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May 2014 Abstracts

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A Review of the Studies Using Buprenorphine in Cats.
P.V.M. Steagall, B.P. Monteiro-Steagall1 and P.M. Taylor.
Pain management is a crucial component of feline medicine and surgery. This review critically evaluates studies using buprenorphine in cats and highlights the clinical application of the opioid in this species. The pharmacokinetic-pharmacodynamic (PK-PD) modeling of IV buprenorphine has been best described by a combined effect compartmental/receptor association-dissociation model with negative hysteresis. Therefore, plasma concentrations of the drug are not correlated with analgesia, and clinicians should not expect to observe pain relief immediately after drug administration. In addition, a ceiling effect has not been demonstrated after administration of clinical doses of buprenorphine in cats; dosages of up to 0.04 mg/kg have been reported. The route of administration influences the onset, duration, and magnitude of antinociception and analgesia when using this drug in cats. At clinical dosages, the SC route of administration does not appear to provide adequate antinociception and analgesia whereas the buccal route has produced inconsistent results. Intravenous or IM administration at a dosage of 0.02–0.04 mg/kg is the preferred for treatment of pain in the acute setting. A literature search found 14 clinical trials evaluating buprenorphine sedation, analgesia, or both in cats. There were 22 original research studies reporting the antinociceptive effects of buprenorphine by means of thermal threshold, mechanical threshold, or both, minimal alveolar concentration, or PK-PD. Individual variability in response to buprenorphine administration has been reported, indicating that buprenorphine may not provide sufficient analgesia in some cats. Pain assessment is important when evaluating the efficacy of buprenorphine and determining whether additional analgesic treatment is needed.

Clinical Findings and Prevalence of the Mutation Associated with Primary Ciliary Dyskinesia in Old English Sheepdogs.
Background Primary ciliary dyskinesia (PCD) is generally a recessively inherited disorder characterized by dysfunction of motile cilia. A mutation in a new causative gene (CCDC39) has been identified in the Old English Sheepdog (OES). Objectives To describe the clinical findings and the molecular changes of affected dogs and estimate the worldwide prevalence of the mutation in a large cohort of OES. Animals 578 OES, including 28 affected and 550 clinically healthy dogs. Methods This retrospective study reviewed the data of OES diagnosed with PCD and OES tested for the mutation. Clinical data including results of physical examination and further investigations were obtained on 11/28 dogs. CCDC39 expression was assessed by qRT-PCR and Western blot analysis in affected dogs and healthy dogs. DNA was extracted on 561/578 dogs and a genetic test by Taqman technology was developed to genotype the CCDC39 mutation in these dogs. Results Clinical findings were recurrent nasal discharge and cough, pyrexia, leucocytosis, and bronchopneumonia. Ultrastructural defects were characterized by central microtubular abnormalities and decreased number of inner dynein arms (IDAs). Molecular analysis revealed a reduced expression of CCDC39 RNA and an absence of CCDC39 protein in affected dogs compared to healthy dogs. The mutation was more frequent in nonrandomly selected European OES population with a higher proportion of carriers (19%) compared to non-European dogs (7%). Conclusion and Clinical Importance CCDC39 mutation is dispersed in a worldwide population and is responsible for PCD in this breed. Genetic testing might enable control of this disease.

Background Previous studies have reported a seasonal increased risk for leptospirosis, but there is no consistent seasonality reported across regions in the United States. Objectives To evaluate and compare seasonal patterns in
seropositivity for leptospirosis in dogs for 4 US regions (northeast [NE], midwest [MW], south-central [SC], and California-southern west coast [CS]). Animals Forty-four thousand nine hundred and sixteen canine serum samples submitted to a commercial laboratory for microscopic agglutination tests (MAT) from 2000 through 2010. Methods In this retrospective study, positive cases were defined as MAT titers ≥1 : 3,200 for at least one of 7 tested serovars. Four geographic regions were defined, and MAT results were included in regional analyses based on hospital zipcode. A seasonal-trend decomposition method for times series was utilized for the analysis. Monthly variation in the seropositive rate was evaluated using a seasonal cycle subseries plot and logistic regression. Results Two thousand and twelve of 44,916 (4.48%) samples were seropositive. Compared to seropositive rates for February, significantly higher monthly rates occurred during the 2nd half of the year in the MW (OR 3.92–6.35) and NE (OR 2.03–4.80) regions, and only in January (OR 2.34) and December (OR 1.74) in the SC region. Monthly seropositive rates indicative of seasonality were observed earlier in the calendar year for both CS and SC regions. Conclusions and Clinical Importance Seasonal patterns for seropositivity to leptospires differed by geographic region. Although risk of infection in dogs can occur year round, knowledge of seasonal trends can assist veterinarians in formulating differential diagnoses and evaluation of exposure risk.

Vaccine-Associated Leptospira Antibodies in Client-Owned Dogs.
Background Long-term microscopic agglutination test (MAT) results after vaccination with 4-serovar Leptospira vaccines are not available for all vaccines used in client-owned dogs. Hypothesis/Objectives To determine antibody responses of client-owned dogs given 1 of 4 commercially available Leptospira vaccines. Animals Healthy client-owned dogs (n = 32) with no history of Leptospira vaccination for at least the previous year.Methods Dogs were given 1 of 4 Leptospira vaccines on week 0 and then approximately on week 3 and week 52. Sera were collected before vaccine administration on week 0 and then within 3 days of week 3, within 2 days of week 4, and approximately on weeks 7, 15, 29, 52, and 56. Antibody titers against Leptospira serovars bratislava, canicola, grippotyphosa, hardjo, icterohemorrhagiae, and pomona and were determined by MAT. Results When compared among vaccines, MAT results varied in maximal titers, the serovars inducing maximal titers, and the time required to reach maximal titers. Each vaccine induced at least some MAT titers ≥1 : 800. Most dogs were negative for antibodies against all serovars 1 year after vaccination, and anamnestic responses were variable. Conclusions and Clinical Importance Dogs vaccinated with Leptospira vaccines have variable MAT titers over time, and antibodies should not be used to predict resistance to Leptospira infection. MAT titers ≥1 : 800 can develop after Leptospira spp. vaccination, which can complicate the clinical diagnosis of leptospirosis.

The Effect of Tramadol and Indomethacin Coadministration on Gastric Barrier Function in Dogs.
Background Tramadol is a centrally acting analgesic that is often used in conjunction with nonsteroidal anti-inflammatory drugs (NSAIDs). The effect of coadministration of tramadol and indomethacin on gastric barrier function in dogs is unknown. Hypothesis/Objectives That coadministration of a nonselective NSAID (indomethacin) and tramadol would decrease recovery of barrier function as compared with acid-injured, indomethacin-treated, and tramadol-treated mucosa. Animals Gastric mucosa of 10 humanely euthanized shelter dogs. Methods Ex vivo study. Mounted gastric mucosa was treated with indomethacin, tramadol, or both. Gastric barrier function, prostanoid production, and cyclooxygenase expression were quantified. Results Indomethacin decreased recovery of transepithelial electrical resistance after injury, although neither tramadol nor the coadministration of the two had an additional effect. Indomethacin inhibited production of gastroprotective prostanoids prostaglandin E2 (acid-injured PGE2: 509.3 ± 158.3 pg/mL, indomethacin + acid injury PGE2: 182.9 ± 93.8 pg/mL, P < .001) and thromboxane B2 (acid-injured TXB2: 233.2 ± 90.7 pg/mL, indomethacin + acid injury TXB2: 37.9 ± 16.8 pg/mL, P < .001), whereas tramadol had no significant effect (PGE2 P = .713, TXB2 P = .194). Neither drug had an effect on cyclooxygenase expression (COX-1 P = .743, COX-2 P = .705). Acid injury induced moderate to marked epithelial cell sloughing, which was unchanged by drug administration. Conclusions and Clinical Importance There was no apparent
interaction of tramadol and a nonselective cyclooxygenase in this ex vivo model. These results suggest that if there is an adverse interaction of the 2 drugs in vivo, it is unlikely to be via prostanoid inhibition.

**In Vivo Histologically Equivalent Evaluation of Gastric Mucosal Topologic Morphology in Dogs By using Confocal Endomicroscopy.**


Background Confocal endomicroscopy (CEM) is an endoscopic technology permitting in vivo cellular and subcellular imaging. CEM aids real-time clinical assessment and diagnosis of various gastrointestinal diseases in people. CEM allows in vivo characterization of small intestinal mucosal morphology in dogs. Objective To determine the feasibility of CEM to evaluate gastric mucosal morphology in dogs and to characterize the appearance in healthy dogs. Animals Fourteen clinically healthy research colony dogs. Methods Experimental study. Under general anesthesia, dogs underwent standard endoscopic evaluation and CEM of the gastric mucosa. In the initial 6 dogs, fluorescent contrast was provided with the fluorophore acriflavine (0.05% solution), applied topically. Subsequently, 8 dogs were assessed using a combination of fluorescein (10% solution, 15 mg/kg IV), followed by acriflavine administered topically. For each fluorophore, a minimum of 5 sites were assessed. Results Confocal endomicroscopy provided high quality in vivo histologically equivalent images of the gastric mucosa, but reduced flexibility of the endoscope tip limited imaging of the cranial stomach in some dogs. Intravenous administration of fluorescein allowed assessment of cellular cytoplasmic and microvasculature features. Topical application of acriflavine preferentially stained cellular nucleic acids, allowing additional evaluation of nuclear morphology. Identification of Helicobacter-like organisms was possible in 13 dogs. Conclusion and Clinical Importance Confocal endomicroscopy provides in vivo images allowing assessment of gastric mucosal morphology during endoscopy, potentially permitting real-time diagnosis of gastrointestinal disease.

**The Clinical Efficacy of Dietary Fat Restriction in Treatment of Dogs with Intestinal Lymphangiectasia.**

H. Okanishi, R. Yoshioka, Y. Kagawa and T. Watari

Background Intestinal lymphangiectasia (IL), a type of protein-losing enteropathy (PLE), is a dilatation of lymphatic vessels within the gastrointestinal tract. Dietary fat restriction previously has been proposed as an effective treatment for dogs with PLE, but limited objective clinical data are available on the efficacy of this treatment. Hypothesis/Objectives To investigate the clinical efficacy of dietary fat restriction in dogs with IL that were unresponsive to prednisolone treatment or showed relapse of clinical signs and hypoalbuminemia when the prednisolone dosage was decreased. Animals Twenty-four dogs with IL. Methods Retrospective study. Body weight, clinical activity score, and hematologic and biochemical variables were compared before and 1 and 2 months after treatment. Furthermore, the data were compared between the group fed only an ultra low-fat (ULF) diet and the group fed ULF and a low-fat (LF) diet. Results Nineteen of 24 (79%) dogs responded satisfactorily to dietary fat restriction, and the prednisolone dosage could be decreased. Clinical activity score was significantly decreased after dietary treatment compared with before treatment. In addition, albumin (ALB), total protein (TP), and blood urea nitrogen (BUN) concentration were significantly increased after dietary fat restriction. At 2 months posttreatment, the ALB concentrations in the ULF group were significantly higher than that of the ULF + LF group. Conclusions and Clinical Importance Dietary fat restriction appears to be an effective treatment in dogs with IL that are unresponsive to prednisolone treatment or that have recurrent clinical signs and hypoalbuminemia when the dosage of prednisolone is decreased.

**Short- and Long-Term Cure Rates of Short-Duration Trimethoprim-Sulfamethoxazole Treatment in Female Dogs with Uncomplicated Bacterial Cystitis**


Background Long-duration beta-lactam antibiotics are used for empirical treatment in female dogs with uncomplicated bacterial cystitis. However, women with bacterial cystitis are treated with short-duration potentiated sulfonamides because longer courses of beta-lactams result in lower cure and higher recurrence rates. Hypothesis/Objectives Short-duration potentiated sulfonamide treatment is more efficacious than long-duration beta-lactam treatment in achieving clinical and microbiological cures in female dogs with uncomplicated bacterial
cystitis. Animals Thirty-eight client-owned female dogs. Methods Randomized, double-blinded, placebo-controlled clinical trial. Dogs were treated with TMP-SMX (15 mg/kg PO q12h for 3 days followed by a placebo capsule PO q12h for 7 days; Group SDS; n = 20) or cephalaxin (20 mg/kg PO q12h for 10 days; Group LDBL; n = 18). Dogs were monitored for clinical and microbiological cure during treatment and at short- and long-term follow-up. Results No statistically significant differences were found between treatment groups in clinical cure rates after 3 days of treatment (89% SDS, 94% LDBL; P = 1.00) and 4 days (85% SDS, 72% LDBL; P = .44) or >30 days (50% SDS, 65% LDBL; P = .50) after conclusion of treatment or in microbiological cure rates 4 days (59% SDS, 36% LDBL; P = .44) or >30 days (44% SDS, 20% LDBL; P = .40) after conclusion of treatment. Conclusions and Clinical Importance We did not identify a difference in cure rates between short-duration sulfonamide and long-duration beta-lactam treatments in female dogs with uncomplicated cystitis. Long-term cure rates in both treatment groups were low. In some female dogs, “uncomplicated” bacterial cystitis may be more complicated than previously recognized.

**Relationship among Serum Creatinine, Serum Gastrin, Calcium-phosphorus Product, and Uremic Gastropathy in Cats with Chronic Kidney Disease.**

S.M. McLeland, K.F. Lunn, C.G. Duncan, K.R. Refsal and J.M. Quimby. Background Chronic kidney disease (CKD) in cats is associated with gastrointestinal signs commonly attributed to uremic gastropathy. Consequently, patients often are treated with antacids and gastrointestinal protectants. This therapeutic regimen is based on documented gastric lesions in uremic humans and dogs, but the nature and incidence of uremic gastropathy in cats are unknown. Hypothesis/Objectives Evaluate uremic gastropathy in CKD cats to facilitate refinement of medical management for gastrointestinal signs. Animals Thirty-seven CKD cats; 12 nonazotemic cats Methods Stomachs were evaluated for the presence of classic uremic gastropathy lesions. Histopathologic lesions were compared with serum creatinine concentrations, calcium-phosphorus product (CPP), and serum gastrin concentrations. Results Gastric ulceration, edema, and vascular fibrinoid change were not observed. The most important gastric lesions in CKD cats were fibrosis and mineralization. Sixteen CKD cats (43%) had evidence of gastric fibrosis of varying severity and 14 CKD cats (38%) had gastric mineralization. CKD cats were more likely to have gastric fibrosis and mineralization than nonazotemic controls (P = .005 and P = .021, respectively). Only cats with moderate and severe azotemia had gastric mineralization. CPP was correlated with disease severity; severely azotemic CKD cats had significantly higher CPP when compared with nonazotemic controls, and to mildly and moderately azotemic cats (P < .05). Gastrin concentrations were significantly higher in CKD cats when compared with nonazotemic controls (P = .003), but increased concentrations were not associated with gastric ulceration. Conclusions and Clinical Importance Uremic gastropathy in CKD cats differs from that described in other species and this difference should be considered when devising medical management.

**Acute Effects of Ivabradine on Dynamic Obstruction of the Left Ventricular Outflow Tract in Cats with Preclinical Hypertrophic Cardiomyopathy.**

K.A. Blass, K.E. Schober, X. Li, B.A. Scansen and J.D. Bonagura. Background Ivabradine is a negative chronotropic drug with minimal effects on central hemodynamics. Its effect on dynamic obstruction of the left ventricular outflow tract (LVOT) in cats with hypertrophic cardiomyopathy (HCM) remains unknown. Hypothesis/Objectives Ivabradine reduces dynamic obstruction of the LVOT in cats with HCM. Animals Twenty-eight client-owned cats with preclinical HCM and dynamic LVOT obstruction. Methods Randomized, double-blind, active-control single dose study. Cats received a single dose of either ivabradine (0.3 mg/kg PO) or atenolol (2 mg/kg PO). Heart rate, echocardiographic variables, and systolic blood pressure (SBP) were recorded before and 3 hours after drug administration. Statistical comparisons were made using ANCOVA. Results Peak velocity in the LVOT was significantly decreased compared to baseline for both drugs; however, the effect was more prominent with atenolol (mean reduction 2.53 m/s; 95% CI 2.07–3.13 m/s) compared to ivabradine (mean reduction 0.32 m/s; 95% CI −0.04 to 0.71 m/s; P < .0001). Echocardiographic indices of systolic function were largely unchanged by ivabradine, but significantly reduced by atenolol. Conclusions and Clinical Importance A
single dose of ivabradine decreases dynamic LVOT obstruction in cats with HCM, but the clinical effect is negligible and inferior compared to that achieved by atenolol.

**A Randomized Study Assessing the Effect of Diet in Cats with Hypertrophic Cardiomyopathy.**


Background Diet might influence progression of hypertrophic cardiomyopathy (HCM). Objective To investigate whether diet composition could alter clinical, biochemical, or echocardiographic variables in cats with HCM.

Animals Twenty-nine cats with HCM (International Small Animal Cardiac Health Council stage 1b) examined at a university teaching hospital. Methods Randomized, placebo-controlled trial. After physical examination, echocardiogram, and blood collection, cats were randomized to 1 of 3 diets, which varied in carbohydrate and fat content and ingredients. Measurements were repeated after 6 months. Results There were no significant differences among the 3 groups at baseline. After 6 months, there were no significant changes in the primary endpoints, left ventricular free wall (Group A, P = .760; Group B, P = .475; Group C, P = .066) or interventricular septal thickness in diastole (Group A, P = .528; Group B, P = .221; Group C, P = .097). Group A had significant increases in BUN (P = .008) and cholesterol (P = .021), while Group B had significant increases in BUN (P = .008), cholesterol (P = .007), and triglycerides (P = .005), and significant decreases in NT-proBNP (P = .013) and hs-troponin I (P = .043). Group C had significant decreases in body weight (P = .021), left atrial dimension (P = .035), interventricular septal thickness in systole (P = .038), and liver enzymes (P = .034–.038). Conclusions and Clinical Importance These data suggest that diet might influence some clinical, biochemical, and echocardiographic variables in cats with HCM.

**Influence of Beta Blockers on Survival in Dogs with Severe Subaortic Stenosis.**


Background Subaortic stenosis (SAS) is one of the most common congenital cardiac defects in dogs. Severe SAS frequently is treated with a beta adrenergic receptor blocker (beta blocker), but this approach largely is empirical. Objective To determine the influence of beta blocker treatment on survival time in dogs with severe SAS. Methods Retrospective review of medical records of dogs diagnosed with severe, uncomplicated SAS (pressure gradient [PG] ≥80 mmHg) between 1999 and 2011. Results Fifty dogs met the inclusion criteria. Twenty-seven dogs were treated with a beta blocker and 23 received no treatment. Median age at diagnosis was significantly greater in the untreated group (1.2 versus 0.6 years, respectively; P = .03). Median PG at diagnosis did not differ between the treated and untreated groups (127 versus 121 mmHg, respectively; P = .2). Cox proportional hazards regression was used to identify the influence of PG at diagnosis, age at diagnosis, and beta blocker treatment on survival. In the all-cause multivariate mortality analysis, only age at diagnosis (P = .02) and PG at diagnosis (P = .03) affected survival time. In the cardiac mortality analysis, only PG influenced survival time (P = .03). Treatment with a beta blocker did not influence survival time in either the all-cause (P = .93) or cardiac-cause (P = .97) mortality analyses. Conclusions Beta blocker treatment did not influence survival in dogs with severe SAS in our study, and a higher PG at diagnosis was associated with increased risk of death.

**Agreement of Serum Spec cPL with the 1,2-o-Dilauryl-Rac-Glycero Glutaric Acid-(6′-methylresorufin) Ester (DGGR) Lipase Assay and with Pancreatic Ultrasonography in Dogs with Suspected Pancreatitis.**


Background Spec cPL is the most sensitive and specific test for diagnosing pancreatitis in dogs. Its results have not been compared to those of the 1,2-o-dilauryl-rac-glycero-3-gluutaric acid-(6′-methylresorufin) ester (DGGR) lipase assay or those of abdominal ultrasonography. Objectives To investigate agreement of Spec cPL with DGGR lipase activity and pancreatic ultrasonography in dogs with suspected pancreatitis. Animals One hundred and forty-two dogs. Methods DGGR lipase activity (reference range, 24–108 U/L) and Spec cPL were measured using the same sample. The time interval between ultrasonography and lipase determinations was <24 hours. The agreement of the 2 lipase assays at different cutoffs and the agreement between pancreatic ultrasonography and the 2 tests were assessed using Cohen’s kappa coefficient (κ). Results DGGR lipase (>108, >216 U/L) and Spec cPL (>200 µg/L) had κ values of 0.79 (95% confidence interval [CI], 0.69–0.89) and 0.70 (CI, 0.58–0.82). DGGR lipase (>108, >216 U/L) and Spec cPL (>400 µg/L) had κ values of 0.55 (CI, 0.43–0.67) and κ of 0.80 (CI, 0.71–0.89). An
ultrasonographic diagnosis of pancreatitis and DGGR lipase (>108, >216 U/L) had κ values of 0.29 (CI, 0.14–0.44) and 0.35 (CI, 0.18–0.52). Ultrasonographically diagnosed pancreatitis and Spec ePL (>200, >400 µg/L) had κ values of 0.25 (CI, 0.08–0.41) and 0.27 (CI, 0.09–0.45). Conclusions and Clinical Importance Although both lipase assays showed high agreement, agreement between ultrasonography and lipase assays results was only fair. Because lipase results are deemed more accurate, ultrasonography results should be interpreted carefully.

A Homozygous KCNJ10 Mutation in Jack Russell Terriers and Related Breeds with Spinocerebellar Ataxia with Myokymia, Seizures, or Both.


Background Juvenile-onset spinocerebellar ataxia has been recognized in Jack Russell Terriers and related Russell group terriers (RGTs) for over 40 years. Ataxia occurs with varying combinations of myokymia, seizures, and other signs of neurologic disease. More than 1 form of the disease has been suspected. Hypothesis/Objectives The objective was to identify the mutation causing the spinocerebellar ataxia associated with myokymia, seizures, or both and distinguish the phenotype from other ataxias in the RGTs. Animals DNA samples from 16 RGTs with spinocerebellar ataxia beginning from 2 to 12 months of age, 640 control RGTs, and 383 dogs from 144 other breeds along with the medical records of affected dogs were studied. Methods This case-control study compared the frequencies of a KCNJ10 allele in RGTs with spinocerebellar ataxia versus control RGTs. This allele was identified in a whole-genome sequence of a single RGT with spinocerebellar ataxia and myokymia by comparison to whole-genome sequences from 81 other canids that were normal or had other diseases. Results A missense mutation in the gene coding for the inwardly rectifying potassium channel Kir4.1 (KCNJ10:c.627C>G) was significantly (P < .001) associated with the disease. Dogs homozygous for the mutant allele all had spinocerebellar ataxia with varying combinations of myokymia and seizures. Conclusions and Clinical Importance Identification of the KCNJ10 mutation in dogs with spinocerebellar ataxia with myokymia, seizures, or both clarifies the multiple forms of ataxia seen in these breeds and provides a DNA test to identify carriers.

Canine T-Zone Lymphoma: Unique Immunophenotypic Features, Outcome, and Population Characteristics.

D.M. Seelig, P. Avery, T. Webb, J. Yoshimoto, J. Bromberek, E.J. Ehrhart and A.C. Avery

Background Canine T-cell lymphoma (TCL) is clinically and histologically heterogeneous with some forms, such as T-zone lymphoma (TZL), having an indolent course. Immunophenotyping is an important tool in the classification of TCL in people, and can be equally useful in dogs. Hypothesis/Objectives We hypothesized that loss of expression of the CD45 antigen is a specific diagnostic feature of TZL. Animals Twenty dogs with concurrent histology and immunophenotyping by flow cytometry were studied in depth. An additional 494 dogs diagnosed by immunophenotyping were used to characterize the population of dogs with this disease. Methods Lymph node biopsies from 35 dogs with TCL were classified by 2 pathologists using WHO criteria. Twenty lymph nodes were from dogs with CD45− TCL and 15 were from CD45+ TCL. The pathologists were blinded to the flow cytometry findings. Outcome information was sought for the 20 dogs with CD45− lymphoma, and population characteristics of the additional 494 dogs were described. Results All 20 CD45− cases were classified as TZL. The 15 CD45+ cases were classified as aggressive TCL and are described in an accompanying paper. TZL cases had a median survival of 637 days. Examination of 494 additional dogs diagnosed with TZL by immunophenotyping demonstrated that 40% of cases are in Golden Retrievers, are diagnosed at a median age of 10 years, and the majority have lymphadenopathy and lymphocytosis. Conclusions TZL has unique immunophenotypic features that can be used for diagnosis.

Hemodynamic and Biochemical Alterations in Dogs with Lymphoma after Induction of Chemotherapy.


Background Doxorubicin is a common antineoplastic agent with dose-dependent cardiotoxic adverse effects, and pre-existing myocardial dysfunction is a contraindication to its use. Objectives To systematically define the hemodynamic and biochemical alterations in dogs undergoing chemotherapy for newly diagnosed lymphoma and
assess the reversibility of these alterations with fluid administration. Animals Twenty-one client-owned dogs with newly diagnosed lymphoma were evaluated 1 week after induction of chemotherapy. Underlying degenerative valve disease was exclusionary. Eighteen healthy age- and weight-matched dogs were used as controls. Methods Physical examination, blood pressure by Doppler, echocardiography, and biochemical evaluation (routine serum biochemistry, plasma renin activity and aldosterone concentrations, plasma and urine osmolalities, and urine electrolyte concentrations) were measured in dogs with lymphoma and compared to controls. Dogs with lymphoma received crystalloids IV at 6 mL/kg/h for 24 hours. All variables were reassessed at 4 and 24 hours. Deuterium oxide dilution and bromide dilution were used to determine total body water and extracellular water space, respectively. Results Baseline echocardiograms showed significantly smaller chamber dimensions in dogs with lymphoma compared to controls. These changes were reversed by fluid administration. Systolic blood pressure and urine sodium concentration were significantly increased, and bromide dilution space, PCV, urine specific gravity, and urine potassium concentration were significantly decreased compared to controls. Conclusion and Clinical Importance Echocardiographic and biochemical abnormalities in dogs with lymphoma appear consistent with volume depletion, and may be the result of systemic hypertension and subsequent pressure natriuresis.

**Pro-tumorigenic Effects of Transforming Growth Factor Beta 1 in Canine Osteosarcoma.**

**Background** Transforming growth factor beta 1 (TGFβ1) is a pleiotropic cytokine that contributes to reparative skeletal remodeling by inducing osteoblast proliferation, migration, and angiogenesis. Organic bone matrix is the largest bodily reservoir for latent TGFβ1, and active osteoblasts express cognate receptors for TGFβ1 (TGFβRI and TGFβRII). During malignant osteolysis, TGFβ1 is liberated from eroded bone matrix and promotes local progression of osteotropic solid tumors by its mitogenic and prosurvival activities. Hypothesis Canine osteosarcoma (OS) cells will possess TGFβ1 signaling machinery. Blockade of TGFβ1 signaling will attenuate pro-tumorigenic activities in OS cells. Naturally occurring primary OS samples will express cognate TGFβ1 receptors; and in dogs with OS, focal malignant osteolysis will contribute to circulating TGFβ1 concentrations. Animals Thirty-three dogs with appendicular OS. Methods Expression of TGFβ1 and its cognate receptors, as well as the biologic effects of TGFβ1 blockade, was characterized in OS cells. Ten spontaneous OS samples were characterized for TGFβRI/II expressions by immunohistochemistry. In 33 dogs with OS, plasma TGFβ1 concentrations were quantified and correlated with bone resorption. Results Canine OS cells secrete TGFβ1, express cognate receptors, and TGFβ1 signaling blockade decreases proliferation, migration, and vascular endothelial growth factor secretion. Naturally occurring OS samples abundantly and uniformly express TGFβRI/II, and in OS-bearing dogs, circulating TGFβ1 concentrations correlate with urinary N-telopeptide excretion. Conclusions and Clinical Importance Canine OS cells possess TGFβ1 signaling machinery, potentially allowing for the establishment of an autocrine and paracrine pro-tumorigenic signaling loop. As such, TGFβ1 inhibitors might impede localized OS progression in dogs.

**Serum Biomarkers of Clinical and Cytologic Response in Dogs with Idiopathic Immune-Mediated Polyarthropathy.**

**Background** Immune-mediated polyarthropathy (IMPA) is common in dogs, and is monitored by serial arthrocenteses. Hypothesis/Objectives Plasma C-reactive protein (CRP), interleukin-6 (IL-6), and CXCL8 (interleukin-8) would serve as noninvasive markers of joint inflammation in IMPA. Animals Nine client-owned dogs with idiopathic IMPA; 6 healthy controls. Methods Prospective study. Plasma CRP, IL-6, and CXCL8 were measured by ELISA at baseline, 2, and 4 weeks during treatment with prednisone at 50 mg/m2/day. Arthrocenteses, the canine brief pain inventory (CBPI), and accelerometry collars were used to assess joint inflammation, lameness, and mobility at all 3 time points. Results C-reactive protein concentrations were higher in IMPA dogs (median 91.1 µg/mL, range 76.7–195.0) compared with controls (median <6.3 µg/mL, <6.3–13.7; P = .0035), and were significantly lower at week 2 (10.6 µg/mL, <6.3–48.8) and week 4 (<6.3 µg/mL, <6.3–24.4; P < .001). C-reactive protein was correlated with median CBPI scores (r = 0.68; P = .0004), joint cellularity (r = 0.49, P = .011), and mobility by accelerometry (r = −0.42, P = .048). Plasma IL-6 concentrations were also higher in IMPA dogs.
Degenerative Left Shift as a Prognostic Tool in Cats.

Background A degenerative left shift (DLS) is reported to be a poor prognostic indicator in dogs and cats. Limited data in dogs and no studies in cats have been published to investigate this claim. Hypothesis/Objectives To characterize the feline population affected by DLS and to determine if the presence and severity of DLS are associated with increased risk of euthanasia or death. Animals One hundred and eight cats with DLS (cases) and 322 cats without DLS (controls) presented to the University of California, Davis Veterinary Medical Teaching Hospital between April 1, 1995 and April 1, 2010. Methods Retrospective case–control study. All cases had a CBC performed within 24 hours of presentation in which immature granulocytic precursors exceeded mature neutrophils. Controls were matched by year of presentation and primary diagnosis. Survival analysis was used to determine risk of death or euthanasia from DLS and other potential predictors of outcome. Results Cases were more likely to die or be euthanized in hospital compared to controls (60/108 [56%] versus 107/322 [33%]). DLS was a significant predictor of death or euthanasia in hospitalized cats in both univariate and multivariate analysis (hazard ratio, 1.57; 95% confidence interval, 1.13–2.18). Trend analysis showed an increasing trend in the hazard of euthanasia or death with increasing severity of DLS. Conclusions and Clinical Importance Cats with DLS are 1.57 times more likely to die or be euthanized in hospital than cats without DLS. In addition, increasing severity of DLS is associated with increased likelihood of death or euthanasia.

Intra-abdominal Mycobacterium tuberculosis Infection in a Dog.
N. Engelmann, N. Ondreka, J. Michalik and R. Neiger

The Veterinary Journal

Magnetic resonance spectroscopy: A review of the current literature and its potential utility in veterinary oncology.
Katherine Lynch, Robert O'Brien.
Advanced imaging of veterinary cancer patients has evolved in recent years and modalities once limited to human medicine have now been described for diagnostic purposes in veterinary medicine (positron emission tomography/computed tomography, single-photon emission computed tomography, whole body magnetic resonance imaging). Magnetic resonance spectroscopy (MRS) is a non-invasive and non-ionizing technique that is well described in the human medical literature and is most frequently used to evaluate the metabolic activity of tissues with questionable malignant transformation. Differentiation of neoplastic tissue from surrounding normal tissue is dependent on variations in cellular metabolism. Positive identification of malignancy can be made when neoplastic alterations are occurring at the cellular level prior to gross anatomic changes. This improved, early detection of cancer occurrence (or recurrence) can improve patient survival and direct medical therapy. MRS techniques are largely underutilized in veterinary medicine, with current research predominantly limited to the brain (both evaluation of normal and diseased tissue). Given the clinical utility of MRS in humans, the technique may also be useful in the staging of cancer in veterinary medicine.

Serological and virological detection of canine herpesvirus-1 in adult dogs with and without reproductive disorders.
A. Pratelli, V. Colao, M. Losurdo
Canine herpesvirus 1 (CaHV-1) is known to cause reproductive disorders in adult dogs and neonatal mortality in puppies. The seroprevalence of CaHV-1 has not been documented in Italy. Sera from 865 dogs were screened for
Dogs with congenital portosystemic shunts (CPSS) have liver hypoplasia and hepatic insufficiency. Surgical CPSS attenuation results in liver growth associated with clinical improvement. The mechanism of this hepatic response is unknown, although liver regeneration is suspected. This study investigated whether markers of liver regeneration were associated with CPSS attenuation. Dogs treated with CPSS attenuation were prospectively recruited. Residual liver tissue was collected for gene expression analysis (seven genes) from 24 CPSS dogs that tolerated complete attenuation, 25 dogs that tolerated partial attenuation and seven control dogs. Relative gene expression was measured using quantitative polymerase chain reaction (qPCR). Blood samples were collected before, 24 h and 48 h following CPSS surgery from 36 CPSS dogs and from 10 control dogs. Serum hepatocyte growth factor (HGF) concentration was measured using a canine specific enzyme-linked immunosorbent assay (ELISA). HGF mRNA expression was significantly decreased in CPSS compared with control dogs (P = 0.046). There were significant increases in HGF (P = 0.050) and methionine adenosyltransferase 2 A (MAT2A; P = 0.002) mRNA expression following partial CPSS attenuation. Dogs with complete attenuation had significantly greater MAT2A (P = 0.024) mRNA expression compared with dogs with partial attenuation. Serum HGF concentration significantly increased 24 h following CPSS attenuation.
attenuation \((P < 0.001)\). Hepatic mRNA expression of two markers of hepatocyte proliferation (HGF and MAT2A) was associated with the response to surgery in dogs with CPSS, and serum HGF significantly increased following surgery, suggesting hepatocyte proliferation. These findings support the concept that hepatic regeneration is important in the hepatic response to CPSS surgery.

**Quantitative assessment of hsp70, IL-1β and TNF-α in the spinal cord of dogs with E40K SOD1-associated degenerative myelopathy.**


Inflammation is involved in the pathogenesis of many neurodegenerative diseases. Canine degenerative myelopathy (DM) is a progressive adult-onset neurodegenerative disease commonly associated with an E40K missense mutation in the SOD1 gene. DM has many similarities to some familial forms of human amyotrophic lateral sclerosis (ALS) and may serve as an important disease model for therapy development. Pro-inflammatory mediators such as interleukin (IL)-1β, tumor necrosis factor (TNF)-α and heat shock protein (hsp) 70 play a role in the pathogenesis of ALS. The focus of the current work was to determine whether an inflammatory phenotype is present in canine DM as defined by IL-1β, TNF-α, and hsp70 responses in cerebrospinal fluid (CSF) and spinal cord tissue. Concentrations of hsp70, IL-1β and TNF-α were below the limits of detection by ELISA in the CSF of both normal and DM-affected dogs. Immunohistochemical staining for hsp70 was significantly increased in ependymal cells lining the spinal cord central canal of DM-affected dogs \((P = 0.003)\). This was not associated with increased IL-1β or TNF-α staining, but was associated with increased CD18 staining in the gray matter of DM-affected dogs. These results suggest that hsp70 in spinal cord tissue is a potential inflammatory signature in canine DM.

**Minimal residual disease detection by flow cytometry and PARR in lymph node, peripheral blood and bone marrow, following treatment of dogs with diffuse large B-cell lymphoma.**

Luca Aresu, Arianna Aricò, Serena Ferrarese, Valeria Martini, Stefano Comazzi, Fulvio Riondato, Mery Giantin, Mauro Dacasto, Eleonora Guadagnin, Patrick Frayssinet, Nicole Rouquet, Michele Drigo, Laura Marconato The most promising techniques for detecting minimal residual disease (MRD) in canine lymphoma are flow cytometry (FC) and polymerase chain reaction amplification of antigen receptor genes (PARR). However, the agreement between these methods has not been established. MRD was monitored by FC and PARR following treatment of dogs affected with diffuse large B-cell lymphoma (DLBCL), comparing results in lymph node (LN), peripheral blood (PB) and bone marrow (BM) samples. The prognostic impact of MRD on time to relapse (TTR) and lymphoma-specific survival (LSS) was also assessed. Fourteen dogs with previously untreated DLBCL were enrolled into the study; 10 dogs eventually relapsed, while four dogs with undetectable MRD were still in remission at the end of the study. At diagnosis, the concordance rate between FC and PARR was 100%, 78.6%, and 64.3% for LN, PB and BM, respectively. At the end of treatment, the agreement rates were 35.7%, 50%, and 57.1% for LN, PB and BM, respectively. At least one of the follow-up samples from dogs experiencing relapse was PARR+; conversely, FC was not able to detect MRD in seven of the dogs that relapsed. PARR was more sensitive than FC in predicting TTR, whereas the combination of PARR and FC was more sensitive than either technique alone in predicting LSS using PB samples. The results suggest that immunological and molecular techniques should be used in combination when monitoring for MRD in canine DLBCL.

**Journal of the American Animal Hospital Association (May/June)**

**Inside the Brachycephalic Nose: Intranasal Mucosal Contact Points**

Riccarda Schuenemann, Gerhard U. Oechtering,

The purpose of this study was to evaluate the prevalence of intranasal mucosal contact points in brachycephalic and normocephalic dogs. In total, 82 brachycephalic dogs (42 pugs and 40 French bulldogs) were evaluated by rhinoscopy for their intranasal mucosal contact and 25 normocephalic dogs were evaluated as a control group. Of those, 162 brachycephalic nasal cavities were evaluable and 140 had contact between intranasal structures (87%). Intraconchal and septoconchal mucosal contact points were the most commonly detected sites of contact. French bulldogs had a significantly higher prevalence of mucosal contact and had 3 mean contact points compared with 1.7
mean contact points per nasal cavity in pugs. Septal deviations were present in 62% of brachycephalic dogs. In the control group, mucosal contact points were present in only 7 of 50 nasal cavities (14%), and septal deviations occurred in 16% of those cases. Contact point average was 0.1 in large and 0.3 in small normocephalic dogs. Intranasal mucosal contact was identified as a common and previously unreported problem in brachycephalic dogs. Numerous contact points reduce the lumen of the intranasal passageways and indicate potential intranasal obstruction. Affected dogs might benefit from removal of obstructing conchae, potentially using laser-assisted turbinectomy.

A Pilot Comparison of Limited Versus Large Fluid Volume Resuscitation in Canine Spontaneous Hemoperitoneum
Tara N. Hammond, Jennifer L. Holm, Claire R. Sharp
Treatment for hemorrhagic shock secondary to a spontaneous hemoperitoneum includes restoration of IV volume and surgical control of hemorrhage. This study was designed to determine if limited fluid volume resuscitation (LFVR) with hypertonic saline (HS) and hyperoncotic fluids (hydroxyethylstarch [HES]) results in more rapid cardiovascular stabilization in dogs with spontaneous hemoperitoneum versus conventional resuscitation (CR) with large volume resuscitation. Eighteen client-owned dogs presenting in hemorrhagic shock with a spontaneous hemoperitoneum were enrolled. Dogs were randomized to be fluid resuscitated with up to 90 mL/kg of an isotonic crystalloid (CR group) or up to 8 mL/kg of 7.2% Na chloride (i.e., HS) combined with up to 10 mL/kg of 6% HES. Measurements of vital signs, lactate, packed cell volume (PCV), total solids (TS), and blood pressure were made at standard time points. The primary endpoint was time to stabilization of hemodynamic parameters (measured in min). Dogs in the LFVR group achieved hemodynamic stabilization significantly faster (20 min; range, 10–25 min) than those in the CR group (35 min; range, 15–50 min; P = .027). Future studies are warranted to further investigate potential benefits associated with LFVR in dogs with spontaneous hemoperitoneum.

Tolerability of Lomustine in Combination with Cyclophosphamide in Dogs with Lymphoma
Kenneth M. Rassnick, Dennis B. Bailey, Erin K. Malone, Andrea B. Flory, Michael A. Kiselow, Joanne L. Intile
This retrospective study describes toxicity associated with a protocol of lomustine (CCNU) and cyclophosphamide (CTX) in dogs with lymphoma. CCNU was administered per os (PO) at a targeted dosage of 60 mg/m² body surface area on day 0, CTX was administered PO at a targeted dosage of 250 mg/m² divided over days 0 through 4, and all dogs received prophylactic antibiotics. Ninety treatments were given to the 57 dogs included in the study. Neutropenia was the principal toxic effect, and the overall frequency of grade 4 neutropenia after the first treatment of CCNU/CTX was 30% (95% confidence interval, 19–43%). The mean body weight of dogs with grade 4 neutropenia (19.7 kg to 13.4 kg) was significantly less than the mean body weight of dogs that did not develop grade 4 neutropenia (31.7 kg to 12.4 kg; P = .005). One dog (3%) developed hematologic changes suggestive of hepatotoxicity. No dogs had evidence of either renal toxicity or hemorrhagic cystitis. Adverse gastrointestinal effects were uncommon. On the basis of the findings reported herein, a dose of 60 mg/m² of CCNU combined with 250 mg/m² of CTX (divided over 5 days) q 4 wk is tolerable in tumor-bearing dogs.

Relationship of Body Weight to Maintenance Cyclosporine A Dose in Canine Atopic Dermatitis
Loren Cohen, Sonja Zabel, Rod A.W. Rosychuk,
Cyclosporine A (CsA) is a commonly prescribed and effective therapy for canine atopic dermatitis. The purpose of this study was to investigate the potential relationship between patient body weight and CsA dosing. Seventy-seven cases of canine atopic dermatitis managed between 2000 and 2011 were evaluated retrospectively. Duration of CsA therapy was at least 16 wk. Groups analyzed included the study population as a whole, those treated with only CsA, and those treated with both CsA and metoclopramide. The division between small and large dogs was set at 15 kg. Descriptive analysis, two-way analysis of variance, Pearson correlations, and a Student t test were used to analyze data. There were no significant differences between CsA dose and body weight regardless of method of analysis. Concurrent corticosteroid use, other medication use, and pruritus score were also analyzed over the study period. There was a significant decrease in CsA dose, corticosteroid dose, medication score, and pruritus score between the time points for all patients, but no significant relationship between those changes and body weight. These study findings suggest that differential CsA dosing is not warranted based on body weight.

Short- and Long-Term Outcome of Dogs Following Surgical Correction of a Persistent Right Aortic Arch
Ingår A. Krebs, Shauna Lindsley, Stephanie Shaver, Catriona MacPhail
This study reports the survival to discharge, postdischarge survival, and long-term outcome of dogs following surgical correction of a persistent right aortic arch (PRAA). Information for 52 dogs, 28 dogs, and 23 dogs was available for analysis of survival to discharge, postdischarge survival, and long-term outcome, respectively. Ninety-two percent of dogs survived to the time of discharge and 18% of dogs surviving to discharge were euthanized within 2 mo of surgery. Breed, age at the time of presentation, and gender were not correlated with increased odds of death prior to discharge from the hospital. Long-term outcome for dogs was excellent in 30%, good in 57%, and poor in 13% of dogs. Although this study shows a relatively high mortality rate prior to discharge from the hospital and within 2 mo of surgical treatment, the long-term outcome is good or excellent in 87% of survivors. Dogs frequently display either residual clinical signs or require dietary modification longterm, but owner satisfaction is high.

Clinical Outcome for MCTs of Canine Pinnae Treated with Surgical Excision (2004–2008)
Timothy M. Schwab, Catherine Popovitch, John DeBiasio, Michael Goldschmidt
Canine mast cell tumors (MCTs) are the most common cutaneous neoplasm in the dog. It has been suggested that MCT in certain locations may behave in a more biologically aggressive fashion than MCTs located in others; however, no published data are available for MCTs of canine pinnae treated with surgical excision. A retrospective study of 28 animals with surgical excision of MCTs of pinnae was completed with a medical record review and follow-up questionnaire to the operating veterinarian. The effect of tumor grade, clean or dirty excision, cartilage penetration, and mitotic index (MI) on local recurrence and survival time (ST) was evaluated. There was local recurrence in one dog with a grade 2 MCT and in seven of eight dogs with grade 3 MCTs. The median ST of animals with grade 1 and 2 MCTs was not reached, whereas the median ST of animals with grade 3 MCTs was 10 mo. There was no statistical association between histologically clean and dirty margins and either local recurrence or ST. A prolonged disease free interval without local recurrence may be achieved with local excision of grade 1 and 2 MCTs. Animals with grade 3 MCTs had a uniformly poor outcome with short times to local recurrence and death.

Complete Surgical Removal of a Very Enlarged Pituitary Corticotroph Adenoma in a Dog
Federico Fracassi, Luciana Mandrioli, Dardan Shehdula, Alessia Diana, Guy C.M. Grinwis, Björn P. Meij
A 13 yr old castrated male vizsla was referred to the authors’ institute because of polyuria, polydipsia, polyphagia, and weight loss. Pituitary-dependent hypercortisolism (PDH) was diagnosed by hormone testing and adrenal and pituitary imaging. Computed tomography (CT) revealed a pituitary mass measuring 21 mm in width. Medical therapy was initiated with trilostane. Despite adequate control of the hypercortisolism, the polyuria and polydipsia persisted and the dog developed neurologic signs due to the pituitary mass effect. Pituitary transsphenoidal debulking surgery was performed and immunocytochemistry confirmed a corticotroph adenoma. The dog survived for 13 mo after surgery. Postmortem examination revealed an empty fossa without pituitary remnants and the presence of a malignant pheochromocytoma in the right adrenal gland. This case report demonstrates, for the first time, that a large pituitary adenoma in the dog may be treated successfully by pituitary surgery.

Synovial Myxoma in the Vertebral Column of a Dog: MRI Description and Surgical Removal
Casey P. Neary, William W. Bush, Deena M. Tiches, Amy C. Durham, Patrick R. Gavin,
A 12 yr old castrated male mixed-breed dog presented with a 2 wk history of progressive tetraparesis. Neurologic deficits included a short-strided choppy gait in the thoracic limbs and a long-strided proprioceptive ataxia in the pelvic limbs. Withdrawal reflexes were decreased bilaterally in the thoracic limbs. Signs were consistent with a myelopathy of the caudal cervical/cranial thoracic spinal cord (i.e., the sixth cervical [C] vertebra to the second thoracic [T] vertebra). A mass associated with the C6–C7 articular facet on the left side was identified on MRI of the cervical spinal cord. The lesion was hyperintense to spinal cord parenchyma on T2-weighted images, hypointense on T1-weighted images, and there was strong homogenous contrast enhancement. Significant spinal cord compression was associated with the lesion. The mass was removed through a C6–C7 dorsal laminectomy and facetectomy. Histopathology of the mass was consistent with a synovial myxoma of the articular facet. A postoperative MRI showed complete surgical resection. Albeit rare, synovial myxomas should be included in the list of differential diagnoses for neoplasms affecting the vertebral columns in dogs.

Distal Renal Tubular Acidosis Associated with Concurrent Leptospirosis in a Dog
Stephen A. Martinez, Roger A. Hostutler
A 9 yr old spayed female boxer was presented for evaluation of vomiting, lethargy, anorexia, and weight loss. Initial laboratory evaluation revealed a hyperchloremic normal anion gap metabolic acidosis with alkaline urine that was
consistent with a diagnosis of distal renal tubular acidosis (RTA). Targeted therapy was initiated with Na bicarbonate (HCO₃) and potassium (K) gluconate. Leptospirosis was subsequently diagnosed with paired microagglutination testing (MAT), and doxycycline was added to the other treatments. Clinical signs resolved, and 6 mo after diagnosis, although the dog remained on alkali therapy (i.e., NaHCO₃ and K gluconate) and a mild metabolic acidosis persisted, the dog remained otherwise healthy with a good quality of life. To the authors’ knowledge, this is the first report to describe the concomitant association of those two disorders. Leptospirosis should be considered for any case of RTA in dogs.

Spontaneous Resolution of Postoperative Chylothorax Following Surgery for Persistent Right Aortic Arch in Two Dogs
Laura Barbur, Heather Towle Millard, Steve Baker, Emily Klocke

Two young dogs underwent surgical management of a persistent right aortic arch (PRAA) and developed chylothorax postoperatively. In both cases, the surgical procedure and anesthetic recovery were uncomplicated and routine. Following surgery, both patients appeared bright, alert, responsive, and previous signs of regurgitation had resolved. Dyspnea and tachypnea developed 1–2 days postoperatively in each patient, and chylous effusion was detected on thoracocentesis. For each case, a diagnosis of chylothorax was based on cytology and triglyceride concentrations of the aspirated pleural fluid. Similar protocols for monitoring were used in the treatment of each patient’s chylothorax. The duration and volume of chylous effusion production were closely monitored via routine thoracostomy tube aspiration. Both dogs rapidly progressed to recovery with no additional complications. With diligent monitoring, chylothorax secondary to surgical trauma can resolve in a rapid, uncomplicated manner.

Surgical Excision of the Parotid Salivary Gland for Treatment of a Traumatic Mucocele in a Dog
Kathleen M. Guthrie, Robert J. Hardie

A 3 yr old spayed female mixed-breed German shepherd dog was presented with a right facial swelling that developed after fighting with another dog. A parotid salivary mucocele was diagnosed via physical examination, fine-needle aspirate, and sialography of the parotid and mandibular salivary glands. Surgical excision of the right parotid salivary gland and duct was performed along with drainage of the mucocele. Neither intraoperative nor postoperative complications occurred, and follow-up examination 4 mo later revealed no evidence of recurrence. Case outcome was considered excellent. Sialography was useful for confirming the parotid gland as the source of the mucocele. Surgical excision of the parotid salivary gland is technically challenging, but an effective treatment option for traumatic mucocles in the dog.

Recurrent Gastric Dilatation and Intestinal Dysmotility Possibly Resulting from Autonomic Neuropathy in a Great Dane
Joseph W. Spoo, G. Diane Shelton

A 5 yr old female spayed Great Dane was presented for recurrent episodes of gastric dilatation, intestinal dysmotility, and one episode of gastric rupture. Numerous hematologic, radiographic, and endocrine diagnostic tests were performed with no identifiable underlying cause. Many risk factors have been identified for gastric dilatation and most were present in this Great Dane. A number of symptomatic treatments, aimed primarily at altering the gastrointestinal tract flora and motility were tried, but failed to influence the clinical course of the disease. The dog continued to worsen, experienced more frequent episodes of gastric dilatation, and developed generalized muscle atrophy. Biopsies were collected from the biceps femoris and triceps brachii muscles. A pattern of denervation atrophy was evident in both muscles, consistent with polyneuropathy. The owners elected humane euthanasia and a necropsy was performed. A striking finding at necropsy was severe loss of myelinated fibers with extensive endoneurial fibrosis in the vagus nerve, consistent with an autonomic neuropathy. Autonomic neuropathy is a previously unexplored cause of gastric dilatation and intestinal dysmotility in dogs. These findings should open new directions for exploring pathogenic mechanisms for gastric dilatation in this species.

The New Zealand Veterinary Journal (May/June)

A comparison of anaesthetic recoveries in cats following induction with either alfaxalone or ketamine and diazepam
MA Gieseg, H Hon, J Bridges and V Walsh

AIM: To determine if cats anaesthetised with alfaxalone have different recoveries to cats anaesthetised with a combination of ketamine and diazepam. METHODS: Anaesthesia for ovariohysterectomy was induced in cats with
either alfaxalone (n=23) or a combination of ketamine and diazepam (n=22). All cats were premedicated with combinations of acepromazine and morphine. Recoveries were scored using a categorical grading scheme applied to 18 parameters over 60 minutes following extubation. The parameters scored covered movement, sensitivity to touch, sound and light, body position, sneezing and vocalisation. One person scored all recoveries and they were blinded to the induction drug used. Scores were compared between drugs at different times using the Kruskal–Wallis rank sum test. RESULTS: Recovery scores were not normally distributed. Analysis of the data using the Kruskal-Wallis rank sum test revealed that cats induced with alfaxalone showed an increase in recovery scores at 5 minutes for pawing at the head (p=0.001). No parameters differed significantly at 10 and 20 minutes. For cats anaesthetised with ketamine and diazepam there was an increase at 30 minutes in pacing, jerky sudden movements, unsettledness and increased sensitivity to touch at the surgical site and on the head (p≤0.01). At 60 minutes cats anaesthetised with ketamine and diazepam still showed an increase in unsettledness compared to those cats anaesthetised with alfaxalone (p=0.005). CONCLUSIONS: The results suggest that recoveries of cats following alfaxalone induction are significantly different to recoveries after induction with ketamine and diazepam. Overall, cats induced with ketamine and diazepam had more active and unsettled recoveries than alfaxalone over the 60-minute period observed. CLINICAL RELEVANCE: Cats recovering from alfaxalone anaesthesia have more settled recoveries than cats recovering from ketamine and diazepam anaesthesia. If a quiet settled recovery is desired following a surgical procedure, alfaxalone is likely to be a better choice than ketamine and diazepam.

Comparison of anaesthetic and analgesic effects of emulsified isoflurane used alone or combined with lidocaine and fentanyl in dogs

HG Fan, S Jiang, DQ Lin, DZ Lu, L Li, W Ji and WZ Li

AIM: The objective of this study was to investigate the effects of a combination of emulsified isoflurane, lidocaine, and fentanyl (EI-L-F) compared with the efficacy of emulsified isoflurane alone (EI), a combination of emulsified isoflurane and lidocaine (EI-L) or emulsified isoflurane and fentanyl (EI-F) for anaesthetising dogs. METHODS: Eight mongrel dogs were anaesthetised with EI (8mL/kg/hour), EI-L (3 mg/kg/hour lidocaine and 6 mL/kg/hour of emulsified isoflurane), EI-F (1.5 µg/kg/hour fentanyl and 6mL/kg/hour of emulsified isoflurane), and EI-L-F (5 L/kg/hour of emulsified isoflurane, 1 µg/kg/hour of fentanyl and 2.4 mg/kg/hour of lidocaine). Each dog received all four treatments and there was a 15-day washout period between the treatments. The dogs’ anaesthesia and analgesia scores and physiological parameters were determined before and 5, 10, 20, 30, 40, 50, 60, 70 and 80 minutes after the administration of anaesthetic agents. RESULTS: The dogs in each of the four groups became laterally recumbent within 1 minute. Respiration rate and heart rate increased (p<0.05) during the first 5 minutes of anaesthesia in all groups. Respiration rate in the EI-F-L group was higher (p=0.037) than other groups from 30 to 50 minutes. Heart rate was higher in the EI than EI-L-F group (p=0.018) from 10 to 20 minutes, then returned to near baseline. Arterial oxygen saturation decreased during the period of anaesthesia but was higher (p=0.032) from 10 to 50 minutes in EI-F-L group than in other groups. The total anaesthesia scores in the EI-L-F group were higher than the EI and EI-L groups (p<0.05). The mean time to body movement was 5 (SD 2), 5 (SD 2), 7 (SD 2) and 8 (SD 2) minutes for the EI, EI-L, EI-F and EI-F-L groups, respectively. The mean time to standing was 8 (SD 2), 9 (SD 2), 10 (SD 2) and 13 (SD 3) minutes for the EI, EI-L, EI-F and EI-F-L groups, respectively. No excitement was observed during recovery after anaesthesia. CONCLUSIONS: The EI-F-L Combination that was used in this study provided an adequate anaesthetic effect in dogs, which was characterised by adequate analgesia and muscle relaxation without any complications.

Seroprevalence and exposure to risk factors for leptospirosis among veterinary students at Massey University

F Fang, J Benschop, PR Wilson, JM Collins-Emerson, C Heuer and D Prattley

AIMS: To determine the seroprevalence and quantify putative risk factors for exposure to leptospirosis both within and outside the veterinary curriculum among undergraduate veterinary students at Massey University, New Zealand. METHODS: A cross-sectional study was conducted from September 2010 to November 2011. In total, 302 students were blood sampled, with serum tested by microscopic agglutination test (MAT) for antibodies to Leptospira borgpetersenii serovars Hardjobovis, Leptospira interrogans Pomona and Leptospira borgpetersenii Ballum. Information on demographic characteristics, potential exposure within and outside the veterinary curriculum in the previous 18 months, and previous leptospirosis-like clinical history were recorded using an online questionnaire. RESULTS: All students were MAT negative for each serovar, using a cut-point of ≥1:48. Potential exposure to animal urine within and outside the veterinary curriculum was reported by 259/302 (85.8%) and 150/302 (49.7%) of the students, respectively. The median number of potential exposures to animal urine by each student within the veterinary curriculum in the previous 18 months was 63 (min 1, max 155). The other potential exposures among respondents included home slaughter (63/302; 20.9%), hunting (43/302; 14.2%) and outdoor activities involving
exposure to fresh water (241/302; 79.8%). CONCLUSIONS: This study demonstrated that these veterinary students were at low risk of contracting leptospirosis, despite frequent exposure to potential sources of infection. The findings in this study contribute to a broader understanding of the occupational risk of leptospirosis. Data describe the level of animal exposure in veterinary students, which can support other zoonotic disease studies in this group.

**Veterinary Clinics of North America (May/June)**

**Small Animal Behavioral Triage: A Guide for Practitioners**
Kenneth M. Martin, Debbie Martin, Julie K. Shaw
Behavioral concerns are the principal cause of a weakened human-animal bond and pet relinquishment. Triaging behavioral concerns and providing early intervention may be the difference between a patient remaining in its current home or relinquishment. Prevention and intervention behavior services using a team approach may also improve pet retention through client education and appropriate assistance. Identifying and integrating qualified animal behavior professionals to assist with the hospital’s behavior team ensures appropriate support is provided to the client and patient.

**Common Sense Behavior Modification: A Guide for Practitioners**
Debra F. Horwitz, Amy L. Pike
Behavior problems are often given as a reason for pet relinquishment to shelters. When presented with any behavior problem, veterinarians should perform a thorough physical examination (including neurologic and orthopedic examination) and a minimum database, including a complete blood cell count, chemistry panel, and total T4 and free T4 by equilibrium dialysis if values are low to rule out any medical contributions. Veterinarians should be a source of information regarding management, safety, and basic behavior modification for common behavior problems. Additionally, various control devices offer pet owners the ability to better manage their pets in difficult situations.

**Canine and Feline Enrichment in the Home and Kennel: A Guide for Practitioners**
Sarah Heath, Clare Wilson
As general veterinary practitioners, we have a duty of care that applies not only to the physical health needs of our patients but also to their mental well-being. Advising clients about how to enrich their home and kennel environments is an important part of fulfilling that duty of care and will also enrich the relationship between the veterinary practitioner and client. This article discusses how to optimize welfare for dogs and cats in the home and kenneled environments through appropriate environmental enrichment and understanding of species-typical behavioral requirements.

**The Pet-friendly Veterinary Practice: A Guide for Practitioners**
Meghan E. Herron, Traci Shreyer
Low-stress handling is important for the safety of the veterinary staff and for the welfare of the patient. The commitment to ensuring the emotional well-being of the patient should be equal to that shown toward the physical well-being of the animals under a veterinarian’s care. Before handling animals it is essential to assess the environment and the patient’s response to it. Taking the time to create a behavior handling plan makes future visits easier and bonds clients to the practice. Understanding how and when to use handling tools is key to making patient visits safer, more humane, and more efficient.

**Genetics and Behavior: A Guide for Practitioners**
Karen L. Overall, Katrina Tiira, Desiree Broach, Deborah Bryant
Phenotyping behavior is difficult, partly because behavior is almost always influenced by environment. Using objective terms/criteria to evaluate behaviors is best; the more objective the assessment, the more likely underlying genetic patterns will be identified. Behavioral pathologies, and highly desirable behavioral characteristics/traits, are likely complex, meaning that multiple genes are probably involved, and therefore simple genetic tests are less possible. Breeds can be improved using traditional quantitative genetic methods; unfortunately, this also creates the possibility of inadvertently selecting for covarying undesirable behaviors. Patterns of behaviors within families and breed lines are still the best guidelines for genetic counseling in dogs.
Recognizing Behavioral Signs of Pain and Disease: A Guide for Practitioners
Diane Frank
Disease is always associated with changes in behavior such as disappearance of normal behaviors or appearance of new behaviors. These changes are often considered as abnormal behavior, indicating illness and/or pain. The aim of this article is to illustrate some examples of cases that might present as behavioral disorders but are in fact medical conditions. Subtle behavioral signs of disease are also discussed.

Stress—Its Effects on Health and Behavior: A Guide for Practitioners
Daniel Mills, Christos Karagiannis, Helen Zulch
Stressors impact on all areas of a pet's life, potentially to the detriment of their well-being. In addition, should this lead to behavior change, it is likely to cause strain in the owner-pet relationship with an increased risk of relinquishment. Understanding why events may be perceived as stressful to a given individual is essential in remedying their effect. Clinicians need to be skilled in recognizing and categorizing potential stressors as well as auditing the background stress in the animal's environment as only once this has been accomplished can specific measures be implemented to reduce the effects of the stress load.

Abnormal Repetitive Behaviors in Dogs and Cats: A Guide for Practitioners
Valarie V. Tynes, Leslie Sinn
Abnormal repetitive behaviors (ARBs) represent a diverse group of behaviors whose underlying mechanism is poorly understood. Their neurobiology likely involves several different neurotransmitter systems. These behaviors have been referred to as compulsive disorders, obsessive compulsive disorders and stereotypies. Underlying medical conditions and pain can often cause changes in behavior that are mistaken for ARBs. A complete medical work-up is always indicated prior to reaching a presumptive diagnosis. The frequency of ARBs can be reduced but not always eliminated with the use of selective serotonin reuptake inhibitors (SSRIs) or tricyclic antidepressants (TCAs) in conjunction with behavior modification and environmental enrichment.

Intercat Aggression: Restoring Harmony in the Home: A Guide for Practitioners
Christopher L. Pachel
Intercat aggression is a common problem within multicat households. Diagnosis and treatment requires an understanding of the social structure of free-living cats and of how those interactions are impacted by confinement and household management practices. There are multiple causes of aggression between cats within a home, and treatment plans should be customized to account for the diagnosis and behavior pattern identified. Some cases of intercat aggression can be treated successfully without requiring full separation of the involved cats. In cases where separation is required, treatment includes steps for successful reintroduction and reintegration. Several situational and maintenance medication options can be used to improve the response to treatment.

Feline Aggression Toward Family Members: A Guide for Practitioners
Melissa Bain, Elizabeth Stelow
Feline aggression toward people is a common and potentially dangerous problem. Proper diagnosis of the underlying cause of the aggression is key in effective treatment. A complete history, including information on the people in the home, other pets, and specific incidents, is necessary to make this diagnosis. A comprehensive treatment plan typically includes management, enhancement of the cat’s living environment, techniques for replacing the aggressive behavior with more appropriate behaviors, and, potentially, medication. The treatment plan must reflect the abilities and commitment of the owner.

Canine Aggression Toward People: A Guide for Practitioners
Karen Lynn C. Sueda, Rachel Malamed
This article reviews the various causes of human-directed aggression in dogs and provides a step-by-step plan guiding the general practitioner through history taking, behavior observations, diagnosis, consultation, treatment, and follow-up care. Charts summarizing how to obtain behavioral information, the client’s management options, treatment recommendations, diagnosis and treatment of human-directed aggression, and the clinician’s role in preventing human-directed aggression are included. A graphic illustration of canine body language is also provided.

Appendix: Drug Dosage Chart
Caroline Perrin, Kersti Seksel, Gary M. Landsberg
For many medications, the pharmacokinetics and pharmacodynamics in pets have not been established and even where studies have been done, there is widespread species and individual variation. Practitioners should start with the lower end of the dose range and titrate up to maximum doses where there is insufficient therapeutic effect and no adverse effects or contraindications. Complete blood count, serum chemistry profile, and urinalysis should be performed before initiating the use of any medication, especially with off-label medications. Pharmacologic intervention for the treatment of behavior problems should be considered just one aspect of a comprehensive behavioral management and treatment protocol.

**Journal of Small Animal Practice**

**Whole blood manganese concentrations in dogs with primary hepatitis.**

Objectives: Increased whole blood manganese concentrations have been reported in humans with primary liver disease. Due to the neurotoxic effects of manganese, altered manganese homeostasis has been linked to the development of hepatic encephalopathy. Whole blood manganese concentrations are increased in cases of canine congenital portosystemic shunts, but it remains unclear whether dogs with primary hepatopathies also have altered manganese homeostasis. Methods: Whole blood manganese concentrations were measured by graphite furnace atomic absorption spectrometry in 21 dogs with primary hepatitis, 65 dogs with a congenital portosystemic shunt, 31 dogs with non-hepatic illnesses and 18 healthy dogs. Results: The whole blood manganese concentrations were significantly different between dogs with primary hepatitis, dogs with non-hepatic illnesses and healthy dogs (P=0.002). Dogs with primary hepatitis had significantly increased whole blood manganese concentrations compared with healthy dogs (P<0.05) and dogs with non-hepatic illnesses (P<0.01). Dogs with primary hepatitis had significantly lower whole blood manganese concentration compared with dogs with congenital portosystemic shunts (P=0.0005). Clinical Significance: Dogs with primary hepatopathies have increased concentrations of whole blood manganese although these concentrations are not as high as those in dogs with congenital portosystemic shunts. The role of altered manganese homeostasis in canine hepatic encephalopathy is worthy of further study.

**Fish oil supplementation increases concentration of adiponectin in healthy dogs.**

OBJECTIVE; To determine the effect of fish oil supplementation on circulating concentrations of adiponectin, leptin, insulin, glucose, triglyceride and cholesterol in healthy dogs. METHODS; Twenty healthy adult dogs were administered 220 mg/kg of a fish oil supplement once daily for 30 days. At baseline, on supplement and 10 to 20 weeks off supplement, dogs were examined, body condition scores determined (range: 4 to 6), body measurements recorded for % body fat calculation and fasted blood samples collected. RESULTS; Serum concentrations of the measured individual and total n-3 polyunsaturated fatty acids increased following supplementation (P<0.001). Mean serum adiponectin concentration on supplement was 3.4 µg/mL (95% confidence interval: 0.8 to 6.6; P=0.006) higher than baseline, and 5.3 µg/mL (2.0 to 8.7; P<0.001) higher than off supplement. Concentrations of adiponectin off supplement were not different from baseline. There were no significant differences in weight, body condition scores, % body fat and concentrations of other measured analytes between baseline and on supplement. CLINICAL SIGNIFICANCE; Fish oil supplementation significantly increased circulating concentration of adiponectin in healthy non-obese dogs. Further investigation is warranted to determine whether this effect may be extended to obese dogs and to evaluate the potential role of fish oil supplementation in the management of disorders associated with low circulating adiponectin concentrations.

**A retrospective evaluation of doxorubicin-based chemotherapy for dogs with right atrial masses and pericardial effusion.**

OBJECTIVE; To report the outcome of doxorubicin-based chemotherapy as the sole treatment for dogs with echocardiographically identified right atrial masses and pericardial effusion. METHODS; A retrospective study of case records of dogs with right atrial masses treated with doxorubicin. Dogs were excluded from the study if they had any type of surgery performed such as pericardiectomy or right atrial mass resection, or if their chemotherapy protocol did not include doxorubicin. The data collected included signalment, history, physical examination findings, diagnostic test results and long-term survival. RESULTS; Dogs with right atrial masses and pericardial effusion that received doxorubicin-based chemotherapy alone had a median survival of 139 ± 5 days (range 2 to 302 days). Chemotherapy side effects were frequent but mild. CLINICAL SIGNIFICANCE; Doxorubicin-based
chemotherapy alone appears to be a viable treatment option for dogs with echocardiographically identified right atrial masses and pericardial effusion.

**Comparison of manual and laboratory PCV and total protein using EDTA and lithium heparin canine samples.**


**Objectives;** To evaluate if lithium heparin (LiH) and potassium ethylenediaminetetraacetic acid (EDTA) can be used interchangeably to obtain packed cell volume (PCV) and total protein by refractometry (TPr), and to compare those values with laboratory derived haematocrit (Hct) and total protein (TP) concentration, respectively, in canine blood samples. **Methods;** Blood samples taken in LiH and EDTA were manually assessed for PCV and TPr. Results were correlated to Hct and TP. Results; 238 EDTA and corresponding serum/LiH samples were obtained. There was excellent correlation but statistically significant difference between LiH and EDTA PCV (n=43). LiH and EDTA TPr (n=43) were excellently correlated without significant difference. PCV and Hct (n=176) were excellently correlated without significant difference. LiH (n=105) and serum (n=133) TP was respectively fairly or well correlated with TPr but with significant differences. An increase in cholesterol of 1 mmol/L was associated with a mean independent increase in TPr of approximately 1 g/L. **Clinical Significance;** LiH and EDTA can be used interchangeably for TPr. Although TPr and serum/plasma TP were correlated, there were statistically significant differences that could impact on clinical decision making. TPr is increased by cholesterol but this alone could not account for the magnitude of the difference observed.

**Prevalence and demographics of the MYBPC3-mutations in ragdolls and Maine coons in the British Isles.**


**OBJECTIVES;** To determine prevalence and demographics of two myosin-binding protein C (MYBPC3) mutations that affect ragdolls (R820W) and Maine coons (A31P) in the British Isles. **METHODS;** From the database of a genetic testing laboratory samples from 2018 ragdolls and 742 Maine coons were analysed with respect to mutation status, age, sex and county of origin. The actual prevalence was compared to the expected Hardy–Weinberg prevalence by chi-squared test. **RESULTS;** The prevalence of the R820W mutation in ragdolls was 27% (25.6% heterozygous, 1.4% homozygous), and that of the A31P mutation in Maine coons was 39.4% (36.4% homozygous, 3% heterozygous). There were more female cats (69.5% ragdoll, 70.3% Maine coon). The median age was 6-4 months (ragdolls) and 5-9 months (Maine coons). Cats from more than 60 counties were represented for each breed. The difference between the expected and observed allele frequency was significant in Maine coons (P=0.047) but not in ragdolls (P=0.092). **CLINICAL SIGNIFICANCE;** This is the first report of prevalence and demographics of the R820W and A31P mutations in ragdolls and Maine coons, respectively, in the British Isles. The prevalence is high, which is of relevance for breeding and screening programmes. The significant difference in genetic distribution may suggest early death of homozygous Maine coons.

**Unusual congenital pulmonary anomaly with presumed left lung hypoplasia in a young dog.**

C. M. Lee, J. H. Kim, M. H. Kang, K. D. Eom and H. M. Park

A seven-month-old, entire, male miniature schnauzer dog was referred with acute vomiting, inappetence and depression primarily as a result of a gastric foreign body (pin cones). During investigations, thoracic radiographs revealed increased volume of the right lung lobes, deviated cardiomes/interstitial structures and elevation of the heart from the sternum. Thoracic computed tomography revealed left cranial lung lobe hypoplasia and extension of the right cranial lung parenchyma across the midline to the left hemithorax. Branches of the right pulmonary vessels and bronchi also crossed the midline and extended to the left caudal lung lobe. These findings suggested that the right and left lungs were fused. In humans this finding is consistent with horseshoe lung, which is an uncommon congenital malformation. To the authors’ knowledge, this case represents the first report of such a pulmonary anomaly in a dog.

**Conversion of atrial fibrillation after levothyroxine in a dog with hypothyroidism and arterial thromboembolism.**

B. Chow and A. French

A six-year-old female spayed mixed-breed dog was referred following a 3-week history of lameness and progressive neurological deficits in both hindlimbs, and a 1-week history of a cardiac arrhythmia. The dog was diagnosed with hypothyroidism, atrial fibrillation, myocardial dysfunction and arterial thromboembolism. Cardioversion occurred after 2 weeks of levothyroxine supplementation, with improved systolic function over time. To the authors’ knowledge, this is the first case reported in the veterinary or human literature documenting hypothyroidism with persistent atrial fibrillation being converted to sinus rhythm with levothyroxine as sole therapy.
Paraparesis as initial manifestation of a Prototheca zopfii infection in a dog.
C. Font, J. Mascort, M. Márquez, C. Estevez, D. Sánchez, N. Durall, M. Pumarola and A. Luján
A case of protothecosis causing non-ambulatory paraparesis in a dog without clinical evidence of disseminated infection is described. A five-year-old female Labrador retriever was referred with a 10-day history of progressive non-ambulatory paraparesis and lumbar pain as the only physical and neurological abnormalities. Lumbar myelography revealed severe extradural spinal cord compression extending from L4 to L7 vertebrae, and a right hemilaminectomy was performed. Surgical findings included an adherent whitish hard ill-defined mass. Cytology and biopsy results disclosed the presence of algae enclosed in a matrix of chronic inflammatory infiltrate. Culture confirmed the presence of Prototheca species. Neurological improvement occurred within a month, and the dog received antifungal treatment without evidence of clinical disseminated disease for 6 months, but died after a generalised tonic–clonic seizure. Post-mortem examination revealed multiple foci of inflammatory granulomatous infiltrate and algae-like structures in the brain, lumbar intumescence and cauda equina. Prototheca zopfii was identified using molecular biology methods.

American Journal of Veterinary Research

Evaluation of thromboelastography for prediction of clinical bleeding in thrombocytopenic dogs after total body irradiation and hematopoietic cell transplantation.
Melissa C. Bucknoff, Rita M. Hanel, Steven L. Marks, Alison A. Motsinger-Reif, Steven E. Suter.
Objective—To determine whether thromboelastography is more accurate than conventional methods of evaluating hemostasis for the prediction of clinical bleeding in thrombocytopenic dogs following total body irradiation (TBI) and bone marrow transplantation (BMT). Animals—10 client-owned thrombocytopenic dogs with multicentric lymphoma. Procedures—Results of a kaolin-activated thromboelastography assay, platelet count, and buccal mucosal bleeding time were evaluated for correlation to clinical bleeding. Results—Maximum amplitude, derived via thromboelastography, was the only hemostatic variable with significant correlation to clinical bleeding. Buccal mucosal bleeding time had a high sensitivity but poor specificity for identifying dogs with clinical bleeding. Conclusions and Clinical Relevance—Compared with buccal mucosal bleeding time and platelet count, thromboelastography was more reliable at identifying thrombocytopenic dogs with a low risk of bleeding and could be considered to help guide the use of transfusion products in dogs undergoing TBI and BMT.

Pharmacokinetics of dexmedetomidine after intravenous administration of a bolus to cats.
Bruno H. Pypendop, Jan E. Ilkiw.
Objective—To characterize the pharmacokinetics of dexmedetomidine after IV administration of a bolus to conscious healthy cats. Animals—5 healthy adult spayed female cats. Procedures—Dexmedetomidine was administered IV as a bolus at 3 doses (5, 20, or 50 µg/kg) on separate days in a random order. Blood samples were collected immediately before and at various times for 8 hours after drug administration. Plasma dexmedetomidine concentrations were determined with liquid chromatography–mass spectrometry. Compartment models were fitted to the concentration-time data by means of nonlinear regression. Results—A 2-compartment model best fit the concentration-time data after administration of 5 µg/kg, whereas a 3-compartment model best fit the data after administration of 20 and 50 µg/kg. The median volume of distribution at steady-state and terminal half-life were 371 mL/kg (range, 266 to 435 mL/kg) and 31.8 minutes (range, 30.3 to 39.7 minutes), respectively, after administration of 5 µg/kg; 545 mL/kg (range, 445 to 998 mL/kg) and 56.3 minutes (range, 39.3 to 68.9 minutes), respectively, after administration of 20 µg/kg; and 750 mL/kg (range, 514 to 938 mL/kg) and 75.3 minutes (range, 52.2 to 223.3 minutes), respectively, after administration of 50 µg/kg. Conclusions and Clinical Relevance—The pharmacokinetics of dexmedetomidine was characterized by a small volume of distribution and moderate clearance and had minimal dose dependence within the range of doses evaluated. These data will help clinicians design dosing regimens once effective plasma concentrations are established.

Relationship between plasma dexmedetomidine concentration and sedation score and thermal threshold in cats.
Bruno H. Pypendop, Jan E. Ilkiw.
Objective—To characterize the relationship between plasma dexmedetomidine concentration and the temperature difference between the thermal threshold and skin temperature (ΔT) and between plasma dexmedetomidine concentration and sedation score in healthy cats. Animals—5 healthy adult spayed female cats. Procedures—Cats received IV administrations of saline (0.9% NaCl) solution, dexmedetomidine (5, 20, or 50 µg/kg), or acepromazine
(0.1 mg/kg). Blood samples were collected and thermal threshold and sedation score were determined before and at various times up to 8 hours after drug administration. In addition, cats received an IV infusion of dexmedetomidine that targeted a concentration achieving 99% of the maximum effect on $\Delta T$. Results—No change in $\Delta T$ over time was found for the saline solution and acepromazine treatments; $\Delta T$ increased for 45 minutes when cats received dexmedetomidine at 5 and 20 µg/kg and for 180 minutes when cats received dexmedetomidine at 50 µg/kg. No change in sedation score over time was found for saline solution. Sedation score increased for 120 minutes after cats received acepromazine and for 60, 120, and 180 minutes after cats received dexmedetomidine at 5, 20, and 50 µg/kg, respectively. The plasma dexmedetomidine concentration–effect relationships for the effect on $\Delta T$ and sedation score were almost identical. The plasma dexmedetomidine concentration after infusion was lower than targeted, and $\Delta T$ was not significantly affected. Conclusions and Clinical Relevance—Dexmedetomidine administration to cats resulted in thermal analgesia and also profound sedation. These data may be useful for predicting the course of thermal analgesia and sedation after dexmedetomidine administration to cats.

Journal of the American Veterinary Medical Association – May 15

Clinical findings in dogs with incidental adrenal gland lesions determined by ultrasonography: 151 cases (2007-2010).
Cook AK1, Spaulding KA, Edwards JF.
OBJECTIVE: To determine the prevalence of and clinical features associated with incidental adrenal gland lesions (IAGLs) discovered during abdominal ultrasonography in dogs. DESIGN: Retrospective case series. ANIMALS: 151 dogs with an IAGL and 400 control dogs. PROCEDURES: Reports of ultrasonographic examinations of the abdomen of dogs performed during a 3.5-year period were reviewed. Adrenal glands were classified as having an IAGL if a nodule or mass was described or the width of either gland was ≥ 10 mm. For dogs with an IAGL, information regarding signalment, concurrent disorders, and outcome was obtained from the medical record. Findings were compared with those in a control population of 400 dogs examined during the same period. RESULTS: An IAGL was detected in 151 of 3,748 (4%) dogs. Dogs with an IAGL were significantly older (median age, 11.25 years) and heavier (median body weight, 21 kg [46.2 lb]) than the control population (median age, 9.5 years; median body weight, 14 kg [30.8 lb]). Malignant tumors were reported in 6 of 20 (30%) dogs that underwent adrenal glandectomy or necropsy and had a maximum IAGL dimension that ranged from 20 to 46 mm; benign lesions all had a maximum dimension < 20 mm. Various coincidental conditions were reported in dogs with an IAGL, including nonadrenal gland malignant neoplasia in 43 (28.5%) dogs. CONCLUSIONS AND CLINICAL RELEVANCE: IAGLs were more likely in dogs ≥ 9 years of age. On the basis of this small data set, malignancy should be suspected for IAGLs ≥ 20 mm in maximum dimension.

Nichols MC1, Ettestad PJ, Vinhatton ES, Melman SD, Onischuk L, Pierce EA, Aragon AS.
OBJECTIVE: To describe the epidemiology, clinical signs, and treatment practices in dogs with Yersinia pestis infection in New Mexico. DESIGN: Retrospective case series. ANIMALS: 62 dogs with plague in New Mexico. PROCEDURES: Confirmed case animals had isolation of Yersinia pestis from a clinical specimen, a positive direct fluorescent antibody test result, or a minimum 4-fold change between acute and convalescent serum antibody titers with clinically compatible illness. Retrospective review of cases of laboratory-confirmed plague from 2003 to 2011 was performed with a standardized chart abstraction form. Epidemiologic, clinical, and treatment data were evaluated. RESULTS: 62 confirmed cases of canine plague were identified from 2003 to 2011. Most cases (85%) were confirmed by serologic titers alone or in conjunction with other testing methods. Clinical signs included fever (100%), lethargy (97%), anorexia (77%), lymphadenopathy (23%), vomiting (13%), diarrhea (8%), and abscesses (2%). Most case animals (73%) were treated with multiple antimicrobials. Sixty (97%) case animals survived; of the 2 nonsurvivors, one was euthanized and another died. Potential sources of exposure to Y pestis included hunting, rodent or rabbit exposure, and residence in rural areas. CONCLUSIONS AND CLINICAL RELEVANCE: Results indicated that dogs with exposure to Y pestis can develop moderate to severe illness or die as a result of infection. Veterinarians practicing in and examining animals from the western United States need to be familiar with the epidemiology of plague and query owners about potential plague exposures when consistent clinical signs are present. Veterinarians are often the first to recognize signs of plague among sentinel populations and have the opportunity to intervene and prevent zoonotic disease transmission.
Comparison of rectal and axillary temperatures in dogs and cats.
Goic JB1, Reineke EL, Drobotz KJ.

OBJECTIVE: To compare rectal versus axillary temperatures in dogs and cats. DESIGN: Prospective observational study. ANIMALS: 94 dogs and 31 cats. PROCEDURES: Paired axillary and rectal temperatures were measured in random order with a standardized method. Animal signalment, initial complaint, blood pressure, blood lactate concentration, and variables associated with vascular perfusion and coat were evaluated for associations with axillary and rectal temperatures. RESULTS: Axillary temperature was positively correlated with rectal temperature ($\rho = 0.75$ in both species). Median axillary temperature (38.4°C [101.1°F] in dogs, and 38.4°C [101.2°F] in cats) was significantly different from median rectal temperature in dogs (38.9°C [102.0°F]) but not in cats (38.6°C [101.5°F]). Median rectal-axillary gradient (difference) was 0.4°C (0.7°F; range, -1.3° to 2.3°C [-2.4° to 4.1°F]) in dogs and 0.17°C (0.3°F; range -1.1° to 1.6°C [-1.9° to 3°F]) in cats. Sensitivity and specificity for detection of hyperthermia with axillary temperature were 57% and 100%, respectively, in dogs and 33% and 100%, respectively, in cats; sensitivity and specificity for detection of hypothermia were 86% and 87%, respectively, in dogs and 80% and 96%, respectively, in cats. Body weight ($\rho = 0.514$) and body condition score ($\rho = 0.431$) were correlated with rectal-axillary gradient in cats. CONCLUSIONS AND CLINICAL RELEVANCE: Although axillary and rectal temperatures were correlated in dogs and cats, a large gradient was present between rectal temperature and axillary temperature, suggesting that axillary temperature should not be used as a substitute for rectal temperature.

Efficacy of orally administered maropitant citrate in preventing vomiting associated with hydromorphone administration in dogs.
Hay Kraus BL.

OBJECTIVE: To evaluate the effectiveness of orally administered maropitant citrate in preventing vomiting after hydromorphone hydrochloride administration in dogs. DESIGN: Randomized, blinded, prospective clinical study. ANIMALS: 40 dogs with American Society of Anesthesiologists status of I or II, > 6 months of age, and weighing between 24 and 58.2 kg (52.8 and 128.04 lb). PROCEDURES: Dogs were randomly selected to receive maropitant (2.0 to 4.0 mg/kg [0.9 to 1.8 mg/lb]) or placebo (lactose monohydrate) orally 2 hours prior to receiving hydromorphone (0.1 mg/kg [0.045 mg/lb], IM). A blinded observer recorded the occurrence of vomiting or signs of nausea (eg, salivation or lip-licking) during a 30-minute period after hydromorphone administration. Two-tailed Fisher exact tests were used to compare the incidences of vomiting and signs of nausea with or without vomiting between treatment groups. Results-Of the 20 dogs receiving maropitant, none vomited but 12 (60%) developed signs of nausea. Of the 20 dogs receiving placebo, 5 (25%) vomited and 11 (55%) developed signs of nausea; overall, 16 of 20 (80%) dogs in the placebo treatment group vomited or developed signs of nausea. Compared with the effects of placebo, maropitant significantly decreased the incidence of vomiting but not signs of nausea in dogs administered hydromorphone. CONCLUSIONS AND CLINICAL RELEVANCE: Among the 40 study dogs, the incidence of vomiting associated with hydromorphone administration was 25%. Oral administration of maropitant prevented vomiting but not signs of nausea associated with hydromorphone administration in dogs.

Journal of the American Veterinary Medical Association – May 1

Type II error and statistical power in reports of small animal clinical trials.
Giuffrida MA.

OBJECTIVE: To describe reporting of key methodological elements associated with type II error in published reports of small animal randomized controlled trials (RCTs) and to determine the statistical power in a subset of RCTs with negative results. DESIGN: Descriptive literature survey. SAMPLE: Reports of parallel-group clinical RCTs published in 11 English-language veterinary journals from 2005 to 2012. PROCEDURES: Predefined criteria were used to identify trial primary outcomes and classify results as negative or positive. Details of sample size determination and use of confidence intervals in results reporting were recorded. For each 2-group RCT with negative results, the statistical power to detect 25% and 50% relative differences in outcome was calculated.
Osteosarcoma following tibial plateau leveling osteotomy in dogs: 29 cases (1997-2011).
Selmic LE1, Ryan SD, Boston SE, Liptak JM, Culp WT, Sartor AJ, Prpich CY, Withrow SJ.
OBJECTIVE: To determine the signalment, tibial plateau leveling osteotomy (TPLO) plate type, clinical staging information, treatment, and oncological outcome in dogs that developed osteosarcoma at the proximal aspect of the tibia following TPLO and to calculate the interval between TPLO and osteosarcoma diagnosis. DESIGN: Multi-institutional retrospective case series. ANIMALS: 29 dogs. PROCEDURES: Medical records from 8 participating institutions were searched for dogs that developed osteosarcoma (confirmed through cytologic or histologic evaluation) at previous TPLO sites. Signalment, TPLO details, staging tests, treatment data, and outcome information were recorded. Descriptive statistics were calculated, and disease-free intervals and survival times were evaluated by means of Kaplan-Meier analysis. RESULTS: 29 dogs met the inclusion criteria. The mean age was 9.2 years and mean weight was 45.1 kg (99.2 lb) at the time of osteosarcoma diagnosis. Most dogs had swelling over the proximal aspect of the tibia (17/21) and lameness of the affected limb (28/29). The mean interval between TPLO and osteosarcoma diagnosis was 5.3 years. One type of cast stainless steel TPLO plate was used in most (18) dogs; the remaining dogs had received plates of wrought stainless steel (n = 4) or unrecode type (7). Twenty-three of 29 dogs underwent treatment for osteosarcoma. Median survival time for 10 dogs that underwent amputation of the affected limb and received ≥ 1 chemotherapeutic treatment was 313 days. CONCLUSIONS AND CLINICAL RELEVANCE: Results supported that osteosarcoma should be a differential diagnosis for dogs with a history of TPLO that later develop lameness and swelling at the previous surgical site. Oncological outcome following
amputation and chemotherapy appeared to be similar to outcomes previously reported for dogs with appendicular osteosarcoma.

**The Australian Veterinary Journal**

**Carbonate apatite nephrolithiasis associated with Corynebacterium urealyticum urinary tract infection in a dog.**

Fleischhacker S1, Horstmann C, Hartmann K, Schubert S, Dorsch R.

**BACKGROUND:** Urinary tract infections caused by *Corynebacterium urealyticum* are uncommon in veterinary medicine. Encrusted cystitis, encrusted pyelitis and uroliths have been described as complications in humans, but only encrusted cystitis and cystoliths have been reported in dogs so far. Because *C. urealyticum* is usually resistant to all standard antibacterial drugs, antimicrobial treatment and elimination of this microorganism are challenging.

**CASE REPORT:** An 11-month-old female spayed mixed-breed dog was evaluated because of a *C. urealyticum* urinary tract infection, mineralisation within both renal pelvises and failure of antimicrobial treatment. Physical examination, haematology and biochemistry were unremarkable. Radiographic and ultrasonographic examinations confirmed bilateral nephrolithiasis. Voided uroliths were composed of 100% carbonate apatite. Urinalysis was indicative of bacterial infection. Aerobic culture of the urine and 16S rRNA sequencing identified significant growth of *C. urealyticum* and susceptibility testing revealed sensitivity to only vancomycin and linezolid. **CONCLUSION:** Treatment with the oxazolidinone antibacterial, linezolid, in combination with a urine-acidifying diet resulted in elimination of this multiresistant microorganism and complete resolution of nephrolithiasis.

**Canine superficial bacterial pyoderma: evaluation of skin surface sampling methods and antimicrobial susceptibility of causal Staphylococcus isolates.**

Ravens PA1, Vogelnest LJ, Ewen E, Bosward KI, Norris JM.

**OBJECTIVE:** To evaluate three easily performed methods of skin surface sampling for bacterial culture of *Staphylococcus* isolates obtained from dogs with superficial bacterial pyoderma (SBP) presenting to two veterinary teaching hospitals in Sydney, Australia, and to determine the antimicrobial susceptibility of isolates.

**DESIGN:** Prospective study of 27 dogs with SBP. Cytologically confirmed SBP lesions were sampled for bacterial culture using a dry cotton swab, a saline-moistened cotton swab and a skin surface scraping. Isolates were identified by standard discriminatory phenotypic and biochemical analyses, and confirmed using matrix-assisted laser desorption ionisation time of flight mass spectrometry (MALDI-TOF MS). Susceptibilities to 14 antimicrobials were determined by disk diffusion and by detection of the meC gene using PCR. Sampling methods were compared according to bacterial yield, antibiograms and bacterial phenotypic analysis. Location of causative bacteria was evaluated via 8-mm punch skin biopsies using haematoxylin and eosin, Gram-Twort and Giemsa staining, and fluorescence in situ hybridisation (FISH).

**RESULTS:** *Staphylococcus* sp. were isolated from lesions in all dogs, either *S. pseudintermedius* (24 dogs) or *S. schleiferi* (3 dogs). Susceptibility was highest to cephalexin (96%) and amoxycillin clavulanate (96%). Methicillin resistance assessed by meC real-time PCR and phenotypic oxacillin resistance was found in one dog (4.3%). Routine histology and FISH revealed bacteria within superficial stratum corneum. **CONCLUSION:** *Staphylococcal* isolates from canine SBP demonstrated high susceptibility to common empirical antimicrobials. Histological techniques confirmed presence of bacteria at superficial sites, likely to be accessed by the sampling techniques. The three techniques afforded similar results and may be equally suitable for obtaining samples for culture.

**Journal of Feline Medicine and Surgery**

**From FUS to Pandora syndrome: Where are we, how did we get here, and where to now?**

C A Tony Buffington, Jodi L Westropp, and Dennis J Chew

New concepts: Ideas about the causes of lower urinary tract signs (LUTS) in cats have changed significantly in the past 40 years. Recent research is challenging the conventional view that the bladder is always the perpetrator of
LUTS, and suggests that the bladder can also be one victim of a systemic process associated with a sensitized central stress response system. Aim: In this article the authors provide their perspective on the implications of these findings for the diagnosis and treatment of cats with LUTS, provide some historical context, and suggest ways that the veterinary profession might work together to better understand the disorders underlying these signs, and possibly reduce their prevalence.

Pancreatitis in cats: Is it acute, is it chronic, is it significant?
Julien Bazelle and Penny Watson
Practical relevance: Pancreatitis is a frequent finding in cats, the chronic form being more common than the acute form. Despite the large number of diseases or conditions that may be associated with feline pancreatitis, in most cases no cause is diagnosed and the pancreatitis is said to be idiopathic. The chronic form can be mild and asymptomatic, and has a high prevalence in apparently healthy cats. This has generated debate concerning the clinical significance of chronic feline pancreatitis. However, several reports have demonstrated the severity of clinical signs in certain forms of acute feline pancreatitis, while other studies have reported a strong association between chronic pancreatitis and the development of comorbidities such as hepatic lipidosis, diabetes mellitus, inflammatory bowel disease or exocrine pancreatic insufficiency. This suggests that feline pancreatitis should not be overlooked. Clinical challenges: Diagnosis of feline pancreatitis is complicated by the non-specific clinical signs and poor diagnostic value of basic biochemistry and haematology or imaging techniques. Development of a feline-specific pancreatic lipase immunoassay has improved our diagnostic ability in the past decade, but may have more limited application for mild and chronic forms of pancreatitis. Moreover, histopathology (the ‘gold standard’ diagnostic test) can be associated with false-negative results due to multifocal distribution of lesions or mild forms of the disease. With respect to treatment, it is important to take into account the idiosyncrasies of the feline species when considering medical therapies. Evidence base: This article reviews the literature on feline pancreatitis, focusing on the different forms and their relative clinical significance, while explaining difficulties inherent in the diagnosis of this disease. An overview of current recommendations for the management of cats with pancreatitis is also provided.

Feline dermatophytosis: Steps for investigation of a suspected shelter outbreak
Sandra Newbury and Karen A Moriello
Practical relevance: Dermatophytosis (ringworm) is the most important infectious and contagious skin disease of cats in shelters. Its importance relates to the fact that it can affect all cats, but tends to affect those which would otherwise have good chances for adoption. Although many diseases in shelters fit this description, dermatophytosis is of particular significance because of associated public health concerns. Clinical challenges: Disease management in animal shelters is challenging because new animals are frequently entering the population, numerous animals are often housed together, and resources are almost always limited. Global relevance: Outbreaks of dermatophytosis occur worldwide and no animal shelter is completely shielded from possible introduction of the disease into the population. Audience: This article offers a flexible stepwise approach to dealing with a known or suspected outbreak of dermatophytosis in an animal shelter. It is based on the authors’ experiences spanning more than a decade of responses and/or consultations. While primarily aimed at veterinarians involved in shelter medicine, the principles largely apply to other group-housing situations, such as catteries and breeding establishments. Aims: The goals in dealing with a potential dermatophytosis outbreak are to ascertain if the ‘outbreak’ is actually an outbreak, to develop a shelter-specific outbreak management plan and to implement a long-term plan to prevent recurrences.

Feline dermatophytosis: Aspects pertinent to disease management in single and multiple cat situations
Karen Moriello
Practical relevance: Dermatophytosis (ringworm) is a superficial fungal skin disease of cats that, depending on the geographic region and practice caseload, may be encountered uncommonly through to commonly. This is a self-curing disease in an immunocompetent cat. Global importance: Dermatophytosis is prevalent worldwide and is one of a number of zoonotic skin diseases that cat owners are at risk of contracting. Clinical challenges: Dermatophytosis
causes non-specific signs of hair loss, erythema and scaling, making it a differential diagnosis for many skin diseases of cats. The fact that this disease is infectious and contagious, and does not have any one classic clinical presentation, makes knowledge of diagnostic tools important in detection. The veterinarian’s role is in early disease recognition and institution of appropriate therapy to hasten resolution of the disease. Aim: The focus of this article is to provide an update and review of the most pertinent aspects that may be helpful in the management of dermatophytosis in any single or multiple cat situation. Evidence base: Where appropriate, evidence from the literature is used to supplement a summary of the author’s clinical experience and research in feline dermatophytosis.

**Polyostotic hyperostosis in a domestic shorthair cat**
Anne Fawcett, Richard Malik, C Rolfe Howlett
Clinical presentation: An 11-year-old male neutered domestic shorthair cat was presented for investigation of weight loss and inappetence. On physical examination there was palpable enlargement and thickening of many bones, and this finding was confirmed radiographically. Proposed diagnosis: Based on clinical, radiological and histopathological findings, a polyostotic bone disease, best described as generalised idiopathic hyperostosis, was diagnosed. This condition has not been reported in cats previously. Canine and human diseases with similarities to this presentation are discussed.

**Australian Veterinary Practitioner**
No publication this month

**Compendium**
Still no new publications since August 2013