serotype 2 (rAAV2) vector containing feline erythropoietin (fEPO) cDNA and determine whether readministration of the vector or removal of muscle tissue at the injection sites alters those effects. ANIMALS: 10 healthy 7-week-old specific pathogen-free cats. PROCEDURE: Cats received 1 X 10(7) infective units (iU; n = 3), 1 X 10(8) iU (3), or 1 X 10(9) iU (2) of rAAV2-fEPO vector IM (day 0). Two control cats received an rAAV2 vector containing the LacZ gene (1 X 10(9) iU, IM). In all cats, hematologic variables and serum fEPO concentration were measured at intervals; anti-rAAV2 antibody titer was measured on day 227. In cats that did not respond to treatment, the rAAV2-fEPO vector was readministered. Injection sites were subsequently surgically removed. RESULTS: Compared with control cats, cats treated with 1 X 10(9) iU of rAAV2-fEPO vector had increased Hct and serum fEPO concentrations. One of these cats developed pure RBC aplasia; its Hct normalized following injection site excision. Cats receiving lower doses of vector had no response; on retreatment, 1 of those cats developed sustained erythrocytosis that persisted despite injection site removal and the others did not respond or responded transiently. Antibodies against rAAV2 were detected in all vector-treated cats. CONCLUSIONS AND CLINICAL RELEVANCE: Gene therapy may be an effective treatment for cats with hypoproliferative anemia. However, rAAV2-fEPO vector administration may result in pure RBC aplasia or pathologic erythrocytosis, and injection site removal does not consistently abolish the biological response.

Am J Vet Res. 2005 Feb;66(2):319-24

Effects of dietary supplementation with sodium chloride on urinary relative supersaturation with calcium oxalate in healthy dogs.

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OBJECTIVE: To evaluate the effect of dietary supplementation with sodium chloride (NaCl) on urinary calcium excretion, urine calcium concentration, and urinary relative supersaturation (RSS) with calcium oxalate (CaOx). ANIMALS: 6 adult female healthy Beagles. PROCEDURE: By use of a crossover study design, a canned diet designed to decrease CaOx urolith recurrence with and without supplemental NaCl (i.e., 1.2% and 0.24% sodium on a dry-matter basis, respectively) was fed to dogs for 6 weeks. Every 14 days, 24-hour urine samples were collected. Concentrations of lithogenic substances and urine pH were used to calculate values of urinary RSS with CaOx. RESULTS: When dogs consumed a diet supplemented with NaCl, 24-hour urine volume and 24-hour urine calcium excretion increased. Dietary supplementation with NaCl was not associated with a change in urine calcium concentration. However, urine oxalate acid concentrations and values of urinary RSS with CaOx were significantly lower after feeding the NaCl-supplemented diet for 28 days. CONCLUSIONS AND CLINICAL RELEVANCE: Dietary supplementation with NaCl in a urolith-prevention diet decreased the propensity for CaOx crystallization in the urine of healthy adult Beagles. However, until long-term studies evaluating the efficacy and safety of dietary supplementation with NaCl in dogs with CaOx urolithiasis are preformed, we suggest that dietary supplementation with NaCl be used cautiously.

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Surgical revision of the urethral stoma following perineal urethrostomy in 11 cats: (1998-2004).

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Eleven cats required urethral stoma revision because of urethral stricture following perineal urethrostomy. At surgery, eight cats had evidence of inadequate dissection to the bulbourethral glands, and three cats had evidence of urine extravasation into the subcutaneous tissues. Following revision of the stoma, long-term follow-up was obtained in nine cases. For eight cats, owners reported no complications after the revision. Failure to dissect beyond the bulbourethral glands and inadequate mucosa-to-skin apposition resulted in postoperative stricture formation. Stoma revisions were performed a median of 71 days following the initial perineal urethrostomy, indicating that long-term evaluation of cases is necessary.

J Am Anim Hosp Assoc. 2005 Nov-Dec;41(6):373-81

Fungal urinary tract infections in the dog and cat: a retrospective study (2001-2004).

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Thirty-five animals (23 dogs, 12 cats) with fungal urinary tract infections (UTIs) were retrospectively studied. Dysuria, hematuria, increased frequency of micturition, anorexia, depression, and pyrexia were the most common clinical signs noted. Seven species of fungi were identified in the affected animals. Candida albicans was the most common isolate. Most animals diagnosed with fungal UTI also had other concurrent urinary tract or medical problems. Lower urinary tract diseases, diabetes mellitus, neoplasia, and renal failure were the most common concurrent or preceding diseases identified. Resolution of fungal UTI occurred in 12 animals that received specific antifungal treatment.

J Am Anim Hosp Assoc. 2005 Sep-Oct;41(5):332-5.

Ectopic ureterocele in a cat.

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A 9-month-old, castrated male domestic shorthair cat with urinary incontinence was referred for surgical correction of an ectopic ureter. Excretory urography revealed hydronephrosis of the right kidney, right hydroureter, and ureterocele. A partial ureterocelectomy and neoureterocystostomy were performed. This report describes the surgical modification of the ureterocele and

J Am Anim Hosp Assoc. 2005 Sep-Oct;41(5):298-309.

Nonsteroidal antiinflammatory drugs: a review.

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The increasing use of nonsteroidal antiinflammatory drugs (NSAIDs) in small animals has resulted in the development of new and innovative additions to this class of drugs. Examples of NSAIDs now available for use in small animals include aspirin, etodolac, carprofen, ketoprofen, meloxicam, deracoxib, and tepoxalin. The purposes of this article are to review the pathophysiology of prostaglandin synthesis and inhibition, the mechanisms of action, pharmacokinetics, pharmacological effects, and potential adverse reactions of aspirin and the newly released NSAIDs.

J Am Anim Hosp Assoc. 2005 Jan-Feb;41(1):39-46.

Trends in the frequency of calcium oxalate uroliths in the upper urinary tract of cats.

Lekcharoensuk C, **Osborne CA**, **Lulich JP**, **Albasan H**, **Ulrich LK**, **Koehler LA**, **Carpenter KA**, **Swanson LL**, **Pederson LA**.

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Medical records from cats diagnosed with uroliths at nine United States veterinary teaching hospitals from 1980 to 1999, and records of cats with uroliths submitted for analyses to the Minnesota Urolith Center from 1981 to 2000, were evaluated. A 10-fold increase in frequency of upper tract uroliths occurred in cats during the 20-year interval at the nine veterinary teaching hospitals. Calcium oxalate emerged as the predominant mineral type in upper tract uroliths, having increased more than 50-fold during the study period. These results emphasize the need for increased awareness of the occurrence of upper urinary tract uroliths in cats.

J Am Anim Hosp Assoc. 2005 Jan-Feb;41(1):3-11.

Effects of clomipramine on cats presented for urine marking.

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Twenty-five cats exhibiting at least four episodes of vertical urine marking per week were assessed. Following a medical workup, a 4-week clomipramine trial was instituted, using a mean dose of 0.54 mg/kg per os q 24 hours. No concurrent behavioral or environmental modifications were applied. There was a statistically significant (P<0.0001) decrease in urine spraying when the cats were on clomipramine, with 20 of 25 cats having a >/=75% reduction in spraying within 4 weeks. Side effects were mild. Twenty cats were followed for an additional 5 months. Fifteen cats required medication to control the spraying, often at a reduced dose.

Journal of the American Veterinary Medical Association (Feb 05–Apr 06)

J Am Vet Med Assoc. 2006 Mar 1;228(5):743-9

Renal transplantation in cats with calcium oxalate urolithiasis: 19 cases (1997-2004).

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OBJECTIVE: To determine outcome of renal transplantation in cats with renal failure associated with calcium oxalate urolithiasis. DESIGN: Retrospective case series. ANIMALS: 19 cats. PROCEDURE: Medical records were reviewed for evaluation of signalment, preoperative clinical signs, physical examination results, dietary history, clinicopathologic data, abdominal imaging, postoperative diet, complications, and long-term outcome. RESULTS: The domestic shorthair was the most common breed represented. There were 13 spayed females and 7 castrated males. Mean age was 6.8 years. Clinical signs included weight loss, lethargy, vomiting, anorexia, polyuria, and polydipsia. Before surgery, cats received commercially available canned or dry food (n = 10), a prescription renal failure diet (5), a commercial diet to manage struvite crystalluria (1), or an unknown diet (3). Seventeen cats were anemic. All cats were azotemic. Hypercalcemia was detected in 7 cats. Abdominal imaging revealed nephrolithiasis, ureterolithiasis, or both in all cats. Median duration of survival of all cats was 605 days. Eight cats were alive 282 to 2,005 days (median, 1,305 days) after surgery. Eleven cats died 2 to 1,197 days (median, 300 days) after surgery. Five cats formed calculi in their allograft (120 to 665 days). Two of the 5 cats that formed calculi were hypercalcemic. Four of the 5 cats died following complications associated with formation of calculi. CONCLUSIONS AND CLINICAL RELEVANCE: Renal transplantation appears to be a viable option for cats in renal failure secondary to calcium oxalate urolithiasis. In addition to reported complications in renal transplant recipients, formation of calculi within the allograft may also occur.

J Am Vet Med Assoc. 2006 Mar 1;228(5):722-5

Risk factors associated with clinical signs of lower urinary tract disease in indoor-housed cats.

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OBJECTIVE: To determine associations between environmental and cat-related factors and

lower urinary tract signs in indoor-housed domestic cats. DESIGN: Case-control study. Animals-238 healthy cats, 157 cats with clinical signs of lower urinary tract disease, and 70 cats with other diseases. PROCEDURE: Data collected from owners of the cats were analyzed. Descriptive statistics, environmental variables, and physical and behavioral signs were analyzed by use of ANOVA and logistic regression analysis to assess which factors were associated with clinical signs of lower urinary tract disease. RESULTS: The only demographic or environmental factors associated with lower urinary tract signs were older age and months owned. In contrast, cats with clinical signs of lower urinary tract disease had significantly greater owner-observed gastrointestinal tract signs and scratching, fearful, nervous, and aggressive behaviors. CONCLUSIONS AND CLINICAL RELEVANCE: Lower urinary tract signs in indoor-housed cats may be more closely associated with cat-related factors than with demographic or environmental factors.

J Am Vet Med Assoc. 2006 Feb 1;228(3):389-91

Circumcaval ureter associated with an intrahepatic portosystemic shunt in a dog.

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CASE DESCRIPTION: A 4-month-old Bernese Mountain Dog was examined because of shifting hind limb lameness and lethargy of 2 weeks' duration. CLINICAL FINDINGS: The lameness was attributed to hypertrophic osteodystrophy. Portosystemic shunting was suspected on the basis of low serum albumin concentration and high serum bile acids concentration, and an intrahepatic shunt was identified ultrasono-graphically. Celiotomy was performed, and the shunt was partially closed with a cellophane band. During follow-up ultrasonography 7 months later, dilation of the left renal pelvis and proximal portion of the left ureter was identified. During exploratory celiotomy, the left ureter was found to pass dorsal to the caudal vena cava, and circumcaval ureter was diagnosed. TREATMENT AND OUTCOME: The ureter was transected, repositioned ventral to the vena cava, and anastomosed. Follow-up ultrasonographic examinations revealed gradual resolution of the hydronephrosis and hydroureter. CLINICAL RELEVANCE: Findings suggest that circumcaval ureter should be considered in the differential diagnosis for hydronephrosis and hydroureter in dogs. Partial obstruction of the middle segment of the ureter on ultrasonograms or contrast radiographs should increase the index of suspicion for this condition.

J Am Vet Med Assoc. 2005 Oct 15;227(8):1253-6

Reliability of using reagent test strips to estimate blood urea nitrogen concentration in dogs and cats.

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OBJECTIVE: To evaluate the clinical accuracy of reagent test strips used to estimate BUN concentration in dogs and cats. DESIGN: Prospective study. ANIMALS: 116 dogs and 58 cats. PROCEDURE: Blood samples were collected at the time of admission to the hospital. Estimates of BUN concentration obtained with reagent test strips (category 1 [5 to 15 mg/dL], 2 (15 to 26 mg/dL], 3 [30 to 40 mg/dL], or 4 [50 to 80 mg/dL]) were compared with SUN concentrations measured with an automated analyzer. For dogs, category 1 and 2 test strip results were considered a negative result (nonazotemic) and category 3 and 4 test strip results were considered a positive result (azotemic). For cats, category 1, 2, and 3 test strip results were considered a negative result (nonazotemic) and category 4 test strip results were considered a positive result (azotemic). RESULTS: On the basis of SUN concentration, 40 of the 174 (23%) animals (20 dogs and 20 cats) were classified as azotemic. One dog and 2 cats had false-negative test strip results, and 1 dog had a false-positive result. Sensitivity and specificity were 95% (20/21) and 99% (94/95), respectively, for dogs and 87% (13/15) and 100% (43/43), respectively, for cats. CONCLUSIONS AND CLINICAL RELEVANCE: Results suggest that reagent test strips are a reliable method for rapidly estimating BUN concentrations in dogs and cats. Because test strip results are only semiquantitative and there remains a potential for misclassification, especially in cats, urea nitrogen concentration should ultimately be verified by means of standard chemistry techniques.

J Am Vet Med Assoc. 2005 Sep 15;227(6):948-53

Evaluation of the prevalence of infections in cats after renal transplantation: 169 cases (1987-2003).

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OBJECTIVE: To determine the prevalence of infections developing postoperatively, document the contribution of infection to increased risk of death, and identify risk factors associated with the development of infectious complications in cats after renal transplantation. DESIGN: Retrospective study. ANIMALS: 169 cats that received renal allograft transplants. PROCEDURES: Medical records of cats receiving renal transplants at the University of California from January 1987 through December 2003 were reviewed. RESULTS: 47 infections developed in 43 of 169 cats. Bacterial infections were most common (25/47 cats), followed by viral (13/47), fungal (6/47), and protozoal (3/47) infections. The median duration from transplant surgery to development of infection was 2.5 months. Infection was the second most common cause of death after acute rejection of the transplant, accounting for 14% of deaths overall. Cats with concurrent diabetes mellitus had a significantly increased risk of developing an infection after renal transplantation. Sex, increasing age, concurrent neoplasia, and previous treatment for transplant rejection were not associated with development of infection. CONCLUSIONS AND CLINICAL RELEVANCE: Infection was a common complication and an important cause of death or euthanasia in cats after renal

transplantation. Development of diabetes mellitus after transplantation significantly increased the risk of infection.

J Am Vet Med Assoc. 2005 Aug 15;227(4):565-9.

Evaluation of the association between sex and risk of forming urate uroliths in Dalmatians.

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OBJECTIVE: To test the hypothesis that urate uroliths are uncommonly detected in female Dalmatians, compared with males. DESIGN: Case-control study. SAMPLE POPULATION: Medical records of dogs evaluated at veterinary teaching hospitals in North America from 1981 to 2002 and compiled by the Veterinary Medical Database, and records of dogs with uroliths submitted for quantitative analyses to the Minnesota Urolith Center from 1981 to 2002. PROCEDURES: Crude odds ratios (ORs) and 95% confidence intervals were calculated to assess whether sex (male vs female) was a risk factor for urate urolithiasis. RESULTS: In Dalmatians evaluated by veterinary teaching hospitals in North America, males were more likely (OR, 13.0) to form uroliths, compared with females. In Dalmatians that formed uroliths analyzed by the Minnesota Urolith Center, males were more likely (OR, 14.0) to form urate uroliths, compared with females. In all dogs (Dalmatian and non-Dalmatian) that formed uroliths analyzed by the Minnesota Urolith Center, males were also more likely (OR, 48.0) to form urate uroliths, compared with females. CONCLUSIONS AND CLINICAL RELEVANCE: When conducting studies and formulating generalities about urate urolithiasis in Dalmatians, it is important to consider sex-related differences in urolith occurrence

J Am Vet Med Assoc. 2005 Jul 15;227(2):239-43.

Frequency of urinary tract infection among dogs with pruritic disorders receiving long-term glucocorticoid treatment.

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Department of Veterinary Clinical Sciences, College of Veterinary Medicine, University of Minnesota, Saint Paul, MN 55108, USA.

OBJECTIVE: To determine frequency of urinary tract infection (UTI) among dogs with pruritic disorders that were or were not receiving long-term glucocorticoid treatment. DESIGN: Observational study. ANIMALS: 127 dogs receiving glucocorticoids for > 6 months and 94 dogs not receiving glucocorticoids. PROCEDURE: Bacterial culture of urine samples was performed in dogs receiving long-term glucocorticoid treatment, and information was collected on drug administered, dosage, frequency of administration, duration of glucocorticoid treatment, and clinical signs of UTI. For dogs not receiving glucocorticoids, a

single urine sample was submitted for bacterial culture. RESULTS: Multiple (2 to 6) urine samples were submitted for 70 of the 127 (55%) dogs receiving glucocorticoids; thus, 240 urine samples were analyzed. For 23 of the 127 (18.1%) dogs, results of bacterial culture were positive at least once, but none of the dogs had clinical signs of UTI. Pyuria and bacteriuria (present vs absent) were found to correctly predict results of bacterial culture for 89.9% and 95.8% of the samples, respectively. Type of glycocorticoid, dosage, frequency of administration, and duration of treatment were not associated with frequency of UTI. None of the urine samples from dogs not receiving glucocorticoids yielded bacterial growth. The frequency of UTI was significantly higher for dogs treated with glucocorticoids than for dogs that had not received glucocorticoids. CONCLUSIONS AND CLINICAL RELEVANCE: Results suggest that dogs receiving long-term glucocorticoid treatment have an increased risk of developing a UTI. On this basis, we recommend that urine samples be submitted for bacterial culture at least yearly for such dogs.

J Am Vet Med Assoc. 2005 Jul 1;227(1):94-100.

Evaluation of the effect of dietary vegetable consumption on reducing risk of transitional cell carcinoma of the urinary bladder in Scottish Terriers.

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OBJECTIVE: To evaluate the effects of vegetable consumption and vitamin supplementation on the risk of developing transitional cell carcinoma (TCC) of the urinary bladder in Scottish Terriers. DESIGN: Case-control study. ANIMALS: 92 adult Scottish Terriers with TCC (cases) and 83 Scottish Terriers with other conditions (controls). PROCEDURE: Owners of dogs with TCC completed a questionnaire regarding their dogs' diet and intake of vitamin supplements in the year prior to diagnosis of TCC; owners of control dogs completed the questionnaire for a comparable time period. The risk (odds ratio [OR]) of developing TCC associated with diet and vitamin supplementation was determined by use of logistic regression. RESULTS: After adjustment for age, weight, neuter status, and coat color, there was an inverse association between consumption of vegetables at least 3 times/wk (OR, 0.30; 95% confidence interval [CI], 0.15 to 0.62) and risk of developing TCC. For individual vegetable types, the risk of developing TCC was inversely associated with consumption of green leafy vegetables (OR, 0.12; 95% CI, 0.01 to 0.97) and yellow-orange vegetables (OR, 0.31; 95% CI, 0.14 to 0.70). Consumption of cruciferous vegetables was not significantly associated with a similar reduction in risk of developing TCC (OR, 0.22; CI, 0.04 to 1.11). The power of the study to detect a 50% reduction in TCC risk associated with daily vitamin supplementation was considered low (25%). CONCLUSIONS AND CLINICAL RELEVANCE: Results suggest that consumption of certain vegetables may prevent or slow the development of TCC in Scottish Terriers.

J Am Vet Med Assoc. 2005 May 15;226(10):1676-80.

Corynebacterium urealyticum urinary tract infection in dogs and cats: 7 cases (1996-2003).

Bailiff NL, **Westropp JL**, **Jang SS**, **Ling GV**.

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OBJECTIVE: To identify clinical features of Corynebacterium urealyticum urinary tract infection in dogs and cats and antimicrobial susceptibility patterns of C urealyticum isolates. DESIGN: Retrospective study. ANIMALS: 5 dogs and 2 cats. PROCEDURE: Medical records of dogs and cats for which C urealyticum was isolated from urine samples were reviewed. Isolates from clinical cases, along with previously lyophilized unsubtyped isolates of Corynebacterium spp collected between 1977 and 1995, were examined and, if subtyped as C urealyticum, tested for antimicrobial susceptibility. RESULTS: Signalment of infected animals was variable. Prior micturition disorders were common, and all animals had signs of lower urinary tract disease at the time C urealyticum infection was diagnosed. Median urine pH was 8.0; WBCs and bacteria were variably seen in urine sediment. In vitro antimicrobial susceptibility testing of 14 C urealyticum isolates revealed that all were susceptible or had intermediate susceptibility to chloramphenicol, tetracycline, and vancomycin and most were susceptible to enrofloxacin. Thickening of the bladder wall and accumulation of sediment were common ultrasonographic findings. Contrast radiography or cystoscopy revealed findings consistent with encrusting cystitis in 3 dogs. Infection resolved in 2 dogs following surgical debridement of bladder plaques and antimicrobial administration. In 2 other dogs and 1 cat treated with antimicrobials, infection with C urealyticum resolved, but urinary tract infection with a different bacterial species developed. CONCLUSIONS AND CLINICAL RELEVANCE: Results suggest that preexisting urinary tract disorders are common in dogs and cats with C urealyticum infection. Treatment with appropriate antimicrobials in combination with surgical debridement might eliminate C urealyticum infection.

J Am Vet Med Assoc. 2005 Apr 1;226(7):1095-7

Use of a particulate extracellular matrix bioscaffold for treatment of acquired urinary incontinence in dogs.

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OBJECTIVE: To evaluate use of a particulate bioscaffold consisting of the extracellular matrix (ECM) of the urinary bladder from pigs for treatment of acquired urinary incontinence in dogs resistant to medical treatment. DESIGN: Case series. ANIMALS: 9 female dogs with acquired urinary incontinence. PROCEDURE: In 6 dogs, 30 mg of particulate ECM in 1.0 mL of a carrier consisting of glycerin and saline 10.9% NaCl) solution was injected into each of 3 equally spaced sites around the circumference of the internal urethral sphincter via an

endoscopic technique. In the remaining 3 dogs (control dogs), 1.0 mL of the carrier alone was injected in 3 equally spaced sites around the circumference of the internal urethral sphincter in a similar manner. RESULTS: For dogs treated with the ECM, median duration of urinary continence following treatment was 168 days (range, 84 to 616 days), whereas for the control dogs, median duration of urinary continence following the procedure was 14 days (range, 7 to 31 days). Two of the 3 control dogs were treated with the ECM at the end of the study and were continent for 119 and 252 days. No adverse effects were observed in any dog. CONCLUSIONS AND CLINICAL RELEVANCE: Results suggest that endoscopically guided injection of particulate ECM into the internal urethral sphincter may be useful for the treatment of acquired urinary incontinence in female dogs.

J Am Vet Med Assoc. 2005 Mar 15;226(6):937-44, Comment in: J Am Vet Med Assoc. 2005 May 15;226(10):1644.

Management and outcome of cats with ureteral calculi: 153 cases (1984-2002).

Kyles AE, **Hardie EM**, **Wooden BG**, **Adin CA**, **Stone EA**, **Gregory CR**, **Mathews KG**, **Cowgill LD**, **Vaden S**, **Nyland TG**, **Ling GV**.

Department of Surgical and Radiological Sciences, School of Veterinary Medicine, University of California, Davis, CA 95616, USA.

OBJECTIVE: To determine outcome of medical and surgical treatment in cats with ureteral calculi. DESIGN: Retrospective study. ANIMALS: 153 cats. PROCEDURE: Medical records were reviewed. Owners and referring veterinarians were contacted for follow-up information. RESULTS: All cats were initially treated medically before a decision was made to perform surgery. Medical treatment included parenteral administration of fluids and diuretics to promote urine production and passage of the ureteral calculus and supportive treatment for renal failure. Ureteral calculi in the proximal portion of the ureter were typically removed by ureterotomy, whereas ureteral calculi in the distal portion of the ureter were more likely to be removed by partial ureterectomy and ureteroneocystostomy. Ureterotomy could be performed without placement of a nephrostomy tube for postoperative urine diversion. Postoperative complication rate and perioperative mortality rate were 31% and 18%, respectively. The most common postoperative complications were urine leakage and persistent ureteral obstruction after surgery. Chronic renal failure was common at the time of diagnosis and continued after treatment, with serum creatinine concentration remaining greater than the upper reference limit in approximately half the cats. Twelve-month survival rates after medical and surgical treatment were 66% and 91%, respectively, with a number of cats dying of causes related to urinary tract disorders, including ureteral calculus recurrence and worsening of chronic renal failure. CONCLUSIONS AND CLINICAL RELEVANCE: Results suggest that medical and surgical management of ureteral calculi in cats are associated with high morbidity and mortality rates. Treatment can stabilize renal function, although many surviving cats will continue to have impaired renal function.

J Am Vet Med Assoc. 2005 Mar 15;226(6):932-6.

Clinical, clinicopathologic, radiographic, and ultrasonographic abnormalities in cats with ureteral calculi: 163 cases (1984-2002).

Kyles AE, **Hardie EM**, **Wooden BG**, **Adin CA**, **Stone EA**, **Gregory CR**, **Mathews KG**, **Cowgill LD**, **Vaden S**, **Nyland TG**, **Ling GV**.

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OBJECTIVE: To determine clinical, clinicopathologic, radiographic, and ultrasonographic abnormalities in cats with ureteral calculi. DESIGN: Retrospective study. ANIMALS: 163 client-owned cats. PROCEDURE: Medical records were reviewed, and information on signalment, history, clinical signs, and results of clinicopathologic testing and diagnostic imaging was obtained. RESULTS: The number of cats in which ureterolithiasis was diagnosed each year increased progressively during the study period. Clinical signs tended to be non-specific and included inappetence, vomiting, lethargy, and weight loss. A combination of survey radiography and abdominal ultrasonography revealed ureteral calculi in 66 of 73 (90%) cats in which the diagnosis was confirmed at surgery or necropsy. Ultrasonography revealed that ureteral calculi were causing ureteral obstruction in 143 of 155 (92%) cats. One hundred thirty-four of 162 (83%) cats had azotemia, 84 of 156 (54%) had hyperphosphatemia, and 22 of 152 (14%) had hypercalcemia. Urinary tract infection was documented in 10 of 119 (8%). Fifty-eight of 76 (76%) cats with unilateral ureterolithiasis had azotemia and 33 (43%) had hyperphosphatemia, indicating impairment of renal function in the contralateral kidney or prerenal azotemia. Ultrasonographic imaging of the contralateral kidney in cats with unilateral ureteral calculi suggested that preexisting renal parenchymal disease was common in cats with ureterolithiasis. Ninety-one of 93 (98%) ureteral calculi contained calcium oxalate. CONCLUSIONS AND CLINICAL RELEVANCE: Results suggest that abdominal imaging should be performed in all cats with chronic nonspecific signs or with acute or chronic renal failure to rule out ureterolithiasis. Preexisting renal disease may be common in cats with ureteral calculi.

Journal of Comparative Pathology (Apr 05– Apr 06)

J Comp Pathol. 2005 Aug-Oct;133(2-3):205-8

Glomerulocystic kidney in a domestic dog.

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Glomerulocystic kidney was diagnosed in a 5-year-old female Shiba dog, which died from chronic renal failure with convulsions, vomiting and diarrhoea. Haematological examination revealed non-regenerating anaemia, azotaemia and high serum creatinine. Grossly, both kidneys were mildly atrophic with multiple small cysts in the cortex. Histopathological examination revealed marked dilatation of Bowman's space, often with glomerular atrophy or loss, and mild interstitial fibrosis. Bowman's basement membranes (BMs) were tortuous and thickened, with patchy calcification. Glomerulo-tubular junctions in the urinary pole side of the kidneys had a stenotic appearance associated with thickening of Bowman's BMs and calcification. Focal interstitial fibrosis around the glomerulo-tubular junction was also found. Continuity with the proximal tubule was evident in cystic glomeruli. Ultrastructurally, marked thickening of Bowman's BMs with many granular deposits in the urinary pole side was observed. The findings indicate that glomerular cystic changes may have developed as a consequence of glomerulo-tubular junctional stenosis due to thickened Bowman's BMs and focal periglomerular fibrosis in the urinary pole side of the kidneys.

J Comp Pathol. 2005 Jul;133(1):1-13

Histopathological studies of experimental lyme disease in the dog.

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Experimental borrelia infection was induced in 62 specific--pathogen-free beagle dogs by exposure to Ixodes scapularis ticks harbouring the spirochaete Borrelia burgdorferi. Clinical signs of Lyme disease occurred in 39/62 dogs, the remaining 23 being subclinically infected. Clinical signs consisted of one to six episodes of transitory lameness with joint swelling and pain, most commonly affecting the elbow or shoulder joints. The polymerase chain reaction and culture demonstrated that the dogs remained infected for up to 581 days. At necropsy, gross findings consisted of lymphadenopathy in the area of tick attachment. Microscopical changes consisted of effusive fibrinosuppurative inflammation or nonsuppurative inflammation, or both, affecting synovial membranes, joint capsules and associated tendon sheaths. Plasma cells dominated areas of chronic inflammation, with CD3(+) T cells being present in lesser numbers. Microscopical signs of arthritis were polyarticular and more widespread than indicated by clinical signs, and most of the subclinically affected animals also had synovitis. In areas of tick attachment to the skin, hyperkeratosis and a mixture of suppurative and nonsuppurative dermatitis were encountered. Lymphadenopathy in superficial lymph nodes resulted from follicular and parafollicular hyperplasia. In 14/62 dogs, lymphoplasmacytic periarteritis and perineuritis were noted, resembling lesions found in human Lyme disease and syphilis, in which an underlying microangiopathy has been proposed.

J Comp Pathol. 2005 Jul;133(1):64-7

Renal dysplasia with unilateral renal agenesis in a dog.

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This report describes a renal dysplastic lesion associated with renal agenesis in a 3-year-old dog with chronic renal failure. Haematological examination revealed non-regenerative anaemia, azotaemia, increased creatinine and hyperphosphataemia. At necropsy, the right kidney and right ureter could not be identified. The left kidney was slightly enlarged, with a reduced cortico-medullary ratio. Histologically, the medulla of the left kidney had persistent mesenchyme and primitive tubules (tall pseudostratified columnar epithelium), dilated collecting ducts lined by flattened epithelium, and adenomatoid proliferation of cuboidal epithelium; fetal or immature glomeruli could not be identified. To our knowledge, this is the first report of a renal dysplastic lesion with unilateral agenesis in animals.

Journal of Small Animal Practice (March 05– Apr 06)

J Small Anim Pract. 2006 Apr;47(4):196-200.

Cohort study of COX-1 and COX-2 expression in canine rectal and bladder tumours.

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Objectives: To determine the role that cyclooxygenase-1 (COX-1) and cyclooxygenase-2 (COX-2) play in malignant transformation in canine transitional cell carcinoma and rectal tumours. Methods: Histological sections of 21 canine rectal adenocarcinomas and 18 canine transitional cell carcinomas were stained for COX-1 and COX-2. Mann-Whitney non-parametric tests were applied to determine if there was any relationship between the percentage of cells expressing COX-1 or COX-2, and between COX-1 and COX-2 staining intensity and age, breed or sex. Results: For rectal adenocarcinomas, 19.0 per cent of the sections were negative for COX-1 and COX-2. A further 38.1 per cent of the sections were negative for COX-2 but positive for COX-1, and 38.1 per cent of the sections had rare or occasional single cells positive for COX-2. No significant differences were found in COX staining when compared with age, breed or sex. For transitional cell carcinomas, all of the sections were positive for COX-1 and COX-2. For COX-2 staining, 16.7 per cent had more than 30 per cent positive cells. For COX-1 staining, 38.9 per cent had more than 30 per cent positive cells. There was a significant increase in the percentage of COX-1 positive cells in small breed dogs (P = 0.0337). Clinical Significance: The variations in COX expression reported in this study may explain the differences in the clinical response of transitional cell

carcinomas and rectal adenocarcinomas following treatment with non-steroidal anti-inflammatory drugs.

J Small Anim Pract. 2006 Jan;47(1):14-20

The in vitro effects of piroxicam and meloxicam on canine cell lines.

Knottenbelt C, **Chambers G**, **Gault E**, **Argyle DJ**.

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OBJECTIVES: To analyse the direct antiproliferative effects of both piroxicam and meloxicam at a variety of concentrations on a series of canine cancer cell lines and the mechanism of cell death. METHODS: The in vitro effects of piroxicam and meloxicam at various concentrations on canine cell cultures (Madin-Darby canine kidney cells, osteosarcoma, mammary carcinoma, and lymphoma) were assessed with respect to proliferation inhibition and apoptosis induction. Western blot analysis of cyclooxygenase-1 and cyclooxygenase-2 expression was performed on all cell lines. RESULTS: All cell lines used in this study were cyclooxygenase-1 and cyclooxygenase-2 positive apart from Madin-Darby canine kidney cells which were negative for both cyclooxygenase-1 and cyclooxygenase-2. Both meloxicam and piroxicam were able to inhibit proliferation in cell lines in a dose-dependent manner. However, the drug concentration required for a given effect was cell line dependent. CLINICAL SIGNIFICANCE: The results suggest that significant inhibition of proliferation and induction of apoptosis would only occur when drug concentrations were in excess of those that can be achieved in vivo following maximum recommended dose rates. It is possible, however, that local or topical treatment or altered dosing regimens may offer alternative approaches to the use of these drugs as antineoplastic agents.

J Small Anim Pract. 2005 Dec;46(12):578-81

Acquired urinary bladder diverticulum in a dog.

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A neutered female chow chow aged six years and five months was evaluated for dysuria. An initial diagnosis of bladder distension and atony was made following physical, ultrasonographic and radiographic examinations. The problems did not resolve with medical management and exploratory surgery revealed a large bladder diverticulum. This report describes the radiographic findings and surgical repair of the acquired bladder diverticulum. The literature available on this condition is also reviewed.

J Small Anim Pract. 2005 Dec;46(12):571-7

Evaluation of clinical signs and causes of lower urinary tract disease in European cats.

Gerber B, **Boretti FS**, **Kley S**, **Laluha P**, **Muller C**, **Sieber N**, **Unterer S**, **Wenger M**, **Fluckiger M**, **Glaus T**, **Reusch CE**.

Clinic for Small Animal Internal Medicine, Vetsuisse Faculty, University of Zurich, Switzerland.

OBJECTIVES: To investigate the clinical signs and causes of lower urinary tract disease (LUTD) in 77 cats. METHODS: Cats diagnosed with LUTD over a two-year period were included in the study. RESULTS: The study population comprised 67 male and 10 female cats. Uroliths occurred in 17 of the 77 cats (22 per cent), urethral plugs in eight cats (10 per cent) and urinary tract infection in six cats (8 per cent). In 44 cats (57 per cent), no specific cause for the disease was found and they were classified as having idiopathic LUTD. In two of the 77 cats (3 per cent) no definitive diagnosis was established. Pain was less common in cats with uroliths and haematuria was more often seen in cats with urinary tract infection. At presentation, urethral obstruction was diagnosed in 45 of the 77 cats (58 per cent). CLINICAL SIGNIFICANCE: The causes of LUTD found in cats in this study are similar to those that have been previously documented, and idiopathic LUTD is the most frequent diagnosis. However, the rate of urethral obstruction, particularly in cats with idiopathic LUTD, was higher than in other reports. The cause of this difference is unknown.

J Small Anim Pract. 2005 Dec;46(12):567-70

Prostatopexy as a treatment for urethral sphincter mechanism incompetence in male dogs.

Holt PE, **Coe RJ**, **Hotston Moore A**.

Division of Companion Animal Studies, Department of Clinical Veterinary Science, University of Bristol, Langford.

OBJECTIVES: The incidence of urinary incontinence due to urethral sphincter mechanism incompetence (USMI) in male dogs is relatively rare compared with the incidence in bitches, but the medical management of USMI in male dogs is less rewarding than in bitches. Attempts have been made to manage this condition surgically using either urethral bulking agents such as Teflon or by relocating the intrapelvic bladder neck to an intra-abdominal position by vas deferentopexy. This paper reports the response to prostatopexy in male dogs with USMI. METHODS: The response to prostatopexy was determined in nine severely incontinent male dogs with USMI that were followed up for periods ranging from 10 months to five years (mean 2.3 years). RESULTS: One dog was cured, four were improved, and no improvement in the frequency or degree of urinary incontinence occurred in the remaining four animals. No complications were seen in any of the dogs. CLINICAL SIGNIFICANCE:

Prostatopexy may provide a further method of treating male dogs with USMI that do not respond to medical therapy.

J Small Anim Pract. 2005 Nov;46(11):549-52

Myocarditis and generalised vasculitis associated with leishmaniosis in a dog.

Torrent E, **Leiva M**, **Segales J**, **Franch J**, **Pena T**, **Cabrera B**, **Pastor J**.

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A three-year-old, female bulldog was presented with bilateral uveitis, apathy, listlessness, generalised lymphadenopathy and perivulvar haematoma. The initial laboratory studies showed non-regenerative anaemia, polyclonal gammopathy and a high urine protein:creatinine ratio. Serology for leishmaniosis was positive and treatment with allopurinol and meglumine antimoniate was started. Despite treatment, the dog's clinical condition deteriorated. Signs included cutaneous ecchymosis, respiratory distress and finally cardiorespiratory arrest. Histopathological studies of postmortem tissue samples revealed a generalised vasculitis of several internal organs and severe myocarditis. Leishmania species organisms were identified in affected tissues using immunoperoxidase labelling and PCR techniques.

J Small Anim Pract. 2005 Oct;46(10):504-6

Urethral transitional cell carcinoma in a cat.

Takagi S, **Kadosawa T**, **Ishiguro T**, **Ohsaki T**, **Okumura M**, **Fujinaga T**.

Laboratory of Veterinary Surgery, Department of Veterinary Clinical Sciences, Graduate School of Veterinary Medicine, Hokkaido University, Sapporo, Japan.

A 15-year-old, male neutered cat was referred for investigation of dysuria. A retrograde urethrography was performed which showed two space-occupying masses within the lumen of the mid-to-proximal urethra. Exploratory coeliotomy revealed two urethral masses. Segmental urethrectomy was performed to resect the mass, and the lower urinary tract was reconstructed by vesico-urethral anastomosis. Histopathology showed the mass to be a transitional cell carcinoma with incomplete surgical margins. Tumour regrowth was suspected when dysuria was found approximately 318 days after surgery. Clinical signs were palliated by radiation using weekly fractions of 6 Gy for three weeks. The cat died of unknown causes 386 days postoperatively.

J Small Anim Pract. 2005 Oct;46(10):469-78

Canine glomerulonephritis: new thoughts on proteinuria and treatment.

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Glomerular disease in the dog is not only a common form of renal disease but also an important cause of chronic renal failure. The presence of immune complexes in glomerular capillary walls is a major cause of canine glomerular disease and is commonly referred to as glomerulonephritis. Leakage of plasma proteins, principally albumin, across the damaged glomerular capillary walls results in persistent proteinuria--the clinicopathological hallmark of glomerulonephritis. Recent evidence suggests that, in addition to being a marker of disease, persistent proteinuria is associated with progressive glomerular and tubulointerstitial lesions and loss of additional nephrons. Perhaps the best treatment for glomerulonephritis is the identification and correction of any underlying inflammatory, immune-mediated or neoplastic disease that results in the deposition or formation of glomerular immune complexes. In cases of idiopathic glomerulonephritis, angiotensin-converting enzyme inhibitors have been shown to decrease proteinuria and potentially slow disease progression.

J Small Anim Pract. 2005 May;46(5):232-6, Comment in: J Small Anim Pract. 2005 May;46(5):215.

Nephrotic syndrome associated with administration of sulfadimethoxine/ormetoprim in a dobermann.

Vasilopulos RJ, **Mackin A**, **Lavergne SN**, **Trepanier LA**.

Department of Clinical Sciences, Mississippi State University College of Veterinary Medicine, Starkville, Mississippi, USA.

This case report describes sulphonamide-induced nephrotic syndrome in a young dobermann dog. The clinical signs and laboratory abnormalities resolved shortly after discontinuation of the sulphonamide antibiotic and with generalised supportive care. Since nephrotic syndrome typically carries a guarded prognosis in veterinary medicine and is poorly responsive to therapy, a thorough drug history should be an important part of the investigation of any animal with a protein-losing nephropathy.

J Small Anim Pract. 2005 May;46(5):227-31.

Retrospective study of indications for and outcome of perineal urethrostomy in cats.

Bass M, **Howard J**, **Gerber B**, **Messmer M**.

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OBJECTIVES: To evaluate indications for and outcome of perineal urethrostomy in cats. METHODS: The medical records of 59 cats that had undergone perineal urethrostomy were evaluated. Short-term follow up information (for a period of four weeks following surgery) was available for all of the cats. Long-term follow up information (for a period of at least four months) was available for 39 cats. RESULTS: Early complications occurred in 25.4 per cent of cats and late complications were observed in 28.2 per cent of cats. The most frequent late complication was recurring bacterial urinary tract Infection. CLINICAL SIGNIFICANCE: Despite frequent complications and recurring signs of lower urinary tract disease, 32.2 per cent of the cats had a disease-free long-term outcome (mean four years, median 3.9 years), and 88.6 per cent of clients interviewed thought that their cats had a good quality of life after surgery.

J Small Anim Pract. 2005 Apr;46(4):177-84.

Epidemiology of canine urolithiasis in the Czech Republic from 1997 to 2002.

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OBJECTIVES: To compare data on the epidemiology of canine urolithiasis in the Czech Republic with that from other countries. METHODS: The records from the Centre for Mineralogical Analysis from 1997 to 2002 were reviewed. The data were obtained from mineralogical analysis of 1366 canine uroliths obtained from patients in the Czech Republic. These included 396 females and 629 males. RESULTS: Sixty-eight breeds plus crossbreeds were identified. Eight breeds plus the crossbreeds accounted for 71.3 per cent of all cases. Males were affected more frequently than females (61.4 per cent versus 38.6 per cent). Struvites significantly predominated in females, while in males calcium oxalates, brushites and cystines were the most common stones. Most of the uroliths (48.9 per cent) were 5 mm or less in dimension. By 2001, struvite was the most frequent (38.5 to 44.1 per cent) urolith, followed by calcium oxalate (26.5 to 32.0 per cent). In 2002, calcium oxalate became the most frequent calculus, followed by struvite, mixed calculi and others. CLINICAL SIGNIFICANCE: Comparison of these results with studies by other authors showed that for most of the monitored parameters there was agreement with respect to the proportions of different breeds within the populations of dogs in different geographical areas.

Journal of Veterinary Internal Medicine (March 05– Apr 06)

J Vet Intern Med. 2006 Mar-Apr;20(2):422-34

ACVIM small animal consensus statement on Lyme disease in dogs: diagnosis, treatment, and prevention.

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The purpose of this report is to offer a consensus opinion of ACVIM diplomates on the diagnosis, treatment, and prevention of Borrelia burgdorferi infections in dogs (canine Lyme disease). Clinical syndromes known to commonly be associated with canine Lyme disease include polyarthritis and glomerulopathy. Serological test results can be used to document exposure to B. burgdorferi but not prove illness. Although serum enzyme-linked immunosorbent assay/indirect fluorescent antibody assay titers can stay positive for months to years after treatment, quantitative C6 peptide antibody paired tests need more study. Serological screening of healthy dogs is controversial because it can lead to overdiagnosis or overtreatment of normal dogs, most of which never develop Lyme disease. However, serological screening can provide seroprevalence and sentinel data and stimulate owner education about tick infections and control. Although it is unknown whether treatment of seropositive healthy dogs is beneficial, the consensus is that seropositive dogs should be evaluated for proteinuria and other coinfections and tick control prescribed. Tick control can include a product that repels or protects against tick attachment, thereby helping to prevent transmission of coinfections as well as Borrelia spp. Seropositive dogs with clinical abnormalities thought to arise from Lyme disease generally are treated with doxycycline (10 mg/kg q24h for 1 month). Proteinuric dogs might need longer treatment as well as medications and diets for protein-losing nephropathy. The ACVIM diplomates believe the use of Lyme vaccines still is controversial and most do not administer them. It is the consensus opinion that additional research is needed to study predictors of illness, "Lyme nephropathy," and coinfections in Lyme endemic areas.

J Vet Intern Med. 2006 Mar-Apr;20(2):245-9

Antibiotic sensitivity profiles do not reliably distinguish relapsing or persisting infections from reinfections in cats with chronic renal failure and multiple diagnoses of Escherichia coli urinary tract infection.

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Older cats with chronic renal failure (CRF) commonly develop urinary tract infections (UTI). Uropathogenic Escherichia coli (UPEC) is identified as the causal agent of UTI in most affected cats. Infections are often complicated, and UPEC infections may persist or recur in

these cats. Antibiotic sensitivity profiles have been used to distinguish relapsing or persisting UTI from reinfection by different clones of the same species. However, the accuracy with which antibiograms discriminate different urinary E coli clones in cats is uncertain. We studied 17 cystocentesis-derived UPEC isolates collected from 5 cats with stable CRF and multiple diagnoses of UTI. UTIs were classified as relapses versus persistent infections or reinfections using antibiograms determined by Kirby-Bauer discs and Etests. Subsequently, clonality of UPEC isolates was determined by pulsed-field gel electrophoresis (PFGE). A comparison of PFGE results with antibiograms indicated that antibiotic resistance patterns varied considerably within several individual E coli clones. Both antibiotic susceptibility tests differentiated between relapsing or persistent infections and reinfections with only 58% overall efficiency. Thus, antibiotic sensitivity profiles cannot be relied upon to distinguish between persisting or relapsing infections as compared to reinfections in cats with CRF and multiple diagnoses of E coli UTI.

J Vet Intern Med. 2006 Mar-Apr;20(2):228-33.

Effects of allopurinol treatment on the progression of chronic nephritis in Canine leishmaniosis (Leishmania infantum).

Plevraki K, **Koutinas AF**, **Kaldrymidou H**, **Roumpies N**, **Papazoglou LG**, **Saridomichelakis MN**, **Savvas I**, **Leondides L**.

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Forty dogs with canine leishmaniosis (CL) participated in this study, which was designed to investigate the effect of allopurinol on the progression of the renal lesions associated with this disease. The animals were allocated into 5 groups. Group A dogs (n = 12) had neither proteinuria nor renal insufficiency, group B dogs (n= 10) had asymptomatic proteinuria, and group C dogs (n = 8) were proteinuric and azotemic. Two more groups, CA and CB, comprising 5 dogs each, served as controls for groups A and B, respectively. Group A, B, and C dogs received allopurinol PO (10 mg/kg q12h) for 6 months, whereas group CA and CB dogs were placebo-treated. Serum biochemistry profile, urinalysis, urine protein/creatinine ratio, and glomerular filtration rate (GFR) measurements were carried out at the beginning of the study, the 3rd month, and the 6th month, whereas renal biopsies were carried out only at the beginning and the end of the trial. Membranoproliferative glomerulonephritis was the most common cause of chronic renal failure. Mesangioproliferative and tubulointerstitial nephritis were detected even in group A and CA dogs. Allopurinol not only lowered proteinuria in group B dogs but also prevented the deterioration of GFR and improved the tubulointerstitial, but not the glomerular, lesions in both group A and group B dogs. Further, it resolved the azotemia in 5 of the 8 dogs admitted with 2nd stage chronic renal failure (group C). Consequently, treatment with allopurinol is advisable in CL cases with asymptomatic proteinuria or 1st-2nd stage chronic renal failure.

J Vet Intern Med. 2006 Jan-Feb;20(1):52-6

Simplified methods for estimation of plasma clearance of iohexol in dogs and cats.

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The purpose of this study was to evaluate simplified methods for iohexol plasma clearance estimation in dogs and cats. Serial blood samples were taken before and 5, 20, 40, 60, 80, 100, 120, 150, 180, and 240 minutes after a bolus injection of iohexol in 51 dogs and 25 cats. Iohexol plasma concentration was determined with X-ray fluorescence. Clearance was calculated by dividing the injected dose by the area under the plasma tracer elimination curve estimated with a 2-compartment pharmacologic model. Clearance was normalized to body surface area (BSA). The 10-point clearance was used as a reference for the evaluation of simplified methods. A 2-sample method based on a single exponential fit and a single-sample method based on a linear quadratic model were investigated. Simplified methods were evaluated by calculating the standard deviation of the difference (SDD) between the clearances obtained with the simplified methods and the 10-point reference method. All combinations of sampling times were evaluated. The best sampling times were chosen for dogs and cats as the ones yielding the lowest SDD. Linear regression analysis was performed between the reference method and the optimized simplified methods. The best combination of time for the 2-sample method was 5 and 120 minutes in dogs and 20 and 180 minutes in cats. The best time for sampling in the single-sample method was 120 minutes in dogs and 80 minutes in cats. Plasma clearance of iohexol can be estimated in dogs and cats from 1 or 2 blood samples with a reasonable margin of error.

J Vet Intern Med. 2005 Nov-Dec;19(6):794-801.

Renal biopsy: a retrospective study of methods and complications in 283 dogs and 65 cats.

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Renal biopsy often is required to establish a definitive diagnosis in dogs and cats with renal disease. In this retrospective study, we determined the complications of renal biopsy as well as factors that may be associated with development of complications and procurement of adequate renal biopsy specimens in 283 dogs and 65 cats. Data extracted from medical records at 4 institutions were evaluated using logistic regression. Proteinuria was the most common indication for renal biopsy in dogs. Complications were reported in 13.4 and 18.5% of dogs and cats, respectively. The most common complication was severe hemorrhage; hydronephrosis and death were uncommon. Dogs that developed complications after renal biopsy were more likely to have been 4 to < 7 years of age and > 9 years, to weigh < or = 5

kg, and to have serum creatinine concentrations > 5 mg/dL. The majority of biopsies from both dogs (87.6%) and cats (86.2%) were considered to be of satisfactory quality. Biopsies from dogs were more likely to be of high quality if they were obtained when the patient was under general anesthesia and more likely to contain only renal cortex if they were obtained by surgery. We concluded that renal biopsy is a relatively safe procedure, with a low frequency of severe complications. Hospital practices and patient variables have the potential to impact both the quality of the specimen obtained and the rate of complications.

J Vet Intern Med. 2005 Sep-Oct;19(5):663-74

Acute renal failure in dogs after the ingestion of grapes or raisins: a retrospective evaluation of 43 dogs (1992-2002).

Eubig PA, **Brady MS**, **Gwaltney-Brant SM**, **Khan SA**, **Mazzaferro EM**, **Morrow CM**.

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A review of records from the AnTox database of the American Society for the Prevention of Cruelty to Animals Animal Poison Control Center identified 43 dogs that developed increased blood urea nitrogen concentration, serum creatinine concentration, or both as well as clinical signs after ingesting grapes, raisins, or both. Clinical findings, laboratory findings, histopathological findings, treatments performed, and outcome were evaluated. All dogs vomited, and lethargy, anorexia, and diarrhea were other common clinical signs. Decreased urine output, ataxia, or weakness were associated with a negative outcome. High calcium x phosphorus product (Ca x P), hyperphosphatemia, and hypercalcemia were present in 95%, 90%, and 62% of the dogs in which these variables were evaluated. Extremely high initial total calcium concentration, peak total calcium concentration, initial Ca x P, and peak Ca x P were negative prognostic indicators. Proximal renal tubular necrosis was the most consistent finding in dogs for which histopathology was evaluated. Fifty-three percent of the 43 dogs survived, with 15 of these 23 having a complete resolution of clinical signs and azotemia. Although the mechanism of renal injury from grapes and raisins remains unclear, the findings of this study contribute to an understanding of the clinical course of acute renal failure that can occur after ingestion of grapes or raisins in dogs.

J Vet Intern Med. 2005 Sep-Oct;19(5):633-43

The coxib NSAIDs: potential clinical and pharmacologic importance in veterinary medicine.

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Nonsteroidal anti-inflammatory drugs (NSAIDs) are used to control acute and chronic pain as

well as to manage oncologic and neurologic diseases in human and veterinary patients. Despite ongoing research and efforts to improve the safety and efficacy of existing drugs, adverse effects such as gastrointestinal irritation, renal and hepatic toxicity, interference with hemostasis, and reproductive problems persist. The true incidence of NSAID-induced adverse effects in animals is unknown, but is likely underestimated, because cats and dogs may be more sensitive than humans to NSAIDs due to alterations in drug metabolism, absorption, and enterohepatic recirculation. NSAIDs produce both analgesia and toxic adverse effects primarily by inhibiting cyclooxygenase (COX), thereby decreasing the production of prostaglandins that signal inflammation and pain as well as mediate physiologic functions such as platelet aggregation, gastric protection, and electrolyte balance in the kidney. The presence of at least 2 COX isoforms may account for variability in NSAID efficacy and toxicity both within and among species. This paper reviews and evaluates the published literature on the safety, pharmacology, uses, and complications of a subclass of COX-1-sparing drugs, the coxibs, in veterinary medicine. Coxibs and other COX-1-sparing drugs provide a clinically useful improvement over traditional NSAIDs, but data are incomplete and more in vivo species-specific, target-tissue, and clinical studies are needed.

J Vet Intern Med. 2005 May-Jun;19(3):377-85.

Assessment and management of proteinuria in dogs and cats: 2004 ACVIM Forum Consensus Statement (small animal).

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Emerging data indicate that more attention should be given to the detection, evaluation, monitoring, and treatment of dogs and cats with proteinuria. The purposes of this consensus statement are to describe an appropriate approach for accomplishing these tasks and to provide specific recommendations for assessing and managing dogs and cats with proteinuria based on data that are currently available. Because proteinuria and albuminuria have numerous possible causes, they must be assessed appropriately to determine their implications for the patient. This assessment involves localization of the origin of the proteinuria as well as determination of its persistence and magnitude. Because persistent renal proteinuria usually indicates presence of chronic kidney disease, which sometimes is a progressive disorder, its detection identifies dogs and cats that have increased risk for adverse health outcomes. Thus, urine testing that will detect proteinuria should be a component of the clinical evaluations of dogs and cats under all circumstances that prompt their veterinarians to also perform comprehensive hematologic and serum biochemical evaluations. At a minimum, this testing should consist of a complete urinalysis that includes a satisfactorily accurate semiquantitative test for protein, and positive reactions should be properly followed with further testing. The appropriate response to persistent renal proteinuria depends on the magnitude of proteinuria and the status of the patient. The recommended response generally involves continued monitoring, further investigation, and

therapeutic intervention, which should be implemented as an escalating series of inclusive, stepwise responses.

J Vet Intern Med. 2005 May-Jun;19(3):315-20

Histopathologic features of canine uremic gastropathy: a retrospective study.

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Uremic gastritis is a term commonly used to describe the gastrointestinal signs and histopathologic changes associated with renal failure in the dog. This retrospective study reviews the clinical, serum biochemical, and postmortem histopathologic data from 28 dogs with renal failure to determine the prevalence of gastric histopathology, characterize the gastric histopathology, and identify associations between gastric histopathology and serum concentrations of blood urea nitrogen (BUN), creatinine (Cr), calcium-phosphorus product (Ca x Phos), and hematocrit. Affected and control dogs with available renal and gastric tissue, serum biochemistry data, and urinalysis data were identified over a 10-year period (1992-2002) in the pathology department postmortem examination database at the Cornell University College of Veterinary Medicine. The serum biochemistry data and histopathologic findings were scored as normal, mild, moderate, and severe. All affected dogs had derangements of BUN, Cr, or Ca x Phos with gastric histopathology in 22 of 28 dogs (79%). Dogs with renal failure had a higher prevalence of gastric histopathologic changes compared with the control group. Associated histopathologic changes in the stomach were edema (P = .008), mineralization (P = .03), and vasculopathy (P = .03). Only 1 dog had evidence of gastric ulceration. Gastric necrosis was an uncommon finding (4/28, 14%). Gastric histopathology appears to be common in dogs with renal failure and is associated with increasing severity in the serum biochemistry data. Unlike humans with renal failure, in whom gastric ulceration predominates, gastric necrosis and ulceration appear to be uncommon in dogs with renal failure.

J Vet Intern Med. 2005 Mar-Apr;19(2):143; author reply 143-4., Comment on: J Vet Intern Med. 2004 Jul-Aug;18(4):483-7.

Questionable incidence of Dalmatian urolithiasis.

Weiss CH.

Journal of Veterinary Medical Science (March 05 – March 06)

J Vet Med Sci. 2006 Mar;68(3):243-8.

Diurnal variations of blood pressure in cats.

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Blood pressure (BP) was analyzed invasively using the telemetry system in unanesthetized, unrestrained healthy adult mongrel cats. After surgical implantation of a telemetry transmitter, BP was transiently elevated due to the invasive nature of the surgery, but it was gradually decreased. BP was largely stabilized seven to ten days postsurgery. Once BP was settled, systolic, diastolic and mean BPs(2) were obtained at 5-min intervals in individual cats. Hourly averages of these BP values revealed a diurnal variation with two peaks at 8:00 and 19:00. We also found that BP was significantly higher when cats were active compared to when they were sleeping or at rest ($p<0.05$). The average 24-hr BP in 20 healthy cats was 118.4+/-11.0 (systolic), 78.0+/-8.7 (diastolic) and 94.8+/-9.5 mmHg (mean) by the telemetry system.

J Vet Med Sci. 2005 Dec;67(12):1253-5

Urinary transforming growth factor-beta1 in feline chronic renal failure.

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Transforming growth factor-beta1 (TGF-beta1), an inflammatory cytokine, plays a role in tissue fibrosis, such as glomerular sclerosis and tubulointerstitial fibrosis of the kidneys. In the present study, the urinary TGF-beta1 level of cats diagnosed with chronic renal failure (CRF) was measured to investigate its relationship to the pathogenesis of feline CRF. Urinary TGF-beta1 levels (TGF-beta1/creatinine ratio) were significantly increased compared with healthy controls, whereas serum levels of TGF-beta1 were not. These results indicate that TGF-beta1 is expressed in the kidneys of CRF cats, and that it was reflected in the urinary TGF-beta1 level. Therefore, TGF-beta1 may play a role in feline CRF, and urinary TGF-beta1 could be used as a clinical marker for renal fibrosis.

J Vet Med Sci. 2005 Sep;67(9):847-53

Effects of long-term oral administration of ketoprofen in clinically healthy beagle dogs.

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To investigate the adverse effects of long-term administration of ketoprofen in dogs, ketoprofen (1 mg/kg) was administered to five clinically healthy beagle dogs (ketoprofen group) and gelatin capsules (control group) were administered to four clinically healthy beagle dogs for 30 days. We monitored the dogs through periodic physical examination, blood analyses, endoscopic examinations, fecal occult blood tests, renal function tests, urinalysis, urinary enzyme indices and cuticle bleeding time analysis. The lesions in the stomach, especially in the pyloric antrum, and fecal occult blood progressively worsened in the ketoprofen group. However, the differences between the ketoprofen group and the control group were not statistically significant. One dog in the ketoprofen group temporarily exhibited a decrease in renal plasma flow and two dogs exhibited enzymuria. However, these changes did not persist and the other examinations showed no significant difference between premedication and postmedication in the ketoprofen group. Therefore, the adverse effects of long-term administration of ketoprofen observed in this study were not clinically important in healthy dogs. Nevertheless, further investigation of adverse renal effects from long-term administration of ketoprofen is necessary in the dogs with subclinical renal disease.

J Vet Med Sci. 2005 May;67(5):461-5

Renal effects of medetomidine in isoflurane-anesthetized dogs with special reference to its diuretic action.

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Renal effects of the selective alpha(2)-adrenoceptor agonist, medetomidine, were investigated in anesthetized dogs. Animals were administered medetomidine 20 and 40 microg/kg intravenously (IV) and 80 mug/kg intramuscularly (IM) or 1 ml of saline IV. Urine and blood samples were collected before and at 30, 60, 90 and 120 min following medetomidine injection. Mean arterial blood pressure (MABP), renal blood flow (RBF), glomerular filtration rate (GFR), urine volume (U(v)), urine osmolality (U(osm)), free water clearance (C(H2O)), fractional clearance of sodium (F(Na)), plasma osmolality (P(osm)), plasma glucose levels and plasma antidiuretic hormone (ADH) concentrations were measured. The results showed that IV administration of medetomidine initially increased MABP 5-15 min followed by long-lasting decrease. The initial hypertension was not observed after IM administration, which was accompanied by a more profound hypotensive effects. RBF, GFR, U(v), C(H2O) increased after IV injection and decreased after IM. Medetomidine

increased FNa and Posm and decreased U(osm). Plasma glucose levels initially increased and subsequently decreased. Plasma ADH concentration was decreased by IV injection but increased by IM administration. Our data imply that: 1) IV administration of medetomidine at dose rates of 20 and 40 microg/kg results in profound diuresis up to 2 hr; 2) Suppression of ADH release from the CNS is one of the mechanisms of medetomidine-induced diuresis although it may not be the principal one.

J Vet Med Sci. 2005 Mar;67(3):249-54

Enzyme-linked immunosorbent assay for the detection of canine Leptospira antibodies using recombinant OmpL1 protein.

Okuda M, **Sakai Y**, **Matsuuchi M**, **Oikawa T**, **Watanabe M**, **Itamoto K**, **Iwata H**, **Kano R**, **Hasegawa A**, **Onishi T**, **Inokuma H**.

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OmpL1 is a 31-kDa outer membrane protein characterized in 1993 and known to be expressed only in pathogenic Leptospira spp. Recombinant OmpL1 (GST-rOmpL1) was expressed for use as an ELISA antigen for the detection of anti-Leptospira antibodies. In immunoblot analysis, the protein reacted with sera of dogs infected with three different serotypes of Leptospira interrogans, while did not react with sera of dogs both uninfected negative controls and infected with Borrelia burgdorferi, which is closely related to Leptospira spp. Moreover, in ELISA using GST-rOmpL1, the optical density (O.D.) values from the positive controls were very high (1.125 +/- 0.549). In contrast, the O.D. values from clinically healthy dogs and dogs with diseases other than leptospirosis were very low (0.109 +/- 0.046 and 0.089 +/- 0.046, respectively). These data suggest that the detection of anti-Leptospira antibodies by ELISA using the GST-rOmpL1 protein can be applied for diagnosis of canine leptospirosis.

Journal of Veterinary Pharmacology and Therapeutics (April 05 – Apr 06)

J Vet Pharmacol Ther. 2005 Dec;28(6):581-6

Effect of tepoxalin on renal function in healthy dogs receiving an angiotensin-converting enzyme inhibitor.

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The objective of this study was to investigate renal function in clinically normal dogs receiving tepoxalin, a nonsteroidal inflammatory drug, either in association with or without an angiotensin-converting enzyme inhibitor (ACEI). Ten adult female Beagle dogs were used in the three phases of the study. The dogs were administered the drugs once daily for 7 days (experiment 1: placebo/tepoxalin/tepoxalin and benazepril; experiment 2: enalapril/tepoxalin and enalapril) or for 28 days (experiment 3: tepoxalin and benazepril together). Renal function was assessed by measurement of glomerular filtration rate (GFR) by renal scintigraphy [(renal uptake of 99mTc-diethylenetriaminepentacetic acid (DTPA)] and plasma clearance of 99mTc-DTPA. Compared with the placebo group, renal uptake and plasma clearance of 99mTc-DTPA were not significantly modified after a 7-day period of treatment with tepoxalin or enalapril alone, tepoxalin and benazepril or tepoxalin and enalapril together. No significant change was obtained in GFR after a 28-day period of dosing with tepoxalin and benazepril together. Therefore, it was concluded that tepoxalin did not alter renal function in healthy Beagle dogs receiving ACEI.

Journal of Veterinary Science (April 05 – March 06)

J Vet Sci. 2006 Mar;7(1):87-8

A hermaphrodite dog with bilateral ovotestes and pyometra.

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Hermaphroditism was identified in a 3-year-old American Cocker spaniel with an enlarged os clitoridis that was shown as reddish finger-like structure protruding from the vulva. The urethral orifice was located cranially to the base of the os clitoridis. The gonads were situated caudal to the kidneys at the cranial tips of the uterine horns, and were composed mainly of seminiferous tubules and interstitial cells and had ovarian follicles in the cortices. The uterus was enlarged and revealed pyometra. Gross and histopathological findings of the dog suggested hermaphroditism with bilateral ovotestes and pyometra.

J Vet Sci. 2006 Mar;7(1):79-81

Influence of ascorbic acid on BUN, creatinine, resistive index in canine renal ischemia-reperfusion injury.

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Renal ischemia as a course of renal transplantation is a common cause of renal dysfunction as renal failure. The purpose of this study was to investigate the influence of ascorbic acid on blood urea nitrogen (BUN), creatinine (Cr) and resistive index (RI) for dog models with renal ischemia-reperfusion (I/R) injury. Renal ischemia was induced on 6 Beagle dogs. The left kidney was exposed to normothermic ischemia for a short period at 30 min followed by reperfusion. On the blood Cr level and RI, there was no significant difference comparing both groups. 14 days after I/R injury a significant reduction on the blood BUN level was observed in the vehicle group (34.06 mg/dl) compared to that of ischemia induced treated group (10.3 mg/dl) ($p < 0.05$). In conclusion, administration of ascorbic acid for renal ischemic-reperfusion injury had influence on blood BUN level, but it was not revealed the influence on blood Cr and RI.

Research in Veterinary Science (April 05 – Apr 06)

Res Vet Sci. 2006 Aug;81(1):68-75. Epub 2005 Nov 8.

Parasite density and impaired biochemical/hematological status are associated with severe clinical aspects of canine visceral leishmaniasis.

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We have performed a detailed investigation in 40 dogs naturally infected with Leishmania infantum (syn. chagasi), subdivided into three groups: asymptomatic (AD=12), oligosymptomatic (OD=12) and symptomatic (SD=16), based on their clinical features. Twenty non-infected dogs (CD) were included as control group. Serological analysis, performed by IFAT and ELISA, demonstrated higher antibodies titers in SD in comparison to the AD. A positive correlation was found between parasite density in the spleen and skin smears as well as the bone marrow parasitism with clinical status of the infection. We observed that the progression of the disease from asymptomatic to symptomatic clinical form was accompanied by intense parasitism in the bone marrow. It is likely that this led to the impaired biochemical/hematological status observed. Finally, we believe that the follow-up of these parameters could be a relevant approach to be used as markers during therapeutic and vaccine evaluations.

Res Vet Sci. 2005 Oct;79(2):161-7. Epub 2005 Feb 5.

Quantitative evaluation of renal function in healthy Beagle puppies and mature dogs.

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Daily urinary collection and assessment of glomerular filtration rate (GFR) and effective renal plasma flow were performed in ten 2-month-old Beagle puppies and ten 6-9 year-old Beagle dogs to identify age-associated differences in renal function. The most striking differences in puppies compared to mature dogs were a higher daily urinary volume (+65%), GFR (+87%), free water reabsorption (+159%), a lower daily protein excretion (-88%), and fractional excretion of phosphorus (-35%). Renal function in Beagle puppies, but not mature dogs, was also quite different compared to data published in younger adult dogs.

Veterinary Clinical Pathology (April 05 – Apr 06)

Vet Clin Pathol. 2006 Mar;35(1):31-6

Comparison of Multistix PRO dipsticks with other biochemical assays for determining urine protein (UP), urine creatinine (UC) and UP:UC ratio in dogs and cats.

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BACKGROUND: Urine protein: urine creatinine (UP:UC) ratio determined from the quantitative measurement of protein and creatinine in a single urine sample is the best feasible assessment of clinically significant proteinuria in dogs and cats. A dipstick that measures urine protein, urine creatinine, and UP:UC ratio has been used in human medicine and could have application for veterinary practice. OBJECTIVE: The objective of this study was to compare the Multistix PRO dipstick (Bayer Corporation, Elkhart, IN, USA) to other biochemical methods for determination of urine protein and creatinine, and UP:UC ratio in canine and feline urine. METHODS: A complete urinalysis, including sulfosalicylic acid (SSA) precipitation, was performed on urine samples submitted to our laboratory between February and April 2003 from 100 dogs and 49 cats. Urine protein and creatinine concentrations were determined by the Multistix PRO dipstick using a Clinitek 50 analyzer (Bayer) and compared with the results of SSA precipitation and quantitative biochemical analysis. The UP:UC ratios from the dipstick results (calculated by the Clinitek 50 and also manually) were compared with those calculated from quantitative values. Pearson product-moment correlation analysis and diagnostic sensitivity and specificity (using quantitative

results as the gold standard) were determined. RESULTS: For both canine and feline urine, protein and creatinine concentrations determined by the Multistix PRO correlated closely with quantitative concentrations for protein (dogs r = .78, P = .0001; cats r = .87, P = .0001) and creatinine (dogs r = .78, P = .0001; cats r = .76, P = .0001). The Multistix PRO was more sensitive and less specific than SSA precipitation for diagnosing clinically significant proteinuria. UP:UC ratios obtained by manual calculation of dipstick results correlated best with quantitative UP:UC ratios in dogs, and had higher specificity but lower sensitivity for the diagnosis of proteinuria. In cats, UP:UC ratios determined by the dipstick method did not correlate (r = -.24, P = .0974) with quantitative values. CONCLUSIONS: The Multistix PRO, with manual calculation of UP:UC, may be a good alternative for the diagnosis of clinically significant proteinuria in dogs, but not cats. Dipstick creatinine concentration should be considered as an estimate.

Vet Clin Pathol. 2005 Dec;34(4):425-8

Urine sediment from a Chihuahua.

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A 6-year-old, intact male Chihuahua was presented with stranguria and painful urination of 5 days duration. Cystine crystals were observed in low numbers in unstained urine sediment preparations, and a diagnosis of cystinuria was made. Uroliths were removed surgically from the urethra and the bladder, and mineral analysis indicated the stones were composed of 100% cystine. Cystinuria results from an inherited defect in renal tubular transport of cystine that affects many breeds and has been found as an autosomal recessive trait in Newfoundlands. Accurate identification of cystine crystals in urine is an important means of diagnosing cystinuria.

Vet Clin Pathol. 2005 Dec;34(4):368-74.

Sensitivity of Tru-cut and fine needle aspiration biopsies of liver and kidney for diagnosis of feline infectious peritonitis.

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BACKGROUND: The detection of typical lesions and feline coronavirus (FCoV) antigen in tissues is the only conclusive method for making a diagnosis of feline infectious peritonitis (FIP). A positive result using Tru-cut biopsy (TCB) and fine-needle aspiration biopsy (FNAB)

has high diagnostic specificity, but information about the capacity of these techniques to correctly identify cats with FIP lesions is not available. OBJECTIVES: The diagnostic sensitivity of TCB and FNAB for detecting liver and kidney histologic lesions caused by FIP was evaluated. METHODS: TCB and FNAB specimens collected mainly at necropsy from 25 cats with FIP were analyzed. Diagnostic sensitivity was calculated on the basis of the number of false-negative and true-positive specimens, compared with the number of organs bearing histologic lesions of FIP. RESULTS: Diagnostic sensitivity was higher for hepatic TCB (64%) and FNAB (82%) than for renal (39% and 42%, respectively) procedures. A high percentage of renal cytologic and TCB specimens were inadequate. Combined analysis of TCB and FNAB specimens collected from the same organ increased the diagnostic sensitivity for liver (86%) and kidney (48%). The sensitivity of immunohistochemical/cytochemical analysis was low (11-38% depending on the technique), probably due to variable distribution of feline coronavirus in the lesions. CONCLUSION: Biopsy of liver and kidney can correctly identify FIP lesions. However, false-negative results or inadequate samples occur with moderate frequency, especially for immunochemical analysis. Diagnostic sensitivity may be increased when both TCB and FNAB specimens from the same organ are examined.

Vet Clin Pathol. 2005 Sep;34(3):264-9

Hemolytic-uremic syndrome in a dog.

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A 3-year-old, spayed, female Boxer was presented because of acute onset of anorexia, vomiting, and hemorrhagic diarrhea. Microangiopathic hemolytic anemia with intravascular hemolysis, thrombocytopenia, and acute renal failure were detected. The dog was treated with fluids, antiemetics, antibiotics, and diuretics. Despite supportive therapy, the dog's condition worsened, and the owners elected euthanasia. Necropsy revealed disseminated petechiae on the parietal peritoneum and serosal surfaces of the intestinal tract. The histologic lesions were consistent with severe arteritis and microvascular thrombosis involving only the renal and intestinal arterioles. The final diagnosis was hemolytic-uremic syndrome (HUS), a rarely described disorder in dogs. The clinical presentation of primarily gastrointestinal clinical signs was similar to that of typical or diarrhea-associated HUS (D+ HUS) in humans (mainly children), which is caused by gastrointestinal proliferation of verocytotoxin-producing Escherichia coli. Bacterial toxins can be adsorbed and cause endothelial injury, activation of hemostasis, and thrombosis, with lesions confined primarily to the kidneys. Although rare, HUS should be considered in the differential diagnosis of dogs with microangiopathic hemolytic anemia.

Vet Clin Pathol. 2005 Sep;34(3):232-6.

Creatinine concentration in plasma from dog, rat, and mouse: a comparison of 3 different methods.

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BACKGROUND: There are numerous methods for analyzing creatinine concentration in plasma, including the Jaffe alkaline picrate method in various modifications, enzymatic tests, and chromatographic methods. OBJECTIVE: The purpose of this study was to evaluate whether an enzymatic method could replace a Jaffe method for routine creatinine measurements in plasma from dogs, rats, and mice. The enzymatic method and a compensated Jaffe method were tested against a high-pressure liquid chromatography (HPLC) method, regarded as the gold standard for creatinine measurement. METHODS: Heparinized plasma samples were obtained from 20 beagle dogs, 20 Wistar rats, and 20 CD1-strain mice. The 2 test kits (Roche Diagnostics), Creatinine Jaffe Compensated and the enzymatic Creatinine Plus Version 2 reagent, were used on a Cobas Integra 400. The Jaffe compensated method used a calibration adjustment of 18 micromol/L to correct for the protein matrix in serum and plasma. The HPLC method was an isocratic method using a weak cation-exchange column following protein precipitation. RESULTS: Creatinine concentrations obtained using the enzymatic and the Jaffe methods differed significantly from the results obtained by the HPLC method. For dog plasma, mean values of 61.2, 61.8, and 67.8 micromol/L were obtained by the compensated Jaffe, enzymatic and HPLC methods, respectively. In the rat, respective mean values were 26.7, 21.9, and 23.0 micromol/L, and in the mouse, respective mean values were 14.2, 5.4, and 9.2 micromol/L. CONCLUSION: The enzymatic method can replace the Jaffe method for plasma creatinine determination in dogs, rats, and mice because results from the enzymatic method were closer to HPLC values than were those of the Jaffe method.

Vet Clin Pathol. 2005 Jun;34(2):110-4

Decreased sodium:potassium ratios in cats: 49 cases.

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BACKGROUND: Sodium:potassium (Na:K) ratios are often reported in feline biochemical panels, although the importance of this measurement has not been investigated. OBJECTIVES: The aims of this study were to document the range of feline disease states associated with a decreased Na:K ratio, to determine the prevalence of this biochemical abnormality in a referral hospital population, and to identify any particular disease that was more likely to have a decreased Na:K ratio. METHODS: A group of 49 cats with decreased Na:K ratios was compared with a group of 50 cats with normal Na:K ratios that were randomly selected from the same hospital population. RESULTS: Twelve of the 49 cats

(24.5%) had gastrointestinal disease, 10 (20.4%) had urinary disease, 8 (16.3%) had endocrine disease, 8 (16.3%) had cardiorespiratory disease, and 5 (10.0%) had diseases affecting other body systems. Six (12.2%) had artifactually decreased Na:K ratios. No cat was identified with hypoadrenocorticism. Statistical analysis revealed that, although none of these disease states was significantly over- or under-represented in the affected group, a significantly higher proportion of cats with decreased Na:K ratio had body cavity effusions (P = .025). Serum potassium concentrations were significantly higher in the affected group (P < .0001), but there was no significant difference in mean sodium concentration between the 2 groups. CONCLUSIONS: Decreased Na:K ratios frequently occur in cats with diseases other than hypoadrenocorticism, including cats with effusions. These findings should be considered when evaluating cats with this biochemical abnormality.

Veterinary Record (April 05 – Apr 06)

Vet Rec. 2006 Feb 18;158(7):226-9

Morbidity and mortality in 928 Dobermanns born in the Netherlands between 1993 and 1999.

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The morbidity and mortality among 928 dobermann dogs born between 1993 and 1999 were investigated by sending questionnaires to their owners; 340 (37 per cent) responded. Eighty-one of the dogs had died. Proportional mortality was high for heart failure (14.8 to 22.2 per cent), behavioural problems (19.8 per cent) and cancer (13.6 per cent), but low for hepatitis (3.7 per cent) and cervical spondylomyelopathy (2.5 per cent). Of the 259 surviving dogs, 132 were suffering from various disorders, with a high prevalence of skin problems (22.4 per cent) and urinary incontinence (15.8 per cent).

Vet Rec. 2005 Dec 17;157(25):814-6

Renal papillary necrosis associated with dehydration in large cats.

Corpa JM, **Marin S**, **Peris B**, **Bolea R**, **Ortega J**, **Martinez J**, **Segura P**, **Perez V**.

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Vet Rec. 2005 Aug 13;157(7):185-7. Comment in: Vet Rec. 2005 Oct 8;157(15):455-6; author reply 456.

Retrospective study of the survival of cats with acquired chronic renal insufficiency offered different commercial diets.

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A retrospective study was carried out on the efficacy of seven commercial diets designed to be fed to cats with chronic renal failure. The median survival time of 175 cats that received conventional diets was seven months, whereas the median survival time of 146 cats given one of the seven diets was 16 months. The cats on the most effective of the diets had a median survival time of 23 months and those on the least effective diet had a median survival time of 12 months. The composition of the seven diets was comparable, except that the most effective diet had a particularly high content of eicosapentaenoic acid.

Vet Rec. 2005 Sep 24;157(13):378-82

Proteinuria and immunoglobulinuria in neonatal dogs.

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Samples of urine and serum from 45 newborn rottweiler puppies from six litters, and milk from their mothers, were taken 24, 48 and 72 hours and seven and 14 days after birth. Urine total protein and creatinine concentrations were determined and the ratios calculated. The immunoglobulin (Ig) concentrations of IgG, IgM and IgA in urine, serum and milk were determined with a commercially available elisa kit. The concentration of total protein in urine decreased from 1.64 to 0.29 mg/ml, and it and the ratio of total protein to creatinine in the urine of the neonatal puppies exceeded the normal values for adult dogs, but all the puppies developed normally. The average concentration of IgG in urine decreased from 0.0035 to 0.0003 mg/ml, that of IgA from 0.0035 to 0.0002 mg/ml and that of IgM from 0.0006 mg/ml to undetectable levels after two weeks. After two weeks, 47 per cent of the puppies had measurable levels of IgA and 70.6 per cent had measurable levels of IgG, but none of them had measurable levels of IgM.

Vet Rec. 2005 Sep 17;157(12):344-7

Diurnal variations in the plasma concentration of parathyroid hormone in dogs.

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The plasma concentrations of parathyroid hormone (PTH), ionised calcium (Ca(2+)), total calcium, albumin and inorganic phosphorus, and the pH were measured in blood samples obtained from nine dogs during a period of 26 hours. The plasma pth levels fluctuated slightly during the day, by about 20 pg/ml, but there was a distinct peak (42.8 [8.8] pg/ml) at 07.00. Plasma Ca(2+) showed a diurnal pattern in which two peaks (increases of 0.03 mmol/l) were observed at 05.00 and 17.00, and the plasma concentration of inorganic phosphorus showed a similar pattern. There were no diurnal changes in total calcium or albumin.

Vet Rec. 2005 Aug 13;157(7):193-6

Antimicrobial resistance in Escherichia coli isolated from bitches with pyometra and from urine samples from other dogs.

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To assess whether the rates of antimicrobial susceptibility in bacteria isolated from the urine of dogs with urinary tract infections are similar to those of bacteria isolated from bitches with pyometra, the antimicrobial resistance of Escherichia coli isolated from the two groups were determined and compared. The samples were collected in Sweden between April 2002 and March 2003, and potential changes over time were assessed by comparing the results with corresponding data from 1991 to 1993. Among 80 isolates of E coli from cases of pyometra, the proportions that were resistant to the antimicrobials used in canine practice were generally low (ampicillin 10 per cent, enrofloxacin 4 per cent, gentamicin 0 per cent, streptomycin 5 per cent, sulfamethoxazole 8 per cent, tetracycline 4 per cent and trimethoprim 2 per cent) and similar to the proportions reported previously. Significantly lower proportions of resistance were recorded among the pyometra isolates than among 92 isolates from urine samples submitted by animal hospitals to ampicillin (P=0.04), streptomycin (P=0.002) and tetracycline (P=0.03), but there were no differences between the pyometra isolates and 113 isolates from urine samples submitted by animal clinics.

Veterinary Research Communications (Apr 05 – Apr 06)

Vet Res Commun. 2006 May;30(4):403-13

Dietary Supplements of Vitamins E and C and beta-Carotene Reduce Oxidative Stress in Cats with Renal Insufficiency.

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Oxidative stress may contribute to the progression of chronic renal failure. In this study, cats with spontaneous renal insufficiency were fed a dry cat food supplemented with the antioxidants vitamins E and C, and beta-carotene for 4 weeks. When compared with healthy cats, cats with renal insufficiency had a tendency to oxidative stress. The antioxidant supplements significantly reduced DNA damage in cats with renal insufficiency as evidenced by reduced serum 8-OHdG and comet assay parameters. Therefore, supplements of vitamins E and C and beta-carotene as antioxidants may be beneficial to cats with renal disease.

Vet Res Commun. 2005 Nov;29(8):671-5

Hypoglycaemia as a paraneoplastic syndrome associated with renal adenocarcinoma in a dog.

Battaglia L, **Petterino C**, **Zappulli V**, **Castagnaro M**.

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Vet Res Commun. 2005 Nov;29(8):647-59

Evaluation of an electrolyte analyser for measurement of concentrations of ionized calcium and magnesium in cats.

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The goal of this study was to evaluate the Nova CRT 8 electrolyte analyser for determination of concentrations of ionized calcium (Ca(i)) and magnesium (Mg(i)) in cats, to determine the effects of sample handling and storage and to establish reference ranges. The precision and analytical accuracy of the Nova CRT 8 analyser were good. The concentrations of Ca(i) and Mg(i) were significantly lower in aerobically handled serum samples than in those handled anaerobically. The concentrations of Ca(i) and Mg(i) differed significantly among whole

blood, plasma and serum. In anaerobically handled serum, the concentration of Ca(i) was stable for 8 h at 22 degrees C, for 5 days at 4 degrees C and for 1 week at -20 degrees C. The concentration of Mg(i) was stable for 4 h at 22 degrees C but for less than 24 h at 4 degrees C and for less than 1 week at -20 degrees C. In serum from 36 cats, the reference ranges were 1.20-1.35 mmol/L for Ca(i) and 0.47-0.59 mmol/L for Mg(i). The Nova CRT 8 electrolyte analyser is suitable for determination of Ca(i) and Mg(i) concentrations in cats. Anaerobically handled serum samples are recommended and, stored at room temperature, they yield accurate results when analysed within 4 h.

Vet Res Commun. 2005 Aug;29 Suppl 2:57-63

Clinical nutrition in gerontology: chronic renal disorders of the dog and cat.

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The recent advances in the nutrition of companion animals has resulted in a longer possible life-span for dogs and cats and an improvement in their quality of life. Numerous studies about geriatric animals show that an aging dog or cat requires a specific nutritional formulation that considers the metabolic changes associated with age. A correct diet plays an important role in the treatment of some chronic pathologies in aging animals, particularly those for which the aging process modifies the organ function. A correct diet can provide therapeutic support to the administration of drugs that can sometimes compromise organ function. In the present study, we identify key aspects of the clinical nutrition during chronic renal disorders of dogs and cats, diseases with an elevated incidence and a major cause of mortality in geriatric animals. The aim of nutritional treatment for dogs and cats affected by chronic renal disorders is to improve the quality and length of life, assuring an adequate amount of energy and slowing the progression of renal failure. To improve treatment efficacy it is necessary to prepare different dietary rations during the various stages of disease, on the basis of clinical signs and laboratory data.

Veterinary Radiology and Ultrasound (Apr 05 – Apr 06)

Vet Radiol Ultrasound. 2006 Mar-Apr;47(2):212-21.

Effect of observer variability on glomerular filtration rate measurement by renal scintigraphy in dogs.

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Observer variation in kidney depth measurement for correction of soft-tissue attenuation and kidney region of interest (ROI) drawing was evaluated using 60 clinical dogs with a wide range of glomerular filtration rate (GFR) for their effect on the calculated percentage uptake of 99mTc-diethylenetriamine pentaacetic acid (DTPA) and individual kidney GFR by scintigraphy. Kidney depth was measured separately on the lateral image using two color tables: a threshold and a continuous red-green-blue. Within-observer variability of the semi-automatic ROI drawing of the estimated total GFR was up to 10% for the right kidney (RK) and 9% for the left kidney (LK). The variability was lower between observers, 6% for RK and 8% for LK. Manual ROI drawing caused more within observer variation than semi-automatic: up to 14% for RK and 11% for LK. Continuous red-green-blue table caused more variation within and between observers than threshold table. Average within-observer variability from both observers of kidney depth measurement on different color tables could vary up to 5.5% and 6.5% variation of the GFR of RK and LK, respectively. Most variation affecting the DTPA percentage uptake came from the ROI drawing technique. Variations of the method because of the effects of both kidney depth and kidney ROI drawing were up to 8% and 10% for RK and LK, respectively. To minimize these variations a threshold scale should be used for the kidney depth measurement and an automatic or semi-automatic ROI should be used whenever possible. In sequential examinations the same person should make all the measurements.

Vet Radiol Ultrasound. 2006 Mar-Apr;47(2):168-73.

Iohexol plasma clearance in healthy dogs and cats.

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Iohexol plasma clearance as a measure of glomerular filtration was determined in 31 dogs and 19 cats after an intravenous (i.v.) bolus injection. All animals were healthy and privately owned. Serial blood samples were taken before and up to 4 h after tracer injection. Iohexol plasma concentration was determined using X-ray fluorescence. A plasma tracer elimination curve was generated and clearance was calculated by dividing the injected dose by the area under the curve estimated using a two-compartment pharmacological model. Clearance was normalized to body weight (BW), body surface area (BSA), and extracellular fluid volume (ECFV). Mean, SD, and coefficient of variation of plasma clearance, before and after normalization, were calculated. Linear regression analyses were performed between body size and normalized plasma clearances. No significant linear relation was found between BSA and clearance normalized to BSA in dogs, and between BSA, BW, ECFV and clearance normalized to BSA, BW, and ECFV in cats. The optimal method for normalization of iohexol plasma clearance in dogs was by using BSA. In cats, all three methods tested were

considered satisfactory. Normalization to BSA appears to be superior to normalization to BW and ECFV in dogs, and can be recommended for clinical use.

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Determination of glomerular filtration rate in dogs using contrast-enhanced computed tomography.

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The purpose of this project was to establish a procedure and reference values for glomerular filtration rate (GFR) using contrast-enhanced computed tomography (CT) in eight healthy dogs. A single section of the kidney was scanned sequentially after bolus injection (3 ml/s) of iohexol (300 mg/kg). Time-attenuation curves were constructed and the GFR per volume of kidney was calculated using Patlak graphical analysis software. The GFR was then converted from contrast clearance per unit volume (ml/min/ml) to contrast clearance per body weight (ml/min/kg). Individual kidney and global GFR were calculated using both CT and nuclear scintigraphy. Global GFR for each dog was also determined by plasma iohexol clearance. Contrast-enhanced CT underestimated the global GFR compared with the other two methods. The average global GFR was 2.57 +/- 0.33 ml/ min/kg using functional CT and 4.06 +/- 0.37 ml/min/kg using plasma iohexol clearance. There was significant ($P < 0.05$) interobserver variability of CT GFR of the right kidney and total GFR. There was decreased interobserver variability for the left kidney. There was no difference in the intraobserver variability for CT-determined individual kidney and global GFR. There was no difference between the motion corrected and nonmotion corrected values for individual and global CT GFR. Nuclear scintigraphy produced a slightly higher coefficient of variation than contrast-enhanced CT, 2.9% and 1.0%, respectively. It is hypothesized that altered renal blood flow, hematocrit of the small vessels, and nephrotoxicity play a role in the underestimation of GFR by contrast-enhanced CT.

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Evaluation of 99MTC-diethylenetriaminepentaacetic acid renal scintigram curves in normal dogs after induction of diuresis.

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The normal 99mTc-diethylenetriaminepentaacetic acid (DTPA) renal scintigram curve has 3

distinct phases; an arterial phase followed by progressive uptake and subsequent excretion from the kidney. In dogs with X-linked hereditary nephritis, a distinct flattening of the renal scintigram curve has been observed prior to any decline in glomerular filtration rate (GFR). The cause of this shape change is not known, however, it coincided with decreased urine-specific gravity and thus might be related to polyuria. To further evaluate this possibility, we assessed whether diuresis without concurrent renal disease could flatten the 99mTc-DTPA renal scintigram curve. GFR scintigraphy was performed in six healthy dogs once as a baseline, and again after induction of diuresis by each of four different methods. Scintigram curves were evaluated subjectively as well as quantitatively by calculation of GFR estimates, mean renal transit times, time to peak activity and half-time clearance. Complete flattening of the renal scintigram curve did not occur with diuresis alone, and therefore, flattening of the scintigram curve may serve as an early indicator of renal dysfunction. However, during diuresis after intravenous saline administration, alterations in time to peak activity and mean renal transit time may create inaccuracies in GFR estimates based on the conventional regression formula that cause a false lowering of the resultant global GFR value.

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Smooth muscle neoplasia of the urinary bladder wall in three dogs.

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Smooth muscle origin neoplasia of the urinary bladder wall is rare in dogs. This report describes the ultrasonographic features of two bladder wall leiomyomas and one bladder wall leiomyosarcoma. All three dogs had a single, smoothly marginated, round, hypo to mixed echogenicity intraluminal mass in the urinary bladder. Based on color Doppler examination of the masses, there was no visible blood flow.

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Imaging diagnosis: mineralization of the aorta, celiac and cranial mesenteric arteries in a cat with chronic renal failure.

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Inverted contrast medium-urine layering in the canine urinary bladder on computed tomography.

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Contrast medium-urine layering is routinely identified on transverse computed tomography (CT) images in the urinary bladder following intravesicular or intravenous administration of iodinated contrast medium. The contrast opacified urine typically occupies the dependent portion of the urinary bladder whereas the nonopacified urine layers above it. In this retrospective study, three patients with inverted contrast medium layering following intravenous contrast medium administration are described. A review of this phenomenon in humans is presented and an explanation for similar imaging findings in the dog proposed.

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Ureteral duplication in a dog.

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A male neutered dog of unknown age had recurrent urinary tract infection and caudal abdominal pain. Using sonography, large dilated tubular structure filled with echogenic fluid was seen extending from the left kidney to the level of the bladder neck. In an excretory urogram there was left hydronephrosis with a normal ureter. Computed tomographic evaluation of the abdomen confirmed a large tubular structure extending from the kidney with a blind ending caudally. The left kidney, ureter, and associated tubular structure were surgically removed. No connection was found between the tubular structure and the ureter. Gross evaluation and histopathologic evaluation confirmed the tubular structure to be a ureter, consistent with a diagnosis of ureteral duplication.

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Comparison of glomerular number and specimen length obtained from 100 dogs via percutaneous echo-assisted renal biopsy using two different needles.

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Our objective was to evaluate possible differences in the number of glomeruli and length of renal biopsies collected in canine subjects by two different types of biopsy needles: a semiautomatic 18-gauge Trucut and an automated 18-gauge Jamshidi modified (Biopince). One hundred biopsy samples obtained from dogs of different ages and gender affected by different nephropathies were evaluated retrospectively. All animals were biopsied using one of the two different needles. Biopsies were performed under ultrasound guidance and evaluated by a single pathologist. Statistical analysis was performed to evaluate possible differences in the number of glomeruli and length of renal biopsies collected comparisons were determined between subgroups of dogs with or without the identification of renal interstitial infiltrates and/or fibrosis. Neither the mean difference of the number of glomeruli nor the length of tissue sample collected with the different needles was significantly different. Likewise, the average biopsy length did not differ in dogs with or without renal interstitial infiltrate in animals biopsied with either biopsy needle. Both the Biopince and the Trucut devices provide diagnostically adequate biopsy renal specimens using ultrasound-guidance.

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A urinary bladder fibrosarcoma in a young dog.

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A 14-month-old female dog, Gos d'Atura Catala was presented for a 7-month-history of reoccurring urinary tract infection. Using sonography, a focal multilobulated thickening of the urinary bladder wall was discovered. The solid mass was arising from the area of the ureteral papllDae and bulging into the lumen of the bladder neck. The wall of the urethra was uniformly thickened. These findings were not considered typical for a generalized urinary tract infection but more indicative of local severe inflammation, neoplasia or hyperplasia in the area of the ureteral openings. The thickening of the urethra was suggestive of urethritis or neoplastic infiltration. Signs of metastasis were not detected on the thoracic radiographs or in the remainder of the abdominal ultrasound examination. A surgical excision of the multilobulated mass was performed and histologic examination was conducted. A fibrosarcoma in the lamina propria of the urinary bladder wall was diagnosed. Because of reoccurence of hematuria and unresponsiveness to therapy the dog was euthanized. Postmortem examination confirmed the diagnosis of fiborsarcoma in the urinary bladder. Additionally, neoplastic infiltration of the urethral wall and metastasis in the lungs and liver were detected histopathologically.