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August 2013 Abstracts

**Compendium**

**Canine Struvite Urolithiasis**
Douglas Palma, Cathy Langston, Kelly Gisselman, John McCue
Struvite calculi, composed of magnesium ammonium phosphate, have existed for thousands of years in human medicine and are a leading cause of calculi in companion animals. Struvite stones have also been called urease, infection-induced, phosphatic, and triple phosphate stones. They are the most common uroliths in dogs, in which most cases of struvite urolithiasis are associated with infection. Management of struvite urolithiasis requires a multimodal approach that addresses the presence of the urolith(s) and associated infection while identifying risk factors that predispose to the development of infection.

**Shock Pathophysiology**
Elizabeth Thomovsky, Paula A. Johnson
Shock, defined as the state where oxygen delivery to tissues is inadequate for the demand, is a common condition in veterinary patients and has a high mortality rate if left untreated. The key to a successful outcome for any patient in shock involves having a clear understanding of the pathophysiology and compensatory mechanisms associated with shock. This understanding allows more efficient identification of patients in shock based on clinical signs and timely initiation of appropriate therapies based on the type and stage of shock identified.

**Feline Focus: Diagnostic Testing for Feline Thyroid Disease: Hyperthyroidism**
Mark Peterson
In older cats presenting with clinical features of hyperthyroidism, confirming the diagnosis of thyroid disease is usually straightforward. However, the potential for false-negative and false-positive results exists with all thyroid function tests, especially when used for routine screening of large numbers of asymptomatic cats. Therefore, all thyroid function test results must be interpreted in light of the cat’s history, clinical signs, and other laboratory findings. If a high serum thyroxine (T4) value is found in a cat that lacks clinical signs of hyperthyroidism, or if hyperthyroidism is suspected in a cat with normal total T4 concentrations, repeating the total T4 analysis, determining the free T4 concentration, or performing thyroid scintigraphy may be needed to confirm the diagnosis.

**Feline Focus: Diagnostic Testing for Feline Thyroid Disease: Hypothyroidism**
Mark Peterson
Although naturally occurring hypothyroidism is very rare in cats, iatrogenic hypothyroidism is a recognized complication of treatment for hyperthyroidism. However, confirming the diagnosis of hypothyroidism in cats is not generally straightforward. The potential for false-negative and false-positive results exists with all thyroid function tests, especially in older cats that may have concurrent nonthyroidal illness. Therefore, all thyroid function test results must be interpreted in light of the cat’s history, clinical signs, and other laboratory findings. If a low to low-normal serum thyroxine (T4) value is found in a cat that has been treated for hyperthyroidism, repeating the total T4 analysis, determining free T4 and thyroid stimulating hormone (TSH) concentrations, or performing a TSH stimulation test or thyroid scintigraphy may be needed to confirm the diagnosis.

**Clinical Snapshot: Dripping Fluid From the Prepuce of a Paint Horse**
Adam Stern

**Journal of Feline Medicine and Surgery**

**Feline eosinophilic keratoconjunctivitis: a retrospective study of 45 cases (56 eyes)**
Eric Dean, Valerie Meunier
The medical records of 45 cases (56 eyes) of feline eosinophilic keratoconjunctivitis (EKC) diagnosed between 2005 and 2011 were reviewed. Cats were included if a clinical diagnosis of EKC was recorded and eosinophils were found on corneal cytology. Median age at presentation was 5 years (interquartiles 5-9 years) for both males and females. Domestic shorthair was the predominant breed, accounting for 77.8% of the cats. The condition was unilateral in 75.6% of cases, with the superotemporal quadrant of the cornea the most frequently affected position (76.8% of eyes). A history of corneal ulceration was recorded in 37.8% of cases, and corneal ulcers were present at or before diagnosis in 66.7% of the cats. Eosinophils were found in 92.0% of conjunctival scrapings. We performed polymerase chain reaction (PCR) for feline herpesvirus type 1 (FHV-1) for 33/45 cats. Viral DNA was detected in 54.5% of these cats. FHV-1 DNA was detected by PCR in 66.7% of cats with a
history and/or presence of a corneal ulcer at first presentation, which is significantly more than those with no corneal ulcer at any time (22.2% FHV-1 DNA detected). Our findings suggest that a corneal ulcer can be present prior to the development of eosinophilic keratitis. Further studies are mandatory to explore the role that FHV-1 could play in EKC-associated corneal ulceration.

A trial with 3′-azido-2′,3′-dideoxythymidine and human interferon-α in cats naturally infected with feline leukaemia virus

Bianca Stuetzer, Konstanze Brunner, Hans Lutz, and Katrin Hartmann

Feline leukaemia virus (FeLV) infection is still one of the leading causes of infection-related deaths in domestic cats. Treatment with various drugs has been attempted, but none has resulted in cure or complete virus elimination. Human interferon-α2a (huIFN-α2a) and 3′-azido-2′,3′-dideoxythymidine (AZT) have been proven to decrease antigenemia in cats infected experimentally with FeLV. The purpose of this study was to assess the efficacy of huIFN-α2a, AZT and a combination of both drugs in cats infected naturally with FeLV in a placebo-controlled double-blinded trial. Forty-four FeLV-infected cats in which free FeLV p27 antigen was detected in serum by enzyme-linked immunosorbent assay were included in the study. Cats were assigned to one of four treatment groups that received either high dose huIFN-α2a (105 IU/kg q24h; 12 cats), AZT (5 mg/kg q12h; 10 cats), both of these treatments (12 cats) or placebo (10 cats). All cats were treated for 6 weeks. Clinical variables, including stomatitis, and laboratory parameters, such as CD4+ and CD8+ counts and serum FeLV p27 antigen concentration, were recorded throughout the treatment period. No significant difference among the groups was observed during the treatment period for any of the parameters. Aside from anaemia in one cat treated with AZT, no adverse effects were observed. It was not possible to demonstrate efficacy of huIFN-α2a or AZT alone or together in cats infected naturally with FeLV when given according to this regimen for 6 weeks; however, no notable side effects were detected.

Prevalence of faecal-borne parasites in colony stray cats in northern Italy

Eva Spada, Daniela Proverbio, Alessandra Della Pepa et. al.

Endoparasitic infections are common in stray cats. Many of these parasites are responsible for zoonoses, and stray cats can be a source of environmental contamination. The prevalence of parasites in 139 stray colony cats in the city of Milan, northern Italy, was investigated by faecal examination. The overall prevalence of endoparasites was 50.4%, with 11 different parasites found. Parasites with zoonotic potential were detected in 49.6% of cats. Concurrent infections with two or more zoonotic parasites were recorded in 14.3% of cats. Among the parasites found, the most common was Toxocara cati (33.1%; P <0.0001). The other species found by coproscopic examination were: Ankylostoma tubaeforme (7.2%), Isospora species (4.3%), Trichuris vulpis (2.9%), Dipyllidium caninum (2.9%), Aelurostrongylus abstrusus (2.9%), Eucoleus aerophilus (syn Capillaria aerophila) (1.4%), Spirometra species (1.4%), Taenia pisiformis (0.7%) and Hymenolepis nana (0.7%). Coproantigen specific for Giardia duodenalis was detected in 2.9% of the samples. Pseudoparasites (eggs of mites) were found in 4.3% of the samples. No sample contained Toxoplasma gondii oocysts, despite the fact that 70 cats tested positive for T gondii-specific IgG antibodies, and none of the diarrhoeic samples tested positive for Cryptosporidium species oocysts. Variables linked to infection were body condition score (BCS), the presence of diarrhoea and infection with G duodenalis. Cats infected with G duodenalis were more likely to have a low BCS (odds ratio (OR) = 11.5, P = 0.02) and diarrhoea (OR = 30.7, P = 0.0007). The results of the present study confirm that endoparasitic infections, most of which have zoonotic potential, are distributed in stray colony cats of Milan.

Evaluation of the clinical use of tepoxalin and meloxicam in cats

Anna N Charlton, Javier Benito, Wendy Simpson, Mila Freire, and B Duncan X Lascelles

Medical records where tepoxalin (Zubrin) or meloxicam (Metacam) were prescribed in cats were reviewed and data extracted. Comparisons were performed for exploring changes between pre- and post-non-steroidal anti-inflammatory drug course laboratory tests. Seventy-nine medical records fit the inclusion criteria (n = 57 and n = 22, tepoxalin and meloxicam, respectively). The median dosages administered were 13 and 0.029 mg/kg/day (tepoxalin and meloxicam, respectively). Median prescription durations were 11 (2–919) and 93 (4–1814) days for tepoxalin and meloxicam, respectively. Suspected adverse events were reported for tepoxalin (9%, 5/57 cats) and meloxicam (18%, 4/22 cats) (median of 774 and 448 days, respectively, after the prescription started. For cats prescribed meloxicam, there were several statistically significant changes for serum biochemistry and hematology parameters, but median values were within normal limits. These valuable clinical data suggest that tepoxalin and meloxicam are well tolerated in the clinical setting at the doses prescribed in this study.

Discrepancy between use of lean body mass or nitrogen balance to determine protein requirements for adult cats

Dorothy P Laflamme, Steven S Hannah
This study was undertaken to contrast the minimum protein intake needed to maintain nitrogen balance or lean body mass (LBM) in adult cats using a prospective evaluation of 24 adult, neutered male cats fed one to three different diets. Following a 1-month baseline period during which all cats consumed a 34% protein diet, cats were fed a 20% (LO), 26% (MOD) or 34% (HI) protein diet for 2 months. During the baseline period and following the 2-month feeding period, nitrogen balance was assessed using a 96-h complete collection of urine and feces, and LBM was assessed using dual energy X-ray absorptiometry. Weight loss increased in a linear manner with decreasing protein intake (P <0.01), despite no significant difference in calorie intake. Linear regression of the data indicated that approximately 1.5 g protein/kg (2.1 g/kg0.75) body weight is needed to maintain nitrogen balance, while 5.2 g protein/kg (7.8 g/kg0.75) body weight is needed to maintain LBM. This study provides evidence that nitrogen balance studies are inadequate for determining optimum protein requirements. Animals, including cats, can adapt to low protein intake and maintain nitrogen balance while depleting LBM. Loss of LBM and an associated reduction in protein turnover can result in compromised immune function and increased morbidity. Current Association of American Feed Control Officials (AAFCO) and National Research Council (NRC) standards for protein adequacy may not provide adequate protein to support LBM. The minimum daily protein requirement for adult cats appears to be at least 5.2 g/kg (7.8 g/kg0.75) body weight, well in excess of current AAFCO and NRC recommendations. Further research is needed to determine the effect, if any, of body condition, age and gender on protein requirements.

Effect of background region of interest and time-interval selection on glomerular filtration ratio estimation by percentage dose uptake of 99mTc-DTPA in comparison with 51Cr-EDTA clearance in healthy cats

Katrien Debruyn, Eva Vandermeulen, Jimmy H Saunders et. al.

Evaluation of glomerular function is a useful part of the diagnostic approach in animals suspected of having renal disease. Time-interval and background region of interest (bg ROI) selection are determining factors when calculating the glomerular filtration ratio (GFR) based on percentage uptake of 99mtechnetium-labelled diethylene triamine penta-acetic acid (99mTc-DTPA). Therefore, three different time intervals (60–120 s, 120–180 s, 60–180 s) and three different bg ROIs (C-shape, caudolateral, cranial + caudal) were investigated. In addition, global GFRs based on percentage dose uptake of 99mTc-DTPA for the different time-intervals and bg ROIs were compared with the global GFR based on 51chromium-ethylene diaminic tetra-acetic acid (51Cr-EDTA) plasma clearance in nine healthy European domestic shorthair cats. Paired Student’s t-tests and linear regression analysis were used to analyse the data. Different time intervals seemed to cause significant variation (P <0.01) in absolute GFR values, regardless of the choice of bg ROI. Significant differences (P <0.01) between bg ROIs were only observed in the 120–180 s time interval between the C-shape and cranial + caudal bg ROI, and between the caudolateral and cranial + caudal bg ROI. The caudolateral bg ROI in the 60–180 s time interval showed the highest correlation coefficient (r = 0.882) between 99mTc-DTPA and 51Cr-EDTA, although a significant difference (P <0.05) was present between both techniques.

Isolation of Tritrichomonas foetus from cats sampled at a cat clinic, cat shows and a humane society in southern Ontario

Ansarah Hosein, Stephen A Kruth, David L Pearl et. al.

Tritrichomonas foetus is a protozoan parasite that has been associated with chronic diarrhea in cats. This study aimed to determine (i) the prevalence of T foetus shedding in cats from three different populations in southern Ontario, and (ii) associations between the presence of T foetus and potential cat management, health and demographic risk factors. A cross-sectional study was conducted involving 140 cats from a cat clinic in Guelph, 46 cats from a humane society in Guelph and 55 cats from two cat shows. Risk factor information was assessed through a questionnaire. The InPouch TF (feline) culture method was used to determine the presence of T foetus in all samples. Polymerase chain reaction was conducted on all samples positive by the InPouch TF, as well as 132 negative samples. The assays were interpreted in series and the prevalence of T foetus shedding and 95% confidence intervals (CI) were estimated at 0.7% (95% CI: 0.0–3.9%; n = 140) from the cat clinic, 0% (95% CI: 0.0–7.7%; n = 46) from the humane society and 23.6% (95% CI: 13.2–37.0%; n = 55) from the cat shows. ‘Attendance at cat shows’ was the only variable significant in both the univariable and multivariable analyses (P <0.05). No significant association was found between the presence of T foetus and diarrhea at the time of sampling or having a history of diarrhea in the past 6 months. The prevalence of T foetus was highly variable among populations of cats in southern Ontario, with shedding being most common in show cats.

Nebulized lidocaine blunts airway hyper-responsiveness in experimental feline asthma

Laura A Nafe, Vamsi P Guntur, John R Dodam et. al.

Nebulized lidocaine may be a corticosteroid-sparing drug in human asthmatics, reducing airway resistance and peripheral blood eosinophilia. We hypothesized that inhaled lidocaine would be safe in healthy and experimentally asthmatic cats, diminishing airflow limitation and eosinophilic airway inflammation in the latter
population. Healthy (n = 5) and experimentally asthmatic (n = 9) research cats were administered 2 weeks of nebulized lidocaine (2 mg/kg q8h) or placebo (saline) followed by a 2-week washout and crossover to the alternate treatment. Cats were anesthetized to measure the response to inhaled methacholine (MCh) after each treatment. Placebo and doubling doses of methacholine (0.0625–32,000 mg/ml) were delivered and results were expressed as the concentration of MCh increasing baseline airway resistance by 200% (EC200Raw). Bronchoalveolar lavage was performed after each treatment and eosinophil numbers quantified. Bronchoalveolar lavage fluid (BALF) % eosinophils and EC200Raw within groups after each treatment were compared using a paired t-test (P <0.05 significant). No adverse effects were noted. In healthy cats, lidocaine did not significantly alter BALF eosinophilia or the EC200Raw. There was no difference in %BALF eosinophils in asthmatic cats treated with lidocaine (36±10%) or placebo (33 ± 6%). However, lidocaine increased the EC200Raw compared with placebo 10 ± 2 versus 5 ± 1 mg/ml; P = 0.043). Chronic nebulized lidocaine was well-tolerated in all cats, and lidocaine did not induce airway inflammation or airway hyper-responsiveness in healthy cats. Lidocaine decreased airway response to MCh in asthmatic cats without reducing airway eosinophilia, making it unsuitable for monotherapy. However, lidocaine may serve as a novel adjunctive therapy in feline asthmatics with beneficial effects on airflow obstruction.

Iodine concentration in commercial cat foods from three regions of the USA, 2008–2009
Charlotte H Edinboro, Elizabeth N Pearce, Sam Pino, and Lewis E Braverman
Fluctuations in iodine concentration in food have been suggested as one risk factor for the development of feline hyperthyroidism, an epidemic disease first described in 1979. Three international studies have examined iodine concentrations of commercial cat foods. The iodine concentration of 112 commercial cat foods from across the USA was measured, and the daily iodine intake by hypothetical 4.5 kg adult cats or 1.4 kg kittens calculated in this descriptive epidemiologic study to examine differences in feline iodine intake due to (i) geographical source of foods, (ii) packaging type, (iii) brand-to-brand variation, (iv) form of iodine supplementation, (v) types and numbers of seafood ingredients and (vi) kitten and ‘therapeutic’ diets. Dramatic variation among canned foods (resulting in ingestion of approximately 49–9639 μg iodine/day) suggests that the disparity in iodine concentrations may lead to development of nodular hyperplasia and, later, clinical hyperthyroidism, if cats consume diets that are at first iodine-deficient and later contain excessive iodine. Manufacturers are encouraged to ensure adequate iodine supplementation across all products and areas of the USA.

Preliminary evaluation of a quantitative polymerase chain reaction assay for diagnosis of feline immunodeficiency virus infection
Mélanie Ammersbach, Susan Little, and Dorothée Bienzle
Enzyme-linked immunosorbent assay (ELISA) has high sensitivity and specificity for detection of feline immunodeficiency virus (FIV) antibodies, but does not distinguish between infection and vaccination. Real-time quantitative PCR (qPCR) assays may distinguish infected from vaccinated cats. Performance of a commercial qPCR assay was assessed with blood samples from 29 FIV-infected non-vaccinated, 26 FIV-uninfected vaccinated and 35 FIV-uninfected non-vaccinated cats. FIV infection status of cats was assigned based on a combination of vaccination and medical history, prevention of contact with potentially infected cats and two FIV antibody ELISA results. Test sensitivity and specificity were determined against this gold standard. The qPCR test yielded positive results in samples from 23/29 FIV-infected non-vaccinated, 2/26 FIV-uninfected vaccinated and 0/35 FIV-uninfected non-vaccinated cats. It was concluded that the qPCR test was moderately sensitive and highly specific for the diagnosis of FIV infection, and that it may be suitable for ruling out FIV infection in cats with a positive antibody ELISA result and unknown vaccination history.

Vitamin D intoxication caused by ingestion of commercial cat food in three kittens
Astrid Wehner, Julia Katzenberger, Anna Groth et. al.
Two siblings, a 6-month-old sexually intact male weighing 2.5 kg (cat 1) and a sexually intact female (cat 2) British Shorthair cat weighing 2.3 kg, were examined because of a 3-week history of polyuria, lethargy and laboured breathing. One year previously, another sibling (cat 3) had been presented because of similar, yet more severe, clinical signs at the age of 5 months. Physical examination revealed lethargy, dehydration and polypnoea with slightly increased inspiratory effort. Diagnostic investigation revealed severe hypercalcæmia (cats 1–3), renal azotaemia (cats 1 and 3) and a radiologically generalised miliary interstitial pattern of the lungs (cats 1–3) attributable to hypervitaminosis D caused by ingestion of commercial cat food. Cat 3 was euthanased. Cats 1 and 2 were treated with isotonic saline solution (180 ml/kg IV daily), sulcrafate (30 mg/kg PO q12h), terbutaline (only cat 1: 0.1 mg/kg SC q4h), furosemide (1.5 mg/kg IV q8h) and tapering doses of prednisolone. Cat 2 was normal on day 14. Cat 1 had stable renal disease and was followed up to day 672. The radiological generalised military interstitial pattern of the lungs had improved markedly. Excessive cholecalciferol-containing commercially available cat food poses a great hazard to cats. Supportive treatment may result in long-term survival and improvement of radiological pulmonary abnormalities.
Multimodal analgesia for perioperative pain in three cats
Paulo VM Steagall, Beatriz P Monteiro-Stegall
Adequate pain relief is usually achieved with the simultaneous use of two or more different classes of analgesics, often called multimodal analgesia. The purpose of this article is to highlight the use of perioperative multimodal analgesia and the need to individualize the treatment plan based on the presenting condition, and to adjust it based on the response to analgesia for a given patient. This case series presents the alleviation of acute pain in three cats undergoing different major surgical procedures. These cases involved the administration of different classes of analgesic drugs, including opioids, non-steroidal anti-inflammatory drugs, tramadol, ketamine, gabapentin and local anesthetics. The rationale for the administration of analgesic drugs is discussed herein. Each case presented a particular challenge owing to the different cause, severity, duration and location of pain. Pain management is a challenging, but essential, component of feline practice: multimodal analgesia may minimize stress while controlling acute perioperative pain. Individual response to therapy is a key component of pain relief in cats.

Successful treatment of malakoplakia of the bladder in a kitten
Bronwyn E Rutland, Judith Nimmo, Matthew Goldsworthy et al.
A 4-month-old female kitten presented with chronic lower urinary tract signs and Escherichia coli cystitis, and was diagnosed with urinary bladder malakoplakia based upon histopathology. The kitten was treated with a prolonged antibiotic course and the malakoplakia resolved. Malakoplakia is a chronic granulomatous reaction characterized by the formation of Michaelis–Gutman bodies within von Hansemann macrophages. It is well described in humans, but has never been documented in a living veterinary patient. This case report describes the first successful treatment of malakoplakia in veterinary medicine.

Extracranial expansion of a feline meningioma
Philemon Karli, Daniela Gorgas, Anna Oevermann, and Franck Forterre
Meningioma is the most frequently observed primary brain tumour in cats. Usually, it is associated with an intracranial expansion with consequent brain compression, oedema and brain herniation. Typical features of feline intracranial meningiomas are hyperostosis of the adjacent bone and intratumoral mineralisation. We describe a 13-year-old male neutered cat with a 1-year history of behavioural change. At clinical and neurological examination the cat showed signs consistent with right-sided forebrain lesion. Magnetic resonance images showed a right-sided extra-axial contrast enhancing mass in the region of the frontotemporal lobe. The overlying bone of the calvarium showed a marked defect with extracranial expansion of the tissue. Surgery was performed and the tumour could be exposed by a right-sided temporal approach. After extension of the bony defect the mass could be removed properly. The cat recovered well from surgery and a 12-month follow-up showed no persistent neurological deficits. Histopathological assessment of the tumour revealed a transitional grade 1 meningioma. Despite osteolysis and extracranial expansion of the tumour differentials should include meningioma in feline intracranial neoplasms.

American Journal of Veterinary Research

Effect of furosemide and high-dosage pimobendan administration on the renin-angiotensin-aldosterone system in dogs
Marisa K. Ames, Clarke E. Atkins, Andrea C. Lantis, Stephen R. Werre
Objective—To determine whether a high dosage of pimobendan, when administered concurrently with moderate-dosage furosemide to healthy dogs, would activate the renin-angiotensin-aldosterone system (RAAS) more than furosemide alone. Animals—12 healthy dogs. Procedures—6 dogs received furosemide (2.0 mg/kg, PO, q 12 h) only, as an RAAS activator, for 10 days. The other 6 dogs received furosemide (2.0 mg/kg, PO, q 12 h) and pimobendan (0.6 mg/kg, PO, q 12 h) for 10 days. The effect of these drugs on the RAAS was determined by measurement of the aldosterone-to-creatinine ratio (A:C) in urine collected in the morning and evening of study days −2, −1, 1, 5, and 10. Results—Although there was an increase in the urine A:C during the study period in both groups, it was significant only for dogs that received both drugs. The urine A:C only differed significantly between groups on day 1, at which time A:C was greater in the group that received both drugs. Conclusions and Clinical Relevance—High-dosage pimobendan administration neither substantially suppressed nor potentiated the RAAS when administered with furosemide in healthy dogs.

Effect of treatment with simvastatin and cyclosporine on neurotransmitter concentrations in cerebrospinal fluid after subarachnoid hemorrhage in dogs
Objective—To measure concentrations of glutamate, aspartate, γ-aminobutyric acid (GABA), and glycine in
CSF of dogs with experimentally induced subarachnoid hemorrhage (SAH) and to assess effects of cyclosporine and simvastatin on these concentrations. Sample—CSF samples from 13 dogs. Procedures—In a previous study, SAH was induced in dogs via 2 injections of autologous blood into the cerebellomedullary cistern 24 hours apart. Dogs were untreated (control; n = 5) or received simvastatin alone (4) or simvastatin in combination with cyclosporine (4). Samples of CSF were collected before the first blood injection (baseline; time 0), before the second blood injection, and on days 3, 7, and 10. For the study reported here, neurotransmitter concentrations in CSF were analyzed via high-performance liquid chromatography. Data were analyzed with a repeated-measures model with adjustments for multiple comparisons by use of the Tukey method. Results—In control dogs, the glutamate concentration peaked on day 3 and there was a significant increase in GABA and glutamate concentrations. Glutamate concentrations were significantly lower and glycine concentrations significantly higher on day 3 after administration of simvastatin alone or simvastatin in combination with cyclosporine, compared with concentrations for the control group. No significant differences in GABA and aspartate concentrations were detected among treatment groups at any time point. Conclusions and Clinical Relevance—Glutamate concentrations were increased in the CSF of dogs with SAH. Simvastatin administration attenuated high glutamate concentrations. A combination of immunosuppression and upregulation of nitric oxide synthase may be useful in lowering high glutamate concentrations in ischemic CNS conditions.

Comparison of concentrations of γ-aminobutyric acid and glutamate in cerebrospinal fluid of dogs with idiopathic epilepsy with and without seizure-related magnetic resonance imaging hyperintense areas in the limbic system.

Kate E. Creevy, John F. Gagnepain; Simon R. Platt, Gaylen L. Edwards, Marc Kent.
Objectives—To investigate differences in CSF concentrations of excitatory and inhibitory neurotransmitters in dogs with and without T2-weighted (T2W) MRI hyperintense areas in the limbic system. Sample—Archived CSF samples and stored brain MRI images of 5 healthy research dogs (group 1), 8 dogs with idiopathic epilepsy (IE) with no abnormal MRI findings (group 2), and 4 dogs with IE with hyperintense areas in the limbic system detected by means of T2W MRI (group 3). Procedures—Archived CSF samples and stored MRI images obtained from all dogs were evaluated. Dogs in groups 2 and 3 were matched on the basis of age and breed. High-performance liquid chromatography was used to evaluate glutamate and γ-aminobutyric acid (GABA) concentrations in CSF samples. Results—Glutamate concentrations were higher in CSF of both groups of dogs with IE than in healthy dogs. However, glutamate concentrations in CSF were not significantly higher in dogs with IE and with hyperintense areas than in dogs with IE but no abnormal MRI findings. Concentrations of GABA in CSF were higher in group 3 than in group 2 and in group 2 than in group 1. Conclusions and Clinical Relevance—No significant difference was evident between glutamate concentrations in CSF of dogs with IE and with and without hyperintense areas detected by means of T2W MRI. However, glutamate concentrations typically were higher in CSF of dogs with IE and MRI hyperintense areas. Future studies with larger sample sizes should be conducted to confirm this finding and to determine the clinical importance of high glutamate concentrations in CSF of dogs with IE.

Effect of hydroxyethyl starch 130/0.4 and 200/0.5 solutions on canine platelet function in vitro.

Duana McBride, Giselle L. Hosgood, Caroline S. Mansfield, Lisa Smart.
Objective—To determine whether dilution of blood samples from healthy dogs with 2 hydroxyethyl starch (HES) solutions, HES 130/0.4 and HES 200/0.5, would result in platelet dysfunction as measured by closure time (Ct) beyond a dilutional effect. Sample—Citrated blood samples from 10 healthy dogs with a Ct within reference limits (52 to 86 seconds). Procedures—Blood samples were diluted 1:9 and 1:3 with 6% HES 130/0.4 and 10% HES 200/0.5 solutions and saline (0.9% NaCl) solution. Dilutions at 1:9 and 1:3 mimicked 10 mL/kg and 30 mL/kg doses, respectively, ignoring in vivo redistribution. Closure time was measured with a platelet function analyzer and compared among dilutions. Results—A dilutional effect on Ct was evident for the 1:3 dilution, compared with the 1:9 dilution, but only HES 200/0.5 increased the Ct beyond the dilutional effect at the 1:3 dilution, to a median Ct of 125 seconds (interquartile range, 117.5 to 139.5 seconds). No effect of HES or dilution on Ct was identified at the 1:9 dilution. Conclusions and Clinical Relevance—1:3 dilution of blood samples from healthy dogs with HES 200/0.5 but not HES 130/0.4 significantly increased Ct beyond the dilutional effect, suggesting that IV administration of HES 200/0.5 in dogs might cause platelet dysfunction.

Evaluation of serosal patch supplementation of surgical anastomoses in intestinal segments from canine cadavers.

Lane A. Hansen, Eric L. Monnet.
Objective—To compare leakage and maximum intraluminal pressures of intestinal anastomoses with and without serosal patch supplementation in dogs. Sample—Healthy small intestine segments from cadavers of 2 dogs euthanized for reasons unrelated to the study. Procedures—12 enterectomy constructs were created by anastomosis of intestinal segments with a standard simple continuous suture pattern. Half of the constructs were
randomly selected for additional serosal patch support. Leakage and maximum intraluminal pressures were measured in and compared between patch-supplemented and nonsupplemented constructs. Results—Mean ± SD leakage pressure was significantly greater for the patch-supplemented anastomoses (81.8 ± 6.7 mm Hg) than for the nonsupplemented anastomoses (28.0 ± 6.7 mm Hg). Maximum intraluminal pressures were not significantly different between the groups. Conclusions and Clinical Relevance—Serosal patch–supplemented anastomoses were able to sustain a significantly higher pressure before leakage than were nonsupplemented anastomoses in intestinal specimens from canine cadavers. The serosal patch supplementation may protect against leakage immediately after enterectomy in dogs.

Journal of Small Animal Practice

Urine concentrations of xanthine, hypoxanthine and uric acid in UK Cavalier King Charles spaniels.
Objectives - Xanthine urolithiasis and asymptomatic xanthinuria have been diagnosed in Cavalier King Charles spaniel dogs suggesting that primary xanthinuria may be a breed-related disorder, although its prevalence remains unclear. The hypothesis of this study was that asymptomatic xanthinuria is common in Cavalier King Charles spaniel dogs. Methods - Free catch urine samples were collected from 35 client-owned Cavalier King Charles spaniel dogs and from 24 dogs of other breeds. The urine metabolites were measured by high-performance liquid chromatography. The urine ratios of xanthine/creatinine and hypoxanthine/creatinine were calculated and compared between the two groups of dogs. Results - The urine concentrations of purine metabolites were not significantly different between the two groups and were very low in both. The urine concentrations of xanthine in all 35 Cavalier King Charles spaniel were markedly lower than in the previously reported case of xanthine urolithiasis in a UK Cavalier King Charles spaniel dog. Clinical Significance - Asymptomatic xanthinuria was not detected in this UK Cavalier King Charles spaniel population. This data may be used as a reference for urinary purine metabolite concentrations in the dog.

Treatment of canine idiopathic immune-mediated haemolytic anaemia with mycophenolate mofetil and glucocorticoids: 30 cases (2007 to 2011)
A. Wang, J. R. Smith and K. E. Creevy.
Objective - To compare short-term outcome and frequency of adverse events for dogs with idiopathic immune-mediated haemolytic anaemia treated with glucocorticoids and mycophenolate mofetil vs alternate immunosuppressive protocols. Methods - A retrospective study of medical case records of dogs with immune-mediated haemolytic anaemia was conducted. Data collected included signalment, clinicopathological data, medications administered, duration of hospitalization, short-term survival and adverse events. Variables were compared between dogs treated with glucocorticoids and mycophenolate mofetil (mycophenolate mofetil group) vs dogs treated with other two-drug immunosuppressive protocols (combined group). Results - Sixty-four cases of idiopathic immune-mediated haemolytic anaemia were identified. Two dogs were euthanased without treatment, three received glucocorticoids alone, and seven received two additional drugs. Fifty-two dogs received glucocorticoids and additional immunosuppressive medications: 30 mycophenolate mofetil, 15 cyclosporine, 6 azathioprine and 1 human immunoglobulin. There was no significant difference between the discharge rate, 30-day or 60-day survival rates between the mycophenolate mofetil and the combined groups (Fisher's exact; P=0.272, 0.518, 1.000, respectively). The sole adverse event observed in the mycophenolate mofetil group was diarrhoea (n=5). Clinical Significance - Administration of mycophenolate mofetil appears safe in dogs with idiopathic immune-mediated haemolytic anaemia. The combination of glucocorticoids and mycophenolate mofetil has similar efficacy to alternate immunosuppressive protocols used to treat this disease.

Refinement of the dose of doxapram to counteract the sedative effects of acepromazine in dogs.
M. Zapata and E. H. Hofmeister.
Objectives - To evaluate the effectiveness of two doses of doxapram in reversing acepromazine sedation in dogs. Methods - Using a crossover design, 10 adult mixed-breed dogs received 0.05 mg/kg acepromazine, intramuscularly (im) followed 30 minutes later by one of the three randomly determined treatments: 0.0625 mL/kg saline, intravenously (iv), 1.25 mg/kg doxapram, iv or 2.5 mg/kg doxapram, iv. Sedation scores were obtained by a single, blinded observer at 0, 15 and 30 minutes after acepromazine administration and at 5, 15 and 30 minutes after the treatment administration. Results - The mean baseline sedation score of all the
treatments was not different among treatments. All the dogs had a significant increase in sedation score at 30 minutes after acepromazine administration. Both the low and high doses of doxapram showed a significant decrease in sedation score compared to saline, but there was no significant difference between the two doses. Five dogs in the high dose group panted after treatment injection, and this was significantly more than in the low dose group. Clinical Significance - Doxapram is effective in reducing the sedative effects of acepromazine over a short period of time. A dose of 1·25 mg/kg effectively decreases acepromazine sedation without causing panting.

Exercises in canine physical rehabilitation: range of motion of the forelimb during stair and ramp ascent.
J. G. Carr, D. L. Millis and H.-Y. Weng

Objectives - To evaluate overall joint range of motion of the forelimb in healthy dogs ascending stairs compared with incline slope walking. Methods - Normal canine forelimb kinematics (range of motion, flexion and extension) were compared during ascent of stairs or a ramp, and compared to unimpeded trotting on a flat surface. Eight adult dogs with no evidence of orthopaedic or neurological lameness were assessed using a 2-dimensional kinematic system as they walked up a custom built ramp and stairs. Results - In healthy dogs, ramp and stair ascent consistently had greater range of motion compared to trotting on a flat surface, and ramp ascent had significantly greater range of motion compared to stair ascent (P<0·05). Shoulder flexion and extension, elbow extension and carpal flexion were all significantly greater while ascending the ramp compared to stairs. Shoulder extension on the flat was significantly greater than while ascending stairs. Clinical Significance - When planning physical rehabilitation exercises following injury to the forelimb, stair and ramp ascent may be considered, as both augment range of motion of joints. Ramp ascent provides the greatest increase in range of motion of forelimb joints.

Infectious agent screening in canine blood donors in the United Kingdom
K. Crawford, J. Walton, D. Lewis, S. Tasker and S. M. Warman

Objectives - Transfusion of blood products is an important component of veterinary emergency medicine. Donors must be carefully selected to minimise risk of transmission of blood-borne infectious agents. This study was devised to assess the prevalence of such agents in healthy, non-travelled UK dogs screened as prospective donors. Method - Ethylenediaminetetraacetic acid blood samples from dogs donating blood between August 2007 and January 2012 were screened by polymerase chain reaction for haemotropic mycoplasmas, Bartonella, Babesia, Leishmania, Ehrlichia and Anaplasma spp. Dogs with positive or inconclusive results underwent repeat polymerase chain reaction testing. Results - Four of 262 dogs had positive or inconclusive results at initial screening. Repeat polymerase chain reaction testing in each dog was negative, and none of the dogs developed clinical signs of disease. Clinical Significance - The positive results on initial screening may have represented false positives from sample contamination or amplification of non-target DNA. It is also possible that dogs were infected at initial sampling but successfully cleared infection before repeat testing. The low number of positive results obtained suggests that prevalence of these agents in a population of healthy UK dogs is low and that use of blood products is unlikely to represent a significant risk of transmission of these diseases.

Comparison of premedication with buprenorphine or methadone with meloxicam for postoperative analgesia in dogs undergoing orthopaedic surgery.
J. R. Hunt, P. M. Attenburrow, L. S. Slingsby and J. C. Murrell

Objectives - To determine whether methadone, administered before orthopaedic surgery, results in improved postoperative analgesia compared to buprenorphine. Methods - Thirty-eight dogs undergoing orthopaedic surgeries (the majority being tibial tuberosity advancement or elbow arthroscopy) were premedicated with 0·03 mg/kg acepromazine and either 20 µg/kg buprenorphine or 0·5 mg/kg methadone, intramuscularly, allocated randomly. Anaesthesia was induced with propofol intravenously to effect and maintained with isoflurane in oxygen. 0·2 mg/kg meloxicam was administered at anaesthetic induction. Sedation was assessed by means of a dynamic interactive visual analogue and simple descriptive scales and pain by dynamic interactive visual analogue and the short form Glasgow composite pain scales, by a single observer blinded to treatment group at intervals for 8 hours following premedication. Results - Sedation scores were higher than baseline in both groups following premedication until the end of the assessment period (P = 0·0001), with no
differences between groups. Pain scores were lower overall in dogs premedicated with methadone (dynamic interactive visual analogue scale $P = 0.048$; short form Glasgow composite pain scale $P = 0.0045$), and these dogs required less additional analgesia (42%, compared to 79% premedicated with buprenorphine, $P = 0.045$).

Clinical Significance - At the doses investigated, methadone produced superior analgesia to buprenorphine for 8 hours postoperatively in dogs undergoing orthopaedic surgery.

**Ehrlichia canis** infection in a dog with no history of travel outside the United Kingdom.
H. E. Wilson, A. R. Mugford, K. R. Humm and L. M. Kellett-Gregory
A two-year-old female neutered Tibetan terrier was referred following a one-month history of lethargy, inappetence and pancytopenia, which had been poorly responsive to immunosuppressive and fluoroquinolone treatment. The dog was diagnosed with pure red cell aplasia and was found to be positive for *Ehrlichia canis* by both antibody titre measurement and polymerase chain reaction. The dog lived in London and had not travelled outside the UK. The dog was treated with doxycycline, prednisolone and ciclosporin, but died as a result of gastrointestinal tract haemorrhage. To the authors’ knowledge, this represents the first reported case of *Ehrlichia canis* in a dog in the UK with no previous travel history.

Subacute and chronic MRI findings in bilateral canine fibrotic contracture of the infraspinatus muscle.
N. G. Orellana-james, M. M. Ginja, M. Regueiro, P. Oliveira, A. Gama, J. A. Rodriguez-Altonaga and J. M. gonzalo-orden
A six-year-old, 30-kg female German pointer dog was presented for examination with a history of pre-existing right-forelimb lameness and more recent (3 months) persistent lameness in the left-forelimb. Physical examination revealed mild left-forelimb lameness and a mild circumduction movement. There were no signs of pain or crepitation detected during manipulation of the shoulders, but the animal was unable to fully flex both glenohumeral joints. Magnetic resonance imaging, using fast recovery fast spin echo T2-weighted and fat saturated proton density sequences, revealed abnormal heterogeneous hypointensity in the right infraspinatus muscle and a heterogeneous hyperintense area in the left infraspinatus muscle. Surgical treatment consisting of a bilateral infraspinatus tenectomy resulted in improved limb function. Histopathological examination demonstrated tissue changes in the right infraspinatus, characterised by myofibre degeneration and fibrosis, compatible with a chronic degenerative process, while changes in the left infraspinatus muscle were characterised by variable degrees of fibre degeneration, haemorrhage and interstitial oedema.

Temporally separated bilateral anal sac gland carcinomas in four dogs.
K. L. Bowlt, E. J. Friend, P. Delisser, S. Murphy and G. Polton
Anal sac gland carcinoma arising from the apocrine secretory epithelium in the anal sac wall, is locally invasive and highly metastatic. The majority of anal sac gland carcinomas are unilateral on presentation, but bilateral tumours have been identified. This case series presents the outcome of four unique cases of unilateral anal sac gland carcinoma which subsequently developed contralateral anal sac gland carcinoma 50 to 390 days after removal of the initial tumour. Median survival was 1035 days after initial diagnosis and 807 days after diagnosis of the second anal sac gland carcinoma.

**The Veterinary Journal**

Early embryonic development, assisted reproductive technologies, and pluripotent stem cell biology in domestic mammals.
V. Hall, K. Hinrichs, G. Lazzari, D.H. Betts, P. Hyttel
Over many decades assisted reproductive technologies, including artificial insemination, embryo transfer, in vitro production (IVP) of embryos, cloning by somatic cell nuclear transfer (SCNT), and stem cell culture, have been developed with the aim of refining breeding strategies for improved production and health in animal husbandry. More recently, biomedical applications of these technologies, in particular, SCNT and stem cell culture, have been pursued in domestic mammals in order to create models for human disease and therapy. The following review focuses on presenting important aspects of pre-implantation development in cattle, pigs,
horses, and dogs. Biological aspects and impact of assisted reproductive technologies including IVP, SCNT, and culture of pluripotent stem cells are also addressed.

**Myokymia and neuromyotonia in veterinary medicine: A comparison with peripheral nerve hyperexcitability syndrome in humans.**

An E. Vanhaesebroeck, Sofie F.M. Bhatti, Robin J.M. Franklin, Luc Van Ham

Involuntary muscle hyperactivity can result from muscle or peripheral nerve hyperexcitability or central nervous system dysfunction. In humans, diseases causing hyperexcitability of peripheral nerves are grouped together under the term ‘peripheral nerve hyperexcitability’ (PNH). Hyperexcitability of the peripheral motor nerve can result into five different phenotypic main variants, i.e. fasciculations, myokymia, neuromyotonia, cramps and tetany, each with their own clinical and electromyographic characteristics. This review focuses on the most commonly described expressions of PNH in veterinary medicine, i.e. myokymia and neuromyotonia, in particular in young Jack Russell terriers. Data from 58 veterinary cases with generalized myokymia and neuromyotonia were analyzed, including unpublished treatment and follow-up data on eight Jack Russell terriers from a previous study and seven additional Jack Russell terriers. A dysfunction of the potassium channel or its associated proteins has been found in many human syndromes characterized by PNH, in particular in generalized myokymia and neuromyotonia, and is suspected to occur in veterinary medicine. Potential pathomechanisms of potassium channel dysfunction leading to signs of PNH are broad and include genetic mutations, antibody-mediated attack or ion channel maldistribution due to axonal degeneration or demyelination. A more accurate classification of the different PNH syndromes will facilitate a more rapid diagnosis and guide further research into natural occurring PNH in animals.

**Epidemiology of intoxication of domestic animals by plants in Europe.**

Cristina Cortinovis, Francesca Caloni

This review focuses on some of the most important poisonous plants in Europe and provides an overview of the poisoning episodes that have occurred in European countries. Poisoning of livestock and companion animals by plants is a relatively common occurrence. In Europe livestock and horses are commonly poisoned by Datura stramonium (Jimson weed), Senecio spp. (ragworts and groundsel), Quercus spp. (oak), Taxus baccata (European yew), Nerium oleander (oleander), Pteridium aquilinum (bracken fern), Robinia pseudoacacia (black locust) and Rhododendron spp. (rhododendrons and azaleas). Poisoning may occur when the fresh plant is ingested in pasture or when it contaminates hay or silage. In pets, the greatest majority of plant poisonings are the result of ingestion of house or garden plants, such as Cycas revoluta (Sago palm), Ricinus communis (castor bean), Allium spp., Euphorbia pulcherrima (poinsettia), Lilium spp., Convallaria majalis (Lily of the valley), Pyracantha spp. (firethorn), Rhododendron spp. (rhododendrons and azaleas), Melia azedarach (Chinaberry tree), Taxus baccata (European yew) and Nerium oleander (oleander).

**A web resource on DNA tests for canine and feline hereditary diseases.**

Jeffrey Slutsky, Karthik Raj, Scott Yuhnke, Jerold Bell, Neale Fretwell, Ake Hedhammar, Claire Wade, Urs Giger.

Following the first identification of a disease-causing mutation in dogs in 1989 and the more recent completion of canine and feline genome sequences, much progress has been made in the molecular characterization of hereditary diseases in dogs and cats. To increase access to information on diagnosing hereditary diseases in dogs and cats, a web application has been developed to collect, organize and display information on available DNA tests and other supporting information, including gene and chromosomal locations, mutations, primary research citations and disease descriptions. The DNA testing information can be accessed at the URL: http://research.vet.upenn.edu/WSAVA-LabSearch. There are currently 131 molecular genetic tests available for hereditary diseases in dogs and cats offered by 43 laboratories worldwide. This tool should provide clinicians, researchers, breeders and companion animal owners with a single comprehensive, up-to-date and readily searchable webpage for information on hereditary disease testing.

**Gene expression profiling of primary canine insulinomas and their metastases.**

Floryne O. Buishand, Jolle Kirpensteijn, Alexandra A. Jaarsma, Ernst-Jan M. Speel, Marja Kik, Jan A. Mol.
The gene expression profile of 10 primary canine insulinomas was compared with that of their accompanying metastases using microarray analysis and quantitative real time-PCR. Analysis of microarray data revealed 84 genes that were differentially expressed between primary insulinomas and their metastases, along with 243 genes differentially expressed between a low-metastatic and a high-metastatic subset of primary insulinomas. The genes differently expressed between primary insulinomas and their metastases clustered together in nine signalling pathways. Comparing the low-metastatic to the high-metastatic subset of primary insulinomas, 26 pathways appeared to be significantly influenced. The acinar enzymes pancreatic lipase (PNLIP) and chymotrypsinogen B1 (CTRB1) were amongst the most down-regulated genes in the malignant group of primary insulinomas and in metastases. Immunofluorescence demonstrated co-localisation of insulin and PNLIP in tumour cells. Different subsets of canine insulinomas can be identified on the basis of their gene expression profile. Canine insulinomas appear to contain amphicrine cells, which exhibit both endocrine and exocrine cell features.

**Uterine artery blood flow characteristics assessed during oestrus and the early luteal phase of pregnant and non-pregnant bitches.**

S.L. Freeman, M. Russo, G.C.W. England

The aim of this study was to measure uterine artery blood velocity daily using Doppler ultrasonography in 10 young and 10 older clinically normal bitches throughout oestrus. Typical arterial waveforms identified in young bitches were characterised by a systolic peak and subsequent flow throughout diastole, whereas in older bitches, flow was sometimes absent in diastole. For 3 days immediately prior to ovulation, at the time of declining plasma oestrogen and increasing progesterone concentrations, resistance index (RI) increased, principally associated with decreased diastolic velocity; in some bitches there was absent late diastolic flow during this time. In older bitches, the waveform appearance was more variable, with absent late and early diastolic flow observed in some cases. Mean RI was higher throughout oestrus for older bitches compared with young bitches, although both groups had a similar 3-day duration increase before ovulation. Nine of the young bitches and five of the older bitches became pregnant; litter size was smaller for the older bitches. Non-pregnant bitches: (1) were significantly older; (2) had fewer waveforms with continuous diastolic flow 2 days before ovulation; (3) had lower end diastolic velocity, higher RI and fewer waveforms with continuous diastolic flow 2 days after ovulation, and (4) had lower plasma progesterone concentrations 5 days after ovulation. These are the first detailed observations of uterine artery blood velocity and waveform appearance throughout oestrus in bitches, and this is the first description of a link between impaired diastolic flow and reduced fertility. Assessment of uterine artery velocity could be useful to promote understanding of physiological mechanisms and could also become an important tool to assess potential infertility.

**The use of an electronic von Frey device for evaluation of sensory threshold in neurologically normal dogs and those with acute spinal cord injury.**

S.A. Moore, B.F. Hettlich, A. Waln

The utility and inter-session repeatability of sensory threshold measurements using an electronic von Frey anesthesiometer (VFA) were assessed in a group of six neurologically normal dogs. Sensory threshold values obtained in neurologically normal dogs were compared to those of dogs with acute spinal cord injury (SCI) caused by intervertebral disc extrusion (n = 6) and to a group of neurologically normal dogs with cranial cruciate ligament rupture (CCLR; n = 6). Sensory threshold values in neurologically normal dogs were 155.8 ± 37.7 g and 154.7 ± 67.2 g for the left and right pelvic limbs, respectively. The difference in mean sensory threshold values obtained for the group when two distinct testing sessions were compared was not statistically significant (P > 0.05). Mean sensory threshold values for the group with SCI were significantly higher than those for neurologically normal dogs at 351.1 ± 116.5 g and 420.3 ± 157.7 g for the left and right pelvic limbs, respectively (P = 0.01). A comparison of sensory threshold values for the group with CCLR and neurologically normal dogs was not statistically significant (P > 0.05). The modified dorsal technique for VFA described here represents a reliable method to assess sensory threshold in neurologically normal dogs and in those with SCI.
Cerebrospinal fluid tau protein as a biomarker for severity of spinal cord injury in dogs with intervertebral disc herniation.

A. Roerig, R. Carlson, A. Tipold, V.M. Stein

Intervertebral disc herniation (IVDH) is a common cause of spinal cord injury (SCI) in dogs. Microtubule-associated protein tau derives predominantly from neurons and axons, making it a potential marker of neuronal injury. A retrospective study, including 51 dogs with thoracolumbar or cervical IVDH and 12 clinically normal dogs, was designed to describe associations between cerebrospinal fluid (CSF) tau concentration, degree of neurological signs and motor functional recovery in dogs with IVDH. Signalment, degree of neurological dysfunction and outcome were recorded. Cisternal CSF tau values were determined by ELISA. Associations between CSF tau concentration and various clinical parameters were evaluated. Receiver-operating characteristics curve (ROC) analyses were performed to assess the validity of protein tau measurements. CSF tau concentrations were significantly higher in dogs showing plegia (median, 79.9 pg/mL; range, 0–778.7 pg/mL; P = 0.016) compared to healthy dogs and dogs with paresis (median, 30.1 pg/mL; range, 0–193.1 pg/mL; P = 0.025). Plegic dogs that improved by one neurological grade within 1 week had significantly lower tau protein levels compared to plegic dogs that needed more time for recovery or did not show an improvement (P = 0.008). A CSF tau concentration >41.3 pg/mL had a sensitivity of 86% and specificity of 83% to predict an unsuccessful outcome in plegic dogs based on ROC analysis (area under the curve, 0.887; P = 0.007, 95% confidence interval [CI] 0.717–1.057). CSF protein tau levels are positively associated with the severity of spinal cord damage and may serve as a prognostic indicator in dogs with IVDH.

Oral glucocorticoids diminish the efficacy of allergen-specific immunotherapy in experimental feline asthma.

Chee-hoon Chang, Leah A. Cohn, Amy E. DeClue, Hong Liu, Carol R. Reinero

Allergen-specific rush immunotherapy (RIT) shows promise in treating asthma; however, pet cats will likely require at least initial concurrent glucocorticoids (GCs) to control serious clinical signs. How the immunosuppressive effects of GCs would impact RIT in cats is unknown. The hypothesis of this study was that oral, but not inhaled GCs will diminish the efficacy of RIT in experimental feline asthma. Cats (n = 6/group) were sensitized using Bermuda grass allergen (BGA) and randomized to receive BGA-specific RIT for 9 months with an oral GC (prednisolone 10 mg daily), inhaled GC (fluticasone 220 μg twice daily), or placebo administered for the first 6 months. Bronchoalveolar lavage fluid (BALF) percent eosinophils and other immunological assays were performed. Eosinophilic airway inflammation was suppressed in all groups at month 6 of RIT (group mean ± SD, 5 ± 2%, 13 ± 4%, and 7 ± 2% for oral GC, inhaled GC, and placebo, respectively; P = 0.291). BALF percent eosinophils significantly increased over time only in oral GC/RIT cats between months 6 and 9 (P = 0.031). Placebo/RIT cats had significant decreases over time in BGA-specific serum IgE (P = 0.031). Concentration of interleukin (IL)-5 in BALF significantly increased over time in inhaled GC/RIT cats (P = 0.031). No significant differences were found between groups at month 6 or over time in each group for BGA-specific lymphocyte blastogenesis, percent blood T regulatory cells, or number of IL-10-producing cells. Given the significant increase of airway eosinophilia over time in RIT cats initially treated with an oral GC, inhaled GCs might be better for dampening eosinophilic inflammation until RIT normalizes the dysregulated immune system.


Anna Puigdemont, Pilar Brazís, Laura Ordeix, Annabel Dalmau, Esther Fuertes, Ana Olivar, Christian Pérez, Iván Ravera

Topical treatment with cyclosporine A (CsA) has recently become possible with the development of novel nanotechnology pharmaceutical formulations of CsA able to penetrate through the epidermis providing good absorption and dermal action. The aim of this multicentre, blinded, parallel, randomized, placebo controlled trial was to evaluate the efficacy of a new topical CsA formulation in dogs with atopic dermatitis (AD). Dogs (n = 32) with severe and moderate clinical signs of non-seasonal AD, but few localized lesions, were randomly allocated to receive topical CsA (17 dogs) or placebo (15 dogs) and were treated twice a day for 6 weeks. Before and 21 and 45 days after starting the treatment, the severity of a previously selected skin lesion was evaluated according to a dermatological scoring system. Owners using a visual analogue scale also assessed pruritus.
weekly and effectiveness of the treatment was defined as a reduction of at least 50% in these variables after 45 days. After 21 and 45 days the lesion severity score in animals treated with CsA was significantly lower than at baseline (P < 0.01, both times). In contrast, the animals on placebo showed no significant improvement at days 21 or 45. The percentage of dogs with an effective reduction in pruritus at the end of the trial was 87.5% and 28.6% in the CsA and placebo groups, respectively. These results suggest that topical administration of CsA is effective in reducing the severity of skin lesions and pruritus in dogs with moderate to severe AD as soon as 3 weeks after starting treatment.

**Intratesticular injection of a zinc-based solution for contraception of domestic cats: A randomized clinical trial of efficacy and safety.**


It has been reported that a commercial zinc gluconate preparation disrupts spermatogenesis and apparently causes permanent sterilization in male dogs, but there is little information regarding similar approaches in the male cat. The objective of this study was to evaluate zinc gluconate as a permanent contraceptive for domestic male cats. Sixteen sexually mature mixed breed cats were allocated at random, by replicate, into two groups and given a single injection into each testis of either isotonic saline or zinc gluconate, respectively. Clinical and reproductive parameters were assessed immediately before injection and after 60 and 120 days. On day 120 the testis size of treated cats was decreased (P < 0.05). Azoospermia occurred in 8/11 (73%) cats, and penile spines were decreased in 6/11 (55%) and absent in 4/11 (36%) cats, and there were substantial reductions in male behavior. However, plasma testosterone concentrations (single samples collected at each assessment) were not significantly different between treated and control cats at any time point. Although additional studies are warranted, intratesticular injection of zinc gluconate might have potential as a permanent contraceptive for cats.

**The occurrence and suspected mode of inheritance of congenital subaortic stenosis and tricuspid valve dysplasia in Dogue de Bordeaux dogs.**

D.G. Ohad, A. Avrahami, T. Waner, L. David

The Dogue de Bordeaux (DdB) breed has gone through several genetic ‘bottle necks’ and has a relatively small effective population size. Importing new stock into Israel has been limited, further narrowing the already restricted local gene-pool and increasing the chances of inherited defects. In 56 DdB dogs examined between 2003 and 2010, the authors sought to study the proportion congenital subaortic stenosis (SAS) and tricuspid valve dysplasia (TVD). The aim was also to identify a probable mode of inheritance (MOI) using segregation and pedigree analyses of genealogical data available from 13/21 DdB dogs diagnosed with these conditions between 2004 and 2007. Among all breeds in the country, TVD was highest in the DdB breed, which also displayed the second highest proportion of SAS. Echocardiographic measurements and selected physical examination findings from 26 normal DdB dogs, 18 DdB dogs with SAS, and 12 DdB dogs with TVD are reported. Based on pedigree and segregation analyses, the most probable MOI appeared to be autosomal recessive. Pedigree analyses helped to identify three ancestors that might have introduced these two congenital heart defects into the local DdB population. Excluding those three dogs and their progeny from future mating could therefore reduce the prevalence of these diseases in the DdB population in Israel. The unusual local breeding circumstances may offer a unique opportunity to identify associated SAS and TVD genes in the DdB, as well as in other dog breeds.

**Comparison of the analgesic effects of robenacoxib, buprenorphine and their combination in cats after ovariohysterectomy.**

F. Staffieri, P. Centonze, G. Gigante, L. De Pietro, A. Crovace

The aim of this study was to compare the postoperative analgesic effects of robenacoxib and buprenorphine alone or in combination, in cats after ovariohysterectomy. Thirty healthy cats were randomly assigned to receive buprenorphine (0.02 mg/kg, n = 10; GB), robenacoxib (2 mg/kg, n = 10; GR) or their combination at the same dosages (n = 10; GBR) SC. After 30 min cats were sedated with an IM administration of medetomidine (0.02 mg/kg) and ketamine (5 mg/kg). General anaesthesia was induced with propofol and after intubation was maintained with isoflurane. Before premedication and at 1, 2, 3, 4, 6, 8, 12 and 24 h after extubation, pain and
sedation were assessed using a simple descriptive pain scale, ranging from 0 (no pain/no sedation) to 4 (intense pain/deep sedation). If the pain score was \( \geq 3 \), rescue analgesia was provided using buprenorphine (0.02 mg/kg) administered IM. Pain score was higher in GB at 2, 3, 4, 6 and 8 h compared to baseline and compared to GBR at the same study times. Moreover, the pain score was also higher in GB compared to GR at 2, 3, 4 and 6 h. Pain score was similar at all study times between GR and GBR. Sedation at 1 and 2 h was higher than baseline values in all groups. Cats in GB received rescue analgesia more often than cats assigned to GR or GBR. Robenacoxib was an effective analgesic drug in cats up to 24 h after ovariohysterectomy. The addition of buprenorphine did not provide any additional analgesic effects compared to robenacoxib alone.

Age-related changes in the propensity of dogs to bite.
L.L. McV. Messam, P.H. Kass, B.B. Chomel, L.A. Hart
This retrospective cohort study was aimed at describing the effects of age at acquisition, age, and duration of ownership of dogs on the risk of (1) bites during play and (2) non-play bites to humans. Data were collected on 110 dogs that had bitten during play with a person, 161 dogs that had bitten outside of play and 951 non-biting dogs from veterinary clients in Kingston (KGN), Jamaica and San Francisco (SF), USA. Modified Poisson regression was employed to model the relationships of both types of bites to each variable separately. Effects of the variables on dog bite risk (1) during and (2) outside of play with the dog, differed from each other and by type of bite. Effects varied with the dog’s age and age-related associations were strongest in dogs younger than 1 year old. Ages at acquisition of dogs at highest risk for bites during play were substantially lower than those at risk for non-play bites. Ages and durations of ownership of dogs at highest risk for bites during play were also lower than those of dogs at highest risk for non-play bites. The propensity of a dog to bite changes as it ages and relationships between dog bites occurring during and outside of play and the dog’s age at acquisition, current age, and duration of ownership, differ from each other.

Morphological changes to endothelial and interstitial cells and to the extra-cellular matrix in canine myxomatous mitral valve disease (endocardiosis).
R.I. Han, C.H. Clark, A. Black, A. French, G.J. Culshaw, S.A. Kempson, B.M. Corcoran
Morphological and functional changes in endothelial and interstitial cells are considered central to myxomatous degeneration of the canine mitral valve (endocardiosis). The aim of this study was to describe and quantify changes in valve endothelial cells (VECs), interstitial cells (VICs) and the extra-cellular matrix (ECM) of the sub-endothelial zone of diseased valves using a combination of transmission electron microscopy, stereology and computer-aided image analysis. Marked degradation of the endothelium was evident in diseased valves, which coincided with significant degradation of the local ECM (P < 0.001). There were decreases and increases in the numbers of VECs and VICs, respectively, in diseased valves, with particular accumulation of VICs subjacent to the valve surface (P < 0.01). Overall, VICs were more pleomorphic than VECs in both normal and diseased valves, but for VECs, the degree of pleomorphism was significantly different in diseased valves (P < 0.0001). The findings of the study confirm that canine myxomatous mitral valve disease is associated with marked endothelial damage, with attendant proliferation of subjacent activated myofibroblasts. The fact that similar endothelial changes are present in normal valves suggests these processes not only contribute to valve pathology, but may also represent life-long valve remodelling.

Serum homocysteine and methylmalonic acid concentrations in Chinese Shar-Pei dogs with cobalamin deficiency.
Cobalamin deficiency is suspected to be hereditary in Chinese Shar-Pei dogs (Shar-Peis), and inherited causes of cobalamin deficiency may affect the cellular processing of cobalamin. In humans, a defect of the two main cobalamin-dependent intracellular enzymes (i.e., methionine synthase and methylmalonyl-CoA mutase) may lead to hyperhomocysteinemia and hypermethylmalonic acidemia. The aim of this retrospective study was to evaluate serum homocysteine (HCY) and methylmalonic acid (MMA) concentrations in cobalamin-deficient Shar-Peis and dogs of six other breeds. Serum samples (n = 297) from cobalamin-deficient dogs (Shar-Peis, German Shepherd dogs, Labrador Retrievers, Yorkshire Terriers, Boxers, Cocker Spaniels, and Beagles) were
Different role of COX-2 and angiogenesis in canine inflammatory and non-inflammatory mammary cancer.

Mónica Clemente, Ana Rodríguez Sánchez-Archipodona, David Sardón, Lucía Díez, Asunción Martín-Ruiz, Sara Caceres, Francesco Sassi, M. Dolores Pérez-Alenza, Juan C. Illera, Susana Dunner, Laura Peña

Human inflammatory breast cancer (IBC) and canine inflammatory mammary cancer (IMC) are the most aggressive and fatal types of mammary cancer, and both have a very poor prognosis and low survival rate. Human IBC is characterised by exacerbated angiogenesis, lymphangiogenesis, and lymphangiotropism. Lymphangiotropism is also characteristic of IMC, but microvascular density (MVD) and lymphangiogenesis have not been previously studied in canine IMC. In this study immunohistochemical expression of several angiogenesis-related factors (cyclooxygenase [COX]-2, vascular endothelial growth factors A and D [VEGF-A, VEGF-D], and vascular endothelial growth factor receptor 3 [VEGFR-3]), MVD, lymphatic proliferation index (LPI), and Ki-67 tumour proliferation index (PI) were studied in 21 canine IMC samples, 20 canine high-grade malignant non-IMC mammary tumours (MMTs), and four normal mammary gland samples (NMGs). All mammary neoplasms were histologically categorised as grade III. COX-2 values were also analysed by RT-PCR in seven IMCs, six MMTs and four NMGs. The expressions of COX-2, VEGF-A, and VEGF-D were significantly higher in IMC, MVD and LPI tumours, but not PI. In MMTs, COX-2 immunoexpression was significantly associated with VEGF-A, while in IMCs COX-2 was associated with VEGF-D (lymphangiogenic factor), its receptor VEGFR-3, and LPI. These results suggested that lymphangiogenic pathway stimulation is a specific role of COX-2 in IMC angiogenesis, which justifies the use of COX-2–based targeted palliative therapies in dogs. The exacerbated angiogenesis and lymphangiogenesis and the increased expression of angiogenesis-related factors further support canine IMC as a natural model for the study of human IBC.

Relationship between glomerular filtration rate and plasma N-terminal pro B-type natriuretic peptide concentrations in dogs with chronic kidney disease.

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Plasma N-terminal pro B-type natriuretic peptide (NT-proBNP) concentrations increase in dogs with azotemia. However, the correlation between glomerular filtration rate (GFR) and NT-proBNP concentrations in dogs has not been evaluated. The objective of this study was to evaluate the correlation between GFR and plasma NT-proBNP concentrations in dogs with chronic kidney disease (CKD). In this retrospective cross-sectional study, plasma creatinine (Cre) and NT-proBNP concentrations, plasma iohexol clearance (PCio) values and blood pressure were measured in dogs with CKD. Dogs were classified according to PCio values into D group (dogs with decreased PCio values), and N group (dogs with normal PCio values). Dogs were further categorized on the basis of their systolic blood pressure and PCio values into NT-D group (normotensive dogs with decreased PCio values), NT-N group (normotensive dogs with normal PCio values), HT-D group (hypertensive dogs with decreased PCio values) and HT-N group (hypertensive dogs with normal PCio values). Significant correlations were observed between plasma NT-proBNP and Cre concentrations (r = 0.360, P < 0.05) and PCio values (r = −0.470, P < 0.01). Plasma NT-proBNP concentrations were significantly higher in the D group than in the N group (P < 0.001). Plasma NT-proBNP concentrations were significantly higher in the HT-D group than in the other three groups (P ≤ 0.007). No differences in plasma NT-proBNP concentrations were observed between the NT-D and HT-N groups (P = 0.28). Plasma NT-proBNP concentrations were significantly lower in the NT-N group than in the other three groups (P ≤ 0.043). Our findings suggest that decreased GFR might be associated with increased plasma NT-proBNP concentrations in dogs, similar to that in humans. In addition, the complication of hypertension in CKD might be associated with further increases in plasma NT-proBNP.
concentrations. In conclusion, the effects of GFR and blood pressure on the plasma NT-proBNP concentration were small, but it could be necessary to consider the effects when this marker is used to evaluate canine cardiac disease.

Two novel real-time PCR methods for genotyping the von Willebrand disease type I mutation in Doberman Pinscher dogs,
Fabio Gentilini, Maria E. Turba
Two single tube real-time PCR methods were designed to genotype the mutation responsible for von Willebrand disease type I (von Willebrand factor c.7437G > A) in Doberman Pinscher dogs: (1) the Divergent PCR assay, which is a modification of the bi-directional PCR amplification of a specific allele (BI-PASA) technique, and (2) a minor groove binder (MGB) real-time PCR assay using fluorescently labelled probes. There was complete agreement between the genotypes determined using the two real-time PCR methods and the results of sequencing of PCR products generated by conventional PCR from genomic DNA purified from the blood of 27 Doberman Pinscher dogs. The Divergent PCR assay yielded reliable results with \( \geq 6.4 \) ng genomic DNA per reaction and the MGB real-time PCR assay yielded reliable results with \( \geq 150 \) pg genomic DNA per reaction. Both real-time PCR methods are suitable for routine genetic testing for the von Willebrand disease type I mutation using blood samples.

Urinary excretion of copper, zinc and iron with and without D-penicillamine administration in relation to hepatic copper concentration in dogs.
Hereditary copper-associated hepatitis in dogs resembles Wilson’s disease, a copper storage disease in humans. Values for urinary copper excretion are well established in the diagnostic protocol of Wilson’s disease, whereas in dogs these have not been evaluated. The objectives of this study were to characterize both basal and D-penicillamine induced urinary copper, zinc and iron excretion in dogs in relation to hepatic copper concentration. Beagles, Beagle-Bedlington terrier cross-breeds homozygous for the COMMD1 gene mutation that causes copper toxicosis, and Labrador retrievers with normal or increased hepatic copper concentrations were investigated. The hepatic copper phenotype was determined by histological evaluation of liver biopsies and measurement of the hepatic copper concentration by instrumental neutron activation analysis. Urinary excretion of copper, iron and zinc was measured via inductively coupled plasma optical emission spectrometry under basal conditions and after oral administration of a single dose (20 mg/kg bodyweight) of the chelator D-penicillamine. There was a rapid increase in urinary excretion of copper and zinc, but not iron after D-penicillamine administration. This increase was not different between dogs with high or normal hepatic copper concentrations. D-penicillamine-induced urinary copper excretion and the copper/creatine ratio did not correlate with hepatic copper concentrations in the dogs studied, although basal urinary copper/zinc ratios did correlate with hepatic copper concentrations in Labrador retrievers. The latter parameter may be useful in diagnostic and follow-up protocols for copper-associated hepatitis in Labrador retrievers.

Isolation, purification, culture and characterisation of myoepithelial cells from normal and neoplastic canine mammary glands using a magnetic-activated cell sorting separation system.
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Mammary gland tumours, the most common malignant neoplasm in bitches, often display myoepithelial (ME) cell proliferation. The aim of this study was to isolate, purify, culture and characterise ME cells from normal and neoplastic canine mammary glands. Monodispersed cells from three normal canine mammary glands and five canine mammary tumours were incubated with an anti-Thy1 antibody and isolated by magnetic-activated cell sorting (MACS). Cells isolated from two normal glands (cell lines CmME-N1 and CmME-N2) and four tumours (cell lines CmME-K1 from a complex carcinoma, CmME-K2 from a simple tubulopapillary carcinoma, and CmME-K3 and CmME-K4 from two carcinomas within benign tumours) were cultured in supplemented DMEM/F12 media for 40 days. Cell purity was >90%. Tumour-derived ME cell lines exhibited heterogeneous morphology, growth patterns and immunocytochemical expression of cytokeratins, whereas cell lines from
normal glands retained their morphology and levels of cytokeratin expression during culture. Cell lines from normal glands and carcinomas within benign tumours grew more slowly than those from simple and complex carcinomas. This methodology has the potential to be used for in vitro analysis of the role of ME cells in the growth and progression of canine mammary tumours.

**Breed predispositions in canine mast cell tumour: A single centre experience in the United Kingdom.**

James Warland, Jane Dobson

Genetic factors play a major role in carcinogenesis. Many breeds have been reported to be predisposed to mast cell tumour (MCT) development using various methods and diverse control populations. A database of 222 dogs with MCT seen at a UK university referral hospital was compared to three control populations, namely, an insured population of UK dogs, registrations with the UK Kennel Club and other dogs seen through the same hospital. Odds ratios were calculated for each breed. Boxers, Labradors, Golden Retrievers and Staffordshire Bull Terriers appeared predisposed to MCT development. English Springer Spaniels, English Cocker Spaniels, German Shepherd Dogs, West Highland White Terriers and Cavalier King Charles Spaniels were underrepresented.

**Journal of the American Veterinary Medical Association – August 1, 2013**

**Evaluation of the use of serum C-reactive protein concentration to predict outcome in puppies infected with canine parvovirus**

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**Objective**—To evaluate associations of serum C-reactive protein (CRP) concentration with duration of hospitalization and with outcome in puppies with canine parvoviral enteritis.

**Design**—Prospective observational study.

**Animals**—79 client-owned puppies with naturally acquired canine parvovirus infection.

**Procedures**—All puppies received supportive care. Serum CRP concentration was measured at the time of admission, approximately every 10 to 12 hours for the first 48 hours, and then every 24 hours until discharge from the hospital or death. Associations between outcome and CRP concentration at various time points or changes in CRP concentration over time were assessed via multiple logistic regression. Associations of CRP concentration with survival time and duration of hospitalization among survivors were estimated with Cox proportional hazards regression. Use of CRP concentration to predict outcome was evaluated by means of receiver operating characteristic curve analysis.

**Results**—Serum CRP concentrations at admission and 12 and 24 hours later were positively associated with odds of death, and CRP concentrations at 12 and 24 hours after admission were negatively associated with survival time for puppies. Among survivors, duration of hospitalization was positively associated with CRP concentrations at 12, 24, and 36 hours after admission. Sensitivity and specificity of CRP concentration to differentiate between survivors and nonsurvivors at 24 hours after admission were 86.7% and 78.7%, respectively (considered moderately accurate).

**Conclusions and Clinical Relevance**—Although serum CRP concentration was associated with outcome in puppies with canine parvovirus enteritis, it did not prove to be a good predictor of outcome when used alone.

**Agreement between low-field MRI and CT for the detection of suspected intracranial lesions in dogs and cats**

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**Objective**—To assess the agreement between CT and MRI for enabling detection of intracranial lesions in cats and dogs.

**Design**—Evaluation study.

**Animals**—51 dogs and 7 cats with suspected intracranial lesions.

**Procedures**—During a 2-year-period, dogs and cats with suspected intracranial pathological changes underwent MRI and CT (single slice) of the head. Radiologists evaluated images produced with both techniques without awareness of subject identity. Agreement between methods was assessed for allowing detection of solitary or...
multiple lesions, selected lesion characteristics (via the Cohen κ statistic), and lesion dimensions (via Bland-Altman plots).

Results—CT and MRI had substantial agreement for allowing detection of lesions and identification of whether the lesions were solitary or multiple. The techniques agreed almost perfectly for allowing identification of a mass effect and contrast medium enhancement, which were considered principal diagnostic imaging signs. A lower degree of agreement was attained for allowing identification of enhancement patterns and aspects of lesion margins. Agreement was substantial to almost perfect for lesion visualization in most anatomic brain regions but poor for identification of lesion dimensions.

Conclusions and Clinical Relevance—Degrees of agreement between CT and MRI for allowing the detection and characterization of intracranial lesions ranged from poor to almost perfect, depending on the variable assessed. More investigation is needed into the relative analytic sensitivity and possible complementarities of CT and MRI in the detection of suspected intracranial lesions in dogs and cats.

Journal of the American Veterinary Medical Association – August 15, 2013

Initial treatment factors associated with feline urethral obstruction recurrence rate: 192 cases (2004–2010)
Peter F. Hetrick, DVM; Elizabeth B. Davidow, DVM, DACVECC

Objective—To evaluate the association of treatment factors during initial urinary catheterization (IUC) of cats with recurrence of urethral obstruction at 24 hours and 30 days after catheter removal.

Design—Retrospective case series.

Animals—192 male cats with urethral obstruction that were treated at an emergency and specialty center from 2004 through 2010.

Procedures—Data were obtained from the cats’ medical records. Duration of indwelling catheterization, catheterization with a 5F versus 3.5F urinary catheter, treatment with phenoxybenzamine versus prazosin, consistent administration of pain medication, and treatment with meloxicam or antimicrobials during IUC were reviewed for association with rate of recurrent urethral obstruction (rUO).

Results—Overall rUO rates were 10.94% (21/192 cats) at 24 hours and 23.57% (37/157 cats) at 30 days after IUC. At 24 hours and 30 days after IUC, rUO developed in 10 of 140 (7.14%) and 20 of 110 (18.18%) prazosin-treated cats, respectively, compared with 10 of 46 (21.74%) and 16 of 41 (39.02%) phenoxybenzamine-treated cats, respectively. Reobstruction developed following use of a 5F or 3.5F urinary catheter in 11 of 58 (18.97%) and 7 of 105 (6.67%) cats, respectively, through 24 hours. There was no association between rUO and duration of urinary catheterization, administration of antimicrobials or meloxicam, or consistent administration of pain medication during IUC.

Conclusions and Clinical Relevance—At 24 hours and 30 days after IUC, rUO rates in prazosin-treated cats were significantly lower than rates in phenoxybenzamine-treated cats. Reobstruction rate at 24 hours was significantly lower when a 3.5F versus 5F urinary catheter was used.

Michael W. Nolan, DVM, PhD, DACVR; Lynn R. Griffin, DVM; James T. Custis, DVM, MS, DACVR; Susan M. LaRue, DVM, PhD, DACVS, DACVR

Objective—to evaluate outcomes of stereotactic body radiation therapy (SBRT) in cats with injection-site sarcomas (ISS) via assessment of local responses and recurrences, survival times, and complications.

Design—Retrospective case series.

Animals—11 cats with ISS.

Procedures—Medical records of cats that were treated with SBRT for ISS between June 2008 and July 2012 were reviewed; information on patient demographics (age, sex, and breed), oncological histories (including prior treatment and histologic grade), details of SBRT plans (tumor volume, treatment field sizes, and prescription), response to treatment (including toxicoses), progression-free intervals, and survival times were extracted.

Results—Acute radiation-associated toxicoses were infrequent and limited to mild, self-limiting dermatitis and colitis in 2 and 1 of the 11 cats, respectively. No late radiation-associated toxicoses were observed. The objective response rate was 8 of 11 cats; these patients either had a partial or complete response as determined on the basis of CT or physical examination findings. The median progression-free interval was 242 days, and the median overall survival time was 301 days; median follow-up time of censored subjects was 173 days.
Conclusions and Clinical Relevance—SBRT was completed in 3 to 5 days and was well tolerated when used to treat cats with ISS. Measurable tumor responses were achieved in most cats in this study. Stereotactic body radiation therapy provided a means for palliation of ISS; further investigation is required to determine whether SBRT is a valid treatment option for downstaging disease prior to definitive surgery.

**Canadian Veterinary Journal – Abstracts not available online until March 2014**

**Hookworm dermatitis due to Uncinaria stenocephala in a dog from Saskatchewan**
Shirley Chu, Sherry L. Myers, Brent Wagner, Elisabeth C.R. Snead (page 743)

**Oronasal blastomycosis in a golden retriever**
Kristen Parker, Elisabeth Snead, James Anthony, Tawni Silver (page 748)

**Prevalence and geographic distribution of canine and feline blastomycosis in the Canadian prairies**
Jennifer L. Davies, Tasha Epp, Hilary J. Burgess (page 753)

**Management of bilateral idiopathic renal hematuria in a dog with silver nitrate**
Michael F. Di Cicco, Tara Fetzer, Patricia L. Secoura, Kieri Jermyn, Tracy Hill, Serge Chaloub, Shelly Vaden (page 761)

**Concurrent gall bladder, liver lobe torsion, and bile peritonitis in a German shepherd dog 2 months after gastric dilatation/volvulus gastropexy and splenectomy**
Kurtis G. Tubby (page 784)

**Australian Veterinary Journal**

**False hyperchloraemia in a dog secondary to ingestion of horse feed supplemented with potassium bromide.**
Peacock R, Smart L.

**BACKGROUND:** A dog was presented for acute abdominal distension after inadvertent access to a large amount of dry dog food and possibly horse feed consisting of chaff, pony cubes and vitamin, mineral and yeast supplements.

**RESULTS:** A marked hyperchloraemia and decreased anion gap on blood electrolyte analysis prompted a review of the patient's history for potential ingestion of bromide. It was revealed that the horse feed was supplemented with potassium bromide. The serum bromide level was 23.6 mmol/L. The dog recovered uneventfully.

**CONCLUSION:** This case report highlights the importance of knowing common interferents of chemical analysis techniques.

**Bioequivalence of a new liquid formulation of benazepril compared with the reference tablet product.**

**OBJECTIVE:** To compare the bioequivalence and 'switchability' of two formulations of benazepril (tablet and liquid) after oral administration.

**DESIGN:** Randomised cross-over design, followed by parallel comparison.

**METHODS:** Twelve mixed-breed dogs were administered either a tablet (Group A) or liquid formulation (Group B) of benazepril orally at 0.45 mg/kg daily for 4 days. With no washout period, the dogs then received the alternative treatment at the same dose for a further 4 days. Blood samples taken prior to treatment and serially after treatment were analysed for plasma concentrations of benazepril and benazeprilat and the activity and concentration of angiotensin-converting enzyme (ACE). The calculated percentage inhibition of ACE was defined as the primary outcome variable.

**RESULTS:** No statistically significant differences were found between groups A and B for any variable evaluated. The mean (± SD) percentage of ACE inhibition was 85.5 ± 7.04% for the liquid formulation and 85.9 ± 6.66% for the tablet formulation. The mean of the ratios was 1.00 (80% confidence interval 0.96-1.04). No evaluated effect term (sequence, formulation or period) had any statistical effect on any outcome variable.
CONCLUSION: This study supports a conclusion that, based on pharmacodynamic response, the liquid formulation of benazepril is bioequivalent to the reference tablet formulation. Further, the lack of a sequence effect supports the switchability of these two formulations.

Histopathological changes in the lungs from dogs with tick paralysis: 25 cases (2010-2012).
Webster R, Mackie J, Haskins S.
OBJECTIVE: To determine the prevalence and nature of histological lung lesions in dogs with tick paralysis.
METHODS: A prospective study of 25 client-owned dogs that died during treatment for tick paralysis or were euthanased because of either the severity of the disease process or financial constraints was conducted at a veterinary emergency hospital in Queensland, Australia. Lung specimens were collected postmortem for histopathological examination.
RESULTS: All 25 dogs had significant pulmonary changes: 9 exhibited congestion and alveolar oedema, with no obvious inflammatory cell infiltrate; 1 exhibited a mild increase in the number of alveolar macrophages in addition to congestion and alveolar oedema; the remaining 15 dogs had moderate or severe bronchopneumonia, with 2 showing evidence of aspiration pneumonia.
CONCLUSION: Dogs with clinically severe tick paralysis are likely to have pulmonary parenchymal disease. Bronchopneumonia may be present in a significant proportion of cases and may reflect aspiration.

Australian Veterinary Practitioner (no journal this month)

Journal of the American Animal Hospital Association (no journal this month)

New Zealand Veterinary Journal (no journal this month)