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Due to the generosity of Dave Collins, Anna Dengate, Karina Graham, Chris Greenwell, Amy Lam and the ISFM, the CVE is able to offer this resource.

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Incidentally detected heart murmurs in dogs and cats: executive summary 2015.
No abstract

Canine hyperlipidaemia.
P. G. Xenoulis and J. M. Steiner
Hyperlipidaemia refers to an increased concentration of lipids in the blood. Hyperlipidaemia is common in dogs and has recently emerged as an important clinical condition that requires a systematic diagnostic approach and appropriate treatment. Hyperlipidaemia can be either primary or secondary to other diseases. Secondary hyperlipidaemia is the most common form in dogs, and it can be a result of endocrine disorders, pancreatitis, cholestasis, protein-losing nephropathy, obesity, as well as other conditions and the use of certain drugs. Primary hyperlipidaemia is less common in the general canine population but it can be very common within certain breeds. Hypertriglyceridaemia of Miniature Schnauzers is the most common form of primary hyperlipidaemia in dogs but other breeds are also affected. Possible complications of hyperlipidaemia in dogs include pancreatitis, liver disease, atherosclerosis, ocular disease and seizures. Management of primary hyperlipidaemia in dogs is achieved by administration of ultra low-fat diets with or without the administration of lipid lowering drugs such as omega-3 fatty acids, fibrates, niacin and statins.

Video-otoscopy-guided tympanostomy tube placement for treatment of middle ear effusion.
V. Guerin, R. Hampel and G. Ter Haar
Objective - To describe video-otoscopy-guided tympanostomy tube placement in 12 cavalier King Charles spaniels with middle ear effusion and assess the clinical outcome. Methods - A retrospective review of medical records of cavalier King Charles spaniels diagnosed with middle ear effusion and treated with tympanostomy tubes placement between 2012 and 2014 was performed. Outcome was assessed based on a telephone questionnaire. Results - Twenty-two tympanostomy tubes were successfully placed in the tympanic membrane in 12 cavalier King Charles spaniels under video-otoscopic guidance using a rigid endoscope and grasping forceps. Follow-up based on an owner questionnaire was available for 11/12 dogs. Subjective improvement in hearing was observed in 9/11 dogs with three dogs achieving normal hearing, according to the owners, and six demonstrating partial improvements. Out of 11 dogs, 10 dogs were reported with improved quality of life. Pruritus of the ears resolved in 3/9 dogs. Clinical signs recurred in four dogs because of tube dislodgement. Clinical Significance - Video-otoscopic tympanostomy tube placement appeared to be indicated as a treatment for middle ear effusion in cavalier King Charles spaniels. It subjectively improved hearing, pruritus and quality of life in most dogs. The tympanostomy tubes dislodged in some cases, leading to recurrence of clinical signs, which were effectively eliminated by replacement of a fresh tube.

Removal of oesophageal foreign bodies: comparison between oesophagoscopy and oesophagotomy in 39 dogs.
C. Deroy, J. Benoit Corcuff, F. Billen and A. Hamaide
OBJECTIVES - To compare complication rates and outcomes after removal of oesophageal foreign bodies by endoscopy or by oesophagotomy. METHODS Retrospective evaluation of medical records of dogs with oesophageal foreign bodies treated by endoscopy and/or oesophagotomy. Postoperative clinical signs, management, length of hospitalisation, type and rate of complications, and time interval to return to eating conventional diet were compared. RESULTS - Thirty-nine dogs diagnosed with oesophageal foreign bodies between 1999 and 2011 were included in the study. Most common breeds included West Highland white terrier, Jack Russell terrier and shih-tzu. Successful endoscopic removal was possible in 24 out of 32 cases (Group 1), while surgical removal was successful in 15 out of 15 cases (7 of which had unsuccessful attempts at endoscopic removal) (Group 2). Length of hospitalisation, time to removal of gastrostomy tube and time to eat conventional diet did not differ between the groups. After foreign body removal, the incidence of oesophagitis, oesophageal stricture and perforation observed during repeated endoscopy were similar between the groups. CLINICAL SIGNIFICANCE In this retrospective study, removal of oesophageal foreign bodies either by oesophagoscopy or oesophagotomy had a similar outcome.
Spinal cord injury secondary to electrocution in a dog
C. Ros, C. de la Fuente, M. Pumarola and S. Añor
A 13-year-old, female spayed, crossbreed dog of 32 kg was presented for evaluation of peracute onset of non-ambulatory tetraparesis after chewing an electrical wire. Neurological examination was consistent with a C1-C5 myelopathy. Magnetic resonance imaging revealed a focal intramedullary lesion over the C2-C3 vertebral bodies, which was confirmed to be an acute focal necrotising poliomyelopathy with subarachnoid and subdural haemorrhages on postmortem examination. This report describes the clinical, imaging and histopathological findings of this unusual type of spinal cord injury, and the effects of electrocution in the central nervous system of dogs.

Journal of American Veterinary Medical Association - Oct 15

Opinions of clinical veterinarians at a US veterinary teaching hospital regarding antimicrobial use and antimicrobial-resistant infections.
Jacob ME, Hoppin JA, Steers N, Davis JL, Davidson G, Hansen B, Lunn KF, Murphy KM, Papich MG.
Objective-To determine opinions of faculty members with clinical appointments, clinical veterinarians, residents, and interns at a US veterinary teaching hospital regarding antimicrobial use and antimicrobial-resistant infections. Design-Cross-sectional survey. Sample-71 veterinarians. Procedures-An online questionnaire was sent to all veterinarians with clinical service responsibilities at the North Carolina State University veterinary teaching hospital (n = 167). The survey included 23 questions regarding demographic information, educational experiences, current prescribing practices, and personal opinions related to antimicrobial selection, antimicrobial use, restrictions on antimicrobial use, and antimicrobial resistance. Results-Of the 167 veterinarians eligible to participate, 71 (43%) responded. When respondents were asked to rate their level of concern (very concerned = 1; not concerned = 5) about antimicrobial-resistant infections, most (41/70 [59%]) assigned a score of 1, with mean score for all respondents being 1.5. Most survey participants rated their immediate colleagues (mean score, 1.9) as more concerned than other veterinary medical professionals (mean score, 2.3) and their clients (mean score, 3.4). Fifty-nine of 67 (88%) respondents felt that antimicrobials were overprescribed at the hospital, and 32 of 69 (46%) respondents felt uncomfortable prescribing at least one class of antimicrobials (eg, carbapenems or glycopeptides) because of public health concerns. Conclusions and Clinical Relevance-Findings indicated that veterinarians at this teaching hospital were concerned about antimicrobial resistance, thought antimicrobials were overprescribed, and supported restricting use of certain antimicrobial classes in companion animals. Findings may be useful in educating future veterinarians and altering prescribing habits and antimicrobial distribution systems in veterinary hospitals.

Subcutaneous ureteral bypass device for treatment of iatrogenic ureteral ligation in a kitten.
Johnson CM, Culp WT, Palm CA, Zacuto AC.
Case Description-A 17-week-old spayed female Sphinx was evaluated after a 3-day history of inappetence, lethargy, and vomiting. Three weeks prior, the kitten had undergone routine elective ovariohysterectomy. Clinical Findings-Abdominal ultrasonography revealed moderate hydronephrosis of the left kidney, and the left ureter was tortuous and dilated from the kidney to the level of the midureter, where it abruptly tapered. No discrete cause of obstruction could be identified. Clinicopathologic analyses revealed that the kitten was nonazotemic. Treatment and Outcome-Exploratory laparotomy revealed that the distal portion of the left ureter was irregular with ill-defined margins and abundant scar tissue, likely secondary to iatrogenic ureteral ligation during the ovariohysterectomy (suture was not observed). Intraoperative antegrade pyelography confirmed complete left ureteral obstruction extending distally from the level of the midureter. A subcutaneous ureteral bypass device was placed to allow for renal decompression. No complications were encountered in the perioperative period, and the kitten recovered well after anesthesia. The kitten was discharged from the hospital 7 days after initial evaluation and continued to do well after surgery. At long-term follow-up, abdominal ultrasonography confirmed resolution of hydronephrosis and ureteral dilation. Clinical Relevance-A subcutaneous ureteral bypass device successfully allowed renal decompression in a kitten with iatrogenic ureteral ligation. A subcutaneous ureteral bypass device may be an alternative to historical surgical options in cases of unilateral ureteral obstruction and may result in a good long-term outcome.

Factors associated with pathological fractures in dogs with appendicular primary bone neoplasia: 84 cases (2007-2013).

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caudoventral region of the thorax. The dog received supportive care and medical treatment for hypercalcemia. Thoracic ultrasonography revealed pulmonary metastases. Masses were found in both axillary regions. Results of serum biochemical analysis indicated evalut.

excised tissues revealed malignant thymoma. Approximately 6.5 months after surgery, the dog was thoracoscopic removal of the mediastinal mass and recovered routinely. Histologic examination of and multiple subcutaneous masses. A soft tissue mass was observed in the cranioventral aspect of the thorax. The dog had a 1-month history of a cough that had recently increased in frequency. On physical examination, the dog had a grade 2/6 left systolic heart murmur and multiple subcutaneous masses. A soft tissue mass was observed in the cranioventral aspect of the thorax on radiographs. Results of a CT scan revealed a well-defined, 2.8 × 3.2 × 3.9-cm soft tissue mass in the cranial mediastinum. Treatment and Outcome-The dog underwent video-assisted thoracoscopic removal of the mediastinal mass and recovered routinely. Histologic examination of excised tissues revealed malignant thymoma. Approximately 6.5 months after surgery, the dog was evaluated because of polyuria, polydipsia, decreased appetite, and vomiting. On physical examination, masses were found in both axillary regions. Results of serum biochemical analysis indicated hypercalcemia. Thoracic ultrasonography revealed pulmonary metastases and a large mass in the right caudodorsal region of the thorax. The dog received supportive care and medical treatment for.
hypocalcemia, but clinical signs recurred. Euthanasia was elected; necropsy and histologic examination revealed thymic carcinoma. Conclusions and Clinical Relevance—Descriptions of the development of portal site metastasis in canine patients are rare. In this patient, portal site metastasis developed rapidly after thoracoscopic resection of a malignant thymic mass and was associated with hypercalcemia. As use of thoracoscopic procedures increases in veterinary medicine, it will be important to monitor the development of major complications such as those in the patient of this report.

Outcomes of dogs undergoing limb amputation, owner satisfaction with limb amputation procedures, and owner perceptions regarding postsurgical adaptation: 64 cases (2005-2012).
Dickerson VM, Coleman KD, Ogawa M, Saba CF, Cornell KK, Radlinsky MG, Schmiedt CW.
Objective—To evaluate outcomes of dogs and owner satisfaction and perception of their dogs’ adaptation following amputation of a thoracic or pelvic limb. Design—Retrospective case series.
Animals—64 client-owned dogs. Procedures—Medical records of dogs that underwent limb amputation at a veterinary teaching hospital between 2005 and 2012 were reviewed. Signalment, body weight, and body condition scores at the time of amputation, dates of amputation and discharge from the hospital, whether a thoracic or pelvic limb was amputated, and reason for amputation were recorded. Histologic diagnosis and date of death were recorded if applicable. Owners were interviewed by telephone about their experience and interpretation of the dog’s adaptation after surgery. Associations between perioperative variables and postoperative quality of life scores were investigated. Results—58 of 64 (91%) owners perceived no change in their dog’s attitude after amputation; 56 (88%) reported complete or nearly complete return to preamputation quality of life, 50 (78%) indicated the dog’s recovery and adaptation were better than expected, and 47 (73%) reported no change in the dog’s recreational activities. Body condition scores and body weight at the time of amputation were negatively correlated with quality of life scores after surgery. Taking all factors into account, most (55/64 [86%]) respondents reported they would make the same decision regarding amputation again, and 4 (6%) indicated they would not; 5 (8%) were unsure. Conclusions and Clinical Relevance—This information may aid veterinarians in educating clients about adaptation potential of dogs following limb amputation and the need for postoperative weight control in such patients.

Implant-associated neoplasia in dogs: 16 cases (1983-2013)
Burton AG, Johnson EG, Vernau W, Murphy BG.
Objective—To characterize clinical and pathological features of implant-associated neoplasms in dogs. Design—Retrospective case-control study.
Animals—16 dogs with implant-associated neoplasia and 32 control dogs with osteosarcoma without implants. Procedures—Medical records of dogs with tumors associated with metallic implants (cases) treated between 1983 and 2013 were reviewed. Two dogs with naturally occurring osteosarcoma (controls) were matched to each case on the basis of tumor location, age, and sex. Results—Median time from implant placement to diagnosis of neoplasia was 5.5 years (range, 9 months to 10 years). Pelvic limbs were most frequently affected, including the tibia (8/16) and femur (5/16), with 1 neoplasm involving both the femur and pelvis. Implant-associated tumors most commonly affected the diaphysis (15/16), with osteosarcomas significantly more likely to involve the long bone diaphysis in case dogs than in control dogs with naturally occurring osteosarcomas. Osteosarcoma was the most common tumor, accounting for 13 of 16 implant-associated tumors. For 7 of these osteosarcoma cases, review of histopathology results enabled subclassification into osteoblastic nonproductive (n = 3), chondroblastic (2), osteoblastic productive (1), and fibroblastic (1) groups. Three case dogs had a diagnosis of histiocytic sarcoma, fibrosarcoma, and spindle cell sarcoma. Conclusions and Clinical Relevance—Results of this study highlighted important anatomic differences between spontaneous and implant-associated neoplasia in dogs.

Guttin T, Knox VW 4th, Diroff JS.
Objective—To describe outcomes for dogs with primary hyperparathyroidism following treatment with percutaneous ultrasound-guided ethanol ablation of presumed functional parathyroid nodules. Design—Retrospective case series.
Animals—24 dogs with primary hyperparathyroidism that underwent 27 ultrasound-guided ethanol ablation procedures of presumed functional parathyroid nodules identified by cervical ultrasonography. Procedures—Dogs were anesthetized for each procedure. For each nodule, 95% ethanol was injected into the center with ultrasound guidance (volume injected calculated on the basis of ultrasonographic measurements). The interval from treatment to resolution of hypercalcemia, complications, and follow-up clinicopathologic data were recorded. Results—5 procedures involved
simultaneous treatment of 2 nodules. Three dogs underwent a second treatment because of initial treatment failure or development of another nodule. Hypercalcemia resolved after 23 of 27 (85%) procedures. In those 23 treatments, 22 (96%) had resolution of hypercalcemia within 72 hours after treatment. Hypocalcemia was detected in 6 different dogs at 2 (1 dog), 7 (3 dogs), 14 (1 dog), and 21 (1 dog) days after treatment; 5 of these dogs had mild transient hypocalcemia and 1 developed clinical signs requiring calcium supplementation. Although there were no perioperative adverse effects, 2 dogs had delayed adverse effects; the overall rate of complications (including delayed adverse events and clinical hypocalcemia) was 11.1%. Long-term follow-up data indicated sustained normocalcemia in 17 of 19 dogs. Conclusions and Clinical Relevance—Results suggested that percutaneous ultrasound-guided ethanol ablation of functional parathyroid nodules may be an effective treatment for primary hyperparathyroidism of dogs, with short duration of anesthesia, minimal complications, and low risk for hypocalcemia.

Journal of Feline Medicine & Surgery

A critical review of food-associated factors proposed in the etiology of feline hyperthyroidism
Ingrid van Hoek, Myriam Hesta, and Vincent Biourge
Since the first description of feline hyperthyroidism (HT) in 1979, several studies have been undertaken to define the etiology of the disease. Epidemiologic studies, after investigating non-food- and food-associated factors, suggest a multifactorial etiology. However, in the absence of prospective cohort studies that can confirm a cause-and-effect relationship between HT and associated risk factors, no causative factor for HT has been identified to date. Feline HT resembles toxic nodular goiter in humans, with autonomously functioning upregulated iodide uptake systems. Contribution of the diet to HT development remains controversial. The purpose of this paper is to review critically the reported food-associated risk factors for HT.

Effect of acarbose on postprandial blood glucose concentrations in healthy cats fed low and high carbohydrate diets
Ranee Singh, Jacqie S Rand, Marcia Coradini, and John M Morton
Objectives Feeding a low carbohydrate diet is recommended for diabetic cats; however, some cats may require diets containing moderate-to-high carbohydrate and may benefit from the use of therapeutic agents to improve glycemic control. The aim of the study was to determine the effect of the α-glucosidase inhibitor acarbose on postprandial plasma glucose concentration when combined with commercially available feline diets high and low in carbohydrate. Methods Twelve healthy, adult, non-obese, neutered cats were enrolled. Plasma glucose concentrations were assessed over 24 h after feeding high and low carbohydrate diets, with and without acarbose, during single and multiple meal tests, in a crossover study. Commercially available feline diets were used, which were high and low in carbohydrate (providing 51% and 7% of metabolizable energy, respectively). Results In cats fed the high carbohydrate diet as a single meal, mean 24 h glucose concentrations were lower when acarbose was administered. Mean glucose concentrations were lower in the first 12 h when acarbose was given once daily, whereas no significant difference was observed in mean results from 12–24 h. Acarbose had little effect in cats eating multiple meals. Compared with consumption of the high carbohydrate diet with acarbose, lower mean 24 h and peak glucose concentrations were achieved by feeding the low carbohydrate diet alone. Conclusions and relevance In healthy cats meal-fed diets of similar composition to the diets used in this study, acarbose has minimal effect when a low carbohydrate diet is fed but reduces postprandial glucose concentrations over 24 h when a high carbohydrate diet is fed. However, mean glucose concentrations over 24 h are still higher when a high carbohydrate diet with acarbose is fed relative to the low carbohydrate diet without acarbose. Future studies in diabetic cats are warranted to confirm these findings.

Safety of ultrasound-guided fine-needle aspiration of the feline pancreas: a case-control study
Sarah K Crain, Leslie C Sharkey, Amy P Cordner et al.
The safety of fine-needle aspiration (FNA) of the feline pancreas has not been reported. The incidence of complications following ultrasound-guided pancreatic FNA in 73 cats (pancreatic aspirate [PA] cats) with clinical and ultrasonographic evidence of pancreatic disease was compared with complications in two groups of matched control cats also diagnosed with pancreatic disease that either had abdominal organs other than the pancreas aspirated (control FNA, n = 63) or no aspirates performed (control no FNA, n = 61). The complication rate within 48 h of the ultrasound and/or aspirate procedure did not differ among the PA cats (11%), control FNA (14%) or control no FNA (8%) cats. There was no difference in rate of survival to discharge (82%, 84% and 83%, respectively) or length of hospital stay.
among groups. The cytologic recovery rate for the pancreatic samples was 67%. Correlation with histopathology, available in seven cases, was 86%. Pancreatic FNA in cats is a safe procedure requiring further investigation to establish diagnostic value.

**Methadone in combination with medetomidine as premedication prior to ovariohysterectomy and castration in the cat**
Louisa S Slingsby, Elisa Bortolami, and Joanna C Murrell

Objectives The aim of the study was to evaluate the tolerability, sedative and analgesic effects of methadone in combination with medetomidine for premedication prior to neutering in healthy cats.

Methods This was an assessor-blinded, randomised, clinical research study. Forty-five cats were recruited and divided into three treatment groups of 15. Following premedication with medetomidine (20 µg/kg) and one of the three test drugs – methadone 0.5 mg/kg, buprenorphine 20 µg/kg or butorphanol 0.4 mg/kg intramuscularly – anaesthesia was induced with propofol and maintained with isoflurane, and neutering was carried out. Sedation and physiological parameters were assessed before premedication, after premedication before induction of anaesthesia, and at 90 mins and 2, 3, 4, 6, 7, 8 and 24 h after premedication. Pain and mechanical nociceptive threshold were assessed at similar time points. Results There were no differences between groups with respect to age, sex, duration of anaesthesia or surgery. Most cats had low pain scores in the postoperative period, with small differences in pain scores between groups at individual time points only. Five, two and no cats required additional rescue analgesia in the postoperative period in the butorphanol, methadone and buprenorphine groups, respectively, representing no significant difference between groups.

Conclusions and relevance Medetomidine combined with methadone for premedication prior to neutering in healthy cats provided adequate analgesia for the first 6 h after administration with no adverse effects; effects overall were comparable with medetomidine combined with buprenorphine or butorphanol. Administration of further analgesia with methadone at 6 h and a non-steroidal anti-inflammatory drug at 8 h provided adequate analgesia for the first 24 h after surgery.

**Spontaneous gastrointestinal perforation in cats: a retrospective study of 13 cases**
Fanny Bernardin, Laura Martinez Rivera, Guillaume Ragetly et al.

Objectives The aim of this study was to describe the clinical characteristics and the frequency of malignant vs non-malignant causes for spontaneous gastrointestinal perforation in cats.

Methods The medical records of cats diagnosed as having gastrointestinal perforation between August 2010 and July 2013 were reviewed. Diagnosis was confirmed by exploratory surgery. Patients with incomplete records, perforation due to external trauma, leakage at previous enterotomy or anastomotic sites, or foreign bodies were excluded. Each record was examined for different information pertaining to signalment, medical history, clinical and clinicopathological data, imaging findings, abdominal fluid examination, surgical findings, histopathological examination, treatment received after surgery and outcome. Results Thirteen cats were included. Five of these cats had concurrent illnesses, including viral upper respiratory tract disease, pancreatitis and chronic kidney disease. Two cats had previously received non-steroidal anti-inflammatory drugs and four had received corticosteroids. Clinical signs and clinicopathological abnormalities were not specific. Six of 13 patients were diagnosed during surgery with gastric perforations, four patients with duodenal perforations and three patients with jejunal perforations. Histopathological examination of the ulcerated wall was performed in 11/13 cats. Alimentary lymphoma was diagnosed in six cats. Non-neoplastic lesions (lymphocytic–plasmacytic inflammatory bowel disease, necrotic suppurative enteritis) were observed in the other five cats. The major limitation of the study was the small sample size. Conclusions and relevance Lymphoma may be a frequent cause of spontaneous perforation in cats. Therefore, histological examination of ulceration is essential in all cases. The direct and sole implication of anti-inflammatory administration in a gastrointestinal perforation is not clearly established in this study.

**Routine kidney variables, glomerular filtration rate and urinary cystatin C in cats with diabetes mellitus, cats with chronic kidney disease and healthy cats**

Objectives Diabetic kidney disease (DKD) is a frequent and serious complication in human diabetic patients, but data are limited in cats. This study was undertaken to assess whether diabetic cats are susceptible to DKD. Methods Kidney function was compared between 36 cats with diabetes mellitus (DM), 10 cats with chronic kidney disease (CKD) and 10 age-matched healthy cats by measuring routine kidney variables (serum creatinine [sCreat], serum urea [sUrea], urine specific gravity [USG], urinary protein:creatinine ratio [UPC]), urinary cystatin C:creatinine ratio and glomerular filtration rate (GFR). Urinary cystatin C (uCysC) was measured with a human particle-enhanced nephelometric immunoassay, validated to measure feline cystatin C, in all but two diabetic cats. GFR was evaluated
by exo-iohexol clearance in 17 diabetic cats, all cats with CKD and all healthy cats. Results Diabetic cats had significantly (mean ± SD) lower sCreat (123 ± 38 vs 243 ± 80 µmol/l), sUrea (11 ± 3 vs 18 ± 7 mmol/l) and urinary cystatin C:creatinine ratio (6 ± 31 vs 173 ± 242 mg/mol), and a significantly higher USG (1.033 ± 0.012 vs 1.018 ± 0.006) and GFR (2.0 ± 0.7 vs 0.8 ± 0.3 ml/min/kg) compared with cats with CKD. Compared with healthy cats, diabetic cats only had significantly lower USG (1.033 ± 0.012 vs 1.046 ± 0.008). Proteinuria (UPC >0.4) was present in 39% of diabetic cats, in 30% of cats with CKD and in none of the healthy cats. However, the UPC did not differ statistically between the three groups. Conclusions and relevance Based on evaluation of routine kidney variables, GFR and uCysC as a tubular marker at a single time point, a major impact of feline DM on kidney function could not be demonstrated.

**Simplified methods for estimating glomerular filtration rate in cats and for detection of cats with low or borderline glomerular filtration rate**
Dominique Paepe, Hervé P Lefebvre, Didier Concordet et al.

Objectives Diagnosis of early feline chronic kidney disease (CKD) is challenging. Glomerular filtration rate (GFR) is the best overall indicator of kidney function, but multisample plasma clearance methods to determine GFR are labour intensive, time consuming and stressful for feline patients. This study aimed to develop simplified methods to detect decreased GFR in cats. Methods Data from a nine-sample combined plasma exogenous creatinine–iohexol clearance test of 73 cats were used. Limited sampling strategies were developed by comparing all sampling time combinations with the complete nine sampling times set and selecting the best sampling time combinations based on maximum relative error. By regression analysis, the ability of routine blood (serum creatinine, serum urea) and urine (urine specific gravity, urinary protein:creatinine ratio) variables to predict GFR or identify cats with low or borderline GFR was examined. Cut-off clearance marker concentrations to predict low or borderline GFR was determined at three time points after marker injection. All procedures were analysed for three clearance markers (exo-iohexol, creatinine, endo-iohexol). Results For reliable estimation of GFR, at least three blood samples for clinical purposes and five blood samples for research purposes are required. Regression formulae based on routine variables did not reliably predict GFR, but accurately identified cats with low (sensitivity 96.5–98.2%; specificity 60–91.3%) or borderline (sensitivity 91.1–96%; specificity 76.5–81.8%) GFR. Clearance marker concentrations exceeding given marker cut-off concentrations also identified cats with low or borderline GFR with high sensitivities and specificities. Conclusions and relevance These simplified methods will facilitate the detection of early kidney dysfunction in cats. Early diagnosis allows timely therapeutic intervention, and future studies must reveal whether this improves the long-term outcome of cats with CKD.

**Stem cell therapy in cats with chronic enteropathy: a proof-of-concept study**
Tracy L Webb and Craig B Webb

Objectives The current treatment of cats with chronic enteropathy frequently includes use of a prescription diet and daily medication administration, with the potential for side effects or problems with owner compliance, and may still result in treatment failure in some cases. The objective of this study was to determine if stem cell therapy was a safe and viable treatment in cases of feline chronic enteropathy. Methods Allogeneic adipose-derived feline mesenchymal stem cells (fMSC) were used to treat seven cats with diarrhea of no less than 3 months’ duration, while four cats with a similar clinical condition received placebo, in a blinded manner. Three additional cats were treated with an identical fMSC protocol, but owners were not blinded to the treatment. Owners completed a questionnaire characterizing clinical signs both before entering the study and 2 weeks following the second of two fMSC or placebo treatments. Owners were also surveyed for similar input by email 1–2 months later before being unblinded to their cat’s study group. Besides the fMSC or placebo treatment, no other changes were made in diet, supplement or medication administration during the study. Results No adverse reactions or side effects were attributed to the fMSC therapy in any of the cats. Owners of 5/7 fMSC-treated cats reported significant improvement or complete resolution of clinical signs, while the owner of the remaining two cats reported modest but persistent improvement. Owners of placebo-treated cats reported no change or worsening of clinical signs. Of the owners not blinded to the treatment, one reported marked improvement, one reported no change and one was lost to follow-up. Conclusions and relevance Although allogeneic adipose-derived fMSC therapy appears to be a safe and potentially effective treatment for cats suffering from chronic enteropathy, these preliminary results require significant follow-up study.
Absence of bacterial DNA in culture-negative urine from cats with and without lower urinary tract disease
Heidi Sjetne Lund, Gaute Skogtun, Henning Sørum et al.
A diagnosis of bacterial cystitis commonly relies on a positive microbiological culture demonstrating the presence of a significant number of colony-forming units/ml urine, as urine within the upper urinary tract, bladder and proximal urethra generally is considered sterile. Recent studies from human and veterinary medicine indicate the presence of non-culturable bacteria in culture-negative urine samples. The aim of the present study was to determine the occurrence of bacterial DNA in culture-negative urine samples from cats with signs of feline lower urinary tract disease (FLUTD) and healthy control cats by 16S ribosomal DNA PCR and subsequent sequencing. The study sample included 38 culture-negative urine samples from cats with FLUTD and 43 culture-negative samples from control cats. Eight culture-positive urine samples from cats with FLUTD were included as external positive controls in addition to negative reaction controls. Of possible methodological limitations, degradation of DNA due to storage, the use of non-sedimented urine for DNA isolation and lack of internal positive reaction controls should be mentioned. The positive controls were recognised, but occurrence of bacterial DNA in culture-negative urine from cats with or without signs of lower urinary tract disease was not demonstrated. However, considering the possible methodological limitations, the presence of bacterial DNA in the urine of culture-negative FLUTD cats cannot be excluded based on the present results alone. Therefore, a prospective study reducing the possibility of degradation of DNA due to storage, in combination with modifications enhancing the chance of detecting even lower levels of bacterial DNA in culture-negative samples, seems warranted.

The TRPV1 receptor agonist capsaicin is an ineffective bronchoprovocant in an experimental model of feline asthma
Megan E Grobman, Stacy Krumme, John R Dodam, and Carol R Reinero
Objectives Airway hyper-responsiveness (AHR), a key feature of feline asthma, can be measured using bronchoprovocation testing. Limitations of both direct and indirect bronchoprovocants evaluated to date in experimental feline asthma have led to a search for a more specific indirect bronchoprovocant (ie, one which relies on existing inflammatory cells or activated neural pathways in diseased but not healthy airways). We hypothesized that capsaicin, a transient receptor potential cation channel subfamily V member 1 agonist, would lead to dose-responsive increases in airway resistance as measured by ventilator-acquired pulmonary mechanics in experimentally asthmatic cats. Methods Five cats induced to have asthma using Bermuda grass allergen (BGA) were studied. Twenty-four hours after aerosol challenge of BGA, cats were anesthetized and underwent neuromuscular blockade for ventilator-acquired pulmonary mechanics. Cats were monitored with pulse oximetry for hemoglobin desaturation. Parameters recorded on a breath-by-breath basis on the ventilator included airway resistance (Raw) and compliance. Saline at baseline and 10-fold increasing concentrations of capsaicin (0.4–4000.0 µM) were aerosolized for 30 s and data collected for 4 mins between doses. The intended endpoint of the study was a doubling in baseline airway resistance, halving of compliance or oxygen desaturation <75%. Results All cats completed the trial, reaching the highest dose of capsaicin without reaching any of the aforementioned endpoints. No biologically significant alteration in any other pulmonary mechanics parameter was noted. Conclusions and relevance Capsaicin does not appear to be an effective bronchoprovocant in a feline asthma model.

Canadian Veterinary Journal
Failure to thrive and life-threatening complications due to inherited selective cobalamin malabsorption effectively managed in a juvenile Australian shepherd dog.
Gold AJ1, Scott MA1, Fyfe JC1.
A juvenile Australian shepherd dog exhibited failure to grow, inappetence, weakness, nonregenerative anemia, neutropenia, and cobalamin deficiency. DNA testing confirmed homozygosity of an amnionless mutation (AMN c.3G > A). Clinical signs resolved with supportive care and parenteral cobalamin supplementation. Inherited selective intestinal cobalamin malabsorption requiring lifelong parenteral supplementation should be considered in Australian shepherds, giant schnauzers, border collies, and beagles that fail to thrive.

Australian Veterinary Journal
Multiple pathological fractures and delayed union associated with lead exposure in a German Shepherd Dog
G Cole*, J Weigel, A Headrick, W Adams and J Biskup
An 8-year-old 40.8-kg intact male German Shepherd Dog was evaluated for bilateral antebrachial fractures. Radiographs revealed osteopenia and comminuted proximal diaphyseal fractures of the left radius and ulna, and proximal articular fracture of the right ulna. A dual energy X-ray absorptiometry scan confirmed decreased bone mineral density. Bone mineral analysis collected at the time of definitive surgical repair demonstrated high lead concentration. Analysis further demonstrated normal bone calcium and phosphorus concentrations. Serum lead concentration was normal. The left radial and ulnar fractures were surgically stabilised with an external fixator. The right ulnar fracture was splinted. The left antebrachial fractures were palpably unstable at 12 weeks after surgery. Moderate callus formation and incomplete bone union were present at 17 weeks postoperatively. The dog was represented 15 months later for right metacarpal and left metatarsal fractures, which were managed conservatively. Complete bone union of the right radial and ulnar fractures was not present at that time. Conclusion: Excessive lead accumulation in bone should be considered as a differential diagnosis for increased susceptibility to pathologic fracture and delayed fracture healing in dogs.

Magnetic resonance imaging and computed tomography findings of Dyke-Davidoff-Masson-like syndrome in a cat
RB Song1,*, EN Glass1, M Kent2, FA Castro3 and A de Lahunta4
A 3.5-year-old spayed female Domestic Shorthair cat was evaluated for new onset seizures and lateralising signs indicative of a lesion in the right prosencephalon. Magnetic resonance imaging and computed tomography of the head revealed hypoplasia of the right cerebral hemisphere and changes in the overlying cranium, including hyperostosis and expansion of the diploic space, resulting in an increased pneumatisation of the rostral bones of the cranium. A congenital injury to the cerebral hemisphere and secondary changes of the cranium in response to the decreased brain parenchyma was presumed. Similar changes have been previously recognised in human patients with unilateral anomalies of the cerebral hemispheres, termed Dyke-Davidoff-Masson syndrome (DDMS).
Conclusion: The case presented is the first clinical and imaging description of a cat with a syndrome that closely resembles DDMS in humans. The description of the syndrome allows recognition of an additional differential for seizures in a young patient and informs the clinician of the imaging characteristics of the cranium seen with early loss of brain parenchyma.

The Veterinary Journal

Serum biochemical, blood gas and antioxidant status in search and rescue dogs before and after simulated fieldwork
The aim of the study was to assess the physiological and antioxidant status before and after a 4 h search and rescue field exercise, with handlers, under warm-weather conditions performing activities compared to a control group of similarly trained dogs at rest. Serum chemistry demonstrated a decrease in serum sodium (Na) and potassium (K) in both exercising and control groups, however only Na was decreased significantly (P < 0.05) after exercise and hematocrits (HCTs) remained unchanged. The exercise group demonstrated significantly decreased serum phosphorus (P) and magnesium (Mg) compared to pre-exercise values, as did the control group (P < 0.025). There was also a significant increase in creatinine kinase concentrations in the exercise groups (P < 0.025). Serum non-esterified fatty acids were increased only in the exercise group after exercise, suggesting fat mobilization to produce energy. The mean total serum antioxidant potential in searching dogs was no different from the pre- and post-exercise values in the control dogs. Serum vitamin E concentrations did not differ between the two groups, with a decreasing trend in both groups. There was a modest decrease in serum uric acid in the control group, while there was a significant rise after exercise in the searching group (P < 0.01). Multiple changes in serum chemistry, HCTs and blood gases were documented in this study, and were similar to those observed after other endurance activities. The lack of hemoconcentration in this field search exercise suggested that even in extreme environmental conditions (heat and humidity), dogs with access to water do not experience significant dehydration or diminished antioxidant status.

Age related skeletal muscle atrophy and upregulation of autophagy in dogs
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Sarcopenia, the age related loss of muscle mass and strength, is a multifactorial condition that occurs in a variety of species and represents a major healthcare concern for older adults in human medicine. In
veterinary medicine, skeletal muscle atrophy is often observed in dogs as they reach old age, but the process is not well understood. Autophagy is a mechanism for degradation and recycling of cellular constituents and is potentially involved in sarcopenia. The aim of the present study was to evaluate the expression of three markers of autophagy, Beclin 1, LC3 and p62, in muscle wasting of geriatric dogs, to establish whether the levels of autophagy change with increasing age. Muscle biopsies from 25 geriatric dogs were examined and compared with those from five healthy young dogs. Samples from older dogs, assessed by routine histology, histoenzymatic staining and immunohistochemistry, showed evidence of muscle atrophy, sarcoplasmic vacuolisation and mitochondrial alterations. Furthermore, in 80% of the muscle samples from the older dogs, marked intracytoplasmic staining for Beclin 1 and LC3 was observed. Significantly greater expression of LC3 II and Beclin 1, but lower expression of p62, was found by Western blotting, comparing muscle samples from old vs. young dogs. The results of the study suggest that enhanced autophagy might be one of the factors underlying muscle atrophy in dogs as they age.

Expression of platelet-derived growth factor BB, erythropoietin and erythropoietin receptor in canine and feline osteosarcoma
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The discovery of expression of the erythropoietin receptor (EPO-R) on neoplastic cells has led to concerns about the safety of treating anaemic cancer patients with EPO. In addition to its endocrine function, the receptor may play a role in tumour progression through an autocrine mechanism. In this study, the expression of EPO, EPO-R and platelet-derived growth factor BB (PDGF-BB) was analysed in five feline and 13 canine osteosarcomas using immunohistochemistry (IHC) and reverse transcription polymerase chain reaction (RT-PCR). EPO expression was positive in all tumours by IHC, but EPO mRNA was only detected in 38% of the canine and 40% of the feline samples. EPO-R was expressed in all samples by quantitative RT-PCR (RT-qPCR) and IHC. EPO-R mRNA was expressed at higher levels in all feline tumours, tumour cell lines, and kidney when compared to canine tissues. PDGF-BB expression was variable by IHC, but mRNA was detected in all samples. To assess the functionality of the EPO-R on tumour cells, the proliferation of canine and feline osteosarcoma cell lines was evaluated after EPO administration using an alamarBlue assay and Ki67 immunostaining. All primary cell lines responded to EPO treatment in at least one of the performed assays, but the effect on proliferation was very low indicating only a weak responsiveness of EPO-R. In conclusion, since EPO and its receptor are expressed by canine and feline osteosarcomas, an autocrine or paracrine tumour progression mechanism cannot be excluded, although in vitro data suggest a minimal role of EPO-R in osteosarcoma cell proliferation.

Assessment of CCL2 and CXCL8 chemokines in serum, bronchoalveolar lavage fluid and lung tissue samples from dogs affected with canine idiopathic pulmonary fibrosis
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Canine idiopathic pulmonary fibrosis (CIPF) is a progressive disease of the lung parenchyma that is more prevalent in dogs of the West Highland white terrier (WHWT) breed. Since the chemokines (C-C motif) ligand 2 (CCL2) and (C-X-C motif) ligand 8 (CXCL8) have been implicated in pulmonary fibrosis in humans, the aim of the present study was to investigate whether these same chemokines are involved in the pathogenesis of CIPF. CCL2 and CXCL8 concentrations were measured by ELISA in serum and bronchoalveolar lavage fluid (BALF) from healthy dogs and WHWTs affected with CIPF. Expression of the genes encoding CCL2 and CXCL8 and their respective receptors, namely (C-C motif) receptor 2 (CCR2) and (C-X-C motif) receptor 2 (CXCR2), was compared in unaffected lung tissue and biopsies from dogs affected with CIPF by quantitative PCR and localisation of CCL2 and CXCL8 proteins were determined by immunohistochemistry. Significantly greater CCL2 and CXCL8 concentrations were found in the BALF from WHWTs affected with CIPF, compared with healthy dogs. Significantly greater serum concentrations of CCL2, but not CXCL8, were found in CIPF-affected dogs compared with healthy WHWTs. No differences in relative gene expression for CCL2, CXCL8, CCR2 or CXCR2 were observed when comparing lung biopsies from control dogs and those affected with CIPF. In affected lung tissues, immunolabelling for CCL2 and CXCL8 was observed in bronchial airway epithelial cells in dogs affected with CIPF. The study findings suggest that both CCL2 and CXCL8 are involved in the pathogenesis of CIPF. Further studies are required to determine whether these chemokines might have a clinical use as biomarkers of fibrosis or as targets for therapeutic intervention.

Systematic review of ground reaction force measurements in cats
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Although orthopaedic abnormalities in cats are frequently observed radiographically, they remain clinically underdiagnosed, and kinetic motion analysis, a fundamental aspect of orthopaedic research in dogs and horses, is not commonly performed. More information obtained with non-invasive measurement techniques to assess normal and abnormal gait in cats would provide a greater insight into their locomotion and biomechanics and improve the objective measurement of disease alterations and treatment modalities. In this systematic review, 12 previously performed studies that investigated ground reaction force measurements in cats during locomotion were evaluated. The aims of these studies, the measurement methods and equipment used, and the outcomes of parameters used to assess both sound and diseased cats are summarised and discussed. All reviewed studies used pressure sensitive walkways to gain data and all provided an acclimatisation period as a prerequisite for measurements. In sound cats during walking, the forelimb peak vertical force was greater than in the hindlimb and the peak vertical force in the hindlimb was greater in cats than in dogs. This review confirms that ground reaction forces can be used to evaluate lameness and treatment effects in the cat.

The effect of feeding, storage and anticoagulant on feline serum cystatin C
Serum cystatin C (sCysC) is a possible marker for early detection of chronic kidney disease (CKD) in cats. In contrast with serum creatinine (sCr), feline sCysC is not affected by age, breed or sex. However, further biological and clinical validation is required. The objectives of this study were: (1) to investigate if food intake and circadian rhythm affect feline sCysC; (2) to determine the stability of sCysC under different storage conditions, and (3) to investigate if plasma concentrations of CysC (pCysC) differed from sCysC. A crossover study with 10 healthy laboratory cats fed the same commercial dry food was performed to study the influence of feeding and diurnal variation. Storage effects and comparison of pCysC with sCysC were determined using healthy cats (n = 3 and n = 10, respectively) and cats with CKD (n = 4 and n = 17, respectively). A significant daily sCysC variation was seen. Pre- and postprandial sCysC and sCr concentrations did not change significantly. Serum CysC significantly increased during storage at room temperature. After freezing, sCysC significantly decreased after 5 and 12 months at both −20 °C and −72 °C. Plasma CysC was significantly lower than sCysC. These findings suggest that it is not mandatory to fast cats before evaluation of sCysC and sCr. Samples were stable during routinely used storage conditions. Based on these findings, freezing for more than 5 months is not recommended, although additional studies are required to evaluate the clinical relevance of decreased sCysC after prolonged storage. Plasma and serum CysC cannot be compared directly.

Expression of somatostatin, dopamine, progesterone and growth hormone receptor mRNA in canine cortisol-secreting adrenocortical tumours
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Cortisol-secreting adrenocortical tumours (AT) in dogs are characterised by uncontrolled growth and excessive cortisol secretion. Dysregulated hormone receptor expression might be involved in tumour growth and hypersecretion of cortisol. The relative mRNA expression of growth hormone receptor, progesterone receptor, somatostatin receptors (SSTR1–3) and dopamine receptors (DRD1–2 and DRD5) was evaluated in 36 canine ATs and 15 adrenal glands obtained from healthy dogs. Compared with normal adrenal tissue, DRD2 mRNA expression was relatively lower in carcinomas, while SSTR1 mRNA expression was lower in both adenomas and carcinomas. Both of these features might contribute to loss of inhibition of tumour growth and upregulation of cortisol secretion. In canine ATs that had recurred within 30 months of surgical adrenalectomy, a marked increase in expression of DRD1 mRNA was observed. Targeting of specific hormone receptors, expressed by ATs, might be exploited for therapy.

Detection and molecular characterization of caliciviruses (vesivirus and norovirus) in an outbreak of acute diarrhea in kittens from Brazil
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Feline caliciviruses (FCVs) have occasionally been described in cats in association with enteric disease, but an etiological role for these viruses in acute gastroenteritis is still unclear. In this study, molecular characterization of FCV and feline norovirus (FNoV) was undertaken using real-time PCR (RT-PCR) and sequence analysis of the ORF1 region in fecal specimens from 29 diarrheic cats. The
specimens were also screened for parvovirus, coronavirus, astrovirus and group A rotavirus. A quantitative one step RT-PCR was also performed to detect and quantitate NoV genogroup IV and the role of these animal caliciviruses in feline gastroenteritis was investigated. This is the first description of enteric FCV and FNoV in South America.