



Research Communications of the 25th ECVIM-CA Congress

Centro Congressos de Lisboa, Lisbon, Portugal, 10th to 12th September 2015

LIST OF ORAL RESEARCH COMMUNICATIONS

ESVCN – European Society of Veterinary Clinical Nutrition

Thursday 10th September

09.00–09.15	ESVCN-O-1	Aguiar	Complications of percutaneous endoscopic gastrostomy in dogs and cats receiving corticosteroid therapy: a retrospective case-control study
09.15–09.30	ESVCN-O-2	German	Assessment of the adequacy of nutrient intake in obese dogs undergoing energy restriction for weight loss: a cohort study
09.30–09.45	ESVCN-O-3	Rochel	Endocrine profile of 402 obese dogs
09.45–10.00	ESVCN-O-4	Adams	Healthy ageing in Labrador retrievers: results of a prospective longitudinal study
10.00–10.15	ESVCN-O-5	Dobenecker	The role of phosphate in the prevention of chronic renal failure in cats

ESVCP – European Society of Veterinary Clinical Pathology

Thursday 10th September

09.00–09.15	ESVCP-O-1	Hillström	Serum C-reactive protein and serum and synovial fluid interleukin 6 as possible objective biomarkers in dogs with joint disease
09.15–09.30	ESVCP-O-2	Goddard	Serum cytokine concentrations in virulent canine babesiosis and its association with outcome
09.30–09.45	ESVCP-O-3	Rautenbach	Investigation of the inflammatory immune response in dogs naturally infected with babesia rossi, using flow cytometry
09.45–10.00	ESVCP-O-4	Freeman	Introduction of the Biologic Variation Website and Database
10.00–10.15	ESVCP-O-5	Johnson	Equine Pancreatic DGGR-Lipase has high tissue activity and specificity
10.15–10.30	ESVCP-O-6	Rannou	Serum amyloid a and fibrinogen concentrations in horses with different lower respiratory diseases
11.20–11.35	ESVCP-O-7	Hooijberg	Haematology and serum biochemistry reference intervals for the white rhinoceros, <i>Ceratotherium simum</i> , in South Africa
11.35–11.50	ESVCP-O-8	Geisen	Evaluation of the diagnostic utility of reticulocytes measured by Sysmex XT-2000iV and the immature reticulocyte fraction in anaemic cats
11.50–12.05	ESVCP-O-9	Moritz	Reticulocyte hemoglobin equivalent (ret-he), a new parameter on the procyte dx* hematology analyzer

12.05–12.20	ESVCP-O-10	Moritz	Reticulated platelets (rPLTs) and platelet indices as a marker of thrombopoiesis
12.20–12.35	ESVCP-O-11	Riondato	Comparison of three methods for the identification of stage V in canine lymphoma
12.35–12.50	ESVCP-O-12	Poggi	Combined flow cytometric approach for the characterization of canine small cell lymphomas

Friday 11th September, Case Presentations

14.25–14.30		Tvedten	Introduction
14.30–14.45	Case 1	Raskin	Leukocytosis in an iquana
14.45–15.00	Case 2	Knöpfler	Hematology of a white gerfalcon
15.00–15.15	Case 3	Rautenbach	Haemolytic anemia in a dog
15.15–15.30	Case 4	Rochel	Marked thrombocytosis in a dog
15.30–15.45	Case 5	Piane	Spurious platelet scattergrams
16.30–16.45	Case 6	Lagrange	Dyserythropoiesis, dog bone marrow
16.45–17.00	Case 7	Piccinelli	CSF + subarachnoid lesion in a dog
17.00–17.15			
17.15–17.30	Case 9	Lilliehöök	Abdominal fluid in a dog
17.30–17.45	Case 10	Hooijberg	Anemia in an impala
17.45–18.00	Case 11	Palić	Lung mass in a dog
18.00–18.15	Case 12	Tvedten	Divergent WBC counts

Saturday 12th September

12.05–12.20	ESVCP-O-13	Bonsembiante	Cytology of the healthy canine and feline ocular surface: comparison between cytobrush and impression technique
12.20–12.35	ESVCP-O-14	Didier	Cytologic evaluations of canine intestinal lymphoma via endoscopic squash-prep cytology
12.35–12.50	ESVCP-O-15	Vessieres	The use of molecular clonality for the diagnosis of thymoma in dogs

ESVIM – European Society of Veterinary Internal Medicine

Thursday 10th September

14.25–14.40	ESVIM-O-1	Swann	Flow cytometric characterisation of lymphocyte populations in dogs with immune-mediated haemolytic anaemia
14.40–14.55	ESVIM-O-2	Priolo	Naturally occurring antibodies against canine red blood cell antigens in cats and feline red blood cell antigens in dogs
14.55–15.10	ESVIM-O-3	Cuq	Rabbit anti-dog thymocyte serum as part of an immunosuppressive regimen in treating hematological immune-mediated diseases: a retrospective study
15.10–15.25	ESVIM-O-4	Taylor	Detection of anti-aspergillus immunoglobulin a in cats with upper respiratory tract aspergillosis
15.25–15.40	ESVIM-O-5	Girod	Comparison of two non-invasive 2% enilconazole infusion protocols for treatment of canine sinonasal aspergillosis and importance of debridement for treatment efficacy

- 15.40–15.55 ESVM-O-6 Vangrinsven Endoscopic investigation of the gastroesophageal junction dynamics in dogs with brachycephalic syndrome
- 15.55–16.10 ESVM-O-7 Leal Tracheobronchial foreign-bodies in cats: a retrospective study of 12 cases
- 16.10–16.25 ESVM-O-8 Slovak Comparison of mycophenolic acid metabolism by cat, dog, and human liver microsomes

VBPS – Veterinary Blood Pressure Society

Thursday 10th September

- 14.25–14.40 VBPS-O-1 Bijmans NT-proBNP in hypertensive cats with and without target organ damage

SCH – Society of Comparative Hepatology

Thursday 10th September

- 14.40–14.55 SCH-O-1 Dirksen Hepatocyte-derived microRNA-122 as an early serum biomarker of hepatocellular injury in dogs
- 14.55–15.10 SCH-O-2 Lecoindre The use of hyaluronic acid and TGF- β in 83 dogs with different stage of liver fibrosis
- 15.10–15.25 SCH-O-3 Kilpatrick Does Systemic Inflammatory Response Syndrome Predict Poor Outcome in Dogs with Hepatopathies
- 15.25–15.40 SCH-O-4 Kerridge Investigating the prevalence of congenital portosystemic shunts in deerhounds

ESVE – European Society of Veterinary Endocrinology

Thursday 10th September

- 15.40–15.55 ESVE-O-1 van Hoek Food-associated factors in etiology of feline hyperthyroidism: where is the proof?
- 15.55–16.10 ESVE-O-2 Fracassi Iodine-restricted food in the management of feline hyperthyroidism: a non-randomised controlled trial in 25 cats
- 16.10–16.25 ESVE-O-3 Dear Predicting postoperative hypocalcemia in dogs following parathyroidectomy or parathyroid heat ablation

Saturday 12th September

- 14.25–14.40 ESVE-O-4 Raffan Juvenile onset diabetes mellitus in seven labrador retriever puppies – case reports and results of candidate gene screening
- 14.40–14.55 ESVE-O-5 Forcada A genome-wide association study identifies novel candidate genes for susceptibility to diabetes mellitus in DSH cats
- 14.55–15.10 ESVE-O-6 Gostelow Home blood glucose monitoring in feline diabetes mellitus: a 3-month prospective clinical trial evaluating owner-acceptance, quality-of-life and glycaemic impact
- 15.10–15.25 ESVE-O-7 Rosca Development of an Artificial Neural Network for Prediction of Glucose Concentration in Feline Diabetes Mellitus
- 15.25–15.40 ESVE-O-8 Hoelmkjaer A placebo-controlled study on the effect of the GLP-1 analogue, exenatide, on body composition, leptin and adiponectin in obese, client-owned cats
- 15.40–15.55 ESVE-O-9 Gostelow Evaluating the efficacy of human-recombinant protamine zinc insulin in feline diabetes mellitus: a three month prospective clinical trial
- 16.30–16.45 ESVE-O-10 Hope Evaluation of a novel seven-day continuous glucose monitoring system in dogs using correlation with blood glucose readings
- 16.45–17.00 ESVE-O-11 Corradini Evaluation of a novel flash glucose monitoring system in diabetic dogs

17.00–17.15	ESVE-O-12	Salesov	Evaluation of two insulin preparations and validation of a continuous glucose monitoring system for use in cats
17.15–17.30	ESVE-O-13	Sanders	New insights in functional zonation of the canine adrenal cortex
17.30–17.45	ESVE-O-14	van Opstal	The role of Sonic Hedgehog signaling in the pathogenesis of canine cortisol-secreting adrenocortical tumors
17.45–18.00	ESVE-O-15	Keyte	Evaluating the use of serum N-terminal type III pro-collagen propeptide in the diagnosis and management of feline hypersomatotropism

ESVC – European Society of Veterinary Cardiology

Friday 11th September

14.25–14.40	ESVC-O-1	Kocaturk	Serum and ascitic fluid proteomes in dogs with dilated cardiomyopathy
14.40–14.55	ESVC-O-2	Nicolson	Cardiac biomarkers in dogs with tick paralysis (<i>Ixodes holocyclus</i>)
14.55–15.10	ESVC-O-3	Gordon	Evaluation of NTproBNP, High Sensitivity Troponin I and PDK4 for the Detection of Occult DCM: A Prospective Study in 449 Doberman Pinschers
15.10–15.25	ESVC-O-4	Langhorn	Serum and urine cardiac troponin I in cats with renal disease
15.25–15.40	ESVC-O-5	Vollmar	Sudden death in Irish wolfhounds with heart disease
15.40–15.55	ESVC-O-6	Vollmar	Heart rates in Irish Wolfhounds with heart disease
16.30–16.45	ESVC-O-7	Sargo	Comparison of 2d mode and m-mode echocardiography in persian cats performed in long-axis and short-axis views
16.45–17.00	ESVC-O-8	Orvalho	Utility of Real Time Three-Dimensional Transesophageal Echocardiography for Balloon Valvuloplasty in Dogs with Pulmonic Stenosis
17.00–17.15	ESVC-O-9	Yata	Evaluation of pimobendan in healthy cats: an echocardiographic study of acute cardiovascular effects
17.15–17.30	ESVC-O-10	Prieto-Ramos	Use of intravenous pimobendan in cats with heart failure
17.30–17.45	ESVC-O-11	James	Efficacy of spironolactone (sp) following oral administration of sp in cats with heart failure: final results of the SEISICAT study.
17.45–18.00	ESVC-O-12	Menciotti	Effects of pimobendan on myocardial perfusion and pulmonary transit time in dogs with myxomatous mitral valve disease: a pilot study

Saturday 12th September

09.00–09.15	ESVC-O-13	Baron Toaldo	Assessment of left atrial deformation and function using two-dimensional speckle tracking echocardiography in healthy dogs and in dogs with myxomatous mitral valve disease
09.15–09.30	ESVC-O-14	Rishniw	Interobserver variability in two-dimensional echocardiographic left atrial measurements is complex
09.30–09.45	ESVC-O-15	Kiss	Identification of cardiac-specific fibrosis related mrna-panel in blood samples of dogs with chronic heart failure
09.45–10.00	ESVC-O-16	Bode	Changes in renal cortisol metabolism are associated with the development of canine congestive heart failure
10.00–10.15	ESVC-O-17	Santilli	Role of right endomyocardial biopsy to characterise unexplained myocardial and rhythm disorders in the dog
10.15–10.30	ESVC-O-18	Baron Toaldo	Morphological and functional echocardiographic assessment of the right ventricle in normal beagles comparing with high field cardiac magnetic resonance imaging

11.20–11.35	ESVC-O-19	McGinnity	Assessment of Spontaneous Echo Contrast in dogs and cats using 2D colour, grey scale and colour tissue doppler imaging
11.35–11.50	ESVC-O-20	Novo Matos	Prevalence of patent foramen ovale in small animals: a post mortem study
11.50–12.05	ESVC-O-21	Pereira	Influence of feline diabetes mellitus on cardiac function
12.05–12.20	ESVC-O-22	Porciello	Reduction of fluoroscopic use with echoguided pacemaker implantation in the dog
12.20–12.35	ESVC-O-23	Szatmári	Differentiation between innocent cardiac murmurs and murmurs caused by congenital cardiac anomalies with auscultation in asymptomatic puppies

ESVNU – European Society of Veterinary Nephrology and Urology

Friday 11th September

09.00–09.15	ESVNU-O-10	Elliott	The effect of amlodipine treatment on vascular endothelial growth factor in feline hypertensive disease
09.15–09.30	ESVNU-O-2	Soerensen	Evaluation of different sampling methods and criteria for diagnosing canine urinary tract infection by quantitative bacterial culture
09.30–09.45	ESVNU-O-3	Dahan	Evolution of uropathogens antimicrobial resistance in a french Veterinary Teaching Hospital: A 10-year retrospective study
09.45–10.00	ESVNU-O-4	Marques	Major international high-risk resistant human <i>Klebsiella pneumoniae</i> lineages are causing urinary tract infections in companion animals
10.00–10.15	ESVNU-O-5	Sagols	In vitro dissolution of feline struvite stones with 2 diets showing different relative supersaturation values
10.15–10.30	ESVNU-O-6	Ghys	Evaluation of cystatin C for the detection of chronic kidney disease in cats
11.20–11.35	ESVNU-O-7	Muñoz	Increase of canine serum cystatin C produced by oral administration of prednisone
11.35–11.50	ESVNU-O-8	Muñoz	Association between plasma phosphate concentration and survival in dogs with chronic kidney disease
11.50–12.05	ESVNU-O-9	Steinbach	Urine protein: creatinine ratio (upc) and its relation to naturally occurring pyuria and plasma acute phase proteins in dogs

ESCG – European Society of Comparative Gastroenterology

Friday 11th September

09.00–09.15	ESCG-O-1	Jaillardon	Feline hypcobalaminemia: epidemiological, clinical and biological study of 259 cats
09.15–09.30	ESCG-O-2	Williams	Serum cobalamin concentration in geriatric cats and response to oral cobalamin supplementation is associated with differences in the composition of the fecal microbiome
09.30–09.45	ESCG-O-3	Maunder	Investigation into the role of campylobacter species in feline neutrophilic inflammatory bowel disease
09.45–10.00	ESCG-O-4	Mariani	Improvement of intestinal microbiota richness in puppies after oral hyper-immunized plasma supplementation
10.00–10.15	ESCG-O-6	Moreno	Comparative analysis of the faecal virome of healthy dogs and dogs with chronic enteropathy
10.15–10.30	ESCG-O-8	Simpson	Characterization of antimicrobial resistance and treatment outcomes in dogs with e. coli-associated granulomatous colitis
11.20–11.35	ESCG-O-7	Ruiz	Diagnostic contribution of cytological specimens obtained from biopsies during gastrointestinal endoscopy in dogs and cats: a prospective pilot study

11.35–11.50	ESCG-O-13	Huang	Intervention to increase physical exercise in dogs with chronic enteropathies
11.50–12.05	ESCG-O-9	Heilmann	Fecal S100A12 concentration predicts a lack of response to treatment in dogs with chronic enteropathies
12.05–12.20	ESCG-O-11	Lamoureux	Inflammatory rectal and anal stricture in small animals: an underestimated etiology. A retrospective study of ten cases (2007–2014)
12.20–12.35	ESCG-O-12	McLean	A comparison of ultrasonographic and clinical findings in 293 dogs with acute pancreatitis: different clinical presentation with left limb, right limb, or diffuse involvement of the pancreas

ISCAID – International Society for Companion Animal Infectious Diseases

Saturday 12th September

09.00–09.15	ISCAID-O-1	Solano-Gallego	Rapid reduction of leishmania infantum-specific antibodies during treatment in dogs with moderate disease
09.15–09.30	ISCAID-O-2	Solano-Gallego	Leishmania infantum-specific production of ifn-gamma in stimulated blood from dogs with clinical leishmaniosis
09.30–09.45	ISCAID-O-3	Bouzouraa	Anaplasma platys infection in dogs: Epidemiological and clinical features from 24 naturally occurring clinical cases
09.45–10.00	ISCAID-O-4	Pantaleo	Prognostic values of serum electrolytes and anion gap in dogs with natural occurring leptospirosis: a cohort study in 156 dogs
10.00–10.15	ISCAID-O-5	Aboim	Emergence of human pathogenic Enterococcus faecalis CC2 lineages in companion animals
10.15–10.30	ISCAID-O-6	Sarvani	Polymerase chain reaction (PCR) survey of feline haemoplasma infections in Serbia
11.20–11.35	ISCAID-O-7	Broussou	Excretion of canine parvovirus type 2 (cpv-2) during gestation and lactation in bitches and puppies
11.35–11.50	ISCAID-O-8	Porporato	Feline panleukopenia: clinical predictors in 177 cases (2011-2013)
11.50–12.05	ISCAID-O-9	Bergmann	Antibody production as reaction to feline panleucopenia virus vaccination in healthy adult cats
12.05–12.20	ISCAID-O-10	Leutenegger	Spike gene mutations in feline coronavirus and their correlation to feline infectious peritonitis
12.20–12.35	ISCAID-O-11	Stranieri	Comparison between the diagnostic accuracy of clinico-pathological and molecular tests for Feline Infectious Peritonitis (FIP)
12.35–12.50	ISCAID-O-12	Felten	Diagnostic utility of an immunocytochemical assay for feline infectious peritonitis using aqueous humor

ESVONC – European Society of Veterinary Oncology

Saturday 12th September

14.25–14.40	ESVONC-O-1	Sayag	Prognostic significance of morphological variant of canine diffuse large b-cell lymphomas: a retrospective study of 49 cases
14.40–14.55	ESVONC-O-2	Davies	Clinical presentation and response to treatment of 63 cases of canine multicentric b-cell lymphoma in the UK
14.55–15.10	ESVONC-O-3	Morris	Next generation sequencing of canine lymphoma identifies variants unique to b cell cases
15.10–15.25	ESVONC-O-4	Zoia	New strategies treatment in feline large granular lymphocyte lymphoma: a non-randomised controlled trials in 20 cats

- 15.25–15.40 ESVONC-O-5 Skor Frequency and prognostic significance of blood eosinophilia in canine mast cell tumors (MCT)
- 15.40–15.55 ESVONC-O-6 Carvalho Association of histopathological features and COX-2 expression in canine renal carcinomas with clinical outcome

LIST OF POSTER RESEARCH COMMUNICATIONS

ESVCN – European Society of Veterinary Clinical Nutrition

- ESVCN-P-1 German Inaccuracy when using tape measures to make zoometric measurements in dogs
- ESVCN-P-2 Koizumi Identification of the palpation site in the diagnosis of body condition score in dogs
- ESVCN-P-3 Otsuji Efficacy of the body condition score model in the nutritional diagnosis in dogs
- ESVCN-P-4 Tvarijonavičiute Alterations in plasma proteome of dogs with obesity-related metabolic dysfunction. Preliminary results

ESVCP – European Society of Veterinary Clinical Pathology

- ESVCP-P-1 Bau-G Evaluation of erythrocyte morphology in the domestic ferret (*Mustela putorius furo*)
- ESVCP-P-2 Bertazzolo Thoracic non-chylous lymphorrhagic effusion in cats
- ESVCP-P-3 Conway Analytical performance of a new point-of care dry chemistry analyser and method of comparison with an established automated wet analyser
- ESVCP-P-4 Tvarijonavičiute Validation of the methods for total oxidant status and total antioxidant capacity measurement in mussels
- ESVCP-P-5 Gavazza Pre-analytical errors in laboratory testing of canine and feline samples. Occurrence of hemolysis, lipemia, and icterus
- ESVCP-P-6 Ghisleni Diagnostic cytology of Myxozoan infections of fish
- ESVCP-P-7 Giordano Hematological, serum biochemical and electrophoretic values in captive Egyptian fruit bats (*Rousettus Aegyptiacus*)
- ESVCP-P-8 Giraldi Evaluation of proteinuria in cats: comparison between Coomassie Brilliant Blue and Pyrogallol Red Molybdate
- ESVCP-P-9 Kohn Serial Crossmatching in Feline Transfusion Patients
- ESVCP-P-10 Schmidt Hypercholesterolaemia in older cats is not associated to haatoglobin and serum amyloid A concentration
- ESVCP-P-11 Lubas Selection of canine blood donors considering epidemiological issues in Italy. A working group consensus on infectious diseases screening
- ESVCP-P-12 Moreira dos Santos Schmidt Hematological profile, plasmatic protein and fibrinogen in Holstein cows under heat stress
- ESVCP-P-13 Miniscalco Long-term preservation of urine sediment with formaldehyde: does it work?
- ESVCP-P-14 Moretti Laboratory reference intervals of holstein lactating cows at 3 and 30 days post-partum
- ESVCP-P-15 Paltrinieri Sodium-dodecylsulphate agarose gel electrophoresis (SDS-AGE) as a tool for monitoring the pattern of proteinuria in dogs with leishmaniasis
- ESVCP-P-16 Peres Rubio C-reactive protein concentration in female dogs submitted to conventional and minimal invasive ovariohysterectomy

ESVCP-P-17	Sævik	The effect of breed, sex, age and body weight on feline serum biochemistry variables
ESVCP-P-18	Scarpa	Reproducibility of urine sediment examination using two different methods
ESVCP-P-19	Gavazza	Prevalence of dog erythrocyte antigens 4 and 7 in Italian canine blood donors using gel agglutination technique
ESVCP-P-20	Tvarijonavičiute	Effects of seasonality on blood analytes related with metabolism in Pyrenean chamois (<i>Rupicapra pyrenaica</i>)
ESVCP-P-21	Vilhena	Serum acute phase proteins in <i>Mycoplasma</i> spp. infected cats
ESVCP-P-22	Rossi	Reproducibility of urine sediment examination using different volumes of sample
ESVCP-P-23	Weber	Fast and simple <i>mdr1</i> -genotyping in dogs: towards a point-of-care test
ESVCP-P-24	Trumel	Comparison of canine and feline blood/plasma creatinine measurements obtained with the Nova Statsensor point-of-care analyzer and the Vitros 350
ESVCP-P-25	Trumel	Urine protein electrophoresis on canine urine stored on absorbent paper

ESVIM – European Society of Veterinary Internal Medicine

ESVIM-P-1	Breu	Analyses of cerebrospinal fluid (CSF) samples of 210 dogs with neurological symptoms
ESVIM-P-2	Hugonnard	Pet owners use of the Internet for their pets' health
ESVIM-P-3	Cocci	Evaluation of topic 1% clotrimazole cream as the only treatment for canine sinonasal aspergillosis: 9 cases (2008–2015)
ESVIM-P-4	Diquélou	Survey of euthanasia practices of dogs and cats by French veterinary practitioners
ESVIM-P-5	Karnezi	Canine pancytopenia: a retrospective study of 119 cases
ESVIM-P-6	García-Guasch	Differences of breathing patterns between cats with laryngeal masses and feline bronchial diseases by using barometric whole-body plethysmography
ESVIM-P-7	Hoummady	Risk factors for mortality in aged guide dogs
ESVIM-P-8	Johnson	Laryngoscopy in coughing dogs
ESVIM-P-9	Johnson	Bronchiectasis in dogs
ESVIM-P-10	Mclean	A Retrospective Study of Chronic Respiratory Disease in 126 Dogs Presenting to a Private South African Veterinary Clinic
ESVIM-P-11	McPartland	Sterile steroid-responsive lymphadenitis in 36 dogs
ESVIM-P-12	Planellas	Oxidative stress values in brachycephalic dogs with upper airway obstruction
ESVIM-P-13	Roels	Chemokine (cc-motif) ligand 2 as a prognostic serum marker in canine idiopathic pulmonary fibrosis
ESVIM-P-14	Roels	Standardized characterization of thoracic high-resolution computed tomographic findings in west highland white terrier with canine idiopathic pulmonary fibrosis and comparison between sedated and anesthetized examinations
ESVIM-P-15	Schmitz	Retrospective characterization of mesenterial purulent lymphadenitis and lymph node abscesses in dogs reveals an increased risk for the small Munsterlander
ESVIM-P-16	Schulz	Clinical and laboratory parameters in dogs with canine infectious respiratory disease (cird)
ESVIM-P-17	Viitanen	Peripheral blood lymphocyte subpopulations in irish wolfhounds with pneumonia

VBPS – Veterinary Blood Pressure Society

- VBPS-P-1 Larsson Comparison of measurement of systolic arterial blood pressure by Doppler method in different body positions in conscious dogs
- VBPS-P-2 Stepien Repeatability of hypertension diagnosis based on noninvasive blood pressure assessment in clinical canine patients

SCH – Society of Comparative Hepatology

- SCH-P-1 Sato Gallbladder agenesis in 15 dogs

ESVE – European Society of Veterinary Endocrinology

- ESVE-P-1 Decôme Prevalence and Clinical Features of Naturally Occurring Hypoadrenocorticism in Great Pyrenees in a Referred Population in Montreal, Canada: 11 Cases (2005–2014)
- ESVE-P-3 Spence The use of a novel latex immunoagglutination inhibition method for haemoglobin A1c measurements in dogs
- ESVE-P-4 Wehner Validation of an enzyme fluorescence assay (ELFA) to measure total thyroxine in dogs and cats

ESVC – European Society of Veterinary Cardiology

- ESVC-P-1 Baisan The diagnostic value of cardio-thoracic ratio for detecting the heart size changes in dogs
- ESVC-P-2 Batista Electrocardiographic changes during normal canine puerperium
- ESVC-P-3 Batista Echocardiographic assessment of pregnant queens
- ESVC-P-4 Caro-Vadillo Reproducibility and influence of age of tricuspid annular plane systolic excursion (TAPSE) in beagle dogs
- ESVC-P-5 Bomassi Tetralogy of Fallot in dogs and cats: a retrospective study of 31 cases (2003–2014)
- ESVC-P-6 Chiu Age-related changes in vertebral heart scale and echocardiographic indices in healthy geriatric cats
- ESVC-P-7 Carnabuci Irreversible pulmonary hypertension and tricuspid regurgitation in young cats secondary to different lungworm infections
- ESVC-P-8 Damoiseaux Quantification of systolic and diastolic right ventricular function by conventional echocardiography and speckle tracking imaging: a prospective study in 104 healthy dogs with documented pulmonary arterial pressure and left ventricular function
- ESVC-P-9 Itikawa Left ventricle function assessment by non-invasive dp/dt in dogs with chronic mitral valve disease
- ESVC-P-10 Pariaut Success of pulmonary balloon valvuloplasty in relation to valve anatomy in dogs: a multicenter follow up study
- ESVC-P-11 Giorgi Prevalence of hypertrophic cardiomyopathy (hcm) in feline population examined by the osservatorio italiano hcm felina
- ESVC-P-12 Lobo Epidemiological characterization of a Portuguese population of dogs with canine chronic mitral valve disease: 542 cases
- ESVC-P-13 Locatelli Anemia in dogs with mitral valve disease: prevalence and associated risk factors
- ESVC-P-14 Schwartz Left atrial dysfunction in dogs with symptomatic chronic mitral valve disease
- ESVC-P-15 Martinelli Cardiorenal syndrome in dogs with mitral valve disease: a prospective study

ESVC-P-16	Monzo	Prevalence of hypertrophic cardiomyopathy on a population of 150 cats
ESVC-P-19	Olsen	Increased serum C-reactive protein concentrations in dogs with congestive heart failure due to myxomatous mitral valve disease
ESVC-P-20	Saponaro	Cardiovascular effects of medetomidine in stage b2 myxomatous mitral valve disease
ESVC-P-21	Ventura	Transarterial Patent Ductus Arteriosus Occlusion Using Different Devices in 25 Dogs
ESVC-P-22	Vezzosi	Comparison of two echocardiographic views for evaluating the right pulmonary artery distensibility index in dogs

ESVNU – European Society of Veterinary Nephrology and Urology

ESVNU-P-2	Grandemange	Long term survey of the effect of imidapril on the glomerular filtration rate in cats suffering from chronic kidney disease
-----------	-------------	---

ESCG – European Society of Comparative Gastroenterology

ESCG-P-1	Allenspach	Hypovitaminosis D is associated with poor outcome in dogs with protein losing enteropathy
ESCG-P-2	Bojanic	Pathogenicity investigation of <i>Campylobacter jejuni</i> , <i>C. upsaliensis</i> and <i>C. helveticus</i> isolated from dogs and cats using <i>Galleria mellonella</i> larvae
ESCG-P-3	Grellet	The influence of a moderate intensity short duration exercise on serum C-reactive protein and fecal S100A12 concentrations in adult dogs
ESCG-P-4	Solomon	Assessment of image quality produced by a novel gi imaging device used in client-owned dogs
ESCG-P-6	Liu	Establishment of a severity scoring system for outcome prediction in dogs with pancreatitis
ESCG-P-7	Luckschander-Zeller	The canine intestine – important for independent glucocorticoid metabolism?
ESCG-P-8	O'Brien	Cardiac injury detected by troponin is associated with pancreatitis detected by DGGR-lipase in dogs and cats
ESCG-P-9	Sharman	Comparison of confocal endomicroscopy and other diagnostic modalities to detect intracellular helicobacter in dogs
ESCG-P-10	Toresson	Oral cobalamin supplementation in cats with hypcobalaminemia
ESCG-P-11	Leça Jacinto	Evaluation of Microparticle Procoagulant Activity in Dogs with Idiopathic Inflammatory Bowel Disease
ESCG-P-12	Jergens	Analysis of the ileal and colonic mucosal microbiota in canine chronic enteropathies

ISCAID – International Society for Companion Animal Infectious Diseases

ISCAID-P-2	Attipa	The first prevalence study of haemoplasma species, leishmania spp., bartonella henselae, ehrlichia/anaplasma spp., feline immunodeficiency virus and feline leukaemia virus in cats from cyprus
ISCAID-P-3	Bergmann	Prevalence of Bartonella species infections in cats in Southern Germany
ISCAID-P-4	Felten	Detection of feline coronavirus spike gene mutations as a tool to diagnose feline infectious peritonitis
ISCAID-P-5	Freiche	Sequencing of 3c and spike genes in Feline Infectious Peritonitis: Which samples are the most relevant for analysis ? A retrospective study of 33 cases from 2008 to 2014.

ISCAID-P-6	Lo Piccolo	Occurrence of MethicillinResistant Staphylococcus aureus (MRSA) isolates from clinical specimens of household dogs
ISCAID-P-8	Müller Pereira	Molecular detection of Haemotropic Mycoplasmas infecting domestic cats from southern Chile
ISCAID-P-9	Pacheco	Myocardial lesions in dogs with visceral leishmaniasis
ISCAID-P-10	Planellas	Urinary adverse effects of allopurinol treatment in dogs with leishmaniosis: a prospective study (preliminary data).
ISCAID-P-11	Rehbein	Giardia duodenalis in dogs and cats: an epidemiological study
ISCAID-P-12	Theron	Canine parvoviral enteritis: a retrospective study of 147 cases (2003–2013)
ISCAID-P-13	Thibault	Evaluation of the impact of residual Maternally Derived Antibodies against Canine Parvovirus on the efficacy of a standard primary vaccination protocol
ISCAID-P-14	Tozon	C-reactive protein elevation in dogs naturally infected with bacterium anaplasma phagocytophilum

ESVONC – European Society of Veterinary Oncology

ESVONC-P-1	Baril	Evaluation of environmental exposure to vincristine and cyclophosphamide in veterinary medicine
ESVONC-P-2	Carvalho	Intratumoral CD3+ T-lymphocytes immunoexpression and its association with c-kit and angiogenesis in malignant canine mammary tumors: a multivariate survival analysis
ESVONC-P-4	Zoia	Epidemiological data of feline large granular lymphocyte lymphoma: a case control study in 176 cats
ESVONC-P-5	Carvalho	Intratumoral FoxP3 expression in malignant canine mammary tumors: its association with clinicopathological parameters, angiogenesis and prognosis

ESCG-O-1

FELINE HYPOCOBALAMINEMIA: EPIDEMIOLOGICAL, CLINICAL AND BIOLOGICAL STUDY OF 259 CATS. L. Jailardon, D. Rochel, C. Amato, L. Hess, P. Nguyen, B. Siliart. Oniris-Nantes Atlantic College of Veterinary Medicine, Food Science and Engineer, Nantes Cedex 3, France

Cobalamin concentrations were previously investigated in cats, but little information is available concerning the follow up of hypocobalaminemic cats. We aimed to assess the frequency of hypocobalaminemia within a large cohort of cats with gastrointestinal signs and describe the epidemiological, clinical, biological and follow-up characteristics of hypocobalaminemic cats.

1495 cats with gastrointestinal signs and for which a cobalamin assay (SimulTRAC-SNB radioassay kit VitaminB12[®], MPBiomedical) was performed between 2007 and 2014 at the LDHVet laboratory were retrospectively included in the study.

259 (17.3%) cats presented for gastrointestinal signs had a hypocobalaminemia: the majority were Domestic Short Hair, 47% were males (84% castrated) and 53% females (94% castrated), aged from 3 months to 18 years. The main clinical signs included chronic diarrhea (93%), weight loss (71%), polyuropolydypsia (48%), vomiting (43%), polyphagia (38%), fatigability (36%) and dysorexia (19%) with a median duration of 4 months before diagnosis. Cobalamin values ranged from 44 to 400 ng/L (median: 296 ng/L). 60% of the hypocobalaminemic cats had also a hyperfolatemia (folate > 12 ng/L) at diagnosis. fT4 was measured in the 64 older cats (> 12 years) and revealed an hyperthyroidism (fT4 > 40 pmol/L) in 20% of the cases. 67/259 hypocobalaminemic cats had a known clinical and biological follow-up (median time follow-up = 44 days): cobalamin significantly improved 1 month after treatment (50 µg/kg IM cyanocobalamin in a single dose) for 87% of the cats, even if 16% remained hypocobalaminemic. 62% of the followed cats were clinically improved, of which 85% with an associated higher cobalamin value. Clinical and biological improvement after cobalamin supplementation was significantly associated with an increase in folate concentration (P -value = 0.02). However, 33% of the cats with an improved cobalamin value did not show any clinical improvement.

Hypocobalaminemia is frequently observed in cats as a consequence of gastrointestinal signs. Cobalamin concentrations could be used as an indicator of the severity of various gut diseases more than a primary cause, because one third of the cats did not show any clinical improvement despite an improved cobalamin value. A hyperfolatemia appearing after treatment of hypocobalaminemia seems to be a good indicator of a clinical improvement associated with a return to a normal intestinal integrity.

Disclosures: No disclosures to report.

ESCG-O-2

SERUM COBALAMIN CONCENTRATION IN GERIATRIC CATS AND RESPONSE TO ORAL COBALAMIN SUPPLEMENTATION IS ASSOCIATED WITH DIFFERENCES IN THE COMPOSITION OF THE FECAL MICROBIOME. D.A. Williams¹, M. Manuzon², Z. Ramadan², G. Czarnecki-Maulden². ¹University of Illinois, Urbana, IL, USA, ²Nestle Purina PetCare, St. Louis, MO, USA

Cobalamin malabsorption is common in old cats with weight loss, macronutrient malabsorption and enteric protein loss due to idiopathic chronic enteropathy, ICE (Patil AP and Cupp CJ, Proc. Nestle-Purina Compan Anim Nutr Summit, 55–61, 2010, Williams and Czarnecki-Maulden, Proc 23rd ECVIM-CA Congress, 2013). High dose oral cobalamin supplementation reverses subnormal serum concentration within 1 week but serum cobalamin can become undetectable within as little as 1 month following cessation of supplementation (Williams and Czarnecki-Maulden, Proc 23rd ECVIM-CA Congress, 2014). The objectives of this study were to determine if serum cobalamin concentrations in cats with ICE and the response to oral supplementation and withdrawal are associated with differences in the intestinal microbiome.

The study evaluated 46 cats older than 12 years of age that were being fed nutritionally complete and balanced diets that included a fortification of vitamin B12. Thirty-one of these cats had ICE demonstrated by increased fecal fat (>20%), subnormal fat

digestibility (<90%), subnormal serum cobalamin or increased serum methylmalonic acid, but without exocrine pancreatic insufficiency as assessed by assay of serum trypsin-like immunoreactivity. Serum cobalamin was determined by competitive binding assay and the fecal microbiome by Roche 454 sequencing and analysis by QIIME (Quantitative Insights into Microbial Ecology), PCA (Principal Component Analysis) and OPLS (Orthogonal Projections to Latent Structures). 13 of these ICE cats were supplemented with oral cobalamin for 2 months. Serum cobalamin concentrations were determined monthly during supplementation and for 3 months after cessation of supplementation.

In the 46 cats there was a significant ($P \leq 0.05$) association between serum cobalamin and the fecal microbiome, with 12 species being positively correlated with serum cobalamin concentration and 7 species being negatively correlated. Serum cobalamin was subnormal (<290 ng/L) in 4 of the 13 ICE cats at the start of the supplementation study and subsequently became normal or supranormal. Within 1 to 3 months after cessation of supplementation serum cobalamin was subnormal in the 4 original cats and 1 additional cat.

It is concluded that serum cobalamin concentration and the responses to oral supplementation and subsequent cessation of supplementation are significantly associated with the composition of the intestinal microflora as reflected in the fecal microbiome.

Disclosures: The study described in the abstract was performed at Nestle-Purina facilities and funded entirely by Nestle-Purina.

David Williams is a consultant and adviser for Nestle-Purina, Idexx Laboratories, and the Gastrointestinal Laboratory at Texas A&M University. He receives royalties from Idexx Laboratories and has given continuing education lectures sponsored by Nestle-Purina.

ESCG-O-3

INVESTIGATION INTO THE ROLE OF CAMPYLOBACTER SPECIES IN FELINE NEUTROPHILIC INFLAMMATORY BOWEL DISEASE. L. Maunder, J. Hall, J. Day, A. Cogan, F. Reynolds. University of Bristol, Bristol, UK

Inflammatory bowel disease (IBD) is a common cause of chronic gastrointestinal signs in cats. Typically, lymphoplasmacytic inflammation is found in biopsies, but a subset of cats with IBD has neutrophilic inflammation. The clinical significance of neutrophilic infiltration is unclear.

The aim of this retrospective study was to use fluorescence *in situ* hybridisation (FISH) to look for the presence of any microorganisms within the intestinal epithelium of cats diagnosed with IBD and then to identify those microorganisms. Our hypothesis was that neutrophilic enteritis in cats would be associated with intestinal mucosal invasion by microorganisms, and specifically by *Campylobacter* spp.

The study included 27 cats presented to the Small Animal Hospital, Langford Veterinary Services for investigation of gastrointestinal disease which had duodenal biopsies collected endoscopically. Thirteen cats were diagnosed with neutrophilic inflammation (study group) and 14 cats with lymphoplasmacytic inflammation (control group).

Fluorescence *in situ* hybridisation (FISH) targeting either all eubacteria or *Campylobacter jejuni*, *coli* and *upsaliensis* was used to identify and count intra-mural bacteria in the intestinal biopsy samples. Neutrophils were detected simultaneously using a FISH probe to neutrophil elastase. The pixel distance between different bacterial species and neutrophils was measured.

All animals in both groups showed the presence of intra-epithelial bacteria and the number of bacteria present did not differ between the control and study groups. Similarly, *Campylobacter jejuni* and *upsaliensis* were present in some animals in each group but numbers did not differ between the 2 groups. In contrast, *Campylobacter coli* was present in significantly more study cats than control cats ($P = 0.04$; Chi-squared test) and the study group showed significantly higher numbers of *C. coli* in the tissue than the control group ($P = 0.02$; Mann-Whitney U test). Co-localisation of neutrophils and *C. coli* was demonstrated with *C. coli* closer than any of the other bacteria to the neutrophils. This association was statistically significant ($P < 0.001$; Mann-Whitney U test).

The presence of intra-epithelial bacteria is a feature common to neutrophilic and lymphoplasmacytic IBD and is likely due to defective epithelial barrier function resulting from inflammation. Increased numbers of *Campylobacter coli*, but not *jejuni* or *upsaliensis*, were significantly associated with neutrophilic, rather than lymphoplasmacytic, inflammation suggesting that *C. coli* is able either to produce compounds which stimulate neutrophils or to induce feline intestinal cells to produce neutrophil chemoattractants. The spatial co-localization of neutrophils relative to the *C. coli* further reinforces this link.

Disclosures: No disclosures to report.

ESCG-O-4

IMPROVEMENT OF INTESTINAL MICROBIOTA RICHNESS IN PUPPIES AFTER ORAL HYPER-IMMUNIZED PLASMA SUPPLEMENTATION. H. Mila^{1,2}, B.C. Guard³, C. Mariani², A. Feugier², A. Grellet², S. Chastant-Maillard¹, J.M. Steiner², J. Suchodolski³. ¹UMR INRA/ENVT 1225 IHAP, Ecole Nationale Vétérinaire de Toulouse, Toulouse, France, ²Royal Canin, Aimargues, France, ³Gastrointestinal Laboratory, Texas A&M University, College Station, TX, USA

The prevalence of neonatal mortality is high in the canine species and poorly studied. Microbiome, undergoing massive changes during the early stages of life, is becoming increasingly recognized as critical to understanding the immune system and metabolic function in neonates. It has been noted in many species that adequate transfer of maternal immunity through colostrum is crucial for survival. Given the highly dynamic and unique interaction between the immune system and the intestinal microbiome, strategies for conditioning and maintaining a healthy gut may be useful in prevention of neonatal mortality in puppies. This study was designed to evaluate longitudinally the fecal microbiome in puppies administered a hyper-immunized plasma supplementation since birth until weaning.

Blood was collected from routinely vaccinated adult dogs, and the plasma was stored at -20°C . At birth and subsequently every 2 days, 28 puppies were treated orally with hyper-immunized plasma and 30 puppies served as healthy controls. Fecal samples were collected on days 2, 21, 42, and 56 after birth. DNA was extracted using the ZR Fecal DNA KitTM (Zymo Research Corporation, Irvine, CA). The fecal microbiota was analysed by 454-pyrosequencing of the 16S rRNA gene. Microbial communities between groups were compared using the ANOSIM function (package PRIMER 6, PRIMER-E Ltd., Plymouth, UK) to evaluate beta diversity. Observed species, Chao1, and Shannon diversity indices were used to evaluate alpha diversity.

Microbial communities were found to be significantly different between hyper-immunized and healthy control puppies at days 2, 42, and 56 (ANOSIM: $P = 0.0030$, 0.0030 , and 0.0400 , respectively). At day 2, the observed species metric revealed that species richness was significantly increased in hyper-immunized puppies compared to control puppies (median [range]: 191 [91–259] and 129 [89–288], respectively; $P = 0.0015$). Similarly, at day 2, the Chao1 metric estimated that true species richness was significantly increased in hyper-immunized puppies compared to control puppies (median [range]: 329 [128–549] and 203 [120–495], respectively; $P = 0.0029$). The Shannon diversity index for species richness and evenness distribution was also significantly increased in hyper-immunized puppies at day 2 compared to control puppies (median [range]: 5.4 [4.2–6.2] and 5.0 [3.6–6.7], respectively; $P = 0.0205$).

Previous studies have shown decreased diversity in dogs with gastrointestinal disease and those that receive antibiotics. Supplemented puppies were characterized by an initial increase in diversity and modified microbial communities. It could be hypothesized that the microbiome of hyper-immunized puppies offers a bolstered immune system in neonate puppies, but this conjecture warrants further research.

Disclosures: This study was sponsored by Royal Canin. Mila H, Mariani C, Feugier A, and Grellet A are Royal Canin employees.

ESCG-O-6

COMPARATIVE ANALYSIS OF THE FAECAL VIROME OF HEALTHY DOGS AND DOGS WITH CHRONIC ENTEROPATHY. P.S. Moreno¹, J. Wagner², J.R. Gilkerson¹, M. Stevens³, C.D. Kirkwood², C.S. Mansfield¹. ¹The University of Melbourne, Melbourne, Vic., Australia, ²Murdoch Childrens Research Institute, Melbourne, Vic., Australia, ³The Australian Genome Research Facility, Melbourne, Vic., Australia

The role of the intestinal virome in health and disease is gaining increased attention in human medicine. The use of next generation sequencing (NGS) technologies has allowed identification of diversity and distribution of the virome. These approaches can equally be applied to dogs. This study aimed to identify and characterise the virome present in faeces of dogs with chronic enteropathy (CE) compared to the virome of healthy dogs (HD). Faecal samples were evaluated from 8 HD and 8 dogs with CE (4 Food, 3 Antibiotic and 1 Steroid Responsive) using a NGS approach. A viral enrichment protocol, using a series of centrifugation, endonuclease treatments and bacterial filtration were performed. The enriched viral DNA and RNA were extracted and amplified using sequence-independent single-primer amplification (SISPA) protocol, and subsequently sequenced by NGS using the Illumina MiSeq platform at the AGRF. Two bioinformatic pipelines were used to analyse the viral population. After selecting high quality reads and removing dog and bacterial sequences, sequence information was compared against 2 reference databases. We identified a total of 15,358 viral contigs, with 14,241 DNA viral sequences and 1,041 RNA sequences across all 16 dog samples. The majority of viral hits from both groups of faecal samples were bacteriophage (73.8% HD and 99.7% CE), from several families mainly from the *Caudovirales* order. After all analyses, only 6 viral eukaryotic families were identified across all samples. Two groups of sequences similar to known virus families, *Reoviridae* and *Papillomaviridae*, were identified in both groups (HD 1/8 and 1/8 and CE 2/8 and 2/8, respectively). Sequences similar to *Picornaviridae* were identified only in one dog with CE and sequences similar to *Adenoviridae*, *Parvoviridae* and *Coronaviridae* were identified only in healthy dogs (1/8 each). Further genomic characterisation and phylogenetic analysis was undertaken on 2 viruses. The 11 genome segments of a Rotavirus (*Reoviridae*) isolate were determined. Similarly, the sequence of the entire coding region of a kobovirus (*Picornaviridae*) isolate was determined. Preliminary analyses indicated that all rotavirus gene segments exhibited between 55% - 98% nt homology to previously reported canine rotaviruses. The kobovirus sequence exhibited moderate nt homology (55%) to previously described genomes and clustered with other canine kobovirus sequences available in GenBank. In conclusion, viral sequences from a range of different virus families, including both RNA and DNA families, and known pathogens were identified and characterised, and the largest proportion of viral contigs identified belonged to bacteriophages.

Disclosures: No disclosures to report.

ESCG-O-7

DIAGNOSTIC CONTRIBUTION OF CYTOLOGICAL SPECIMENS OBTAINED FROM BIOPSIES DURING GASTROINTESTINAL ENDOSCOPY IN DOGS AND CATS; A PROSPECTIVE PILOT STUDY. G.C. Ruiz¹, L. Verrot², E. Laloy³, G. Benckroun³. ¹University of Bristol, Langford, Bristol, UK, ²Vetagro-Sup, Marcy l'etoile, France, ³Ecole Nationale Vétérinaire d'Alfort, Maisons-alfort, France

Endoscopy is widely used to perform targeted and minimally invasive biopsies for histopathology of the gastrointestinal tract of dogs and cats. Only a few studies have focused on the diagnostic contribution of cytological samples of the alimentary tract. The aims of this study were to compare 'imprint' and 'squash' techniques to obtain valuable cytological samples from endoscopic biopsies, and to evaluate the potential interest of cytology compared to histology in reaching the definitive diagnosis.

Eighteen dogs and 5 cats presenting gastrointestinal symptoms that underwent an endoscopy of their alimentary tract were prospectively included. Five biopsies of each area of interest were collected for regular histopathological analysis. An additional biopsy from each area was used to obtain cytological specimens

by imprint and squash techniques. Cytology samples were all reviewed blindly by the same pathologist. Cytology samples of insufficient quality were considered as 'non diagnostic' and were excluded from further analysis. Diagnostic conclusions of both cytological and histological analyses were classified into defined categories (inflammation or neoplasia with subcategories, fibrosis, epithelial hyperplasia, and normal) to allow comparison between the techniques. Agreement between cytology and histology was determined by Cohen's Kappa coefficient.

From the 23 cases, biopsy specimens were collected from 48 different localizations for histology and 95 cytology slides were obtained. Final diagnosis was neoplasia in 5 cases and inflammatory disease in 18. Considering imprint technique, 15/47 were considered 'non diagnostic'. For squash technique, only 2/48 of cytological samples were considered as 'non diagnostic'. Squash cytology and histology gave the same results in 65.2% of the cases ($n = 46$) and agreement between the 2 techniques was considered 'moderate' ($k = 0.48$ (95% confidence interval [CI] 0.32; 0.65)). Agreement was 'fair' between imprint cytology and histology ($n = 32$) ($k = 0.39$ [95% CI 0.2; 0.58]).

Gastric spiral organisms (GSO) were observed in 8 cases. In 3 cases they were identified only on cytology. Amongst these 8 cases, mast cells were identified on cytology in 5 cases, and not on histology in any cases. Mast cells were not found in any other cases.

This prospective pilot study demonstrated that cytological examination of gastrointestinal biopsy squash samples obtained during endoscopy of the alimentary tract may give relevant information, which can help the clinician to initiate treatment while histopathological analysis is pending. Furthermore, it can give additional information (presence of potential pathogens, mast cells) that may not be identified on histopathology.

Disclosures: No disclosures to report.

ESCG-O-8

CHARACTERIZATION OF ANTIMICROBIAL RESISTANCE AND TREATMENT OUTCOMES IN DOGS WITH *E. COLI*-ASSOCIATED GRANULOMATOUS COLITIS. C. Manchester, B. Dogan, W. Simpson, Cornell University, Ithaca, NY, USA

Intramucosal *Escherichia coli* are implicated in the pathogenesis of granulomatous colitis of boxer dogs. Clinical remission hinges upon its eradication, most commonly achieved with fluoroquinolones. Antimicrobial resistance is not uncommon among *E. coli* isolated from dogs with GC and impairs successful treatment. Published data is lacking on efficacious therapies for GC dogs with fluoroquinolone-resistant *E. coli*.

The aim of this study was to characterize the antimicrobial resistance patterns and molecular characteristics of *E. coli* isolated from dogs with GC. Additionally, to evaluate the clinical outcome of dogs treated with antimicrobials guided by culture and susceptibility results.

The study population was 25 (21 boxers and 4 French bulldogs) client-owned dogs with GC. GC biopsies with FISH-confirmed intramucosal *E. coli* were submitted for bacterial culture. Antimicrobial susceptibility was determined by broth microdilution. Most strains were further characterized by phylogroup and overall genotype using triplex and random amplified polymorphic DNA polymerase chain reaction, respectively. Treatment and clinical outcomes data were obtained.

Culture yielded 42 *E. coli* strains (1–6 per dog, med 2) from 24/25 dogs. Resistance to fluoroquinolones was identified in 15/24 dogs; this was correlated with resistance to other macrophage-penetrating antimicrobials ($P < 0.005$). Phylogroup A was over-represented among enrofloxacin-resistant strains. In dogs with *E. coli* isolated at multiple time points, phylogroup changed over time.

Clinical remission was achieved in 8/9 dogs with fluoroquinolone-sensitive *E. coli*. Dogs with fluoroquinolone-resistance had a more variable response; treatment with meropenem (median 10 mg/kg SQ q12 hours for 7 weeks) resolved clinical signs in 5/11.

We conclude that antimicrobial resistance is a growing concern. GC-associated *E. coli* appear genetically diverse. Clinical remission can be achieved in the face of fluoroquinolone-resistance though in vitro antimicrobial susceptibility does not consistently predict a positive response.

Disclosures: No disclosures to report.

ESCG-O-9

FECAL S100A12 CONCENTRATION PREDICTS A LACK OF RESPONSE TO TREATMENT IN DOGS WITH CHRONIC ENTEROPATHIES. R.M. Heilmann¹, M. Volkmann², C.C. Otoni³, N. Grützner⁴, B. Kohn², A.E. Jergens³, J.M. Steiner¹. ¹Texas A&M University, College Station, TX, USA, ²Free University of Berlin, Berlin, Germany, ³Iowa State University, Ames, IA, USA, ⁴Vetsuisse Faculty Bern, Bern, Switzerland

Canine S100A12 has potential as a biomarker of inflammation in dogs. Fecal S100A12 concentrations were increased in dogs with chronic gastroenteropathy (CE), and correlated with the severity of clinical and endoscopic disease. A negative outcome was associated with higher fecal S100A12 concentrations in CE dogs, but the response to different forms of treatment and fecal S100A12 has not been reported, and this information will be important to further evaluate the utility of fecal S100A12 as a biomarker for gastrointestinal disease. Aim of this study was to evaluate the association between responses to various treatments (i.e., elimination diet, antimicrobial drugs, or corticosteroids/other immunosuppressants) and fecal S100A12 in dogs with CE. Fecal samples were collected from dogs diagnosed with CE, and fecal S100A12 was measured in all specimens using an established in-house ELISA. Based on the response to treatment, dogs were classified as having antibiotic-responsive diarrhea (ARD), food-responsive diarrhea (FRD), or steroid-responsive/therapy-resistant idiopathic inflammatory bowel disease (IBD). Statistical analysis was performed using non-parametric 2- or multiple-group comparisons, the likelihood ratio to evaluate the association between groups of dogs and response to treatment, and a receiver operating characteristic curve to calculate sensitivity and specificity at the optimum cut-off concentration. A total of 64 dogs with CE (median age: 6.3 years; 33 males/ 31 females) were included in the study, the final diagnosis of which were ARD ($n = 9$), FRD ($n = 30$), or IBD ($n = 25$). Response to treatment was complete remission ($n = 35$), partial response ($n = 25$), or no response ($n = 4$). Fecal S100A12 concentrations ranged from 1 to 34,500 ng/g, and higher S100A12 levels were seen in dogs with IBD than in dogs with FRD ($P = 0.010$) or ARD ($P = 0.025$). Dogs that did not respond to treatment had significantly higher S100A12 levels than dogs with partial ($P = 0.005$) or complete ($P = 0.003$) remission, but response to treatment was associated with disease classification ($P = 0.020$). Despite a small number of patients, fecal S100A12 levels of $>2,700$ ng/g at the time of diagnosis distinguished dogs that failed responding to treatment from those with at least partial remission with a sensitivity of 100% and specificity of 87%. We conclude that, in line with our previous finding that fecal S100A12 may be a useful biomarker of disease severity in dogs with IBD, fecal S100A12 may also have utility in predicting the lack of response to treatment in dogs with CE. The utility of serial fecal S100A12 concentrations to monitor treatment response in dogs with CE warrants further research.

Disclosures: Dr. Heilmann and Dr. Steiner have filed a patent application that includes the S100A12 ELISA used for this study.

ESCG-O-11

INFLAMMATORY RECTAL AND ANAL STRICTURE IN SMALL ANIMALS: AN UNDERESTIMATED ETIOLOGY. A RETROSPECTIVE STUDY OF TEN CASES (2007–2014). A. Lamoureux, V. Freiche. Université de Paris Est. Ecole Nationale Vétérinaire d'Alfort, Maisons alfort, France

Constipation is a common presenting complaint in dogs and cats. Differential diagnosis for this clinical sign is well-known but strictures resulting from gastro-intestinal inflammation are not commonly included and have been rarely reported in the literature. Acute diarrhea and bone ingestion can lead to anal or rectal stricture which is responsible for the constipation.

The aim of this retrospective study was to describe the prevalence of inflammatory rectal and anal stricture in small animals and to describe a simple and effective treatment.

Medical records of dogs and cats presented for constipation, dyschezia or tenesmus and diagnosed with an inflammatory stricture were obtained from the database of the gastro-intestinal diseases consultation of 2 referral centers in gastroenterology between 2007

and 2014; and were reviewed. Signalment, presenting complaint, clinical findings, treatment protocol and outcome were recorded.

Five dogs and 5 cats were included in the study. Of the 5 cats, 4 were purebred kitten between 3.5 and 7 months, and among them 3 were Persians. The fifth cat was a 16-year-old female domestic shorthair. Three out of 5 cats had history of acute diarrhea and 2 cats had constipation since adoption with unknown history. Digital rectal examination under anesthesia revealed stricture in all cats which was treated by bougienage every 5 days and high-fiber diet. Of the 5 dogs, age ranged from 5.5 to 14 years; 3 dogs had history of acute diarrhea and 2 had ingested bones in prior days. Colonoscopy and biopsies were performed in all dogs and showed a lymphoplasmocytic infiltration in all of them. Dogs were treated with digital bougienage every other day until disappearance of the stricture, metronidazole, lubricant laxatives, corticosteroids and high-fiber diet. The prevalence of inflammatory stricture in dogs was 8.9% based on dogs presented with the same complaints between 2007 and 2014. For all dogs and cats, clinical signs related to the stricture resolved for the duration of their follow-up.

Benign strictures secondary to gastro-intestinal inflammation should be systematically included in the differential diagnosis of constipation. Strictures are easily palpated on digital rectal examination, which should always be performed during clinical examination. Histology should be a routine part of the diagnosis workup to exclude neoplasia. Endoscopy-assisted balloon dilatation with concurrent intralesional injection of triamcinolone has been used in dogs and reported in the human literature. The treatment described here is simpler and effective. In dogs, it can be done at home by the owner.

Disclosures: No disclosures to report.

ESCG-O-12

A COMPARISON OF ULTRASONOGRAPHIC AND CLINICAL FINDINGS IN 293 DOGS WITH ACUTE PANCREATITIS: DIFFERENT CLINICAL PRESENTATION WITH LEFT LIMB, RIGHT LIMB, OR DIFFUSE INVOLVEMENT OF THE PANCREAS. R. Lobetti¹, E. Lindquist², J. Frank², N. Ondreka³, J. McLean¹. ¹Bryanston Veterinary Hospital, Bryanston, South Africa, ²SonoPath, Sparta, NJ, USA, ³University of Giessen, Giessen, Germany

Acute pancreatitis is a diagnostic challenge because of anatomic inaccessibility of the pancreas, vague clinical signs and physical examination findings, and inconsistent laboratory results. Common, yet non-specific, clinical signs include abdominal pain, anorexia, vomiting, and diarrhea. Ultrasonography is the imaging modality of choice to evaluate the pancreas.

The purpose of this study was to compare clinical signs with ultrasonographic findings in dogs with acute pancreatitis to account for differences in clinical presentation depending on the region of the pancreas affected as determined by ultrasonography. The hypothesis was that there would be differences in clinical presentation depending on the pancreatic region involved.

Records of 293 client-owned dogs diagnosed with acute pancreatitis based on history, clinical signs, laboratory testing, and abdominal ultrasonography were retrospectively evaluated. Based on ultrasonography, dogs were divided into 3 groups: Group 1—41 dogs with changes within the left limb of the pancreas exclusively; Group 2—105 dogs with changes within the right limb of the pancreas exclusively; and Group 3—147 dogs with diffuse pancreatic involvement. Presence of abdominal pain, anorexia, vomiting, and diarrhea was correlated between groups using Chi-square and Fisher's exact test.

No significant differences regarding age, breed and sex were noted between groups. In group 1 pain was noted in 11%, anorexia in 32%, vomiting in 66%, and diarrhea in 41% of dogs. In group 2 pain was present in 10%, anorexia in 42%, vomiting in 42%, and diarrhea in 19% of dogs. In group 3 pain was noted in 20%, anorexia in 31%, vomiting in 52%, and diarrhea in 24% of dogs.

Pain was noted with a significantly higher frequency in diffuse pancreatic disease as compared to disease restricted to the left or right limb of the pancreas. Anorexia was significantly more common with right limb involvement. Both vomiting and diarrhea were significantly more common with disease restricted to the left limb as compared to diffuse parenchymal or right limb involvement.

Despite overlap between groups, these findings indicate that pain response is expected to occur with a higher frequency in diffuse pancreatitis but overall is not a very common clinical sign. Anorexia is more prevalent in dogs with pancreatitis of the right limb whereas vomiting and diarrhea both are more evident in dogs left limb pancreatitis. Differences between the groups can possibly be ascribed to gastric involvement when the left side of the pancreas is affected.

Disclosures: No disclosures to report.

ESCG-O-13

INTERVENTION TO INCREASE PHYSICAL EXERCISE IN DOGS WITH CHRONIC ENTEROPATHIES. H.P. Huang¹, Y.H. Lien². ¹National Taiwan University, Taipei, Taiwan, ²Azu Clinic for Animals, Taipei, Taiwan

Increased physical exercise has been reported to improve the clinical symptoms of chronic enteropathies, such as inflammatory bowel disease, in human patients. The aim of this investigation was to evaluate the impact of an intervention to increase physical exercise in dogs with chronic enteropathies.

Twenty-two dogs (11 each in the exercise and control groups) with chronic enteropathies and no response to an elimination diet were included. Routine diagnostic work-up (haematology, plasma biochemistry profile, urinalysis, faecal parasitology, abdominal radiographs, and ultrasound) was conducted in all dogs to eliminate underlying causes. All dogs were given oral prednisolone (1 mg/kg/day) for 14 days, followed by a tapering dosage over 10 weeks. After 4 weeks of prednisolone treatment, a certified canine rehabilitation therapist instructed the owners of dogs in the exercise group on how to increase their dogs' physical exercise. The exercise protocol combined aerobic and resistance exercises in low- to moderate-intensity interval training. Owners of dogs in the control group were asked to maintain the dogs' routine lifestyles. Modified canine inflammatory bowel disease activity scores (CIBDAIs), based on the parameters of activity level, appetite, vomiting, stool consistency, stool frequency, bloating, and weight loss, were calculated pre-treatment and 4 and 10 weeks post-treatment for all dogs. CIBDAI scores were compared among timepoints (pre-treatment and 2 post-treatment assessments) and between groups (exercise and control) using multivariate repeated-measures models for multiple comparisons.

All dogs showed improvement after 4 weeks of prednisolone treatment. Modified CIBDAIs decreased in the exercise (from 18.3 ± 1.7 to 10.3 ± 2.2) and control (from 18.3 ± 1.4 to 11.2 ± 1.1) groups. After 6 weeks of the increased physical exercise intervention, the modified CIBDAI in the exercise group decreased significantly (3.8 ± 2.3) relative to the first post-treatment assessment ($P = 0.022$), whereas this index remained similar (11.2 ± 1.1) in the control group. Modified CIBDAIs differed significantly between groups after 10 weeks of treatment ($P = 0.006$). All 7 parameters of the modified CIBDAI were significantly affected by the intervention of increased physical exercise; the largest difference was found for body weight ($P < 0.001$, adjusted $R^2 = 0.747$) and faecal frequency ($P < 0.001$, Adjusted $R^2 = 0.693$) and activity level ($P < 0.001$, Adjusted $R^2 = 0.692$).

An increased physical activity intervention had positive effects on clinical symptoms in dogs with chronic enteropathies.

Disclosures: No disclosures to report.

ESVCN-O-1

COMPLICATIONS OF PERCUTANEOUS ENDOSCOPIC GASTROSTOMY IN DOGS AND CATS RECEIVING CORTICOSTEROID THERAPY: A RETROSPECTIVE CASE-CONTROL STUDY. J. Aguiar, Y.M. Chang, O. Garden. Royal Veterinary College, Hatfield, UK

Corticosteroid therapy is commonly required in veterinary patients for treatment of inflammatory, immune-mediated, neurological and neoplastic diseases. Some of these patients also require assisted enteral nutrition via percutaneous endoscopic gastrostomy

(PEG) tubes. This retrospective case-control study evaluated the complications associated with PEG tube use in veterinary patients receiving corticosteroids in a referral teaching hospital.

Medical records of dogs and cats in which a PEG tube was placed in the QMHA between January 2006 and March 2015 were reviewed. Patients were included if the PEG tube was in use for at least 24 hours and if complete medical records, including clinical notes from referring veterinarians, kennel sheets, communication records with patients' owners and notes from tube removal, were available. To be included in the steroid group, patients must have received corticosteroid therapy (> 1 mg/kg/day) for at least 50% of the length of time the PEG tube was in use. Control patients were not treated with corticosteroids.

Forty-two cases were included (38 dogs and 4 cats). Fourteen patients (12 dogs and 2 cats) were included in the steroid group and 28 patients (26 dogs and 2 cats) were included in the control group.

Complications were scored in terms of severity as minor (1), moderate (2) and major (3) and compared between groups using the Mann-Whitney *U*-test. Values of $P < 0.05$ were considered significant. Complications included: serous discharge ($n = 17$), sanguineous discharge (7), purulent discharge (7), stoma site inflammation (8), PEG tube dislodgement (6), pain around the stoma (4), PEG tube blockage (2) and PEG tube chewed by the patient on its tip (3) or at the stoma (1). Median (interquartile range) of maximum complication scores for control and steroid groups were respectively 1 (2) and 2 (2). The maximum complication scores were not significantly different between groups ($U = 129.5$, $P = 0.06$), though patients receiving corticosteroids showed a trend towards higher maximum complications scores than those in the control group.

In conclusion, owners of dogs and cats receiving corticosteroids in which a PEG tube is planned should be appraised of the possibility of complications beyond those normally associated with tube placement alone.

Disclosures: No disclosures to report.

ESVCN-O-2

ASSESSMENT OF THE ADEQUACY OF NUTRIENT INTAKE IN OBESE DOGS UNDERGOING ENERGY RESTRICTION FOR WEIGHT LOSS: A COHORT STUDY. A.J. German¹, S.L. Holden¹, Y. Queau², V. Biourge². ¹University of Liverpool, Neston, UK, ²Royal Canin Research Center, Aimargues, France

Canine obesity is usually treated with dietary energy restriction, but data are limited regarding nutritional adequacy. The aim of the current study was to compare intake of essential nutrients with National Research Council recommendations in obese dogs during weight management with a purpose-formulated diet.

Twenty-seven dogs were included in this non-randomized retrospective observational cohort study. All were determined to be systemically well, and without significant abnormalities based upon physical examination and clinicopathological assessments. The dogs underwent a controlled weight loss protocol of at least 26 weeks, to achieve ideal condition and using a high protein high fiber weight loss diet. Median, maximum, and minimum daily intakes of all essential nutrients were compared against NRC 2006 recommended allowances (RA) for adult dogs.

Median weight loss was 28% (16–40%), median daily energy intake was 61 kcal/kg^{0.75} (44–74 kcal/kg^{0.75}), and no signs of nutrient deficiency were observed in any dog. Based upon the average nutrient content of the diet, daily intake of the majority of essential nutrients was greater than their NRC 2006 RA (per kg body weight^{0.75}), except for selenium, choline, choline (2/27 dogs) and methionine-cysteine (2/27 dogs), all essential nutrients remained above NRC minimum requirements (MR) throughout the trial.

Daily intakes of most essential nutrients meet both their NRC 2006 RA and MR in obese dogs throughout a period of weight loss. In light of absence of signs of nutrient deficiency, the significance of the borderline intakes for some nutrients (especially selenium and choline) is not known, and further studies are recommended.

Disclosures: The following conflicts of interest apply: AJG's Readership is funded by Royal Canin; AJG has also received financial remuneration and gifts for providing educational mate-

rial, speaking at conferences, and consultancy work; SLH's post at the University of Liverpool is also funded by Royal Canin; the diet used in this study is manufactured by Royal Canin; SS and VB are employed by Royal Canin.

ESVCN-O-3

ENDOCRINE PROFILE OF 402 OBESE DOGS. D. J. Rochel, C. Amato, P. Nguyen, L. Jaillardon, B. Siliart, Oniris, Nantes Atlantic College of Veterinary Medicine, Food Science, Engineering, Nantes Cedex 03, France

Obesity is a frequent condition of the dog, associated with many endocrine and metabolic disturbances leading to major organ dysfunctions. We therefore aimed to assess biochemical and hormonal profiles of a large cohort of obese dogs.

402 obese dogs were retrospectively included in the study, based on an overweight over 30% the ideal body weight (iBW). Endocrine profiles consisted in assessing prolactin, leptin, Insulin like Growth Factor type 1 (IGF1), cortisol after an ACTH stimulation test, insulin, free thyroxine (fT4) and cTSH serum concentrations.

Obese dogs (64% females of which 20% spayed and 36% males of which 16% castrated) were from 33 different breeds and ranged from 2 to 15 years [median 6 years, 69.9% between 3 and 8 years]. 92% of the dogs suffered from generalized (versus abdominal) obesity and long-term obesity (>1 year) was described in 78% of the cases. The main observed clinical signs were abdominal distension (76%), fatigability (45%), polyphagia (29%), decline of interest for usual activities, (27%) and polyuropolydipsia (21%). Biochemical profile was unremarkable except that 93% of the dogs had hypercholesterolemia (cholesterol > 8 mmol/L). A high prolactin value (>10 ng/mL) was observed in 32% of the dogs, a high leptin value (> 10 µg/L) in 45%, a high IGF1 value [IGF1 > 200 µg/L (iBW < 15 kg), > 290 (15 < iBW < 40 kg) and > 500 (iBW > 40 kg)] in 63% and a high insulin value in 27% (>40 µUI/mL), without significant correlation with glucose concentration in 59% of the cases. 29% of the dogs had a high cortisol value (>450 nmole/L after ACTH stimulation) and 57% had a low fT4 (fT4 < 15 pmol/L) with 41% having a high TSH value (> 0, 45 ng/mL).

Canine obesity is associated with many endocrine disorders including hyperprolactinemia, hyperleptinemia, high IGF1 value, hypercortisolemia and/or a hypothyroxinemia associated with a high cTSH value. The endocrine profile could be very interesting for the diagnosis and prognosis of canine obesity and could allow the veterinarian to choose a better treatment, particularly when the diet is unsuccessful. Further investigations could be done to assess the prognostic value of the endocrine profile at the diagnosis of canine obesity to control the treatment efficiency.

Disclosures: No disclosures to report.

ESVCN-O-4

HEALTHY AGEING IN LABRADOR RETRIEVERS: RESULTS OF A PROSPECTIVE LONGITUDINAL STUDY. V.J. Adams¹, P.J. Watson², D.M. Morgan³. ¹Vet Epi Ltd, Dickleburgh, UK, ²Cambridge University Veterinary School, Cambridge, UK, ³Spectrum Brands, Geneva, Switzerland

A better understanding of how dogs undergo healthy ageing would benefit owners and veterinarians alike. In July 2004 a longitudinal study began to evaluate health and longevity in 39 Labrador Retrievers (12 males and 27 females, all neutered, mean age 6.7 years), continuously fed a fixed plane of nutrition with identical housing, standardised husbandry and veterinary care. Body condition score was maintained between 2 and 4 on a 5-point scale. Standard veterinary protocols were used for any medical conditions; cancer and severe or life threatening conditions were managed individually based on quality of life assessments.

The 'average' lifespan of Labrador Retrievers was estimated to be 12 years. Dogs were classified according to lifespan as 'Typical' if they died between 9 and ≤12.9 years of age, 'Long' ≥13 to 15.5 years and 'Exceptional' ≥15.6 years (corresponding to 30% longer than the average lifespan). Data were analysed using linear

mixed models with random effects for slopes and intercepts and a fixed effect for lifespan grouping variable.

On 31st July 2014, 11 dogs (28%) were classified as Exceptional with 5 still alive, Typical ($n = 13$) and Long ($n = 15$). Gender and age at neutering were not associated with survival time or risk of death ($P \geq 0.1$). Body weight change showed a quadratic trend: up to age 9, body weights increased for all 3 lifespan groups but the changes were not significantly different. There was a significant change in body weight from 9 to 13 years as Exceptional dogs increased body weight while the Long-lifespan dogs lost weight (+0.53 versus -0.91 kg/dog/year, $P = 0.007$). After age 13 the Exceptional and Long groups both had similar losses.

Dual-Energy X-ray Absorptiometry scans revealed that whole-body fat (g) increased in all lifespan groups to age 13 but the change was significantly slower for the Long lifespan dogs when compared with Typical dogs which accumulated fat at >3 times the rate. All groups lost a similar amount of whole-body lean tissue (g) through age 13 ($P > 0.05$). Up to age 13 the mean % gain in whole body fat, and % loss of whole-body lean tissue, was slower and the mean change in fat to lean ratio was lower in the Exceptional and Long-lived dogs compared to the Typical dogs ($P \leq 0.02$).

Typically aged Labradors showed a greater gain of fat tissue, and greater loss of lean tissue, up to 13 years of age than Exceptional dogs.

Disclosures: The Eukanuba diet used in this study is manufactured by Spectrum Brands whilst DMM is employed by Spectrum Brands. VJA is an independent epidemiologist who helped analyze the data and was financially supported by Spectrum Brands for this work. PJW has participated in veterinary seminars organised by Spectrum Brands and has received an honorarium for this work.

ESVCN-O-5

THE ROLE OF PHOSPHATE IN THE PREVENTION OF CHRONIC RENAL FAILURE IN CATS. B. Dobenecker¹, A. Weibel², P. Hertel-Böhne¹, E. Kienzle². ¹Ludwig Maximilians University Munich, Oberschleißheim, Germany, ²Ludwig Maximilians University, Munich, Germany

Introduction: In healthy animals, the phosphate (P) in combination with calcium homeostasis is regulated in comparatively narrow limits: excessively ingested P is excreted via urine. Common knowledge is, however, that P is a progressive factor in chronic renal failure (CRF) wherefore typically a P restricted diet is prescribed for affected patients. In 1995, Pastoor demonstrated that a P excess (significantly at ~ 890 mg P/MJ ME; Ca/P 0.4/1 for 28 days) impairs renal function even in healthy cats, diagnosed mainly by reduced endogenous creatinine clearance. Dietary P originates from meat and other protein sources, bones and cartilages, mineral supplements and technical additives (water binding, palatability a/o texture enhancer etc.). The daily amount ingested with complete diets from the European market often exceeds the recommended daily allowance (RDA; NRC 2006, FEDIAF 2014) considerably (up to 10times, Anonymus 2014).

Our own studies were done with the aim (1) to survey the reproducibility of the results of Pastoor (1995) and (2) to test effects of different Ca/P ratios and P sources on parameters of renal function in healthy adult cats.

Animals, materials and methods: Up to 13 adult, healthy cats were appointed to 2 groups in every trial period. Firstly, a balanced diet was fed for 28 days including a 10 days balance trial. One group was then switched to a high P diet whereas the other remained on the balanced diet, again completed by a balance trial. After 14 days of wash-out (balanced diet) both groups were switched in a cross-over design repeating the 28 days trial period. This design was carried out repeatedly with high P diets differently composed concerning Ca/P ratios and P sources. Endogenous creatinine clearance, glucosuria, microalbuminuria, water and mineral balance were determined at each period. The study was approved by the proper authority for animal welfare.

Results and discussion: The studies confirmed the results of Pastoor (1993): a P content of approximately 870 mg/MJ ME in a diet consumed by healthy cats at maintenance may lead to a decrease of the creatinine clearance. Markers of acute tubular damage, i.e. glucose and microproteins in the urine, showed positive results in several trials. The P concentration of a diet alone is

no sufficient marker of its tolerance since Ca/P ratio and P origin influence the effects. Therefore, high P diets cannot be considered safe and should be avoided also in healthy cats.

Literature: Anonymus 2014: Katzenfutter test 03/2014. 80-85. Pastoor 1995: Vetmed Thesis.

Disclosures: No disclosures to report.

ESVC-O-1

SERUM AND ASCITIC FLUID PROTEOMES IN DOGS WITH DILATED CARDIOMYOPATHY. M. Kocaturk. University of Uludag, Bursa, Turkey

The study aim was to investigate serum global proteomes in dogs with overt dilated cardiomyopathy (DCM) and to correlate protein expression in serum with that in ascitic fluid.

Eight dogs diagnosed with DCM based on echocardiographic evidence including increased left ventricular dimension at diastole and systole, increased E point to septal separation, and decreased fractional shortening were included in the study. Serum and ascitic fluid samples were analyzed for proteomes using a label-free LC-MS/MS method. Eight dogs from different breed, sex and age served as controls.

Proteome analyses revealed significantly different expressions of eight proteins in all samples. Expressions in serum of apolipoprotein A1, Ig heavy chain V, superoxide dismutase and plasminogen were higher ($P < 0.001$), while expressions of clusterin, hemoglobin subunit β , apolipoprotein C II, b 2 glycoprotein I ($\beta 2$ GPI) were lower ($P < 0.001$) in dogs with DCM than in control dogs. In addition, apolipoprotein A1, clusterin, hemoglobin subunit β , Ig heavy chain V, plasminogen and $\beta 2$ GPI were down-regulated whereas apolipoprotein C II and superoxide dismutase were up-regulated in ascitic fluid compared with serum in dogs with DCM.

Data obtained in the present study suggest that serum and/or ascitic fluid proteomes may help explain some of the pathophysiological mechanisms involved in the progression of DCM.

Key words: Dilated cardiomyopathy, DCM, proteomics, dogs.

*This study was partly supported by The Scientific and Technological Research Council of Turkey (TOVAG-1110026).

Disclosures: No disclosures to report.

ESVC-O-2

CARDIAC BIOMARKERS IN DOGS WITH TICK PARALYSIS (IXODES HOLOCYCLUS). G.P. Nicolson¹, A.L.H. McGrath¹, R.A. Webster², J. Li³, S. Kaye⁴, R. Malik¹, N.J. Beijerink¹. ¹University of Sydney, Sydney, NSW, Australia, ²Animal Emergency Service, Carrara, Qld, Australia, ³Northside Emergency Veterinary Service, Forestville, NSW, Australia, ⁴Queensland Veterinary Specialists, Stafford heights, Qld, Australia

Tick paralysis is an important disease of dogs and cats in Australia, induced by toxins of the paralysis tick *Ixodes holocyclus*, very commonly occurring from spring to autumn on the eastern seaboard. Respiratory failure is one of the major clinical derangements occurring in severe cases of tick paralysis, although its pathogenesis is poorly characterised. There is some suggestion that the respiratory failure is secondary to toxin-induced myocardial dysfunction with the subsequent development of cardiogenic pulmonary oedema. The purpose of this study was to determine cardiac involvement in dogs infested with *Ixodes holocyclus*, through measurement of cardiac biomarkers.

A cross-sectional study of 111 client-owned dogs was undertaken. Dogs enrolled in the study belonged to one of 3 groups: dogs with tick paralysis and no-mild respiratory compromise (Group A), dogs with tick paralysis and moderate-severe respiratory compromise (Group B) and a control group of dogs with neither tick paralysis nor respiratory compromise. Respiratory compromise was scored using a commonly employed grading system. Each animal had the following parameters determined: serum cardiac troponin I (cTnI) concentration, plasma N-terminal pro-B-type natriuretic peptide (NT-proBNP) concentration and serum creatinine concentration. For most dogs, but not all, SpO₂ was also determined.

Mean NT-proBNP concentrations were significantly lower in dogs with tick paralysis than those in the control group, with no

statistical difference detected between dogs with and without respiratory compromise. There was no significant difference in mean cTnI concentrations between groups, however there were some high outliers of cTnI concentration. Creatinine concentrations differed significantly between each group, with the control group having the highest mean creatinine and those in Group B having the lowest mean creatinine. There was no significant difference in SpO₂ between groups.

This study showed no compelling evidence of cardiac insult as measured through cardiac biomarkers in our cohort of dogs with tick paralysis; however there was evidence supporting reduced preload in these dogs. In addition, the results of this study suggested that a small subset of patients with systemic hypoxaemia might have some loss of cardiomyocyte integrity.

Disclosures: Employee/salary: GP Nicolson, R Malik and NJ Beijerink are employees of Sydney University; ALH McGrath is a student at Sydney University; RA Webster is an employee of the Animal Emergency Service; Carrara; S Kaye is an employee of Queensland Veterinary Specialists, Stafford Heights; J Li is an employee of Northside Emergency Veterinary Service, Forestville.

Grants/research: This study was funded by bequest grants provided by the Faculty of Veterinary Science at the University of Sydney. IDEXX laboratories provided some funding for the laboratory tests. No other disclosures.

Speaking & consultancies: none related to this presentation.

Investments/commercial interests: none related to this presentation.

Gifts, hospitality, travel support: none related to this presentation.

Other: none related to this presentation.

ESVC-O-3

EVALUATION OF NTPROBNP, HIGH SENSITIVITY TROPONIN I AND PDK4 FOR THE DETECTION OF OCCULT DCM: A PROSPECTIVE STUDY IN 449 DOBERMAN PINSCHERS. G. Gordon¹, A.H. Estrada², L. Braz-Ruivo³, L. Drouin⁴, N. Morris⁵, R. O'Grady⁶, M. Boggess⁷. ¹Texas A&M University, College station, TX, USA, ²University of Florida, Gainesville, FL, USA, ³Dog and Cats Veterinary Referral and Emergency, Bowie, MD, USA, ⁴Veterinary Cardiology Partners, San Francisco, CA, USA, ⁵Mass Veterinary Cardiology Services Inc., West Springfield, MA, USA, ⁶Xxxx, Wasaga Beach, ON, Canada, ⁷Arizona State University, Tempe, AZ, USA

The use of NTproBNP, Troponin I (high-sensitivity, cTnI) and PDK4 pre-screening for occult dilated cardiomyopathy (ODCM) in the Doberman pinscher (DP) has been previously reported. The aim of this prospective collaborative study was to identify robust pre-screening recommendations for DP utilizing the current generation of commercially available diagnostic tests. A cohort of asymptomatic DP were evaluated at the American Doberman National Specialty show in 2012, 2013, and 2014 (N = 449, median age 5 years, range 1–12). Evaluations consisted of auscultation, echocardiography (echo), 3-minute ECG (ECG), NTproBNP (Cardiopet Plus[®]), cTnI, and PDK4. DP were classified as affected (ODCM) if their LVIDs were > the PROTECT entry criteria with or without VPCs (N = 22). DP were classified as normal (NL) if their LVIDd and LVIDs < PROTECT entry criteria and they had no VPCs (NTproBNP: N = 373, cTnI: N = 368, PDK4: N = 253). ROC analysis comparing ODCM and NL was done for NTproBNP, cTnI, and PDK4. Overall accuracy (percent correctly classified) was considered for individual tests as well as a variety of combinations. The goal of combining tests was to eliminate false negatives while minimizing false positives. The AUC for NTproBNP, cTnI and PDK4 was 0.91, 0.90 and 0.65 respectively with the percentage correctly classified equal to 81.8, 80.7 and 56.1 (including 4 false negatives for PDK4) when a cut-off of 548 pmol/l, 0.139 ng/mL or a positive PDK4 (hetero- or homozygous) were used respectively. When the cutoffs for NTproBNP and cTnI are used in combination the AUC was 0.95 and 91.3% were correctly classified (0 false negatives, 30 false positives).

Disclosures: Research and programmatic support from IDEXX the Lab that runs NTproBNP. The study was sponsored by Boehringer Ingelheim, IDEXX and the Doberman Pinscher Society of America.

ESVC-O-4

SERUM AND URINE CARDIAC TROPONIN I IN CATS WITH RENAL DISEASE. R. Langhorn¹, A.S. Kloster¹, L.R. Jensen¹, A. Jensen², J. Koch¹. ¹University of Copenhagen, Frederiksberg C, Denmark, ²Copenhagen Small Animal Hospital, Valby, Denmark

Cardiac troponins are sensitive and specific markers of myocardial injury. However, their reliability in renal disease has been questioned due to possible renal involvement in troponin elimination. The purpose of this study was to examine whether cardiac troponin I (cTnI) is elevated in cats with renal disease and no concurrent cardiac disease, and whether cTnI is measurable in urine of cats with normal and compromised renal function.

Cats presenting with renal disease or primary structural cardiac disease were enrolled in a renal and a cardiac group, respectively. A healthy control group was similarly included. Clinical and echocardiographical examination was performed and blood and urine samples obtained for each cat. The Mann-Whitney U test was applied to evaluate differences between groups.

Seven cats with renal disease, 13 cats with cardiac disease, and 8 healthy cats were included. Serum cTnI concentrations were (median [range]) 0.16 [0.026–0.78] ng/mL for the renal group, 0.058 [0.003–3.27] ng/mL for the cardiac group, and 0.016 [0.050–0.14] ng/mL for the control group. The renal group had significantly higher serum cTnI concentrations than the control group (P = 0.0059), but was not significantly different from the cardiac group (P = 0.18). Urine cTnI was measurable in 71.4% (5/7) of cats in the renal group (0.008 [0.005–0.026] ng/mL), 0% in the cardiac group, and 12.5% (1/8) of controls (0.005 ng/mL).

It was concluded that elevated serum cTnI in cats with renal disease may occur without concurrent cardiac disease. Moreover, compromised renal function was associated with presence of cTnI in urine.

Disclosures: No disclosures to report.

ESVC-O-5

SUDDEN DEATH IN IRISH WOLFHOUNDS WITH HEART DISEASE. A.C. Vollmar, C. Vollmar. Tierärztliche Praxis für Kleintiere, Bonn, Germany

Sudden death (SD) commonly occurs in dog breeds with a high predisposition to VPDs and VT, occurring in about 30% of asymptomatic Doberman pinschers (DP) and 50% of DP with CHF, and reported in 31% of boxers with ARVC. In human patients with atrial fibrillation (AF) on anticoagulant therapy for stroke prevention (n = 18113), cardiac death (SD and progressive heart failure) has been reported to account for 37.4% of all deaths. The objective of this study was to evaluate the incidence of SD in Irish wolfhounds (IW) with DCM and/or AF.

IW from Western Europe (n = 1552) were examined by physical examination, standard echocardiography and electrocardiography between 5/1990–10/2014 (AV). Dogs were longitudinally followed, and owners instructed to report date and circumstances of death. DCM and/or AF were diagnosed in 29%. Long-term follow-up until death was possible in 134 (80 m, 54f) dogs with DCM and 47 (22 m, 25f) dogs with lone AF. Based on the initial diagnosis, 4 disease groups were established.

Results: SD occurred in 21 to 24% of all groups with DCM or AF:

- (1) Out of 76 dogs with DCM +AF, SD occurred in 25% after median 502 (31–2170) days, median age 6.5±1.9 years.
- (2) Out of 29 dogs with DCM +sinus rhythm, 20.7% died from SD after median 893 (310–1209) days, median age 7.0±2.5 years.
- (3) Out of 29 IW with DCM, AF +CHF, 24.1% died from SD after median 232 (2–1587) days, median age 6.1±2.3 years.
- (4) Out of 47 IW with lone AF, SD occurred in 23.4% after median 956 (482–1707) days, median age 6.1±2.4 years, of these, 4 dogs had developed DCM prior to death.

Sudden cardiac death (SD) from cardiac arrest is the most common cause of death in people worldwide, accounting for > 50% of all deaths from cardiovascular disease. Ventricular tachycardia (VT)/ fibrillation (VF) is the most common cause of SD, other causes include pulseless electrical activity. The fatal arrhythmia has not recorded in IW. In this study, VPDs were recorded at one

or more occasions in 4/47 IW with AF, and in 6/134 with DCM, while in IWs without heart disease VPDs were seen in 3.7% of 454 males and in 3.7% of 459 females.

In conclusion, SD occurs in 23.3% of IW with lone AF before or after development of DCM and CHF, and in 23.9% of dogs with DCM.

Disclosures: No disclosures to report.

ESVC-O-6

HEART RATES IN IRISH WOLFHOUNDS WITH HEART DISEASE. C. Vollmar¹, B. Kohn², A. C. Vollmar¹. ¹Tierarztpraxis Dr. A. Vollmar, Bonn, Germany, ²Clinic for Small Animals, Freie Universität Berlin, Berlin, Germany

Tachycardia may induce dilated cardiomyopathy (DCM). Irish Wolfhounds (IW) are commonly affected with DCM and atrial fibrillation (AF). The objective of this study was to compare heart rates (HR) of IW with lone AF with HR of an age and gender matched control IW cohort that had neither AF nor DCM until death and to IW with DCM with either congestive heart failure (CHF), AF or sinus rhythm (SR). All disease groups had HR recorded before and after 3–6 months of medical therapy.

Out of 1552 IW with cardiovascular examinations including standard echocardiography and electrocardiography long-term follow-up until death was possible in 134 (80 m, 54f) dogs with DCM and 47 (22 m, 25f) dogs with lone AF. Based on the initial diagnosis, 4 disease groups were established. Dogs received single or combination treatment of metildigoxine, ACEIs, pimobendan, diltiazem, furosemide, spironolactone, atenolol and sotalol.

Mean HR during 3 minutes ECG monitor recordings with print-outs were evaluated. The differences in HR in the 4 disease groups before and after treatment versus controls were examined by analysis of variance with post hoc multiple comparisons (Dunnett T3).

Mean HR in 47 (22 m, 25f) control dogs was 120.8±21.9 bpm.

Mean HR in 47 IW with lone AF was 143.8±34.7 bpm before, and 128.7±23.7 bpm with therapy.

Mean HR of 76 dogs with DCM +AF was 147.7±37.2 bpm before, and 130.1±31.8 bpm with therapy.

Mean HR of 29 dogs with DCM +sinus rhythm (SR), was 119.2±26 bpm before, and 127.9 ± SD 27 bpm with therapy.

Mean HR of 29 IW with DCM, AF +CHF, was 181.3±37.4 bpm before, and median 145.7±18.6 bpm with therapy.

In conclusion, compared to control dogs, untreated IW with CHF, with DCM+AF, and IW with lone AF had statistically significant ($P = 0.001$) increased HR, but not dogs with DCM and SR, while under medical therapy elevation of HR was only significant ($P = 0.001$) in IW with CHF and DCM.

Disclosures: No disclosures to report.

ESVC-O-7

COMPARISON OF 2D MODE AND M-MODE ECHOCARDIOGRAPHY IN PERSIAN CATS PERFORMED IN LONG-AXIS AND SHORT-AXIS VIEWS. T.J.C.V.S. Sargo, F.L. Queiroga, A.C. Martins-Bessa, A.M. Silvestre, M.J. Pires. University of Trás-os-Montes e Alto Douro, Vila real, Portugal

Echocardiography, as a noninvasive method, is being increasingly used as a complementary means of diagnosis in small animal clinical practice. The need for standardization of techniques by ultrasound operators in the measurement of the different echocardiographic parameters is essential for a proper examination. The aim of this work was to check a potential correlation between the values obtained in right parasternal long-axis and short-axis views in 2-dimensional mode and M-mode. Twenty Persian cats were submitted to a complete physical examination, clinicopathologic tests (hematocrit, total solids and T4 hormone), systolic blood pressure measurement using Doppler and echocardiography.

Seventeen cats fulfilled the criteria inclusion and were included in the study. Two-dimensional mode and M-mode echocardiograms were recorded, in systole and diastole, from both short-axis and long-axis views for evaluation of left ventricular internal diameter (LVD), interventricular septum thickness (IVS), left ventricular free wall thickness (LVPW), aorta diameter, left atrium diameter (LA), pulmonary artery diameter, shortening fraction (FS) and ejection fraction (FE). Statistical analysis included paired t-test (Wilcoxon test) and a linear regression analysis with graphical analysis to assess agreement between the 2 methods of data acquisition. There was a highly significant correlation ($P < 0.001$) between the values obtained in short-axis and long-axis views for the parameter LA diameter (longitudinal: 0.96±0.07 cm; transversal: 0.94±0.1 cm), a very significant correlation ($P < 0.01$) for the parameter LVDs (Longitudinal: 0.56±0.2 cm; transversal: 0.69±0.2 cm), and significant correlation ($P < 0.05$) for the parameters IVSs (longitudinal: 0.7±0.14 cm; transversal: 0.68±0.18 cm), LVPWs (longitudinal: 0.74±0.18 cm; transversal: 0.66±0.14 cm) and FS (longitudinal: 55.7±14.1%; transversal: 48.3±15.4%), with no significant correlation ($P > 0.05$) between the 2 methods for the remaining parameters. In conclusion, the data obtained from right parasternal short-axis and long-axis recordings cannot be used interchangeably in the evaluation of diastolic parameters in normal adult cats.

Disclosures: No disclosures to report.

ESVC-O-8

UTILITY OF REAL TIME THREE-DIMENSIONAL TRANSESOPHAGEAL ECHOCARDIOGRAPHY FOR BALLOON VALVULOPLASTY IN DOGS WITH PULMONIC STENOSIS. S. Orvalho¹, S.J. Miller². ¹University of California Veterinary Medical Center – San Diego, San Diego, CA, USA, ²Southern California Veterinary Specialty Hospital, Irvine, CA, USA

Real time three-dimensional transesophageal echocardiography (RT3DTEE) is an established imaging modality for interventional cardiac procedures in humans. It has been shown to yield comprehensive views of the cardiac valves and congenital heart defects. It potentially provides a more accurate echocardiographic means of evaluating cardiac chamber volumes and a more precise pre and postoperative tool.

RT3DTEE was used in combination with conventional 2-dimensional transesophageal (2-D TEE) and transthoracic echocardiography (TTE) standard imaging protocols. The pulmonic valve anatomy and function was evaluated in 14 client-owned dogs with severe valvular pulmonic stenosis prior to and post-balloon valvuloplasty.

The 3-D images were obtained with the Phillips IE33 and CX50 cardiac ultrasound systems using a 3-D transesophageal 7-2 MHz xMATRIX probe. Standard cardiac 5-1 MHz, 8-3 MHz and 12-4 MHz sector array probes were used to acquire 2D TTE images. Diagnostic images were obtained in all examined patients. RT3DTEE did not change the balloon size decision when compared with 2-D TEE, but provided additional views, detailed anatomy of the pulmonic valve cusps and commissures, as well as thickness and mobility of the pulmonic valve cusps, when compared to those obtained with 2-D TEE or TTE. Successful balloon valvuloplasty was achieved in 13 of the 14 patients.

Repeatable artifacts occurred with respiratory excursions and insufficient probe contact. No complications related to RT3DTEE were observed.

RT3DTEE provided enhanced views of the pulmonic valve while aiding in the procedure guidance and evaluation of the results post-balloon valvuloplasty. A better understanding of the anatomy of the pulmonic valve may improve procedure success. Immediate visualization of the results post-balloon valvuloplasty may reduce patient risk and fluoroscopy time. A larger sample and further research will be needed to establish guidelines and predict success based on particular valve anatomy.

We can conclude that RT3DTEE provided additional anatomical and intraprocedural information and was well tolerated in this group of dogs.

Disclosures: No disclosures to report.

ESVC-O-9

EVALUATION OF PIMOBENDAN IN HEALTHY CATS: AN ECHOCARDIOGRAPHIC STUDY OF ACUTE CARDIOVASCULAR EFFECTS. M Yata¹, A.J. McLachlan², D.J.R. Foster³, A.S. Hanzlicek⁴, N.J. Beijerink¹. ¹Faculty of Veterinary Science, University of Sydney, Sydney, NSW, Australia, ²Faculty of Pharmacy, University of Sydney, Sydney, NSW, Australia, ³School of Pharmacy and Medical Sciences, University of South Australia, Adelaide, SA, Australia, ⁴Department of Veterinary Clinical Sciences, Oklahoma State University, Stillwater, OK, USA

Pimobendan is an inodilator utilised extensively in the treatment of canine congestive heart failure. Several retrospective studies evaluating clinical records have suggested that it is well tolerated in cats; however its efficacy in this species remains ill-defined. Moreover, a recent pharmacokinetic study found peak plasma concentrations of the drug to be around ten times greater than those reported in the dog, thus highlighting inter-species differences in the pharmacokinetics and, potentially, pharmacodynamics of this drug. This study was conducted to evaluate the cardiovascular effects following oral doses of pimobendan in healthy cats.

A placebo-controlled, randomised, operator-blinded crossover study was conducted in 8 healthy cats (weight range 3.69–4.83 kg) to evaluate the effect of 2 doses of pimobendan (high dose [HD]: 1.25 mg Vetmedin chewable tablet PO; low dose [LD]: 0.625 mg Vetmedin chewable tablet PO) and placebo ([PL]: water PO) on cardiovascular parameters over time. Standard echocardiography (2D, M-mode, and spectral doppler) and oscillometric blood pressure measurements (VetHDO) were performed repeatedly for 12 hours following dosing. Each measured parameter was evaluated for between- and within-treatment effects over time using linear mixed modeling with REML estimation to account for inter-cat variability. Heart rate was used as a proxy for the level of anxiety experienced by the cats, and adjustment for this was performed through inclusion of heart rate as a fixed effect in the final model.

The effect of treatment with pimobendan was most evident in the left ventricular internal diameter in systole (LVIDs). Maximal effects occurred 2 hours following treatment with HD and LD. The predicted mean reduction from baseline following heart rate adjustment at this time for LVIDs was 1.96 mm (24% reduction) and 1.68 mm (20% reduction) for HD and LD, respectively. Although there were no significant differences between HD and LD in the magnitude of effect at any given time point, LVIDs remained significantly reduced from baseline and the PL group for longer in the HD (40 minutes to 10 hours following dosing) than in the LD group (2 to 4 hours following dosing). Significant treatment effects on aortic velocity and fractional shortening were also present, but to a lesser degree.

These results demonstrate that treatment with pimobendan results in measurable changes to systolic indices in cats. A dose-dependent increase in duration of effect was also observed. Further studies are required to characterise the optimal dose of pimobendan in cats and to evaluate its efficacy in clinical patients.

Disclosures: This study was funded by grants provided by the Faculty of Veterinary Science at the University of Sydney. M. Yata received financial support from Luoda Pharma, the Australian Postgraduate Awards Scholarship, and the Eric Horatio Maclean Scholarship whilst undertaking this project. None of the authors involved in this study have current affiliations with the drug company that manufactured the product used in this study (Boehringer Ingelheim). M. Yata, A. McLachlan, D. Foster, and N. Beijerink have received prior sponsorship by a pharmaceutical company (Luoda Pharma) for an additional study evaluating pimobendan in dogs. However, no funding or provision of resources for this study was provided by this company.

ESVC-O-10

USE OF INTRAVENOUS PIMOBENDAN IN CATS WITH HEART FAILURE. J. Prieto-Ramos, K.A. McNaught, A.T. French. University of Glasgow, Glasgow, UK

Pimobendan has positive inotropic, positive lusitropic and vasodilator effects and is licensed for use in dogs with cardiac disease in many countries. Numerous studies have shown benefit with

the use of pimobendan in canine dilated cardiomyopathy and chronic degenerative mitral valve disease, and whilst not licensed for use in cats, recent studies have reported benefits with the use of oral pimobendan in a variety of cardiac diseases including dilated and hypertrophic cardiomyopathies. An intravenous formulation has been available in the UK since January 2013. The use of intravenous pimobendan in cats in the clinical setting has not previously been described. The aim of this study was to describe the use of intravenous pimobendan in cats with naturally occurring heart failure and report tolerability and side effects/adverse reactions.

The hospital data base was searched for the use of intravenous pimobendan in feline patients. Signalment, presenting signs, investigations, diagnosis, dose and time of pimobendan administration, concurrent medications, short-term outcome and adverse reactions were recorded. A boarded-certified cardiologist retrospectively reviewed all the cases in order to confirm the diagnosis. All owners had signed consent forms to permit use of off licensed drugs.

Eight cats were included in the study. Median age was 11.9 years (range, 3.2–17.3). Six (75%) were male and 5 (63%) were domestic short-haired. Weight ranged from 3.0 to 5.5 kg. All presented with dyspnoea. Three out of 8 cats (38%) had a heart murmur and 5 out of 8 (63%) had a gallop rhythm. Different heart conditions were diagnosed including 7/8 cats with cardiomyopathy and 1/8 with suspected endocarditis. Median dose of intravenous pimobendan was 0.15 mg/kg (range, 0.136–0.150). Concurrent drugs administered included frusemide, dalteparin, terbutaline, dexamethasone, amoxicillin-clavulanate, maropitant, midazolam, butorphanol, methadone, glyceryl trinitrate, clopidogrel, aspirin and potassium gluconate. No immediate adverse reactions/side effects were observed in any of the cats. Five of the 8 cats were discharged from the hospital between 24 and 72 hours post pimobendan administration. One cat was euthanized, one died during thoracocentesis and one had a thromboembolic episode between 4 and 8 hours post pimobendan administration.

Intravenous pimobendan was well tolerated by this clinical population of cats with heart failure. No immediate adverse reactions/side effects were observed. The intravenous route may be considered as an alternative method of administration of pimobendan in cats with heart failure.

Disclosures: No disclosures to report.

ESVC-O-11

EFFICACY OF SPIRONOLACTONE (SP) FOLLOWING ORAL ADMINISTRATION OF SP IN CATS WITH HEART FAILURE: FINAL RESULTS OF THE SEISICAT STUDY. R.A. James¹, E. Guillot², J. Gilmour³, M. Cobb³. ¹Nantwich Veterinary Hospital, Nantwich, UK, ²CEVA, Av. de La Balastière, Libourne, France., ³University of Nottingham, Loughborough, UK

Spirolactone (SP) is an aldosterone receptor antagonist, registered in Europe for the treatment of congestive heart failure (CHF) caused by valvular regurgitation in dogs, in combination with standard therapy. In cats, cardiomyopathy (CM) is the predominant cause of heart failure. To evaluate the safety and efficacy of SP in cats with CM, a double blind, randomized placebo-controlled study has been conducted with cats receiving either SP (1.7 to 3.3 mg/kg PO once daily) or placebo for up to 15 months in addition to benazepril and furosemide (dose at clinician's discretion). 20 cats (17 DSH, 1 Ragdoll, 1 Siamese and 1 Burmese) with CM of various types (15 hypertrophic, 2 dilated, 2 unclassified and 1 Arrhythmic Right Ventricular) were enrolled.

The cats were randomized to either group A or B according to the presence of HCM or not and whether the cat required hospitalization due to clinical need or not. 9 cats were recruited to group A (SP) and 11 cats recruited to group B (placebo). The only significant difference between the 2 groups at baseline were aortic diameter ($P = 0.0077$) larger in the SP group, and LA:Ao ratio ($P = 0.012$) larger in the placebo group.

The survival analysis showed a survival rate at 15 months respectively of 78% and 71% in the intention to treat (ITT) and per protocol (PP) populations in the SP group and 12% and 14% in the placebo group. The difference between the 2 groups was significant (Log rank test: ITT population $P = 0.011$; PP population

$P = 0.033$). The hazard ratio indicates an 84% (ITT) and 80% (PP) reduction in risk of an event occurrence in the SP group. The effect of covariates (age, weight, BCS, systolic blood pressure, ratio LA/Ao) was not significant.

Although this is a pilot study with small numbers of cats, this data would suggest that spironolactone is likely to be beneficial in the treatment of cats with congestive heart failure secondary to a cardiomyopathy.

Disclosures: The Study was joint funded by CEVA and the University of Nottingham. The authors have the right to publish the results of the study irrespective of outcome.

ESVC-O-12

EFFECTS OF PIMOBENDAN ON MYOCARDIAL PERFUSION AND PULMONARY TRANSIT TIME IN DOGS WITH MYXOMATOUS MITRAL VALVE DISEASE: A PILOT STUDY. G. Menciotti¹, S.M. Apple¹, L. Braz-Ruivo², S. Crosara³, J. Häggström⁴, M. Borgarelli¹. ¹Virginia-Maryland College of Veterinary Medicine, Blacksburg, VA, USA, ²Dogs and Cats Veterinary Referral & ER, Bowie, MD, USA, ³Department of Veterinary Sciences, University of Parma, Parma, Italy, ⁴Department of Clinical Sciences, Swedish University of Agricultural Sciences, Uppsala, Sweden

The objectives of this study were to describe pulmonary transit time and myocardial perfusion normalized to heart rate (nPTT and nMP, respectively), evaluated by means of contrast echocardiography, in dogs with stable stage C ACVIM myxomatous mitral valve disease (MMVD), and to assess short-term effects of pimobendan on these parameters. We hypothesized that nPTT and nMP are increased in dogs with MMVD compared to normal dogs. Additionally, we hypothesized that treatment with pimobendan will decrease both variables in dogs with MMVD.

We prospectively enrolled 6 normal dogs and 12 dogs with stable stage C ACVIM MMVD. All dogs had a standard and contrast echocardiographic examination at the beginning of the study. At this time, MMVD dogs were randomly assigned to receive either pimobendan (0.4 - 0.6 mg/kg) or not. All dogs with MMVD were re-evaluated by means of standard and contrast echocardiography after 1 week (T1), by operators blinded to the dog's treatment.

Our results show that nPTT was significantly increased in dogs with MMVD ($P = 0.0039$), compared to normal dogs. nPTT was significantly decreased at T1 in dogs receiving pimobendan ($P = 0.0250$). nMP was not significantly different in dogs with MMVD, compared to healthy dogs ($P = 0.6639$), and it was not significantly different at T1 in the treatment group ($P = 0.8798$).

In conclusion, contrast echocardiography is a valid, complementary tool for echocardiographic analysis of dogs with MMVD. Pimobendan decreases nPTT in dogs affected by MMVD. Myocardial perfusion is not different in dogs with MMVD and is not changed by pimobendan treatment.

Disclosures: Michele Borgarelli has received research funding by Boehringer Ingelheim for this study.

ESVC-O-13

ASSESSMENT OF LEFT ATRIAL DEFORMATION AND FUNCTION USING TWO-DIMENSIONAL SPECKLE TRACKING ECHOCARDIOGRAPHY IN HEALTHY DOGS AND IN DOGS WITH MYXOMATOUS MITRAL VALVE DISEASE. M. Baron Toaldo¹, G. Romito¹, C. Guglielmini², N.G. Pelle¹, A. Diana¹, M. Cipone¹. ¹University of Bologna, Ozzano Emilia, Italy, ²University of Padova, Legnaro, Padova, Italy

In human beings, assessment of atrial function using 2-dimensional speckle tracking echocardiography (STE) is useful in several cardiovascular diseases. To date information on the use of STE for the evaluation of canine atrial function is lacking.

We assessed the feasibility and reproducibility of STE in the assessment of left atrial (LA) function in healthy dogs and dogs with myxomatous mitral valve disease (MMVD) and we compared

STE derived indices with other parameters of left atrial and ventricular function and morphology.

150 privately owned dogs including 23 clinically healthy dogs (control, H) and 127 dogs with MMVD subdivided according to heart failure class (B1, B2, C+D) were enrolled.

Standard echocardiographic examination was carried out in all dogs. Furthermore, video clips were acquired from a 4-chamber apical view and STE analysis was done using dedicated software. For the STE analysis a region of interest was drawn including the entire left atrial wall. The software provided a strain/time curve that represents the degree of deformation of the LA wall over the entire cardiac cycle. Similarly, LA areas are provided. The following variables were evaluated: peak atrial longitudinal strain (PALS, %), as the point of maximal systolic strain; peak atrial contraction strain (PACS, %) just before atrial contracting phase; contraction strain index (CSI, %) calculated from these 2 variables. LA areas were recorded during ventricular systole (LA maximum area, LA_{Amax}, cm²) and atrial contraction (LA minimum area, LA_{Amin}, cm²), and the LA fractional area change (FAC, %) was then calculated. The intra- and inter-observer variability was assessed using the coefficient of variation (CV, %).

Variability was low for all variables (CVs < 15). A decreased from healthy dogs and dogs with advanced MMVD was found for PALS (H: 60.4±14.7, B1: 49.8±10.7, B2: 40.6±9.4, C+D: 28.9±11.5), PACS (H: 26.3±10.9, B1: 24.3±8.1, B2: 16.5±7.7, C+D: 10.6±8.1), CSI (H: 42.8±13.7, B1: 48.9±12.9, B2: 40±13.5, C+D: 33.9±20.8) and FAC (H: 55.1±9.7, B1: 49.2±11.2, B2: 44.6±7.9, C+D: 36.3±10.2) while LA_{Amax} (H: 3.8±2.3, B1: 4.9±2.2, B2: 6.4±2.7, C+D: 8.8±4.3) and LA_{Amin} (H: 1.8±1.2, B1: 2.5±1.3, B2: 3.6±1.8, C+D: 5.9±3.6) significantly increased. The best significant correlations were found between PALS and FAC, LA_{Amax}, LA and left ventricular dimensions, and between PACS and LA_{Amin}.

The results demonstrated that STE-derived variables and LA areas are feasible to acquire and reproducible. These new indices of LA function might be useful in predicting LA mechanical dysfunction and possibly outcome in dogs MMVD.

Disclosures: No disclosures to report.

ESVC-O-14

INTEROBSERVER VARIABILITY IN TWO-DIMENSIONAL ECHOCARDIOGRAPHIC LEFT ATRIAL MEASUREMENTS IS COMPLEX. M. Rishniw. Veterinary Information Network, Ithaca, NY, USA

Left atrial measurements are commonly obtained by cardiologists to assess severity of left heart disease. Traditionally, measurements were obtained from M-mode images, however several studies have examined measurements of left atrial dimensions and areas from 2-dimensional (2D) images. Studies have demonstrated the interobserver variability of aortic valve measurements, and the effects of timing of the measurements throughout the cardiac cycle. However, few studies have examined interobserver variability of left atrial measurements from 2D images, factors affecting variability, or the consequences of this variability on ascribing degree of disease severity to a patient.

25 images of the right parasternal short-axis view of the left atrium and aorta were provided to 9 cardiologists or cardiology residents. The images depicted left atria of varying size, from both dogs and cats, ranging from normal to markedly enlarged. Each participant placed 2 arrows on each image to denote the start and finish points of their left atrial measurements without prior instructions - the first being near the interface with the aorta and the second being along the caudolateral border of the left atrium. Thus, 25 sets of 9 images were analyzed. 2D distributions were mapped and analyzed to determine dispersion of the start and finish points. These were compared between images to look for association with severity (estimated as the median LA:Ao for each image) and image complexity.

Results: Variability of measurements around the origin of the LA measurement (interface with aorta) was small, and scaled with increasing heart size. Variability at the distal measurement point was complex. In only 8/25 images was interobserver variability <0.3 LA:Ao, and ranged up to 1 LA:Ao (8% to 36% variability). A systematic observer effect was noted. Variability did not appear

to scale with severity of disease or image complexity, although the 2 cases with the greatest variability had severe enlargement and indistinct margins.

Conclusion: This study demonstrates that highly trained individuals vary considerably in their measurement of left atria from the right parasternal short-axis view. The variability did not increase with increasing disease severity or image complexity. In some instances, the same patient could be classified differently by 2 different observers if relying on LA:Ao thresholds. The study suggests that standardized methods of measurement should be developed to minimize this variability.

Disclosures: The study was supported by Veterinary Information Network (Salary, imaging software).

ESVC-O-15

IDENTIFICATION OF CARDIAC-SPECIFIC FIBROSIS RELATED MRNA-PANEL IN BLOOD SAMPLES OF DOGS WITH CHRONIC HEART FAILURE. G. Kiss¹, V. Kékesi², V.K. Nagy², E. Sziksz³, Á. Vannay³, A. Veres-Székely³, L. Balogh⁴, F. Manczur¹. ¹Faculty of Veterinary Medicine, SZIE, Budapest, Hungary, ²Semmelweis University Heart and Vascular Center, Budapest, Hungary, ³MTA-SE, Pediatrics and Nephrology Research Group, 1st Department of Pediatrics, Budapest, Hungary, ⁴Frédéric Joliot-Curie National Research Institute for Radiobiology & Radiohygiene, Budapest, Hungary

There is growing evidence that fibrosis plays an important role in the development of remodeling and heart failure during cardiac diseases. At cellular level, fibrotic processes are prior to clinical manifestation of symptoms. Fibrosis and extracellular matrix remodeling influences cardiac function in a negative manner. To our knowledge there is no biomarker, which is able to properly detect heart-specific fibrotic processes and remodeling in the peripheral blood. Such a biomarker would be of great importance in cardiac diagnostics, risk stratification and therapy monitoring. In a preliminary study, using microarray method and pathway analysis in pooled samples, we were able to identify heart specific gene-expression profile representing fibrotic and inflammatory processes in the peripheral blood of tachypacing-induced cardiomyopathy model dogs. Our results were validated by histopathology and quantitative real time RT-PCR (qRT-PCR).

Based on our microarray results, in this current study we aimed to select and investigate a panel of possible cardiac fibrosis and remodeling specific genes in blood. Whole blood and left ventricular samples of tachypaced dogs (n = 13), healthy controls (n = 6) and blood samples of canine clinical patients (n = 10) with different cardiomyopathies were collected in RNA-stabilizing solution. RNA integrity was confirmed by capillary electrophoresis (RIN>7). Exon-spanning primers were designed. Expression of selected genes were measured by SYBR-Green based qRT-PCR and normalized to 2 different housekeeping genes (HPRT1, RPS5) by ddCt method. Quality controls were made by melting curve analysis and size determination of the PCR products by agarose gel electrophoresis. For data evaluation descriptive statistics, Student's t-test and Mann Whitney U-test were used. The selected gene-expression panel consisted of 13 different mRNAs which represent main biological processes related to fibrosis, remodeling and impaired contractility. COL1A2, MMP1, TIMP1, VCAN, SPP1 are directly related to collagen turnover and remodeling. IL8, CCL2 are inflammatory markers. STC1, HSP70, S100A are early stress response genes. TGFB2 has central role in fibrosis while MYH6 and MYH7 ensure cardiac specificity.

We found significant up regulation ($P < 0.05$) of COL1A2, TIMP1, VCAN, SPP1, IL8, CCL2, STC1, HSP70, S100A9, TGFB2 and down regulation of MYH6, MYH7 genes in the heart tissue samples. All targets also showed similar changes in the blood samples except MMP1, however not all alterations were significant. Based on this selected panel clinical cases could be clearly differentiated from healthy dogs using their gene-expression pattern in blood samples. Our findings suggest that the peripheral blood may have a potential to reveal cardiac specific fibrosis in dogs.

Disclosures: No disclosures to report.

ESVC-O-16

CHANGES IN RENAL CORTISOL METABOLISM ARE ASSOCIATED WITH THE DEVELOPMENT OF CANINE CONGESTIVE HEART FAILURE. E.F. Bode, P. Jamieson, B.H. Stebbing, Y.M. Pereira, G.J. Culshaw. University of Edinburgh, Edinburgh, UK

Within the distal nephron, the enzyme 11-beta hydroxysteroid dehydrogenase 2 (11 β HSD2) protects the mineralocorticoid receptor (MR) from activation by cortisol, allowing it to interact with aldosterone. In humans, mutations of 11 β HSD2 cause apparent mineralocorticoid excess, characterised by sodium and water retention with resultant hypertension. Sodium and water retention is also a hallmark of canine congestive heart failure (CHF). This could partly be explained by dysregulation of renal 11 β HSD2 activity, exposing MR to activation by cortisol. The aim of this study was to investigate the activity of renal 11 β HSD2 in canine CHF by measuring the concentration of cortisol and its metabolites in the urine from affected dogs. Owners collected urine in a home environment from healthy adult dogs (n = 7), and from dogs prior to presentation with non-cardiac chronic disease (n = 6), and dogs with cardiac disease (ISACHC Ib, n = 4; ISACHCII or III, n = 5). Levels of cortisol (F) and cortisone (E) excreted in urine were measured by mass spectrometry. Urinary cortisol was normalised to creatinine to account for variations in glomerular filtration rate. Cortisol was also measured in plasma obtained from all unhealthy dogs. Plasma cortisol levels ($P = 0.75$) and urinary cortisol:creatinine ratio ($P = 0.22$) did not differ between groups. However, the F/E ratio, was increased in dogs with class II-III heart failure ($P = 0.048$). An increased F/E ratio, in the presence of unchanged plasma cortisol, implies decreased renal 11 β HSD2 activity and enhanced MR activation by cortisol in canine CHF. This data suggests that changes in renal cortisol metabolism in canine CHF cannot be explained by chronicity of disease, that the urinary F/E ratio has potential as a biomarker for canine CHF and that renal 11 β HSD2 could offer a therapeutic target in its management. Further studies investigating 11 β HSD2 expression and bioactivity in canine CHF are ongoing.

Disclosures: Supported by the Fiona and Ian Russell seed corn grant through the University of Edinburgh.

ESVC-O-17

ROLE OF RIGHT ENDOMYOCARDIAL BIOPSY TO CHARACTERISE UNEXPLAINED MYOCARDIAL AND RHYTHM DISORDERS IN THE DOG. R. A. Santilli¹, M. Perego¹, M. Tursi², E. Grego², M. Sossella², P. Gianella². Clinica Veterinaria Malpensa, Samarate, Italy, ²Department of Veterinary Sciences - University of Turin, Grugliasco - Turin, Italy

In humans endomyocardial biopsy (EMB) is highly recommended in case of unexplained left ventricular dysfunction associated to ventricular arrhythmias (VA) or high-grade atrioventricular block (AVB). Despite the frequency of these conditions in dogs, histopathology data are lacking. The aims of this study were to describe the feasibility of EMB in dogs and to investigate a possible role of viral myocarditis in case of unexplained dilated cardiomyopathy (DCM) phenotypes, high-grade AVBs, supraventricular arrhythmias (SVA) and VA. Twenty-five dogs of different breeds, M/F 1.5, mean age 5.95 + 3.07 years, mean body weight 32.8 + 11.52 kg, presented for third degree AVB 9/25, DCM 6/25, VA 6/25, SVA 2/25, and VA+SVA 2/25, underwent percutaneous right EMB under general anesthesia throughout the jugular vein. For each dog clinical records were analyzed. In all dogs at least one right ventricular sample (range 1-4) was collected for histopathology and immunohistochemistry; in 16/25 dogs at least one sample (range 1-3) for viral PCR was collected. All histopathologic samples were stained with haematoxylin and eosin, Masson's trichrome and red elastic picrocirius. In selected cases stains with monoclonal anti-CD3 and anti-CD79 were performed. Nucleic acids were obtained after sample storage in RNA later solution, disruption with tissue Lyser and extraction with TRIzol; and tested for canine viruses (enteric and respiratory coronavirus, herpes virus, distemper virus, adenovirus 1 and 2, and parvovirus) and for West Nile virus and Bartonella spp. Seven out of 25 dogs had aspecific signs of cardiomyopathy and 2/25 suggestive of

arrhythmogenic right ventricular cardiomyopathy (ARVC). EMB gave normal samples in 6/25 dogs and not diagnostic in 1/25 dog. Nine out of 25 samples were suggestive of myocarditis at different stages (3 third degree AVB, 5 DCM and 1 SVA). Two of these dogs resulted positive for virus (1 enteric coronavirus, 1 herpes virus). None of the dogs had positive immunohistochemical stains. Two dogs with cardiomyopathy were positive for herpes virus and for herpes virus and parvovirus, respectively. Both of these dogs came from a kennel. No complication was noted in 24/25 dogs, one dog had self-limiting pericardial effusion. This study showed, similarly to human cardiology, that EMB is a safe and useful technique that allows recognition and classification of unexplained myocardial and rhythm disorders, 25% of which possibly associated with viral myocarditis. Further studies are needed to prove the relationship between viruses and myocarditis in a larger cohort of dogs.

Disclosures: No disclosures to report.

ESVC-O-18

MORPHOLOGICAL AND FUNCTIONAL ECHOCARDIOGRAPHIC ASSESSMENT OF THE RIGHT VENTRICLE IN NORMAL BEAGLES COMPARING WITH HIGH FIELD CARDIAC MAGNETIC RESONANCE IMAGING. M. Baron Toaldo¹, M. Dennler², J.N. Matos³, P. Kircher², T. Glaus². ¹University of Zurich, Zurich, Switzerland, ²Department of Small Animals, Clinic of Diagnostic Imaging, University of Zurich, Zurich, Switzerland, ³Department of Small Animals, Division of Cardiology, University of Zurich, Zurich, Switzerland

Echocardiographic evaluation of the right ventricle (RV) is challenging. Studies lack quantitative assessment of the RV in dogs. The goal of this study therefore was to evaluate RV morphology and systolic function using different transthoracic echocardiographic (TE) views and to compare the results with magnetic resonance imaging (MRI) measurements in 10 adult healthy anesthetized Beagles.

TE variables were RV wall thickness (WT) in short axis and from a subcostal view, fractional shortening (FS), RV fractional area change (FAC) from 2 different apical views (an optimized view for the RV and a standard 4 chambers view), tricuspid annular plane systolic excursion (TAPSE) from 2 different apical views, right ventricular outflow tract diameter at proximal (RVOT1) and valvular (RVOT2) levels both obtained in long and short axis, tissue Doppler imaging (TDI) derived tricuspid annulus systolic wave (s_e), isovolumic contraction velocity (IVCvel), and isovolumic contraction acceleration time (IVCat). MRI variables were RV WT, RVOT1 in short and long axis and RVOT2, ejection fraction (EF), and stroke volume (SV) based on flow quantification.

There was no difference between RV WT measured with TE in both short axis (5.4±0.7 mm) and subcostal views (5.6±0.5 mm) and MRI (5.2±0.6 mm). No difference was found between RVOT1 or RVOT2 when measured in long (22.4±3.1 mm for the former, 16.6±1.6 mm for the latter) and short axis (22.8±2.9 mm for the former, 15.1±1.1 mm for the latter) with TE; however RVOT1 in both short and long axis was overestimated by TE compared to MRI (18.7±1.4 mm in long axis, and 19.9±1.4 mm in short axis). Both RVOT2 in short and long axis obtained by TE were lower than MRI values (23.6±3.7 mm). TE FS was 12.4±6%. Values of TAPSE varied significantly when using 2 different apical views, optimized (8.2±1.2 mm) and standard 4 chambers (7±0.9 mm); the same was true for FAC (optimized view, 36.8±10.4%; standard 4 chambers, 44.7±7.8 mm). TDI s_e was 0.07±0.01 m/s, IVCvel was 0.05±0.01 m/s, and IVCat was 23.3±2.1 msec. The only TE correlations found were TAPSE with FAC and s_e. The only 2 echocardiographic variables correlating with the MRI based SV (18.4±6.2 mL) were FAC and s_e. MRI based EF (24.5±6.2%) did not correlate with any echocardiographic variable.

This new approach to assess RV function revealed problems similar to earlier attempts. Without a reliable standard for comparison of quantitative results, the value of any TE parameter is questionable. Furthermore, TE parameters obtained from different views produced different results, indicating that standardization may be difficult, respectively increasing the risk of variability.

Disclosures: No disclosures to report.

ESVC-O-19

ASSESSMENT OF SPONTANEOUS ECHO CONTRAST IN DOGS AND CATS USING 2D COLOUR, GREY SCALE AND COLOUR TISSUE DOPPLER IMAGING. P. Carlton, A. McGinnity, J. Prieto-Ramos, P. Wotton, G. Hammond, T. Parkin, A.T. French. University of Glasgow, Glasgow, UK

Spontaneous echo contrast (SEC) or 'smoke' is caused by low blood velocity and appears on ultrasound as a swirling blood flow pattern. It is associated with increased risk of thromboembolism in small animals. Detection of SEC is entirely subjective and there is limited consensus in veterinary medicine regarding the echocardiographic technique that is best for detection of SEC.

The main hypothesis of this study was that 2 dimensional (2D) colour Tissue Doppler Imaging (TDI) would significantly outperform 2D colour and grey scale as the best echocardiographic technique to view SEC. A further hypothesis was that colour blindness would have no influence on results.

Echocardiographic data was obtained retrospectively from 10 small animal cases that presented to the University of Glasgow small animal hospital. All cases had evidence of SEC. Using a GE vivid 7 echocardiography machine each of the 10 cases had one video loop recorded with 2D colour TDI. Colour TDI was then replaced by 3 different 2D colours (gold, sepia and aqua) and 2 different grey scale colours (machine presets 2 and 3) and video loops recorded. For each case the order of the 6 recorded video loops was randomised. The video loops from the 10 cases were viewed in standardised conditions by 18 observers (veterinary cardiologists, residents, interns and students); 12 observers had full colour spectrum vision (FCSV) and 6 were red-green colour blind (deuteranopia). Each observer ranked their ability to see SEC with each colour, with 1 being the least able to visualise SEC and 6 being the best able to visualise SEC.

Binary logistic regression using Minitab (version 17.1) was used to identify factors associated with whether TDI was ranked best or not. Potential explanatory variables that were examined were view and colour blindness. Observer and case were also fitted as fixed and random effects to account for clustering within these variables.

TDI was chosen by the observers 118/180 (66%) occasions as the best technique to diagnose SEC, which was significantly more frequently than all other 2D colour views together ($P < 0.001$). There was no significant difference between colour blind observers and those with FCSV ($P = 1.0$) and there was no influence of observer or case on the final model.

In conclusion, 2D colour TDI may assist in easier diagnosis of spontaneous echo contrast in veterinary medicine regardless of colour visual spectrum of the observer. Easier detection of SEC would allow earlier implementation of preventative measures.

Disclosures: No disclosures to report.

ESVC-O-20

PREVALENCE OF PATENT FORAMEN OVALE IN SMALL ANIMALS: A POST MORTEM STUDY. J. Novo Matos, U. Hetzel, A. Kipar, T. Glaus. Vetsuisse Faculty University of Zurich, Zurich, Switzerland

The foramen ovale (FO) is a slit-like passageway between septum secundum and primum that typically closes after birth by fusion of these septa. In 25–30% of humans, a patent foramen ovale (PFO) persists into adulthood. The prevalence of PFO in small animals is unknown. This interatrial channel may serve as a bypass to the pulmonary circulation and is an important cause of paradoxical embolism (PE) and stroke in people.

The primary aim of the study was to evaluate the prevalence of PFO in a large population of dogs and cats. Secondary aims were to gather data on the prevalence of atrial septal defects (ASD) and on the potential association between PFO and a) clinical/pathological signs of stroke or thromboembolism and b) the presence of right-sided heart disease.

Hearts of all dogs and cats that underwent a full diagnostic post mortem examination were prospectively evaluated for a PFO in a blinded fashion (to clinical history and cause of death). In selected cases with patent and closed FO respectively, a histological examination of the interatrial septum was undertaken. Clinical information and the results of the post mortem examination were only evaluated after all hearts had been examined.

A total of 198 hearts (113 cats, 85 dogs) were examined, of which 18 cats (16%) and 25 dogs (29%) with a median age of 7 [1 day–21 years] and 8 years [1 day–16 years] respectively, exhibited a probe-patent PFO. In adult animals with presumed normal right atrial pressure the prevalence of PFO was 15% (cats) and 22% (dogs). None of the animals had an ASD. One dog with a PFO also exhibited an aortic thrombus; otherwise there was no evidence of PE in this population. In 82% (dogs) and 60% (cats) with closed FO the left side of the interatrial septum (septum primum) was still partially probe-patent through a channel extending from the left atrial crescentic ridge (ostium secundum) to the limbus, but closed at this level by a thin, easily rupturable membrane.

In conclusion, PFOs are common in dogs and cats, but less prevalent than in humans. In contrast, ASDs appear to be rare in either. Despite the high prevalence of PFO, clinical complications seem to be very rare. The majority of dogs with a closed FO have a fossa ovalis that is weakly fused to the limbus, which may facilitate blunt trans-septal atrial catheterisation and provide an easier access to the left atrium.

Disclosures: Jose Novo Matos and Tony Glaus have performed consultancy work for Boehringer Ingelheim and Vetoquinol.

ESVC-O-21

INFLUENCE OF FELINE DIABETES MELLITUS ON CARDIAC FUNCTION. N.J. Pereira, J. Novo Matos, N. Summerfield, A. Riederer, C. Reusch, T. Glaus. University of Zurich, Zurich, Switzerland

In Human medicine diabetes mellitus (DM) is known to lead to cardiovascular dysfunction and heart failure, characterized by early diastolic and late systolic dysfunction. Diabetic cardiomyopathy has been defined as the existence of left ventricular dysfunction in diabetics without coronary artery disease, hypertension or other potential etiological conditions. The prevalence of a diabetic cardiomyopathy in cats has not been previously studied.

We sought to prospectively identify if cardiac diastolic dysfunction was present or would develop in a population of cats with newly diagnosed DM. Cats were recruited based on a diagnosis of primary DM. Patients received physical examination, biochemical and hematologic profiles including thyroxin and insulin-like growth factor 1, urinalysis, blood pressure measurement, thoracic and abdominal radiographs and abdominal ultrasound. Echocardiography was performed at both diagnosis and 6 months post diagnosis. Echocardiographic assessment included conventional 2D, M-Mode, spectral and tissue Doppler measurements. Patients with relevant concomitant systemic illness or secondary DM were excluded from the study. Healthy age matched control cats were retrospectively enrolled.

Thirty-two diabetics (D0) were enrolled in the study. Eighteen were females and 14 were males. Mean age was 10.8 years. On March 2015, 15 cats had received a 6 month echocardiographic control (D6). Ten control cats were enrolled (C). Eight were males and 2 females. Mean age was 9.2 years.

Results (mean \pm standard deviation) for C, D0 and D1 groups were, respectively:

Left atrium on long axis [13.2 \pm 1.31; 14.2 \pm 1.42; 13.7 \pm 1.07]; Left atrial / Aortic ratio [1.35 \pm 0.14; 1.36 \pm 0.09; 1.34 \pm 0.11]; Interventricular septum in diastole [4.19 \pm 0.46; 4.06 \pm 0.55; 4.21 \pm 0.67]; Left ventricular internal diameter [14.98 \pm 1.54; 15.72 \pm 2.22; 15.93 \pm 1.47]; Left ventricular free wall in diastole [4.38 \pm 0.49; 4.13 \pm 0.59; 4.19 \pm 0.60]; E wave [92 \pm 26.6; 67.5 \pm 20.5; 62.9 \pm 15.4]; E/A [1.24 \pm 0.32; 1.09 \pm 0.38; 0.97 \pm 0.24]; E' wave [90.8 \pm 32.6; 84.3 \pm 28.9; 74.1 \pm 24.0]; E'/A' [1.40 \pm 0.61; 1.29 \pm 0.63; 1.30 \pm 0.63].

D0 ($P = 0.004$) and D6 ($P = 0.03$) had a significantly lower mitral inflow E wave when compared to controls. D6 showed a tendency for lower mitral inflow E:A ratio ($P = 0.08$) and tissue Doppler E' wave ($P = 0.07$) when compared to D0.

This study suggests that diabetes mellitus may be capable of influencing diastolic function.

Disclosures: Summerfield N, consultancy agreements with Boehringer Ingelheim and CEVA. Matos J and Glaus T, consultancy with Boehringer Ingelheim and Vetoquinol.

ESVC-O-22

REDUCTION OF FLUOROSCOPIC USE WITH ECHOGUIDED PACEMAKER IMPLANTATION IN THE DOG. F. Porciello¹, D. Caivano¹, M.E. Giorgi¹, F. Spina¹, P. Knafelz², V. De Monte¹, A. Bufalari¹, M.E. Rishniw³, N.S. Moise³, F. Birettoni¹. ¹University of Perugia, Perugia, Italy, ²Veterinary Hospital "Gregorio VII" Rome, Italy, ³Faculty of Veterinary Medicine, Ithaca, NY, USA

Fluoroscopically guided pacemaker implantation imparts a risk of radiation exposure. Ideally exposure risk should be minimized or avoided. We previously reported using transthoracic (TTE) and transesophageal echocardiography to guide PDA occlusion and balloon valvuloplasty. Therefore, we hypothesized that TTE could be used to minimize fluoroscopy time during pacemaker implantation in dogs.

We implanted single bipolar lead pacemakers (VVIR) in 10 dogs, using either active or passive fixation, as determined by TTE assessment of the right ventricular apical myocardium thickness: in dogs with an apical RV thickness < 2.2 mm we implanted passive fixation leads. Dogs were anesthetized, positioned in right lateral recumbency on a standard echocardiography table and a left jugular vein exteriorization and venotomy were performed. In all dogs, a permanent pacing lead was advanced through the left jugular venotomy and was directed from cranial vena cava through the right atrium into the RV with TTE guidance. Echocardiographic right parasternal views optimized to visualize the pacing lead were used, starting with a short axis image of the right atrium and ending with a long axis view of the RV optimized to image the ventricular apex. After placing the pacing lead in the RV apex with TTE guidance, and after acceptable measures of the capture threshold and impedance had been obtained, fluoroscopy was used to confirm lead placement. The pulse generator was connected to the pacing lead and secured within a right dorsal cervical pocket. Incisions were closed routinely and post-implantation thoracic radiographs were performed.

The pacing lead appeared hyperechoic on TTE images and TTE guidance provided images of a quality sufficient to clearly monitor implantation in real-time. Real-time monitoring allowed for immediate corrections to pacing lead malpositioning or excessive looping. With active-fixation leads, TTE allowed visualization of the fixation helix being implanted into the myocardium in some cases. The right parasternal echocardiographic window allowed imaging of the different positions of the lead in the cardiac chambers during the entire procedure. The implantations were successful in all dogs but in the first 3 cases we required fluoroscopic guidance to follow the intraventricular progression of the lead. In the last 7 dogs we only used the fluoroscope as an intraoperative x-ray machine (no cine mode).

We have demonstrated that TTE monitoring can guide pacemaker lead implantation and that fluoroscopy is only required to confirm the correct placement of the lead just before the end of the procedure.

Disclosures: No disclosures to report.

ESVC-O-23

DIFFERENTIATION BETWEEN INNOCENT CARDIAC MURMURS AND MURMURS CAUSED BY CONGENITAL CARDIAC ANOMALIES WITH AUSCULTATION IN ASYMPTOMATIC PUPPIES. V. Szatmári. Faculty of Veterinary Medicine, Utrecht University, Utrecht, The Netherlands

Deciding whether a cardiac murmur is innocent or the result of a congenital cardiac anomaly could be challenging. The gold standard method to differentiate innocent murmurs from congenital cardiac anomalies is echocardiogram, performed by a skilled operator. The present study investigated whether objective auscultation-criteria can differentiate innocent from pathologic murmurs in asymptomatic puppies between 1.5–9 months of age. The null-hypothesis was that a systolic murmur with an intensity of 1–2 out of 6 with a musical character is innocent.

A total of 50 puppies were included between July 2014 and January 2015. These puppies originated either from breeders who brought their puppies to the clinic for screening for congenital porto-systemic shunts, or were referred to the cardiology service

for evaluation of a murmur. Of the 210 puppies that were brought for shunt-screening 28 puppies (age 45–92 days) had a murmur that was audible on every beat. All these dogs were small terrier breeds. Dogs with intermittently audible murmurs were excluded. The remaining 22 puppies (age 49–210 days) were referrals to the cardiology service.

Based on the above described auscultation criteria the murmur was classified as innocent in 28 dogs and pathologic in 22 dogs.

On each of the 50 dogs an echocardiogram was performed. No abnormalities were seen in 27 of the 28 dogs whose murmur was classified as innocent. Echocardiography revealed one or more congenital cardiac anomaly in 21 of the 22 dogs whose murmur was classified as pathologic. The congenital anomalies were 8 patent ductus arteriosus, 6 pulmonic stenosis (3 severe, 1 moderate and 1 mild; 2 in combination with a small ventricular septal defect), 3 aortic stenosis (2 severe and 1 moderate), 2 ventricular septal defects, 1 mild mitral valve dysplasia and 2 double-chambered right ventricle (both moderate, 1 isolated and 1 combined with a mild aortic stenosis, small ventricular septal defect and mild mitral valve dysplasia). The puppy with the isolated mild mitral dysplasia had a soft systolic murmur with a musical character.

On every puppy with a murmur of the shunt-screening group also a phonocardiogram was performed. Phonocardiograms of the innocent murmurs revealed early systolic murmurs with low amplitude.

Auscultation turned out to be a sensitive and specific method to differentiate innocent murmurs from pathologic ones. Phonocardiogram did not have an additional value.

Limitation: the above described findings may not be used in breeds predisposed to aortic stenosis, such as Boxer.

Disclosures: No disclosures to report.

ESVE-O-1

FOOD-ASSOCIATED FACTORS IN ETIOLOGY OF FELINE HYPERTHYROIDISM: WHERE IS THE PROOF?. I.M.J. van Hoek¹, M. Hesta², Y. Queau¹. ¹Royal Canin SAS, Aimargues, France, ²Faculty of Veterinary Medicine, Ghent University, Ghent, Belgium

Since the first description of feline hyperthyroidism (feHT4) several epidemiological studies have suggested diet as a causal factor of feHT4. The aim was to critically assess the evidence presented in epidemiological studies suggesting food-associated factors in etiology of feHT4.

Scientific literature was screened for peer reviewed publications investigating food-associated factors in feHT4 since it was first described in 1979. Study designs were checked against classical epidemiology biases. Food-associated factors showing an increased risk for feHT4 were assessed for compatibility with the 9 Bradford-Hill (B-H) criteria, which are used to evaluate whether an association involves a causal component. Evidence for a causal component is higher when more B-H criteria are met.

A total of 9 publications investigating food-associated factors in feHT4 were identified, all retrospective. Three publications investigated qualitative factors only (e.g. preferred food flavors) but not quantitative. Feeding canned food was not found to be a significant risk factor for feHT4 in one study, while it was found to be a significant and quantitative risk factor in 5 publications. However there were important limitations in their design: controls included sick cats (3 studies), cases outnumbered controls (2 studies), cases and controls differed in age (3 studies), or diet information did not reflect diet fed at time feHT4 developed (2 studies). Three out of 9 B-H criteria were met when considering canned diet feeding as an increased risk for feHT4 development.

From the available literature there is insufficient evidence to conclude that canned diet is a food-associated factor in the etiology of feHT4. Retrospective studies only describe an association and not a cause to effect relationship, are sensitive to bias from host and environment, and are less likely to identify etiologic factors when prevalence is below 10% as is the case in feHT4. Hypotheses linking food-associated factors to feHT4 (such as BPA, PBDEs, flavonoids and iodine content) have never been proven to date, and lifelong prospective studies are required to investigate food-associated factors in etiology of feHT4.

Disclosures: Ingrid van Hoek and Yann Queau were employees of Royal Canin SAS at the time of writing of the abstract.

ESVE-O-2

IODINE-RESTRICTED FOOD IN THE MANAGEMENT OF FELINE HYPERTHYROIDISM: A NON-RANDOMISED CONTROLLED TRIAL IN 25 CATS. E. Malerba¹, G. Grossi¹, P. Palagiano², N. Leoni³, F. Bubini-Regini⁴, A. Zoia⁵, A. Peli¹, G. Biagi¹, F. Fracassi¹. ¹University of Bologna, Ozzano dell'Emilia, Italy, ²Meda Veterinary Clinic, Meda, Italy, ³San Siro Veterinary Clinic, Milan, Italy, ⁴Practitioner, Venice, Italy, ⁵San Marco Veterinary Clinic, Padua, Italy

An iodine-restricted food has been recently introduced as a potential therapeutic option for feline hyperthyroidism. No controlled studies have been published on this treatment.

The aim of this non-randomised controlled trial was to evaluate the effects of the iodine-restricted food on serum TT4 concentrations, clinical and clinicopathological parameters in client-owned cats with hyperthyroidism.

Indoor cats with newly diagnosed hyperthyroidism (consistent clinical signs and serum TT4 concentration >50 nmol/L), with or without mild to moderate azotemia (IRIS stage ≤2), were included. Cats with severe concurrent disorders (i.e. lymphoma, neoplasia, malabsorption or severe azotemia [IRIS >2]) were excluded. Cats were allocated on owner preference into 2 groups: group A received an iodine-restricted food as a single therapy; the control group (group B) received transdermal methimazole in Pluronic[®] lecithin organogel (PLO, 25 mg/mL) at the starting dose of 2.5 mg/cat q 12 h. In both groups clinical parameters, biochemistry and serum TT4 were evaluated at baseline (T0), 10 (T10), 30 (T30), 60 (T60), and 90 (T90) days after treatment began.

Twenty-five cats were enrolled in the study, 14 were included in group A, and 11 in group B. No statistical differences were present between group at T0 for signalment, clinical and laboratory findings, including TT4 concentrations. In group A, only 6/14 cats (42.9%) completed the study. The causes of interruption were: food refusal in 4/14 (28.6%), loss to follow-up in 2/14 (14.3%), death of unrelated cause in 1/14 (7.1%), and poor owner compliance in 1/14 (7.1%). In group B, 9/11 cats (81.8%) completed the study. The causes of interruption were: suspected methimazole induced hepatotoxicity in 1/11 (9.1%) and loss to follow-up in 1/11 (9.1%).

Median serum TT4 concentration at T90 was 36 nmol/L (range 18–55 nmol/L) in group A, and 19 nmol/L (range 5–73 nmol/L) in group B. No significant differences were found in serum TT4 concentrations between group A and group B in any of the evaluated timing. Bodyweight and serum creatinine significantly increased only in group B between T0 and T90 ($P = 0.0027$ and $P = 0.008$, respectively); nevertheless, urea did not significantly change in both groups. AST, ALT, and ALP significantly decreased only in group B between T0 and T90 ($P = 0.0027$, $P = 0.008$ and $P = 0.0047$, respectively).

These results suggest that iodine-restricted food is effective in reducing serum TT4 concentration in hyperthyroid cats. Compared to transdermal methimazole, food does not produce an increase in serum creatinine, but apparently is less effective in improving bodyweight and liver parameters.

Disclosures: No disclosures to report.

ESVE-O-3

PREDICTING POSTOPERATIVE HYPOCALCEMIA IN DOGS FOLLOWING PARATHYROIDECTOMY OR PARATHYROID HEAT ABLATION. J. Dear, A.M. Della Maggione, P.H. Kass, E.C. Feldman. University of California, Davis, CA, USA

The objective of this study was to identify whether pre-treatment plasma ionized calcium (iCa) concentrations are predictive of hypocalcemia following parathyroid removal or heat ablation in dogs with primary hyperparathyroidism.

Fifty-five dogs seen between January 1, 2004 and February 28, 2015 met the inclusion criteria of having persistent hypercalcemia (defined as $iCa > 1.45$ mmol/L) due to primary hyperparathyroidism, absence of pre-emptive calcitriol therapy, and iCa monitoring post-operatively. Each dog was treated with surgery ($n = 37$) or ultrasound-guided percutaneous heat ablation ($n = 18$). Hypercalcemia resolved for all dogs within 48 hours of the procedure.

Dogs were split into pretreatment iCa groups of 1.45–1.60 mmol/L, 1.61–1.80 mmol/L and >1.80 mmol/L. There was a significant association between higher pretreatment hypercalcemia and lower post treatment hypocalcemia. In addition, there was a significant dose-response relationship between pretreatment calcium concentration and the absolute decline in calcium following treatment. Sixteen dogs became notably hypocalcemic ($iCa < 1.10$ mmol/L). Four out of 20 dogs with pretreatment $iCa \leq 1.60$ mmol/L, 6 out of 21 dogs with iCa between 1.61–1.80 mmol/L and 6 out of 14 dogs with pretreatment $iCa \geq 1.80$ mmol/L became hypocalcemic ($iCa < 1.10$ mmol/L). Adverse effects of hypocalcemia were observed in 5 dogs, 4 of which had pretreatment $iCa > 1.60$ mmol/L. Given the risk of significant hypocalcemia following parathyroid removal in dogs with pretreatment $iCa > 1.80$ mmol/L, these patients should be treated to prevent rapid decline and development of clinical hypocalcemia.

Disclosures: No disclosures to report.

ESVE-O-4

JUVENILE ONSET DIABETES MELLITUS IN SEVEN LABRADOR RETRIEVER PUPPIES – CASE REPORTS AND RESULTS OF CANDIDATE GENE SCREENING. E. Raffan¹, M. Killerby¹, L.J. Davison¹, M.E. Herrtage¹, L.J. Kennedy², B. Catchpole³. ¹University of Cambridge, Cambridge, UK, ²Centre for Integrated Genomics Research, University of Manchester, Manchester, UK, ³Royal Veterinary College, Hawkshead, UK

Diabetes mellitus is estimated to affect 0.32% of pet dogs in the UK. Most cases are thought to result from insulin deficiency resulting from loss of pancreatic beta cells, similar to human type 1 diabetes. Juvenile-onset diabetes is rare (Catchpole, et al., 2005).

Seven Labrador retriever puppies were diagnosed with diabetes mellitus at between 8 and 24 weeks of age on the basis of the presence of hyperglycaemia, glucosuria and compatible clinical signs including polyuria, polydipsia and polyphagia. Two of the dogs were known to be related (full siblings); of the remaining cases, other family members (full or half siblings or one sire) were also reported to be affected, though clinical details were not available. Pancreatic histopathology at post mortem in 2 cases showed islet hypoplasia. In the only puppy tested, hypoinsulinaemia was identified. Two puppies were euthanased soon after diagnosis, 3 were lost to follow up and 2 survived to >8 years of age with well controlled diabetes.

Due to the early age of onset and occurrence within a single breed, it was hypothesised that diabetes in these cases might be due to mutation(s) in a single gene. Three candidate genes were selected on the basis that they are the more common genetic causes of monogenic diabetes in human neonates or young children (KCNJ11, HNF1A, HNF4A). The coding regions of the canine orthologues of those genes (Q5BMM8_CANFA, HNF1A, HNF4A, respectively) were amplified and sequenced from genomic DNA from all 7 affected puppies and unaffected siblings and control Labradors.

No variants were identified in the coding sequences of HNF1A or HNF4A. In Q5BMM8_CANFA, 2 novel, synonymous coding, single nucleotide base substitution variants were identified in 2 of the 7 affected dogs. However, these variants were considered unlikely to be the cause of the clinical syndrome, as their presence did not co-segregate with disease within families or across the cohort and did not change the protein coding sequence.

In conclusion, we report a case series of 7 Labrador puppies suspected to be affected with monogenic diabetes mellitus, and results of candidate gene screening which did not identify a causa-

tive mutation. Further investigation of a possible genetic cause would be required to elucidate the cause of early onset diabetes in this breed.

Disclosures: ER's salary and laboratory costs were paid using a grant from the Wellcome Trust.

Samples were submitted to the Canine Diabetes Register at the RVC which has received funding from Masterfoods, Kennel Club Charitable Trust, MSD Animal Health and EU grant FP7 'LUPA'.

MEH is a Trustee of the Kennel Club Charitable Trust. He was not part of discussions to award funding to the Canine Diabetes Register.

Some samples were submitted as part of LJD's PhD which was funded by the RVC (Clinical Research Fellowship) with additional funding from Intervet Pharma R&D (currently MSD Animal Health).

ESVE-O-5

A GENOME-WIDE ASSOCIATION STUDY IDENTIFIES NOVEL CANDIDATE GENES FOR SUSCEPTIBILITY TO DIABETES MELLITUS IN DSH CATS. Y. Forcada¹, M. Bournnell², B. Catchpole¹, D.B. Church¹. ¹The Royal Veterinary College, North Mymms, UK, ²Animal Health Trust, Newmarket, UK

Diabetes mellitus (DM) is a common feline endocrinopathy and pathophysiologically similar to human type 2 diabetes (T2DM). T2DM occurs due to a combination of insulin resistance and β -cell dysfunction. Several studies have identified environmental and genetic susceptibility factors for T2DM. In cats, environmental factors such as obesity and physical inactivity have been linked with DM; however, identification of genetic factors has been challenging. To date, MC4R is the only gene shown to be associated with increased susceptibility to DM in overweight domestic short hair (DSH) cats. The aim of the present study was to perform a genome-wide association study (GWAS) to identify loci associated with DM in lean DSH cats.

Illumina Infinium 63k iSelect DNA arrays were used to interrogate genomic DNA samples from 200 lean diabetic DSH cats from the Royal Veterinary College Feline DM Archive and 400 control DSH cats. The data was analysed using PLINK whole genome data analysis toolset. Significance was established at $p < 1 \times 10^{-5}$. SNPs with a minor allele frequency below 0.05 and a call rate below 95% and individuals with a genotyping rate $<90\%$ were excluded from analysis.

A total of 49,930 SNPs were available for analysis. After excluding cats with low genotypic rate, 389 control DSH and 192 lean diabetic DSH cats were evaluated. Diabetic cats had a mean (SD) age of 11.62 (3.44) years; 123 (63%) were male, 71 (37%) female. Non-diabetic cats had a mean (SD) age of 14.83 (2.06) years; 216 (54%) were female, 183 (46%) male. Control cats were significantly older than diabetic cats ($P < 0.0001$; t-test). Five significant SNPs were identified: chrA2.4150731 ($P = 1.4 \times 10^{-7}$); chrUn17.115508 ($P = 7 \times 10^{-7}$); chrUn17.394136 ($P = 3 \times 10^{-7}$); chrUn17.314128 ($P = 3 \times 10^{-7}$) and chrUn17.7283 ($P = 9 \times 10^{-6}$). The first SNP is located within chromosome A2; the others are located within a 0.8 Mb region towards the end of chromosome A3. The SNP in chromosome A2 is located 3 kb upstream of Dipeptidyl-peptidase-9 (DPP9), a peptidase similar to DPP-4, involved in incretin inactivation. Within the identified region of chromosome A3, genes of interest include TMEM18 and ACPI; both have been associated with T2DM in humans, most likely causing insulin resistance.

This is the first GWAS of DM in cats. A number of significant SNPs have been identified; some of which are located in proximity to genes that have been associated with T2DM in humans others could be involved in pathophysiology related to DM. Further investigation of these candidate genes is warranted.

Disclosures: SNP chips for the GWAS were provided by the Morris Animal Foundation.

ESVE-O-6

HOME BLOOD GLUCOSE MONITORING IN FELINE DIABETES MELLITUS: A 3-MONTH PROSPECTIVE CLINICAL TRIAL EVALUATING OWNER-ACCEPTANCE, QUALITY-OF-LIFE AND GLYCAEMIC IMPACT. R.F. Gostelow, C. Scudder, D.B. Church, S.J. Niessen. The Royal Veterinary College, Hatfield, UK

Diabetes mellitus (DM) and its treatment have been documented to exert a negative psychosocial impact on cats and their owners. Common owner concerns include hypoglycaemia worry, social- and work-life impact and a desire for more control over their cat's treatment. Home blood glucose monitoring (HBGM) has been suggested to enable superior glycaemic control and could address some of the above-mentioned quality-of-life (QoL) issues. Conversely, HBGM could also exert negative psychosocial effects such as disturbance of the cat-owner bond. This prospective 3-month trial aimed to document the acceptance rate of HBGM among owners of diabetic cats, reasons for declining HBGM, possible impact on glycaemic control and whether acceptance altered pet and owner QoL measured through the use of a validated psychometric diabetic pet QoL-tool (DIAQoL-pet).

At baseline (M0) all owners of recently diagnosed cats received a veterinary glucometer (Alphatrak[®] 2, Zoetis) and a standardised demonstration of its use on their cat. Diabetic management was standardised and included a low carbohydrate diet, twice-daily insulin following a standardised dose-adjustment-protocol according to, initially, weekly blood glucose curves (BGCs) carried out through HBGM (if adopted; HBGM-group) or in-hospital (if not adopted; non-HBGM-group). Mann-Whitney U-tests assessed for significant differences in fructosamine, average BGC-value, insulin dose and DIAQoL-pet-scores at M0 and month 3 (M3) between the HBGM- and the non-HBGM-group. Fisher's exact test was used to compare remission rates; average values are given as median (range).

HBGM was introduced to 21 owners and was successfully adopted by 15 (71.4%). Reasons for failure were patient aggression ($n = 1$), owner concerns about patient distress ($n = 4$) and lack of available assistance ($n = 1$). At M3, there was no significant difference in fructosamine (HBGM: 347(215–606) $\mu\text{mol/L}$, non-HBGM: 414(344–560) $\mu\text{mol/L}$; $P = 0.20$), insulin dose (HBGM: 0.35(0–1.01) U/kg/dose, non-HBGM: 0.44(0.27–0.68) U/kg/dose; $P = 0.41$), average BGC-value (HBGM: 8.7(4.1–22.0) mmol/l, non-HBGM: 12.6(7.7–12.6) mmol/l; $P = 0.3$) or overall DIAQoL-pet-score (HBGM: $-0.69(0.38 \text{ to } -4.83)$, non-HBGM: $-0.97(-0.31 \text{ to } -3.34)$). On examination of individual DIAQoL-pet-categories HBGM-cat owners reported no significant difference in the bond they felt with their cat ($P = 0.56$), degree of worry about hypoglycaemia ($P = 0.72$) or restriction to their work- ($P = 0.33$) or social-life ($P = 0.23$) compared to the non-HBGM-group. Four HBGM-cats (26.7%) achieved diabetic remission; none of the non-HBGM-group did ($P = 0.23$).

HBGM can be successfully adopted in a majority of cat-owner combinations without a demonstrable extra burden on cat and owner's QoL. HBGM also did not appear to compromise owners' relationships with their cat. A larger sample size is likely needed to assess whether HBGM promotes superior glycaemic control and remission.

Disclosures: The research presented in this abstract was supported by Zoetis. The clinic at which this research was conducted is also supported by Boehringer Ingelheim and Nestle Purina Pet-Care.

Ruth Gostelow and Christopher Scudder both receive PhD funding from the Evetts-Luff Animal Welfare Trust.

Stijn Niessen acts as a consultant for the Veterinary Information Network (VIN).

ESVE-O-7

DEVELOPMENT OF AN ARTIFICIAL NEURAL NETWORK FOR PREDICTION OF GLUCOSE CONCENTRATION IN FELINE DIABETES MELLITUS. M. Rosca¹, L. Ferariu², R. Gostelow³, A. Burlacu², G. Solcan¹, S. Niessen³. ¹USAMV, Iasi, Romania, ²Gheorghe Asachi Technical University of Iasi, Iasi, Romania, ³Royal Veterinary College, University of London, London, UK

A major difficulty in the management of diabetes mellitus (DM) is our inability to predict blood glucose values in response to an

insulin dose. This is linked to the existence of numerous factors impacting on blood glucose in the diabetic patient (e.g. caloric intake, type of food, exercise, insulin type and dose, stress). Artificial neural networks (ANNs), which are statistical learning algorithms, have shown potential to aid in this prediction process in human DM. Their development has been hugely aided by the introduction of continuous glucose monitoring systems (CGMS), enabling generation of sufficient data-points. The goal of the current study was to develop an ANN for feline DM.

Algorithms were developed with MATLAB[®] (MathWorks, UK) using data on exogenous insulin dose, serial blood glucoses (obtained through traditional blood glucose curves and CGMS) and caloric intake over 24 hours of 46 diabetic cats. All cats were maintained in an environment that enabled normal activities, limiting stress. The Neural Network Toolbox[™] (MathWorks, UK) was used to construct and test 2 types of ANNs: Multi-Layer Perceptron (MLP) and Radial Basis Function (RBF). Both ANNs were trained using the diabetic cat data, followed by so-called detrending, elimination of outliers and configuration of external delays. In order to increase accuracy, neural architecture was set as a single hidden layer with a maximum of 12 neurons; inclusion of saturated neurons was forbidden. The accuracy of the resulting MLP and RBF models was assessed by calculating the mean squared normalised error (threshold: 0.01), generated through comparison of predicted data with actually registered data in recruited diabetic cats.

In total, 46 diabetic cats were recruited for this study (25 males, 21 females, 4.3 ± 1.2 [SD] kg, age 10.2 ± 3.7 ; 19 Burmese, 20 DSH, 7 other breeds). All had a 24-hour blood glucose curve performed ($n = 10$ with CGMS) and response to insulin was predicted by MLP and RBF. Calculation of the mean squared normalized error revealed that in 39/46 diabetic cats (85%; MLP) and 38/46 (83%; RBF), the dynamics of the blood glucose curve were correctly predicted by the ANN.

In conclusion, our study is the first to describe the successful development of an ANN to predict blood glucose dynamics in insulin-treated diabetic cats. Further evaluation is indicated, though ANN-model-based prediction of glucose concentration may allow clinicians in future to optimise insulin management protocols or may allow the development of an artificial pancreas for the diabetic cat.

Disclosures: No disclosures to report.

ESVE-O-8

A PLACEBO-CONTROLLED STUDY ON THE EFFECT OF THE GLP-1 ANALOGUE, EXENATIDE, ON BODY COMPOSITION, LEPTIN AND ADIPONECTIN IN OBESE, CLIENT-OWNED CATS. K.M. Hoelmkjaer, T. Mandrup-Poulsen, D.H. Nielsen, A. Cronin, C.R. Bjornvad. University of Copenhagen, Frederiksberg c, Denmark

Glucagon-like peptide (GLP) -1 analogues induce significant weight loss in humans; presumably by slowing gastric emptying and increasing satiety. In lean purpose-bred cats, short-term GLP-1 analogue treatment also induced weight loss. We evaluated the effect of 12 weeks exenatide, a GLP-1 analogue approved for treatment of human type 2 diabetes, or placebo treatment on body composition and adipokines in obese, client-owned cats. Cats were randomized to subcutaneous saline ($n = 6$) or exenatide ($n = 6$) injections; 0.5 $\mu\text{g/kg}$ q12 h during the initial 4 weeks and 1.0 $\mu\text{g/kg}$ q12 h during the following 8 weeks. Body weight, body composition using dual-energy x-ray absorptiometry and adipokine levels were measured before and after treatment.

All cats were obese (body condition score ≥ 7 out of 9). Mean body weight was 7.71 kg (range 5.04–10.80 kg) and mean % body fat was 47.5% (32.6–61.1%). Median percent loss of baseline body weight was 5.1% (range 1.7–8.4%) for exenatide and 3.2% (range -5.3 to 5.7%) for placebo. Only the exenatide group had a significant absolute weight loss; however the difference in median percent loss between groups was not significant. Change in total amount or % body fat were not different between groups. Correspondingly, plasma leptin and total adiponectin were unaltered by treatment. Complications were limited to a single, mild hypoglycemic episode and 2 cases of self-limiting gastrointestinal signs.

We conclude that the appointed dose of exenatide was well tolerated and safe in obese healthy cats. A larger study population may be required to fully elucidate the effect of exenatide in obese cats.

Disclosures: No disclosures to report.

ESVE-O-9

EVALUATING THE EFFICACY OF HUMAN-RECOMBINANT PROTAMINE ZINC INSULIN IN FELINE DIABETES MELLITUS: A THREE MONTH PROSPECTIVE CLINICAL TRIAL. R.F. Gostelow, C. Scudder, D.B. Church, S.J. Niessen. The Royal Veterinary College, Hatfield, UK

Feline diabetes mellitus (DM) is recommended to be treated through addressing underlying diseases, BID insulin injections and low carbohydrate diets. Good glycaemic control is suggested to promote diabetic remission. A recent systematic review of feline DM literature identified studies on glargine and lente insulin to be proportionately overrepresented compared to other insulin types. Additionally, most insulin studies suffered from lack of screening for concurrent disease, homogeneity in management and assessment of quality of life (QoL). Until recently, only porcine lente insulin was available as a veterinary-licensed product. This prospective trial evaluated the impact of newly veterinary-licensed human-recombinant protamine zinc insulin (ProZinc™, Boehringer Ingelheim) on clinical signs, glycaemic control and QoL in diabetic cats.

Recently (<5 months) diagnosed diabetic cats, treated with Caninsulin® (MSD) BID for at least 6 weeks and receiving a specific low carbohydrate diet were recruited. A full history, physical examination, diabetic clinical score (DCS; range 0 [no diabetic signs] -12 [many diabetic signs]), fructosamine concentration, 24-hour blood-glucose-curve (BGC) and QoL-assessment (DIAQoL-pet-score) were performed before and 3 months after transition to ProZinc™ (start dose: 0.2–0.7 unit/kg BID), following a set protocol of weekly BGCs and dose adjustments (0.5–1 unit change/injection/week guided by nadir). Cats were excluded if screening (biochemistry, urinalysis, fPLI, TT4, IGF-1, abdominal ultrasound) identified: ketoacidosis, clinical pancreatitis, glucocorticoid/progesterone administration, hyperthyroidism, acromegaly, other conditions impairing treatment response. Data were assessed for normality and reported as mean±standard deviation; changes were assessed using paired t-tests ($P < 0.05$; without multiple comparisons correction following latest statistical guidelines).

Sixteen cats were recruited (10 male neutered, 6 female neutered; age 128±22 months); all completed the trial. At time of entry cats received 0.50±0.3unit/kg Caninsulin BID, had a DCS of 3.8±3.4; DIAQoL-pet-score of -2.28±1.5; BGC-value of 13.0±5.4 mmol/l; and fructosamine of 449±105 µmol/L. Three months after transitioning to ProZinc™, cats were receiving 0.37±0.2unit/kg BID; had a significantly lower mean DCS (0.8±1.3, $P = 0.001$) and DIAQoL-pet-score (-1.76±1.4, $P = 0.04$); BGC-value (10.7±4.2 mmol/l) and fructosamine (388±113 µmol/L) were also lower, though not significantly ($P = 0.15$ and $P = 0.08$, respectively). Three cats entered diabetic remission (19%).

These results show that transitioning cats from Caninsulin to ProZinc™ produced a significant improvement in clinical signs and QoL. More cases are likely needed to document any additional significant glycaemic impact after transition. Finally, in veterinary DM research, this represents the first clinical trial to include validated quantitative QoL-assessment as an outcome parameter.

Disclosures: The study described in this abstract received financial support from Boehringer Ingelheim.

The clinic in which this research was produced also receives support from Nestle Purina PetCare and Zoetis.

Ruth Gostelow and Christopher Scudder both receive PhD funding from the Evetts-Luff Animal Welfare Trust.

Stijn Niessen is a consultant for the Veterinary Information Network (VIN).

ESVE-O-10

EVALUATION OF A NOVEL SEVEN-DAY CONTINUOUS GLUCOSE MONITORING SYSTEM IN DOGS USING CORRELATION WITH BLOOD GLUCOSE READINGS. A. Hope, S. Spence, I.K. Ramsey. University of Glasgow Small Animal Hospital, Bearsden, UK

Serial blood glucose measurements are currently used as an accepted method to assess diabetic control, however extended curves are expensive and can be technically challenging. A new 7 day continuous glucose monitoring system (CGMS) called the Dexcom G4 Platinum® that incorporates a glucose oxidase-based sensor to measure interstitial blood glucose was evaluated by comparing the results to the blood glucose measured contemporaneously on a glucometer (AlphaTrak®). These measurements were made at least twice daily at the time of calibration of the CGMS, which was a variable period (but not more than 12 hours) after the previous calibration.

A total of 77 measurements from eight dogs' glucose curves (blood glucose range 3–33.3 mmol/l, with a median of 16.43 mmol/l) were compared to a paired measurement of interstitial glucose by calculation of the Pearson correlation coefficient (r). A minimum of 4 measurements were obtained from each dog. The device only provides a specific measurement of interstitial glucose in the range 2.2 to 22.2 mmol/l. Values above and below this range were not included in the study.

Subjectively, the device was easy to use with an intuitive user interface that provided wireless real time measurements and was much smaller than older CGMS systems. Overall, there was excellent correlation between the glucometer and the CGMS readings ($r = 0.9$), which was statistically significant ($P = < 0.0001$). The range of differences between the blood and interstitial glucose concentrations was 0–14.6 mmol/l with a median of 1.5 mmol/l. Problems encountered with the system included detachment of the system from the dog's skin, as well as variably correlated glucometer and CGMS readings in individual dogs (r range 0.14 - 0.95, median 0.53).

In conclusion, the Dexcom® G4 CGMS can be used to assess interstitial glucose concentrations in dogs, and these are generally well correlated with blood glucose concentrations. More work is needed (with larger numbers of patients) to determine the relationship of the correlation to the timing of calibration, and to determine why some dogs seem to have poorer correlation than others.

Disclosures: No disclosures to report.

ESVE-O-11

EVALUATION OF A NOVEL FLASH GLUCOSE MONITORING SYSTEM IN DIABETIC DOGS. S. Corradini¹, B. Pilosio², F. Dondi², G. Linari², S. Testa², F. Brugnoli², P. Gianella⁴, M. Pietra², F. Fracassi². ¹Università di Bologna, Ozzano dell'emilia, Italy, ²Department of Veterinary Medical Sciences, University of Bologna, Ozzano dell'emilia, Italy, ³Portoni Rossi Veterinary Clinic, Bologna, Italy, ⁴Department of Veterinary Sciences, University of Turin, Turin, Italy

Several continuous glucose monitoring systems that measure interstitial glucose (IG) are currently available. However, they require multiple calibrations and therefore multiple blood sampling; moreover, the sensors are quite expensive and can be used only for a few days. A new human flash glucose monitoring system (FGM) (FreeStyle Libre, Abbott, UK) measures IG, does not require calibration, is rather inexpensive and the sensor can be used as many as 14 days. It is composed by a small sensor applied subcutaneously that has to be "scanned" with a reader to obtain real time glucose values. The aim of this study was to assess the accuracy of this FGM in diabetic dogs. In all dogs the sensor was placed on the neck area and fixed with an adhesive patch. During the 1st–2nd, 6th–7th, 13th–14th days from the application, the IG measurements were compared with the peripheral blood (EDTA plasma) glucose (PG) concentrations analysed by a reference hexokinase based method (Olympus/Beckman Coulter AU400). Linear regression, Bland Altman plots and the Clarke error grid analysis were used to assess the accuracy. Ten client-owned diabetic dogs on insulin treatment were included. Median age was 9.5 years (range 2–13), 7 were female (spayed), 3 were male (2 neu-

tered). Median body weight was 17.9 kg (range 5.4–43.1). Four hundred and sixty four simultaneous measurements were taken with FGM (IG) and with the reference method (PG): 29 samples were in the hypoglycemic range (<70 mg/dL), 175 in the euglycemic range (70–180 mg/dL) and 260 in the hyperglycemic range (>180 mg/dL). Considering all the measurements together a positive significant correlation between IG and PG concentrations ($r^2 = 0.86$) was found. Mean \pm standard deviation difference from the reference method was -1.8 ± 22 mg/dL in the hypoglycemic range, -9.8 ± 47 mg/dL in the euglycemic range, -1.25 ± 63 mg/dL in the hyperglycemic range. IG values differed >50 mg/dL from the reference method in 0%, 11% and 32% and >25 mg/dl in 13%, 27% and 70% in the hypoglycemic, euglycemic and hyperglycemic range, respectively. Underestimation-overestimation of IG compared to PG was observed in 31–69%, 60–38% and 48–39% of hypoglycemic, euglycemic and hyperglycemic measurements, respectively; 78.6% and 97.8% of glucose values measured by FGM fall in zone A and zones A+B of the error grid analysis, respectively. The application of the sensor was easy and apparently painless; a mild local erythema after sensor removal was found in 5/10 dogs. FGM is a simple and promising glucose monitoring system that seems accurate for the clinical use in diabetic dogs.

Disclosures: No disclosures to report.

ESVE-O-12

EVALUATION OF 2 INSULIN PREPARATIONS AND VALIDATION OF A CONTINUOUS GLUCOSE MONITORING SYSTEM FOR USE IN CATS. E. Salesov, A. Riederer, E. Zini, C.E. Reusch. Clinic for Small Animal Internal Medicine, Zurich, Switzerland

The cornerstone of treatment in diabetic cats is insulin. Among other issues, insufficient duration of insulin action may lead to poor metabolic control and persistence of clinical signs. With the aim to improve current therapeutic options, the present study evaluated pharmacodynamics parameters, such as onset of action, time to glucose nadir and duration of action, of protamine zinc insulin (ProZinc[®], Boehringer Ingelheim) and insulin degludec (Tresiba[®], Novo Nordisk) in healthy cats. Additionally, the accuracy of 2 different sensors, Sof- and Enlite-sensor, of the continuous glucose monitoring system (CGMS) iPro2[®] (Medtronic) was determined with particular attention to the low glycemic range, since reliability of CGMS in case of hypoglycemia is crucial.

Three different doses (0.1, 0.2 and 0.3 IU/kg) of each insulin and both iPro2[®] sensors were tested in 6 healthy purpose bred cats in a randomized crossover trial. The sensors were placed in the neck area for 7 days. Paired glucose measurements were obtained every 8–12 hours with a validated portable blood glucose meter (AlphaTRAK[®], Abbot) set as standard and accuracy was assessed by using ISO 15197 2013 criteria. Additionally, to determine onset of insulin action, time to glucose nadir and duration of action, glucose concentrations were measured 30 and 5 minutes before and 30, 60, 90, 120, 180, 240, 300 and 360 minutes after each insulin administration, then every 2 hours for 18 hours.

Median (range) onset of action was 1.5 (1.5–3) hours for ProZinc[®] and 1.5 (1.5–4) hours for Tresiba[®]. Median (range) time to glucose nadir and duration of action were 4 (1.5–6) hours and 7 (5–10) hours for ProZinc[®] and 5.5 (3–8) hours and 11 (8–24) hours for Tresiba[®], respectively. With regard to iPro2[®], 100% of paired glucose measurements with both sensor types were in zone A and B of the Consensus Error Grid. At glucose concentrations <5.55 mmol/l 90% (160/177) of Sof-sensor measurements and 87% (269/309) of Enlite-sensor measurements were within ± 0.83 mmol/l of the standard; at glucose concentrations ≥ 5.55 mmol/l 43% (6/14) of Sof-sensor measurements and 40% (6/15) of Enlite-sensor measurements were within $\pm 15\%$ of the standard.

In conclusion, healthy cats injected with ProZinc[®] and Tresiba[®] showed similar onset of action. Later glucose nadir and longer duration of action was seen in cats treated with Tresiba[®] compared to those treated with ProZinc[®]. Both iPro2[®] sensors revealed good clinical accuracy and performed similarly in the low glycemic range.

Disclosures: No disclosures to report.

ESVE-O-13

NEW INSIGHTS IN FUNCTIONAL ZONATION OF THE CANINE ADRENAL CORTEX. K. Sanders, J.A. Mol, H.S. Kooistra, S. Galac. Faculty of Veterinary medicine, Utrecht, The Netherlands

The canine adrenal cortex consists of 3 concentric zones: the zona glomerulosa (zG), the zona fasciculata (zF) and the zona reticularis (zR), which produce mineralocorticoids, glucocorticoids and androgens, respectively. In humans, critical step for the production of either aldosterone or cortisol are the zG-specific aldosterone synthase (CYP11B2) and the zF-specific 11 β -hydroxylase cytochrome P450 (CYP11B1). The fact that humans and dogs have the same adrenocortical end products, i.e. aldosterone and cortisol, has led to the assumption that canine steroidogenesis is identical to that of humans. However, in dogs, the zonal expression of steroidogenic enzymes has not been studied previously. Moreover, in dogs the expression of CYP11B1/2 is unclear, as only one coding gene sequence (CYP11B2) has been published in the NCBI database and, adjacent to this, a large non-sequenced gap is present. We hypothesized that canine adrenals possess only one CYP11B gene, similar to sheep and pigs.

zG and zF tissue was isolated separately by use of laser-guided microdissection of 5 adrenals of healthy dogs. The zone-specificity of the tissues was confirmed by specific markers, with mRNA relative expression of Wnt4, angiotensin II receptor and Disabled-2 being significantly higher ($P = 0.05$, $P = 0.014$, $P = 0.014$, respectively) in the zG compared to the zF. RT-qPCR analysis of mRNA relative expression of steroidogenic enzymes demonstrated a significantly higher fold change of steroidogenic acute regulatory protein (StAR), cytochrome P450 side chain cleavage (CYP11A1) and 17 α -hydroxylase/17,20-lyase (CYP17) ($P = 0.014$, $P = 0.014$, $P = 0.05$, respectively) in the zF compared to the zG. The zF-specific presence of CYP17 was also demonstrated by immunohistochemistry. No significant difference ($P = 0.62$) in the mRNA relative expression of CYP11B2 mentioned in the database was found, and southern blot analysis showed that the non-sequenced gap does not contain another CYP11B gene.

We conclude that there is only one functional CYP11B enzyme in canine adrenals. The zone-specific production of aldosterone and cortisol is probably due to zone-specific CYP17 expression. Its presence in the zF is crucial for cortisol synthesis, while lack of CYP17 in the zG conducts steroidogenesis to mineralocorticoid production. This is the first report providing insights in one of the most important physiological mechanisms of the canine adrenal cortex, its zone-dependent steroidogenesis.

Disclosures: No disclosures to report.

ESVE-O-14

THE ROLE OF SONIC HEDGEHOG SIGNALING IN THE PATHOGENESIS OF CANINE CORTISOL-SECRETING ADRENOCORTICAL TUMORS. S. van Opstal, J.A. Mol, H.S. Kooistra, S. Galac. Utrecht University, Utrecht, The Netherlands

The pathogenesis of cortisol-secreting adrenocortical tumors (ATs) has become more clear recently. Mutations of the *GNAS* gene provide an explanation for ACTH-independent hormonal activity of ATs, but the autonomous growth remains greatly undisclosed. An approach to elucidate the proliferative capacity of ATs is to learn from the current understanding of adrenal growth biology. The Sonic Hedgehog (SHH) signaling pathway plays an essential role in the development of the adrenal gland and in regulating adrenocortical cell proliferation. The members of the SHH signaling pathway are present in progenitors of the steroidogenic cells of the normal adrenal gland and dysregulation of SHH signaling has been implicated in adrenal cancer in humans. We hypothesized that SHH signaling is also enhanced in canine ATs, predominantly in carcinomas.

We examined the relative expression of SHH pathway components (SHH, PTCH1, SMO, GLI1, GLI2 and GLI3) by RT-qPCR analysis in cortisol-secreting adenomas ($n = 15$) and carcinomas ($n = 21$) and normal canine adrenals ($n = 7$).

The relative expression of members of the SHH pathway was detected in both ATs and normal adrenal tissue. A significant ($P < 0.05$) lower mRNA expression of GLI3 was detected in carci-

nomas when compared to normal tissue. Amongst the other genes, no significant differences were found. Since *GLI3* is mainly a repressor of genes activated by the SHH pathway, a down regulation of *GLI3* in carcinomas could point to enhanced SHH signaling in adrenocortical carcinomas and could theoretically be responsible for their expansive growth. In conclusion, dysregulation of SHH pathway might be involved in the pathogenesis of canine cortisol-secreting carcinomas. Modulating SHH expression might provide a new target therapy for adrenocortical carcinomas and will need to be explored in the future.

Disclosures: No disclosures to report.

ESVE-O-15

EVALUATING THE USE OF SERUM N-TERMINAL TYPE III PRO-COLLAGEN PROPEPTIDE IN THE DIAGNOSIS AND MANAGEMENT OF FELINE HYPERSOMATOTROPISM. S.V. Keyte, Y. Forcada, P. Kenny, D.B. Church, S.J.M. Niessen. Royal Veterinary College, North Mymms, UK

Feline hypersomatotropism (acromegaly) has been suggested to be an underdiagnosed endocrinopathy among diabetic cats. Treatment options include management of the secondary diabetes mellitus alone, medical pituitary inhibition, radiotherapy (RT) and hypophysectomy (HPX). Tools to diagnose the disease and monitor treatment effect are limited, with insulin-like growth factor-1 (IGF-1) currently being the only easily accessible blood test. Serum IGF-1 has previously been shown to be insensitive when assessing RT effect. Development of additional serological diagnostic tools that can be measured alongside serum IGF-1 is therefore desirable. A pilot study previously validated an N-terminal type III pro-collagen propeptide (PIIINP) ELISA for use in cats and found this peripheral biomarker of collagen turnover to be significantly elevated in a small number of hypersomatotropic diabetic (HSDM) cats. This study therefore aimed to: 1. further evaluate the use of serum PIIINP to differentiate HSDM from DM; and 2. to evaluate PIIINP as a marker for treatment success.

PIIINP concentrations were measured in 30 cats with uncomplicated diabetes mellitus (DM) (IGF-1 <600 ng/mL [radioimmunoassay], <1.5µg/kg/injection exogenous insulin requirement) and 30 with confirmed HSDM (IGF-1 >1000 ng/mL, pituitary mass on computed tomography) using the previously validated ELISA. Additionally, PIIINP and IGF-1 were measured in pre- and post-treatment (1–18 months) samples of HSDM cats that responded favourably (decreased insulin requirement) to radiotherapy (RT; n = 5) or hypophysectomy (HP; n = 9, of which 8 had achieved diabetic remission at time of sampling).

Serum PIIINP concentrations were significantly higher in HSDM cats (median 19.77 ng/mL; range: 1.69–27.93) compared to DM cats (median 5.03 ng/mL; 2.07–10.44; $P < 0.001$, Mann Whitney U-test). Receiver-operator-curve-analysis revealed a 10.5 ng/mL cut-off to differentiate between DM and HSDM cats with 87% sensitivity and 100% specificity (AUC: 0.91; 95% confidence interval: 0.82–1.0). After RT, PIIINP increased significantly (median pre-RT 13.53 ng/mL, 10.52–19.77; post-RT 14.96 ng/mL, 12.69–21.51; $P = 0.043$, Wilcoxon signed rank-test) despite absence of significant change in IGF-1 concentrations (median pre-RT 1915 ng/mL, 1087–2000; post-RT 1263 ng/mL, 645–2000; $P = 0.068$, Wilcoxon signed rank-test). Following HPX, serum PIIINP concentrations did not change significantly (median pre-HPX 20.5 ng/mL, 14.59–27.93; post-HPX 18.87 ng/mL, 8.7–28.43; $P = 0.441$, Wilcoxon signed rank-test) despite significant serum IGF-1 decreases (median pre-HPX 1875 ng/mL, 590–2000; post-HPX 44 ng/mL, 15–1819; $P = 0.008$, Wilcoxon signed rank-test).

In conclusion, serum PIIINP concentration was confirmed to be a useful additional parameter when differentiating HSDM from DM in cats. However, the current data do not suggest PIIINP to be a reliable marker of treatment success following RT or HPX.

Disclosures: No disclosures to report.

ESVIM-O-1

FLOW CYTOMETRIC CHARACTERISATION OF LYMPHOCYTE POPULATIONS IN DOGS WITH IMMUNE-MEDIATED HAEMOLYTIC ANAEMIA. J. Swann, J. Wu, B. Glanemann, O. Garden. Royal Veterinary College, Hatfield, UK

Decreased frequency and function of peripheral regulatory T cells (Tregs) have been documented in people with immune-mediated haemolytic anaemia (IMHA), suggesting that defects in peripheral tolerance may play a role in the pathogenesis of this disease. The aim of the current study was to test the hypothesis that the frequency of peripheral Tregs is decreased in dogs with primary IMHA, accompanied by increases in T helper (Th) cells, cytotoxic T (Tc) cells and B cells.

Residual EDTA-anticoagulated blood samples were obtained from dogs with primary IMHA (n = 11), dogs with inflammatory diseases (n = 10) and healthy dogs (n = 12). Primary IMHA was diagnosed in dogs with regenerative anaemia (packed cell volume [PCV] <35%) and either persistent agglutination of erythrocytes after saline dilution or detection of spherocytosis on a fresh blood smear. The study was approved by an institutional ethics and welfare committee.

After erythrocyte lysis, peripheral blood mononuclear cells were stained with fluorophore-conjugated antibodies specific for extracellular (CD4, CD5, CD8) and intracellular (CD79b, FoxP3) antigens. Multicolour flow cytometry was undertaken to determine the proportion of lymphocytes that were B cells (CD79b^{hi}), Th cells (CD5^{hi}CD4⁺), Tc cells (CD5^{hi}CD8⁺) and Tregs (CD5^{hi}CD4⁺FoxP3⁺); the Kruskal-Wallis test was used to compare proportions between groups. Correlations between the proportions of Tregs and PCV and serum total bilirubin concentration (TBil) in dogs with IMHA at presentation were assessed using Spearman's rho coefficients.

The median proportion of CD4⁺ T cells that expressed FoxP3 was 4.29% (inter-quartile range [IQR]: 1.55–5.56) in dogs with IMHA, 2.72% (IQR: 2.38–4.21) in dogs with inflammatory diseases and 5.1% (IQR: 4.10–6.81) in healthy dogs, with no difference between groups ($P = 0.120$). There was no difference in proportions of T cells that were CD4⁺ ($P = 0.517$) or CD8⁺ ($P = 0.332$) between groups, nor in the proportion of B cells ($P = 0.801$). The proportion of CD5^{hi}CD4⁺FoxP3⁺ Tregs was positively correlated with TBil in dogs with IMHA (Spearman's rho 0.686, $P = 0.041$), but not PCV (rho -0.613, $P = 0.079$).

Though limited by its size, the results of this pilot study suggest that the frequency of Tregs is not decreased in dogs with IMHA; proportions of Th, Tc and B cells were also comparable to those in control dogs. Further work is required to determine whether the function of Tregs is altered, or whether other defects in peripheral tolerance contribute to development of this disease.

Disclosures: No disclosures to report.

ESVIM-O-2

NATURALLY OCCURRING ANTIBODIES AGAINST CANINE RED BLOOD CELL ANTIGENS IN CATS AND FELINE RED BLOOD CELL ANTIGENS IN DOGS. V. Priolo, M. Masucci, L. Gulotta, M.G. Pennisi. Università di Messina, Messina, Italy

Xenotransfusion of canine blood to cats may be a life-saving procedure when treating an acute anaemic syndrome and compatible feline blood cannot be obtained. Published evidence in a limited number of cases dating from the 1960s indicates that cats do not appear to have naturally-occurring antibodies against canine red blood cell antigens. In fact compatibility tests before the first transfusion did not demonstrate evidence of agglutination or haemolysis of canine erythrocytes in feline serum and no severe acute adverse reactions have been reported in cats receiving a single transfusion with canine blood. Severe acute reactions not reported so far cannot however be excluded and we decided to perform a pilot study to evaluate the presence of naturally occurring antibodies against canine red blood cell antigens in cats and viceversa. Surplus material from diagnostic samples (blood EDTA and blood serum samples) of 13 cats and 24 dogs was used to perform test-tube major and minor cross-match tests (at 37 °C, 4 °C and room temperature (RT)) and blood typing, after obtaining the informed consent from owners. Hemolysis, macro- and micro-ag-

glutination were investigated in each test tube and were considered markers of a positive matching. Blood from each cat was tested with blood from 2 to 6 different dogs for a total of 49 major and minor cross-matchings each one performed at the 3 different temperatures of incubation. Thirty-eight overall major cross-matchings proved positive at 37 °C, 33 at RT and 39 at 4 °C respectively. The minor cross-matching was positive in all but 2 tests performed at 37 °C. No cat tested totally negative (37 °C, 4 °C, RT) at both major and minor cross-matching procedures performed towards any single dog. Ten cats experienced positive major and minor cross-matching at 37 °C, RT and 4 °C towards 1–3 different dogs. Five cats were positive in the major cross-match, at least at 37 °C, towards 1–3 different different dogs. Seven cats obtained a positive major cross-match at RT and/or at 4 °C towards 1–5 dogs. Only 2 cats tested completely negative at 37 °C, RT and 4 °C, in one out of the 4 different major cross-matchings performed. In conclusion, naturally occurring antibodies against canine red blood cell antigens appear to be frequently detected in cats as well as those against feline red blood cell antigens in dogs. Xenotransfusion of canine blood to cats should only be performed after the selection of a compatible donor by means of at least a negative major cross-match test result.

Disclosures: No disclosures to report.

ESVIM-O-3

RABBIT ANTI-DOG THYMOCYTE SERUM AS PART OF AN IMMUNOSUPPRESSIVE REGIMEN IN TREATING HEMATOLOGICAL IMMUNE-MEDIATED DISEASES: A RETROSPECTIVE STUDY. B. Cug, S.L. Blois, K.A. Mathews. Ontario Veterinary College, Guelph, ON, Canada

Anti-thymocyte serum (ATS), a potent immunosuppressive agent, is commonly used perioperatively in human patients to increase graft survival and decrease rejection of transplanted tissue. ATS has been reported as part of an immunosuppressive protocol to treat immune-mediated diseases including aplastic anemia and myelodysplastic syndromes (MDS). Rabbit anti-dog thymocyte serum (RADTS) has been used in veterinary medicine for perioperative immunosuppression in canine renal transplants. However, there are no reports regarding the use of RADTS in the treatment of dogs with immune-mediated disorders.

The medical records of 5 dogs diagnosed with IMHA, 3 dogs with ITP and 1 dog with MDS were reviewed. Median age was 6.3 years (8.5 months to 11 years). All dogs failed to respond to traditional immunosuppressive therapy and received RADTS. None of the dogs experienced any adverse reaction. Lymphocyte counts were used to monitor the response to therapy. All dogs, except 1, had a significant decrease in their lymphocyte count; 6/9 had a decrease to <10% of the initial lymphocyte count, which was the aim in previous studies on RADTS. All dogs were discharged, however, the same dog with no changes in his lymphocyte count experienced a relapse of his IMHA after 1 week and was euthanized. All other cases achieved clinical remission with immunosuppressants being tapered or discontinued. RADTS appeared to be a safe immunosuppressant agent of interest in refractory immune mediated diseases.

Disclosures: No disclosures to report.

ESVIM-O-4

DETECTION OF ANTI-ASPERGILLUS IMMUNOGLOBULIN A IN CATS WITH UPPER RESPIRATORY TRACT ASPERGILLOSIS. A.J. Taylor. University of Sydney, Sydney, NSW, Australia

In cats with upper respiratory tract aspergillosis (URTA), invasive disease is common. In other species, invasive mycoses are associated with immunodeficiency. Characterisation of the humoral immune response in feline URTA serves to identify whether selective immunodeficiency underlies susceptibility and to determine the utility of class-specific antibody detection for early diagnosis. We have shown that serum anti-*Aspergillus* IgG has high sensitivity and specificity for diagnosis.

The aims of the study were to (1) determine whether serum anti-*Aspergillus* IgA can be detected in cats with URTA, and (2) evaluate the sensitivity and specificity of IgA detection for diagnosis.

Sera were collected from 3 groups of cats; Group 1 - confirmed URTA (n = 23), Group 2 - upper respiratory disease without aspergillosis (n = 25), Group 3 - healthy cats (n = 36) and cats with non-fungal, non-respiratory illness (n = 48). An indirect ELISA to detect anti-*Aspergillus* IgA was developed. Inter-assay and intra-assay coefficients of variation were 4.50% and 6.17%, respectively.

Serum IgA was detected in 91.3%, 44% and 50% of Group 1, 2, and 3 cats, respectively. Using an optimal ELISA cut-off value for diagnosis (71.9 ELISA Units/mL), determined by receiver-operating curve analysis, assay sensitivity for Group 1 cats was 78.3%. Specificity was highest (96.0%) when Group 2 was used as the control, compared to Group 3 (85.7%) or Group 2 and 3 combined (88.1%).

We found no evidence of a role for primary IgA deficiency in the pathogenesis of feline URTA. Serum anti-*Aspergillus* IgA detection has moderate sensitivity and moderate specificity for diagnosis of URTA.

Disclosures: There is no conflict of interest.

The study was partially funded by a Australian companion animal health foundation grant 2014.

ESVIM-O-5

COMPARISON OF TWO NON-INVASIVE 2% ENILCONAZOLE INFUSION PROTOCOLS FOR TREATMENT OF CANINE SINONASAL ASPERGILLOSIS AND IMPORTANCE OF DEBRIDEMENT FOR TREATMENT EFFICACY. M. Girod, D. Goosens, R. Volpe, C. Clercx, F. Billen. University of Liege, Liege, Belgium

Non-invasive topical infusion therapies are widely used in canine sinonasal aspergillosis (SNA) but are time-consuming and associated with prolonged recovery and increased costs. Therefore, the main goal of the present study was to compare the efficacy of a simplified infusion protocol (D15E) with a 1-hour infusion protocol (D60EB). D60EB consisted in endoscopic debridement followed by 60 minutes 2% enilconazole infusion and 1% bifonazole cream depot into the affected frontal sinus through endoscopically placed catheter. For D15E protocol, after debridement, enilconazole infusion was shortened to 15 minutes, with the dog remaining in dorsal recumbency, head flexed at 90 °, during the whole procedure. Adjunctive oral itraconazole therapy was prescribed in both protocols.

Effective debridement of fungal plaques is considered as an essential therapeutic step. Unfortunately, it is not always possible to achieve perfect debridement of the sinonasal cavities, due to incomplete accessibility of the whole sinusal area with the endoscope; however, its effect has never been assessed as such. Therefore, the second aim of this study was to evaluate the effectiveness of debridement on success rate after the first treatment.

Fisher's exact test was used to assess the difference in success rate between both protocols and in function of full debridement.

Twenty-eight dogs with SNA were treated with D15E and 25 dogs with D60EB. The median (range) duration of D15E was only 92 minutes (40–140) compared to 176 minutes (135–225) for D60EB. First treatment success rate did not differ between both protocols and were 68% for D15E and 60% for D60EB. Both protocols had an overall success rate of 96% after 2 procedures. In contrast to the majority of dogs with D60EB, all dogs receiving D15E recovered quickly and were discharged the same day.

Completeness of debridement was assessed endoscopically in 48 dogs (28 treated with D15E and 20 with D60EB). Debridement was judged complete in 28/48 dogs and had a significant effect on first treatment success rate ($P = 0.01$). When debridement was complete, 79% of the dogs (D15E: 15/19 dogs; D60EB: 7/9 dogs) were cured after the first procedure, compared to 40% (D15E: 4/9 dogs; D60EB: 4/11 dogs) of the dogs with incomplete debridement.

We concluded that (1) the simplified infusion protocol is quick, safe, easy and effective, and offers a favourable alternative to 1-hour infusion protocols for treatment of canine SNA; (2) completeness of the debridement undoubtedly is an important step for treatment success of infusion protocols.

Disclosures: No disclosures to report.

ESVIM-O-6

ENDOSCOPIC INVESTIGATION OF THE GASTROESOPHAGEAL JUNCTION DYNAMICS IN DOGS WITH BRACHYCEPHALIC SYNDROME. E. Vangrinsven, O. Broux, S. Claeys, C. Clercx, F. Billen. University of Liège, Liège, Belgium

Gastroesophageal (GE) symptoms are commonly reported in dogs with brachycephalic upper airway obstructive syndrome (BS). Since GE symptoms frequently occur during situations of increased inspiratory effort (excitement, respiratory distress), dynamic disorders of the GE junction (GEJ) are probably involved, due to transient increased negative intrathoracic pressure. However, according to a previous study, only few dynamic abnormalities of the GEJ are observed during gastroscopy. We hypothesized that both anaesthesia and endotracheal intubation during gastroscopy lead to underestimation of GEJ abnormalities.

The aim of this study was to improve detection of dynamic GEJ abnormalities during gastroscopy using obstructive manoeuvres mimicking and reproducing upper airway obstruction of variable severity.

Twenty-six dogs presented with BS were prospectively included. Respiratory and digestive symptoms as well as endoscopic abnormalities were scored at initial diagnosis and at control 1 month after surgery. During each endoscopy, GEJ was assessed and scored (based on esophagitis, GEJ atony, GE reflux, cranial displacement of the GEJ) in the 3 consecutive situations: (1) absence of obstruction with the dog intubated (Ob-0), (2) presence of natural obstruction with the dog extubated (Ob-Nat) and (3) during complete manual obstruction of the endotracheal tube during up to 3 spontaneous breathings (Ob-Compl).

Spearman's rank test was used to assess correlations between the different clinical and endoscopic scores.

Taking all endoscopic procedures together, the severity of respiratory symptoms correlated significantly with the severity of respiratory endoscopic abnormalities ($P < 0.001$, $r = 0.6$) and the severity of digestive symptoms ($P = 0.039$, $r = 0.24$). At diagnosis, 23 dogs (89%) presented digestive symptoms while endoscopic GEJ abnormalities were observed in 17 (65%), 24 (92%) and 26 (100%) dogs during Ob-0, Ob-Nat and Ob-Compl respectively. GEJ atony, GE reflux, cranial displacement of the GEJ and sliding hiatal hernia were present in 9 (34.6%), 2 (7.7%), 9 (34.6%) and 0 dogs during Ob-0, in 19 (73.1%), 5 (19.2%), 23 (88.5%) and 4 (15.5%) dogs during Ob-Nat and in 21 (80.8%), 6 (23.1%), 26 (100%) and 10 (38.5%) dogs during Ob-Compl, respectively. A significant correlation was found between digestive and endoscopic GEJ scores during Ob-Compl ($r = 0.55$, $P = 0.003$) as well as during Ob-Nat ($r = 0.41$, $P = 0.03$) but not during Ob-0.

It can be concluded that in dogs with BS (1) GEJ abnormalities are dynamic and related to the degree of upper airway obstruction; (2) the use of obstructive manoeuvres during gastroscopy improves the detection of GEJ abnormalities.

Disclosures: No disclosures to report.

ESVIM-O-7

TRACHEOBRONCHIAL FOREIGN-BODIES IN CATS: A RETROSPECTIVE STUDY OF 12 CASES. R.O. Leal¹, Y. Bongrand², J. Gallay Lepoutre³, J. Hernandez¹. ¹Centre Hospitalier Vétérinaire Fregis, Arcueil, France, ²Clinique Vétérinaire Alliance, Bordeaux, France, ³Clinique Vétérinaire Olliolis, Ollioules, France

Tracheobronchial foreign bodies are common causes of respiratory disease in children but they are rare in veterinary medicine. Particularly in cats, reports of tracheobronchial foreign bodies are scarce. This study aimed to describe clinical presentation, diagnostic findings and treatment modalities in confirmed cases of tracheobronchial foreign bodies in cats. We hypothesize that bronchoscopy is highly effective in their extraction in cats.

Cases of confirmed tracheobronchial foreign bodies in cats admitted to 3 referral centers in France, from May 2009 to November 2014, were included. Files were retrospectively analyzed for age, sex, breed, clinical signs, delay between onset of signs and presentation, diagnostic procedure, method of extraction, location and nature of foreign bodies.

Twelve cats were included (6 males, 6 females). Mean age at presentation was 4 years old (3.75 years \pm 2.5). Cough was the main chief-complaint, being present in 9/12 (75%) cats. While 4/12

(33%) cats presented to consultation in the first week after the beginning of respiratory signs, 8/12 (67%) cats exhibited clinical signs for more than 1 week. Chest radiographs were done in 12/12 cats. Bronchoscopy was performed in 12/12 cats, confirming the presence of foreign body material and allowing their extraction in 10/12 animals (83%). In 2/12 cats (17%), bronchoscopic extraction was unsuccessful and a pulmonary lobectomy was required. The foreign body was located in the trachea in 6/12 cats (50%) and in the bronchial tree in the remaining 6 cats (4/6 in the right caudal bronchus, 1/6 in the left caudal bronchus and 1/6 in the main left bronchus). 7/12 (58%) were vegetal foreign bodies (grain seeds and foxtail awns), 3/12 (25%) were mineral (a bone fragment, a teeth and a small stone) and 2/12 (17%) of undetermined origin. All the mineral foreign bodies were extracted from the trachea, whilst the majority of the vegetal ones (5/7 - 71%) were removed from the bronchial tree.

In this case series, bronchial foreign bodies were as frequent as tracheal foreign bodies in cats. This finding differs from previous data reporting that trachea is the preferential location for feline respiratory foreign bodies. Vegetal foreign bodies are more common. Due to their nature and shape, they may be more prone to lodge in the bronchial tree, while mineral foreign bodies remain in the trachea.

According to our results, bronchoscopy is highly effective for identification and extraction of tracheobronchial foreign bodies in cats.

Disclosures: No disclosures to report.

ESVIM-O-8

COMPARISON OF MYCOPHENOLIC ACID METABOLISM BY CAT, DOG, AND HUMAN LIVER MICROSOMES. J.E. Slovak, N. Villarino, K. Mealey, M.H. Court. Washington State University College of Veterinary Medicine, Pullman, WA, USA

Mycophenolate mofetil is the prodrug of mycophenolic acid (MPA). It is a selective non-competitive inhibitor of inosine-5'-monophosphate dehydrogenase, which is expressed in many cell types. MPA's ability to induce lymphocyte cytotoxicity, reduce monocyte recruitment, and suppress dendritic cell maturation, are useful targets in treating immune mediated and inflammatory diseases. It has been used extensively in human medicine for transplant recipients and more recently in veterinary medicine in dogs with various immune mediated diseases. However, its use in cats is limited in part because MPA is primarily metabolized by glucuronidation and cats inherently have a decreased ability to glucuronidate many drugs. We proposed that cats may glucuronidate MPA more slowly than humans and dogs and conducted a series of in vitro studies to explore this hypothesis.

We used liver microsomes from cats (16 individual and pooled), dogs (pooled), and humans (pooled). These liver samples were incubated at 37 °C in a water bath with MPA and UDP-glucuronic acid or UDP-glucose. UDP-glucose was studied since MPA glucoside is a minor metabolite in humans but may be a major metabolite in other species. HPLC-MS was used to determine concentrations of MPA-glucuronide (phenol and acyl) and MPA-glucoside (phenol) formed by incubation.

Cats formed much less MPA phenol glucuronide (0.7 nmoles/min/mg) than dogs (2.2 nmoles/min/mg), or humans (3.7 nmoles/min/mg). Cats formed similar amounts of MPA acyl glucuronide (0.3 nmoles/min/mg) than humans (0.3 nmoles/min/mg), but less than dogs (0.9 nmoles/min/mg). In contrast, cats (0.5 nmoles/min/mg) formed more MPA phenol glucoside than humans (0.3 nmoles/min/mg) but less than dogs (1.3 nmoles/min/mg). When the 3 pathways of metabolism were summed for each species, cats (1 nmoles/min/mg) metabolized MPA much less efficiently than dogs (3 nmoles/min/mg) or humans (4 nmoles/min/mg). Variability in metabolite formation between the 16 individual cats was high ranging from 6 fold for MPA glucoside, to 8 fold for MPA phenol glucuronide, to 14 fold for MPA acyl glucuronide.

Our preliminary results confirm that cats glucuronidate MPA less rapidly than dogs and humans, however cats and dogs were found to glucuronidate MPA more efficiently than humans. In addition, individual cats are variable in their ability to glucuronidate and glucosidate MPA. This preliminary in vitro data will be compared to in vivo studies of MPA pharmacokinetics to elucidate proper dosing of MPA in cats.

Disclosures: No disclosures to report.

ESVNU-O-2

EVALUATION OF DIFFERENT SAMPLING METHODS AND CRITERIA FOR DIAGNOSING CANINE URINARY TRACT INFECTION BY QUANTITATIVE BACTERIAL CULTURE. T.M. Soerensen¹, A.B. Jensen², P.P. Damborg¹, L. Guardabassi¹, L.R. Jessen¹. ¹University of Copenhagen, Frederiksberg C, Denmark, ²Nordfyns Dyreklinik, Otterup, Denmark

Cystocentesis is the gold standard sampling method for urine microbiology in dogs, as voided samples are associated with a higher risk of contamination. However, the accuracy of the veterinary cut-off values currently recommended for detection of clinically significant bacteriuria in voided urine has been poorly investigated.

The aim of this study was to evaluate the accuracy of veterinary and human criteria for diagnosis of urinary tract infection (UTI) in dogs using voided urine samples.

Dogs with suspected UTI were prospectively enrolled. Paired urine samples collected by cystocentesis and voiding, respectively, were stored at 5°C and cultured within 4 hours. Bacterial counts in voided urine were interpreted using both the veterinary ($\geq 100,000$ colony forming units (CFU) per mL) and the human ($\geq 1,000$ CFU/mL plus presence of clinical signs) criteria for diagnosing UTI, and compared to those obtained in urine collected by cystocentesis (gold standard). Significant bacteriuria in cystocentesis samples was defined as $\geq 1,000$ CFU/mL.

Sixty-five dogs were included in the study. When applying the veterinary criteria for diagnosing UTI in voided samples, the diagnostic accuracy was 97% (sensitivity 100%, specificity 96%, positive predictive value (PPV) 90% and negative predictive value (NPV) 100%). When applying the human criteria the accuracy fell to 75% (sensitivity 68%, specificity 78%, PPV 57% and NPV 86%).

The results indicate that, in most dogs with suspected UTI, an accurate diagnosis can be obtained using voided urine, if applying the current veterinary cut-off values to samples stored at refrigeration temperature and cultured shortly after collection.

Disclosures: The study was supported financially by the UC-CARE research centre, University of Copenhagen, and 2 minor external foundations.

ESVNU-O-3

EVOLUTION OF UROPATHOGENS ANTIMICROBIAL RESISTANCE IN A FRENCH VETERINARY TEACHING HOSPITAL: A 10-YEAR RETROSPECTIVE STUDY. J. Dahan¹, M.L. Théron¹, S. Benmaadi¹, T. Perrin¹, G. Rivière¹, L. Vazquez¹, B. Fontenel², D. Concordet¹, R. Lavoué¹. ¹National Veterinary School of Toulouse, Toulouse, France, ²Biolab Avenir, Toulouse, France

Antimicrobial resistance (AMR) is a major public health concern and will likely be the first cause of mortality in human medicine in 2050. Canine bacterial urinary infection is a frequent condition and might be implicated in interspecies transmission of resistance mechanisms. This study aimed to retrospectively describe the evolution of the AMR of uropathogens over a 10-year period in a Veterinary Teaching Hospital.

Positive urinary cultures obtained by cystocentesis (>1000 CFU/mL) from dogs treated at the National Veterinary School of Toulouse (ENVT) between 2005 and 2014, were reviewed. Annual prevalence of AMR for several Enterobacteriaceae, Staphylococcus spp, Enterococcus spp and Streptococcus spp were recorded for various veterinary and human antimicrobials. Frequency of Extended Spectrum Beta-Lactamase-producing Enterobacteriaceae (ESBL) and multidrug resistant (MDR) bacteria were noted. Logistic regression was performed to analyze the evolution of AMRs. A *P*-value <0.5 was considered significant.

Over the study period, 751 isolates with stable annual distribution were identified. Considering Enterobacteriaceae, AMR for several antimicrobials significantly evolved over time: despite a possible increase in 2014 for some antimicrobials, a general decrease of AMR was observed. Prevalence of ESBL and MDR bacteria remained stable with mean prevalence of 5% and 26%, respectively.

Trends of AMR of Enterobacteriaceae over the study period in ENVT are not in accordance with the worrisome general tendency

and could be consistent with a rationalized antimicrobials use. However, the persistently elevated prevalence of ESBL and MDR bacteria, and the possible increase of AMR during the last studied year warrant further investigation and surveillance.

Disclosures: No disclosures to report.

ESVNU-O-4

MAJOR INTERNATIONAL HIGH-RISK RESISTANT HUMAN KLEBSIELLA PNEUMONIAE LINEAGES ARE CAUSING URINARY TRACT INFECTIONS IN COMPANION ANIMALS. C. Marques¹, J. Menezes¹, G. Trigueiro², A. Belas¹, M. Coelho³, V. Pereira², C. Pomba¹. ¹Faculty of Veterinary Medicine, University of Lisbon, Lisbon, Portugal, ²Laboratório de Análises Clínicas Dr. Joaquim Chaves, Lisbon, Portugal, ³Vet-inLab, Lisbon, Portugal

Klebsiella pneumoniae are important pathogens that cause urinary tract infections (UTI). Antibiotic-resistant and virulent bacterial clones with high interhost transmission may play an important role in the spread of antimicrobial resistance. This study aimed to characterize the antimicrobial resistance and virulence of clinal *Klebsiella* isolated from animals and humans with UTI and to determine the lineages of companion animal *Klebsiella pneumoniae* resistant to third-generation cephalosporins (3GC).

Thirty-five companion animal clinical *Klebsiella* spp., obtained between 2002 and January 2015, and 61 human clinical strains isolated in 2014 were included. Antimicrobial susceptibility testing was performed using disk diffusion and CLSI breakpoints were applied. Extended-spectrum β -lactamases (ESBL) and plasmid-mediated AmpC genes were detected by PCR whenever resistance to 3GC was detected. Furthermore, 3GC-resistant *Klebsiella* were characterized by multi-locus sequence typing. Regarding virulence, PCR for detection of *fimH* (adhesin type-1 fimbriae), *mrkD* (adhesin type-3 fimbriae), *entB* (enterobactin), *Ybts* (yersiniabactin) and *rpmA* (regulator of mucoid phenotype-A) genes was conducted on 27 and 61 companion animal and human strains, respectively.

K. pneumoniae was the main species isolated in companion animals (85.7% N = 30/35) and in humans (98.4%, N = 60/61) but *Klebsiella oxytoca* was also identified. Resistance to 3GC (cefotaxime or ceftazidime) was present in 51.4% (n = 18/35) and 21.3% (n = 13/61) of companion animal and human strains, respectively. Overall, 3CG-resistant *K. pneumoniae* were found to be CTX-M group-1 (88.9%, n = 24/27), CMY (11.1%, n = 3/27) and DHA (3.7%, n = 1/27) producers. Both companion animal *K. oxytoca* were DHA producers. Companion animal 3CG resistant *Klebsiella* were frequently (66.7%, n = 12/18) co-resistant to fluoroquinolones and trimethoprim/sulphamethoxazole rendering them as multidrug resistant. Moreover most companion animal 3CG resistant strains were also resistant/intermediate to amoxicillin/clavulanate (83.3%, n = 15/18). Overall, companion animal *Klebsiella* resistance to amoxicillin/clavulanate (40.0%, n = 14/35), fluoroquinolones (65.7%, n = 23/35) and trimethoprim/sulphamethoxazole (58.8%, n = 20/34) was high. Companion animal *K. pneumoniae* resistant to 3GC belonged to ST15 (n = 10), ST348 (n = 1), ST147 (n = 1) and ST11 (n = 1) lineages.

Concerning virulence, all *K. pneumoniae* were positive for *fimH*, *mrkD* and *entB*. Yersiniabactin was present in 16.0% (n = 4/25) and 43.3% (n = 26/60) of companion animal and human *K. pneumoniae*, respectively. *K. oxytoca* (n = 3) were positive for *entB* and *Ybts*. All tested strains were negative for *rpmA*.

The detection of *K. pneumoniae* lineages highly important for humans in companion animals with UTI raises great concerns regarding their role as reservoirs. Moreover, the fact they were also found to share 3GC resistance genes and common virulence factors with humans further extends the risk of transfer.

Disclosures: Conflicts of interest: The first author currently receives a PhD grant funded by the Portuguese Foundation for Science and Technology.

ESVNU-O-5

IN VITRO DISSOLUTION OF FELINE STRUVITE STONES WITH 2 DIETS SHOWING DIFFERENT RELATIVE SUPERSATURATION VALUES. E.M. Sagols, C. Cuchet-Subsol, H. Billy, A. Feugier, Y. Quéau. Royal canin, Aimargues, France

Feline Lower Urinary Tract Disease (FLUTD) refers to a heterogeneous group of disorders with similar clinical signs. Some diets are designed to manage FLUTD by promoting struvite stone dissolution and addressing key risk factors (overweight, low water intake, stress...).

The goal of this study is to compare the struvite dissolution potential of 2 diets marketed for FLUTD, in standardized *in vitro* conditions.

Six adult healthy cats were fed successively 2 dry diets (A = Royal Canin S/O-Biopeptide; B = Hill's C/D-Urinary-Stress) for 12 days, with urine collection on the last 5 days. Urines collected for each diet were pooled and distributed in bottles containing the mean urine volume produced daily per cat. Urine pH and struvite relative supersaturation (RSS) were measured for each pool.

Two feline struvite uroliths homogenous in shape and weight were immersed separately in a urine bottle of each diet, and put in a stove at 38 °C. Twenty-four hours later, the urine was filtered to collect the stones, which were dried and weighed. Every day, the stones were placed in new bottles of the corresponding urine until the first complete stone dissolution.

Diet effect on urine pH, volume and RSS was analysed non parametrically (Wilcoxon paired rank test). Diet effect was combined with a period effect (period = 5 days dissolution), in a 2 × 5 complete factorial design to analyse struvite stones weight evolution at each period for each diet (mixed model with diet, period, diet x period as fixed effects). FDR method was applied to compare diets at each period.

Diet A induced a higher mean urine volume (14.2 versus 10.2 mL/kg/day), and a lower RSS than diet B (0.15 versus 0.81) ($P < 0.05$). The urine pH of the 2 diets were not significantly different (6.06 and 6.13) ($P > 0.05$).

After 25 days, the struvite stone immersed in urine from diet A was totally dissolved, versus 62% dissolution for the stone in urine from diet B. When considering periods of 5 days, the struvite weight diminution was significantly higher when struvite stone was immersed in urine from diet A than from diet B (diet effect: $P < 0.001$). The interaction between diet and period effect revealed that the difference in dissolution rate between the 2 diets was significant as soon as the first 5 day period ($P < 0.01$), and increased over the other periods ($P < 0.001$).

A diet inducing a lower struvite RSS and a greater urine dilution allows faster struvite stone dissolution.

Disclosures: The author and co-authors work for Royal Canin, the company commercializing one of the diets evaluated.

ESVNU-O-6

EVALUATION OF CYSTATIN C FOR THE DETECTION OF CHRONIC KIDNEY DISEASE IN CATS. L.F.E. Ghys¹, D. Paepe¹, H.P. Lefebvre², B.S. Reynolds², S. Croubels¹, E. Meyer¹, J.R. Delanghe³, S. Daminet¹. ¹Faculty of Veterinary Medicine Ghent University, Merelbeke, Belgium, ²National Veterinary School of Toulouse, Toulouse, France, ³Faculty of Health Medicine and Life Sciences, Ghent University, Gent, Belgium

Serum cystatin C (sCysC) and urinary cystatin C (uCysC) are potential markers for detection of feline chronic kidney disease (CKD). Our aims were twofold. Firstly, we evaluated CysC as marker for CKD. We compared sCysC and uCysC between CKD and healthy cats, correlated sCysC and sCr with glomerular filtration rate (GFR) and calculated sensitivity, specificity for detecting decreased GFR. Secondly, we compared assay performance of the turbidimetric assay (PETIA) with the previously validated nephelometric assay (PENIA).

Forty-nine CKD (IRIS stage 1-4) and 41 healthy cats were included. GFR was measured with plasma exogenous creatinine (PECT), endo- (PenICT) and exo-iohexol (PexICT) clearance test in 17 CKD and 15 healthy cats. Based on PexICT, sCysC was evaluated to distinguish normal, borderline and low GFR. Sensi-

tivity and specificity to detect PexICT < 1.7 mL/min/kg were calculated. Validation of PETIA was performed and sCysC results of PENIA and PETIA were correlated with GFR. Statistical analysis was performed using general linear modelling.

Serum CysC and uCysC were significantly higher ($P < 0.001$) in CKD cats. However, uCysC was detected only in 35/49 CKD cats. R^2 values between GFR and sCr or sCysC were 0.71 and 0.39 respectively. Sensitivity and specificity were 22% and 100% for sCysC and 83% and 93% for sCr. Serum CysC could not distinguish healthy from CKD cats, nor normal from borderline or low GFR, in contrast to sCr. PENIA appeared superior to PETIA.

In conclusion, sCysC is not a reliable marker for GFR in cats and uCysC could not be detected in all CKD cats.

Disclosures: For this work support was received from the institute for the promotion of innovation by science and technology in Flanders (IWT) through a bursary to L.F.E. Ghys.

ESVNU-O-7

INCREASE OF CANINE SERUM CYSTATIN C PRODUCED BY ORAL ADMINISTRATION OF PREDNISONE. J. Muñoz, P. Soblechero, F.J. Duque, P. Ruiz, R. Barrera. University of Extremadura, Cáceres, Spain

Serum cystatin C (sCys C) is a marker of glomerular filtration rate with advantages over serum creatinine. In human medicine, some authors observed that sCys C is influenced by methylprednisolone or prednisone administration. With the aim to follow the course of this maker of renal function in acutely diseased patients with a receiving glucocorticoid medication, we followed at dog's whit steroid responsive meningitis.

The study was carried out on 30 patients that where divided in 3 groups: Control Group (10 clinical healthy dogs), Group B, 10 dogs treated with prednisone due to steroid responsive meningitis (treated with 4 mg/Kg prednisone during 7 days, followed to 2 mg/Kg prednisone for another 7 days). Dogs had no known pre-existing renal disease, and have no previous glucocorticoid medication. Group C was established to test the effects of endogenous steroids: 10 dogs with hyperadrenocorticism were evaluated. Serum Cys -C was measured by turbidimetric latex and creatinine by Jaffe reaction (Spinreac[®]) and were determined at time of diagnosis for group B, and on days 0,7 and 14 in the meningitis dogs. A statistically significant increase of sCys-C was observed in Group B, with doses of 2 mg/Kg of prednisone (0.18 ± 0.03 mg/L; $P < 0.01$), and doses of 4 mg/Kg of prednisone (0.28 ± 0.15 mg/L; $P < 0.001$) respect to these same dogs before treatment (0.05 ± 0.04 mg/L) and compared to the control group (0.07 ± 0.04 mg/L). However, the serum concentration observed in hyperadrenocorticism (0.09 ± 0.06 mg/L) was similar to the one find in the healthy animals Group. The creatinine concentration was not increased either, during the prednisone treatment, or in the case of hiperadrenocorticism. In conclusion, the present study agrees with that is described in human medicine, and confirms the effects of glucocorticoids on sCys C concentrations in dogs. The administration of high doses of prednisone is associated with a sCys C increase. On the other hand endogenous cortisol increase (hyperadrenocorticism) in dogs is not seen to modificate the sCys C.

Disclosures: No disclosures to report.

ESVNU-O-8

ASSOCIATION BETWEEN PLASMA PHOSPHATE CONCENTRATION AND SURVIVAL IN DOGS WITH CHRONIC KIDNEY DISEASE. J. Muñoz, M.C. Lucero, P. Ruiz, F.J. Duque, R. Barrera. University of Extremadura, Cáceres, Spain

Chronic kidney disease (CKD) produces progressive reduction in the number of functional nephrons and directly affects the homeostasis of the solutes excreted in the urine, including phosphorus. Hyperphosphatemia is considered a factor directly related to the increased mortality in humans, cats and dogs. In order to provide data from controlled clinical studies to examine the effects

of hyperphosphatemia on the progression and survival of naturally occurring canine CKD, the following study was conducted.

For the present study 85 dogs, which were followed up by the Veterinary Teaching Hospital of the University of Extremadura (Spain), were used for the study. Distributed in the following groups: Group I (25 healthy adult dogs) and Group II (60 adult dogs with CKD). This second group had a subclassification attending to different factors: Phosphatemia: IIa (20 dogs with phosphatemia < 5.5 mg/dl) and IIb (40 dogs with phosphatemia > 5.5 mg/dl). Leishmaniasis: IIc (20 dogs with CKD due to leishmaniasis) and IId (40 dogs with CKD not due to leishmaniasis). IRIS classification: IRIS1 (10 dogs), IRIS2 (10 dogs), IRIS3 (20 dogs) and IRIS4 (20 dogs).

The results of survival were as followed: IIa: 456.25 ± 316.10 days; IIb: 218.47 ± 89.27 days; IIc: 136.91 ± 231.87 days; IId: 106.49 ± 248.46 days; IRIS1: > 365 days; IRIS2: 430.68 ± 318.50 days; IRIS3: 226.76 ± 288.70 days; IRIS4: 10.50 ± 25.27 days; Statistically lower survival was found between the groups IIa and IIb ($P < 0.01$) also between the IRIS grades 2, 3 and 4 and the IRIS grade 1 ($P < 0.001$), IRIS 3 and 4 with IRIS 2 ($P < 0.001$) and IRIS 4 with IRIS 3 ($P < 0.001$). No significant differences between positive and negative leishmaniasis.

In conclusion, plasma phosphate concentration in dogs increases as chronic kidney disease develops. And an inverse relationship to survival in dogs with phosphorus concentrations above 5 mg/dl, and as it progresses the IRIS scale was observed.

Disclosures: No disclosures to report.

ESVNU-O-9

URINE PROTEIN: CREATININE RATIO (UPC) AND ITS RELATION TO NATURALLY OCCURRING PYURIA AND PLASMA ACUTE PHASE PROTEINS IN DOGS. S. Steinbach, D.P. Dahlem, R. Neiger. Justus-Liebig University, Giessen, Germany

Studies analyzing to which extent UPC in dogs is influenced by pyuria have yielded conflicting results. Moreover, there is no data on the effect of proteinuria on plasma acute phase proteins in dogs. In 315 dogs UPC was prospectively measured. UPC and if available, results of plasma biochemistry including measurement of C-reactive protein (CRP) from the same day were analyzed using the Mann-Whitney-U-Test. Samples without sediment analysis ($n = 7$) were excluded resulting in 308 urine samples for analysis. Hematuria (>5 erythrocytes/hpf), pyuria (>5 leucocytes/hpf), and bacteriuria were present in 86, 53 and 27 samples, respectively. UPC in samples with hematuria was significantly ($P = 0.001$) higher (median 0.32; 25th-75th percentile 0.13–1.76) compared to samples without hematuria (0.17; 0.1–0.64). In dogs with pyuria UPC was significantly ($P < 0.001$) higher (1.14; 0.19–1.96) compared to samples without pyuria (0.17; 0.1–0.62). 53% of the samples with pyuria had an UPC >1. This is in contrast to data reported previously where only 6% of pyuric urine samples had an UPC >1 (Vet Clin Path 2008;33:14). Bacteriuria did not influence UPC ($P = 0.26$). Samples of 3 dogs with negative protein dipstick results had an UPC >0.4 (0.42, 0.6, and 1.14, respectively). All 3 samples had low urine specific gravity (1.004–1.012) and alkaline pH. For a total of 155 samples corresponding plasma data on albumin (reference interval RI: 29.6–37.0 g/dL) and CRP (RI: 0–14.9 mg/L) were available. CRP was significantly ($P = 0.003$) higher in dogs with UPC >0.4 (5.0 mg/L; 1.7–54.3) compared to dogs with UPC ≤0.4 (2.4 mg/L; 0.7–7.0). Albumin was significantly ($P < 0.001$) lower (26.0 g/dL; 22.6–29.6) in dogs with UPC >0.4 compared to dogs with UPC ≤0.4 (29.4 g/dL; 26.5–31.7).

Naturally occurring pyuria has a more profound effect on UPC results than previously reported. Proteinuria is associated with changes of acute phase proteins such as hypoalbuminemia and increased CRP. Whether this is consequence or cause of the proteinuria needs further investigation. Furthermore, animals with low urine specific gravity may have clinically relevant proteinuria even in the light of a negative dipstick result. Therefore measurement of UPC is recommended to exclude renal protein loss in hypo- and isosthenuric dogs.

Disclosures: No disclosures to report.

ESVNU-O-10

THE EFFECT OF AMLODIPINE TREATMENT ON VASCULAR ENDOTHELIAL GROWTH FACTOR IN FELINE HYPERTENSIVE DISEASE. J. Elliott, E. Bijmans, R.E. Jepson, H.M. Syme. Royal Veterinary College, London, UK

High blood pressure causes an increase in vascular endothelial growth factor (VEGF) secretion. Feline hypertension is commonly associated with chronic kidney disease (CKD) Amlodipine is the first choice antihypertensive treatment in cats but could have a negative effect on the kidney by increasing glomerular pressure through afferent arteriolar dilatation. The aims of this study were to: (1) validate a method for the quantification of VEGF in feline serum samples; (2) assess the association between urinary VEGF, serum VEGF (sVEGF) and biochemical and clinical variables in hypertensive cats and (3) investigate changes in urinary VEGF with amlodipine treatment.

A randomised, double blinded, placebo controlled parallel group study ($n = 72$) was conducted in 2 phases to determine the efficacy and safety of amlodipine in cats with naturally occurring hypertension. The placebo group was crossed-over to amlodipine after day 28. A canine VEGF ELISA (previously validated for feline urine) was used to measure urine and serum VEGF. Urine VEGF concentration was normalised to urinary creatinine (urinary VEGF to creatinine ratio [UVC]). Univariable linear regression models, followed by a backwards multivariable linear regression model, were performed to identify independent predictors of sVEGF and UVC. A linear mixed measures model was used to compare the effect of placebo and amlodipine on UVC (28 days) and to investigate potential changes in UVC with long-term amlodipine treatment (90 days).

Intra-assay and inter-assay CV of sVEGF measurements were 0.52–2.79 ($n = 5$) and 5.67–11.05 ($n = 4$) respectively. Dilutional parallelism indicated a mean recovery of 98.8% ± 8.5% ($n = 4$). Urea and urine protein:creatinine (UPC) were independent negative and positive predictors of sVEGF respectively. Plasma creatinine was an independent negative predictor of UVC, UPC and sodium were independent positive predictors. No association was found between sVEGF and UVC. No significant changes in UVC or differences between groups were found with 28 days of amlodipine or placebo treatment. Mean UVC at screening was 0.403 and 0.441 µg/g after 90 days of amlodipine treatment ($P = 0.061$), both within the healthy cat reference range (0.171 to 0.682 µg/g).

The lack of correlation between urinary and serum VEGF suggests that UVC reflects renal VEGF production, and is possibly a biomarker of renal stress. UVC does not significantly change with amlodipine treatment suggesting that amlodipine may not cause renal stress when used in cats with hypertension and concurrent CKD.

Disclosures: This study was sponsored by Orion Inc. and CEVA Animal Health and used residual samples collected from animals involved in a clinical trial run by Orion Inc.

Jonathan Elliott provides consultancy advice to the following companies: Bayer Animal Health, CEVA Animal Health, Orion Inc., Elanco Animal Health, Zoetis Ltd, Boehringer Ingelheim, Vetoquinol Ltd., Waltham Centre for Pet Nutrition, Idexx Ltd.

The group is in receipt of research funding from the following companies: Novartis Animal Health, Royal Canin Ltd, Zoetis, CEVA Animal Health / Orion Inc.

Jonathan Elliott serves on the following advisory boards: International Renal Interest Society, European Emesis Council.

ESVONC-O-1

PROGNOSTIC SIGNIFICANCE OF MORPHOLOGICAL VARIANT OF CANINE DIFFUSE LARGE B-CELL LYMPHOMAS: A RETROSPECTIVE STUDY OF 49 CASES. D. Sayag¹, C. Fournel-Fleury², T. Marchal³, F. Ponce⁴. ¹Vetagro Sup - Campus Veterinaire de Lyon, Marcy l'etoile, France, ²Unité de Recherche ICE Cancerologie / Laboratoire de Pathologie Clinique, Marcy l'etoile, France, ³Unité de Recherche ICE Cancerologie, Marcy l'etoile, France, ⁴Clinical Oncology Unit / Unité de Recherche ICE Cancerologie, Marcy l'etoile, France

Diffuse large B-cell lymphoma (DLBCL) is the most frequent subtype of non-Hodgkin lymphomas in dogs. In humans, 3 common

morphological variants have been recognized by the World Health Organization (WHO) classification: centroblastic, immunoblastic and anaplastic. The WHO classification was recently adapted to canine lymphomas. However, no study clearly correlated prognosis to each morphological variant of canine DLBCL.

The objective of this retrospective study was to correlate morphological variants of DLBCL to prognosis, in dogs treated with a standardized chemotherapy protocol.

Medical records from dogs with a cytological diagnosis of DLBCL between 1999 and 2014 were retrospectively reviewed by a single boarded clinical pathologist. The centroblastic (DLBCL-CP) and immunoblastic morphotypes (DLBCL-IB) were defined as previously described. Anaplastic variant is very rare in dogs, and no case meeting all inclusion criteria were diagnosed during the study period. A fourth borderline morphological variant was identified and distinguished in this study for clinical considerations (immunoblasts rich centroblastics (DLBCL-IRC)). It was characterized by the presence of a higher number of immunoblasts compared to DLBCL-CP. Complete initial and follow-up clinical information and application of a standardized chemotherapy protocol were part of the main inclusion criteria. Statistical analysis was performed using Kaplan-Meier analysis.

Forty-nine dogs were included. Thirty-four (69.4%) were DLBCL-CP, 12 (24.5%) were DLBCL-IB and 3 (6.1%) were DLBCL-IRC. Median first remission duration for DLBCL-CP, DLBCL-IB, DLBCL-IRC were respectively 365 and 156.5 and 91 days ($P < 0.0001$). Median overall survival time for DLBCL-CP, DLBCL-IB, DLBCL-IRC were respectively 482, 259 and 344.5 days ($P = 0.06$). A significant shorter time to obtain complete remission ($P = 0.006$) and a significant longer duration of first remission ($P < 0.00001$) in dogs with DLBCL-CP in comparison to DLBCL-IB were observed when DLBCL-IRC were included in the DLBCL-IB group.

Interestingly for 2 cases, DLBCL-IRC variant was observed in peripheral lymph nodes whereas DLBCL-IB variant was observed in the spleen. Moreover, 1/4 recurrent DLBCL-CP and 2/3 of DLBCL-IRC displayed progression towards DLBCL-IB variant.

In conclusion, this study showed, for the first time, significant prognostic differences between the morphological variants of canine DLBCL, suggesting the prognostic impact of immunoblastic features as it is discussed in humans.

Disclosures: The residency program of David Sayag is supported in part by Zoetis.

ESVONC-O-2

CLINICAL PRESENTATION AND RESPONSE TO TREATMENT OF 63 CASES OF CANINE MULTICENTRIC B-CELL LYMPHOMA IN THE UK. O. Davies, A. Lara Garcia, A. Stell, A.J. Taylor, C. Leo. Royal Veterinary College, Hatfield, UK

Canine lymphoma is a heterogeneous group of diseases and evidence exists to describe different behaviours between B-cell and T-cell phenotypes of disease. This study aims to describe the response to treatment and survival of canine B-cell multicentric lymphoma (cBCL) cases treated at the Royal Veterinary College.

Signalment, clinical findings, staging, treatment, response and survival times were recorded retrospectively.

Sixty-three cases of cBCL were identified. Forty-nine percent presented as stage 5, 35% stage 4, and 16% stage 3. Sixty-two percent were substage b and 38% were substage a. Forty-four percent received "CHOP" induction protocols, 30% "COP," 8% "COAP," and the rest received various induction protocols. Ninety-five percent of dogs responded to induction treatment. Median first remission duration (FRD) was 108.5 days. Thirty-seven dogs (59%) received rescue protocols with a response rate of 60%. Median overall survival time (OS) was 209 days. Follow-up was 1309 days.

This study showed that COP protocols followed by doxorubicin rescue therapy gave no significant difference in OS compared with both CHOP induction alone and CHOP followed by a rescue protocol ($P = 0.179$). OS was significantly increased by increased FRD ($P = 0.001$), absence of an aberrant immunophenotype ($P = 0.025$), complete response to therapy ($P = 0.000$), and use of rescue protocol ($P = 0.000$). FRD was significantly increased by use of a CHOP induction protocol compared with a COP protocol ($P = 0.025$), and complete response to therapy ($P = 0.000$). Age,

bodyweight, sex/neuter status, stage, substage, and cell size had no effect on FRD or OS. Seven (11%) of the dogs had a prolonged OS in excess of 2 years, and 4 of these dogs remain alive. Dogs in the prolonged OS group were more likely to be anaemic on presentation (PCV < 37%, $P = 0.041$), experienced a greater FRD ($P = 0.012$) and were more likely to be treated with a rescue protocol ($P = 0.036$) than other dogs. No other significant differences in signalment, clinical presentation, stage, substage, or treatments received were found between this group of dogs and others.

In this group of dogs, CHOP induction therapy gave no survival benefit over the cheaper, less intense COP protocol, providing doxorubicin rescue therapy was later employed. The proportion of dogs receiving CHOP induction versus COP did not significantly differ between dogs with prolonged survival and those without. The use of rescue protocol, complete response to treatment, aberrant immunophenotype and first remission duration were shown to have prognostic relevance.

Disclosures: No disclosures to report.

ESVONC-O-3

NEXT GENERATION SEQUENCING OF CANINE LYMPHOMA IDENTIFIES VARIANTS UNIQUE TO B CELL CASES. E.M. Waugh, A. Gallagher, M.A.V. Mudaliar, R.F. Jarrett, J.S. Morris. University of Glasgow, Glasgow, UK

Lymphoma is the most common malignant haemopoietic tumour in the dog. Gene expression profiling (GEP) of canine lymphoma has highlighted the important signalling pathways including B-cell activation, B-cell receptor and NF- κ B signalling. Next-generation sequencing offers benefits over microarray technology for GEP in identification of novel transcripts and sequence variants. The aim of this study was to examine gene expression and variant calling in canine lymphoma using RNA-Seq.

Lymph node samples were collected from 23 canine multicentric lymphoma patients as part of their clinical investigations. Diagnosis was confirmed cytologically or histologically and cell lineage established by PCR for antigen receptor rearrangements (PARR) and flow cytometry. cDNA was prepared from extracted RNA and sequencing performed on an Illumina NextSeq 500 sequencer generating 150 bp paired-end reads.

Samples were from 18 B-cell tumours (10 stage V, 5 stage IV, 2 stage III and 1 stage II) and 5 T cell tumours (2 stage III, 1 each stage II, IV, V). 38 million reads (mean) per sample were obtained with 82% mapping to the canine genome. B- and T-cell samples clustered separately on principal component analysis indicating distinct gene expression patterns. 232 genes were upregulated ($\log_2FC > 2$, q value < 0.05) in B-cell lymphomas, many involved in BCR signalling, primary immunodeficiency and haematopoietic cell lineage pathways, innate immune and inflammatory responses. 640 genes were upregulated ($\log_2FC > 2$, q value < 0.05) in T cell lymphomas, most affecting TCR signalling, but also natural killer mediated cytotoxicity, Jak-STAT signalling, haemopoietic cell lineage and cancer pathways.

Compared to the reference genome, 4.8 million sequence variants were detected across the 23 samples; 74% not previously described. Using the SIFT (sorting intolerant from tolerant) algorithm, 17% were predicted to be deleterious for protein function. Functional analysis of the affected genes indicated many were involved in BCR signalling and cancer-related pathways. Some such as BCL10 and MAP3K14 were affected in almost all cases, although proportionally more frequent in B cell lymphoma. Others such as TRAF3 were exclusive to B cell cases. Genes affecting a large number of cases such as BCL10 tended to have a common variant present in 3 or more cases whereas other genes had variants unique to each single case.

Although it remains to be confirmed if the detected variants represent true mutations rather than polymorphisms, RNA-Seq of canine lymphoma samples has generated interesting pilot data that need to be expanded with more samples to validate the results.

Disclosures: Manikhandan Mudaliar works for Glasgow Polyomics which is a commercial company within Glasgow University and carries out genomic and polyomic assays. The Next Gen Sequencing was done at Glasgow Polyomics, partly using an ECVIM grant.

ESVONC-O-4

NEW STRATEGIES TREATMENT IN FELINE LARGE GRANULAR LYMPHOCYTE LYMPHOMA: A NON-RANDOMISED CONTROLLED TRIALS IN 20 CATS. A. Zoia¹, M. Campigli¹, M. Drigo². ¹San Marco Veterinary Clinic, Padova, Italy, ²Sanità Pubblica Veterinaria, Padova, Italy

Feline large granular lymphocyte (LGL) lymphoma is uncommonly described in the literature and it is caused mainly by T-cell lymphocyte. To date a standard protocol has not yet been established and long term prognosis is poor. A recent study (Krick et al. 2008) described a median survival time of 57 days (range: 0–267) in cats with LGL lymphoma receiving mainly a COP-based protocol and in few cases adjuvant surgery or orthovoltage radiation therapy. Surprisingly, in that study the longest survival time was achieved from a cat in the non treated group (median survival time 2 days; range: 0–288) that received only prednisone and single agent cyclophosphamide. Considering these data, and the advantages in treating with more than one alchylating agents T-cell lymphoma in dogs (Brodsky et al 2009), the aim of this study was to assess if the sequential use of different alchylating agents was of any benefit in cats with LGL lymphoma.

To all owners of cats with a cytological or histopathological diagnosis of LGL lymphoma that presented to the San Marco Veterinary Clinic from July 2008 till December 2014 were offered a treatment with sequential alchylating agents and prednisone (SAA&P) protocol or palliative care with only prednisone. The SAA&P protocol consisted of prednisone at 2 mg/kg q24 h and chlorambucil at 2 mg/cat (for cats >4 kg) to q72 h (for cats <4 kg). When despite treatment progressive disease or stable disease plus clinical signs referable to the LGL lymphoma were present chlorambucil was substituted with cyclophosphamide at 25 mg/cat q10 days. Finally, when cats stop responding to cyclophosphamide, this drug was substituted with lomustine at 50–60 mg/m² q3-5 week.

During the study period 28 cats were diagnosed with a LGL lymphoma. On owner request 6 cats were euthanased at the time of diagnosis, 2 cats were sent home with no treatment and lost to follow-up, 10 cats received prednisone alone, and 10 cats received the SAA&P protocol. Median survival time for cats treated with prednisone alone was 7 days (range: 1–229 days, 95% CI 0–22 days) and for cats treated with the SAA&P protocol was 137 days (range: 25–532 days, 95% CI 39–235). Survival Kaplan-Meier curves of the 2 treatment group were significantly different (Log Rank test = 8.01; *P* = 0.0042).

Survival time in cats with LGL lymphoma treated with the SAA&P protocol is significantly longer than in cats receiving only prednisone and seems to be longer than historical reported data of cats receiving COP-based protocol.

Disclosures: No disclosures to report.

ESVONC-O-5

FREQUENCY AND PROGNOSTIC SIGNIFICANCE OF BLOOD EOSINOPHILIA IN CANINE MAST CELL TUMORS (MCT). O.P. Skor, A. Fuchs-Baumgartinger, A. Tichy, M. Kleiter, I. Schwendenwein. Veterinary University Vienna, Vienna, Austria

Mast cell tumors are often accompanied by eosinophilic inflammation as they are known to produce eosinophil chemotactic factors. However, little is known about frequency or eventual prognostic significance of blood eosinophilia in MCT bearing dogs. Thus, the aim of this study was to determine frequency of absolute and relative peripheral blood eosinophilia as well as eosinopenia and to evaluate potential influence on progression free interval (PFI), overall survival time (OST) and tumor specific survival (TSS). Dogs with mast cell tumors diagnosed between 2008 and 2014 were included into this retrospective study. Data were collected from medical records and follow up phone conversations with patient owners or referring veterinarians. Medical records were reviewed to rule out underlying clinical conditions other than MCT that could cause eosinophilia. Tumor diagnosis was made either by fine needle aspirate and/or tumor biopsy. A patient was allocated to the eosinophilic group, when the eosinophil concentration was >0.8*10³/μL or the relative percentage was > 4%, respectively. When the eosinophil concentration was <0.1*10³/μL

patients were categorized as eosinopenic. Groups were compared by the Pearson Chi-Square test. The PFI, OST and TSS curves were generated by the Kaplan-Meier product limit method. A log rank test was used to compare the curves. One-hundred dogs were included into this study. Absolute eosinophilia was detected in 8/100 patients and in 37/100 a relative eosinophilia was present. Median concentration of eosinophils was 0.3*10³/μL (range, 0–3093) and median relative percentage was 3.0% (range, 0–25%). Eosinopenia was found in 24% of all dogs. A positive association between relative eosinophilia and low grade tumors was detected with both Patnaik (*P* = 0.001) and Kiupel (*P* = 0.027) grading system. A positive linear correlation was further noticed between absolute eosinophilia and OST (*P* = 0.022). Positive correlation was confirmed between relative eosinophilia and PFS (*P* = 0.001), OST (*P* = 0.001), and TSS (*P* = 0.001). Accordingly a negative linear fit was found between eosinopenia and PFI (*P* = 0.002), OST (*P* = 0.004) and TSS (*P* = 0.001). Data indicate that peripheral blood eosinophilia might serve as an easily available additional prognostic tool for mast cell tumor bearing dogs.

Disclosures: No disclosures to report.

ESVONC-O-6

ASSOCIATION OF HISTOPATHOLOGICAL FEATURES AND COX-2 EXPRESSION IN CANINE RENAL CARCINOMAS WITH CLINICAL OUTCOME. S. Carvalho¹, A. Stoll², S. L. Priestnall², A. Suarez-Bonnet³, A. Lara-Garcia¹. ¹Queen Mother Hospital for Animals, Royal Veterinary College, Hertfordshire, UK, ²Royal Veterinary College - Pathology and Pathogen Biology, Hertfordshire, UK, ³University Las Palmas Gran Canaria, Las palmas gran canaria, Spain

Limited literature is available about prognostic factors for canine renal carcinomas. In humans, histologic differentiation and tumor type are strongly associated with outcome. In dogs only one publication so far has reported this association. COX-2 expression is documented in several canine neoplasias with prognostic value in canine mammary carcinomas. In renal carcinomas COX-2 expression has been demonstrated but its significance is not known. The aim of this study was to evaluate clinical and histopathological features of canine renal carcinomas, including COX-2 expression, and to correlate them with outcome. Our hypothesis was that advanced disease, higher histological grade and increased COX-2 expression would be associated with shorter survivals.

This retrospective multi-institutional study within 20 veterinary institutions, included histologically confirmed cases of canine renal carcinoma undergoing nephrectomy between 1998–2015, with available follow up. Histologic features and COX-2 immunostaining scoring were reviewed by 2 independent pathologists where available. Signalment, clinical presentation, stage, adjuvant therapy and survival times were recorded and statistical analysis performed.

Sixty-two cases were included. Male to female ratio was 1:1, median age was 8.5 years. Cross-breed dogs (n = 10) and Labrador retrievers (n = 9) were over-represented. On presentation 6 dogs had metastasis. Overall median survival time (MST) was 426 days (18–1945 days). Dogs without metastasis lived longer (MST 420 versus 141 days, *P* = 0.01). Twenty-seven dogs received adjuvant therapy post-nephrectomy, without impact in MST (treatment 420 days, no treatment 532 days, *P* = 0.5).

Fifty samples were available for histopathological review, and 30 for COX-2 immunostaining. Shorter survival times were seen in solid histological type compared to others (solid 152 days, papillary 532 days, tubular 540 days, *P* = 0.01). Histologic degree of differentiation was associated with MST (well 485 days, moderate 1176 days, undifferentiated 90 days; *P* = 0.04). Vascular invasion was associated with shorter survival (MST 210 days versus 540 days if absent; *P* = 0.01). Marked invasiveness was associated with shorter MST (117 days versus mild = 720 days, moderate 570 days; *P* = 0.02).

Patients with low Cox-2 expression had longer MST (1176 days) than those with high (203 days, *P* = 0.01). Mitotic index, clear cell type, nuclear morphology, Fuhrman nuclear grading, presence of pseudocapsule, necrosis, haemorrhage and type of inflammation were not significantly associated with MST.

Histopathological findings (degree of differentiation, invasiveness, vascular invasion, solid histologic type), COX-2 expression and metastasis present at diagnosis are strongly associated with survival in canine renal carcinomas and can be used as prognostic factors.

Disclosures: No disclosures to report.

ISCAID-O-1

RAPID REDUCTION OF LEISHMANIA INFANTUM-SPECIFIC ANTIBODIES DURING TREATMENT IN DOGS WITH MODERATE DISEASE. L.M. Solano-Gallego¹, L. Alborch², L. Di Filippo¹, M. Planellas², S. Montserrat², X. Roura³, L. Ordeix². ¹Facultat de Universitat Autònoma de Barcelona, Bellaterra, Spain, ²Departament de Medicina i Cirurgia Animal, Universitat autònoma de Barcelona, Bellaterra, Spain, ³Hospital Clinic Veterinari, Bellaterra, Spain

The detection of *Leishmania infantum*-specific antibodies has been extensively exploited for specific diagnosis and monitoring of treatment in canine leishmaniasis. High levels of *L. infantum*-specific antibodies are commonly observed in dogs with moderate to severe disease. Controversial results have been described regarding the use of kinetics of *L. infantum* specific antibodies during treatment monitoring. The majority of the studies reported that antibodies often decreased slowly but remained detectable over a long period of time while older studies considered that serology was not useful for treatment monitoring. A consensus statement is that measurement of antibody levels is meaningless before 6 months of treatment. The aim of this study was to evaluate *L. infantum*-specific antibodies at the time of diagnosis and during treatment follow-up visits and to correlate these with the dog's clinical status. Nineteen dogs were diagnosed (day 0) and followed-up during treatment (days 30, 180 and 365). The treatment protocol was a combination of meglumine antimoniate (50 mg/kg/12 h SC for 1 month) and allopurinol (10 mg/kg/12 h PO for 1 year). Physical examination and baseline laboratory tests (CBC, biochemistry profile, serum electrophoresis, urinalysis and urinary protein/creatinine ratio) were performed during all visits. *Leishmania infantum*-specific antibodies were assessed by an end point sera dilution ELISA method. The majority of dogs (n = 16) were classified as LeishVet stage II (moderate disease) at the time of diagnosis. Three dogs were classified as LeishVet stage III (severe disease, n = 2) or IV (very severe disease, n = 1). Results showed high and variable levels of specific antibodies at the time of diagnosis (mean ± SD: 7855 ± 14821 ELISA units (EU)). Interestingly, a rapid significant reduction ($P < 0.05$) was observed at day 30 during treatment (mean ± SD: 3503 ± 5980 EU). A continuing significant decrease of specific antibodies was also determined at days 180 (mean ± SD: 2139 ± 6829 EU) and 365 (mean ± SD: 245 ± 108 EU). All dogs improved clinically with treatment with the exception of one dog that clinically relapsed at 6 months post-treatment and its specific antibodies level slightly increased. In conclusion, this study reports, for the first time, a rapid reduction of *L. infantum* specific antibodies after 30 days of treatment by an end point sera dilution ELISA method associated with clinical improvement. It is important also to highlight that a marked decrease of antibody levels was also noted after 6 months and 1 year of treatment.

Disclosures: No disclosures to report.

ISCAID-O-2

LEISHMANIA INFANTUM-SPECIFIC PRODUCTION OF IFN-GAMMA IN STIMULATED BLOOD FROM DOGS WITH CLINICAL LEISHMANIOSIS. L.M. Solano-Gallego¹, S. Montserrat², D. Mari², L. Ordeix², L. Alborch². ¹Facultat de Universitat Autònoma de Barcelona, Bellaterra, Spain, ²Departament de Medicina i Cirurgia Animal, Universitat autònoma de Barcelona, Bellaterra, Spain

A broad range of clinical manifestations and immune responses have been described in canine leishmaniasis. Canine *L. infantum* infection can manifest as a chronic subclinical infection, self-limiting disease, or non-self-limiting illness. A protective CD4+ T-cell-mediated immune response characterized by production of inter-

feron-gamma, IL-2 and TNF-alpha is believed to be present in resistant subclinical dogs while this response seems to be diminished or absent in sick dogs. However, there are few and poorly standardized assays to evaluate this response in the dog. In addition, cellular mediated immunity has been mainly investigated in subclinical or vaccinated dogs but limited information is available in sick dogs with different degrees of disease severity. The aim of this study was to investigate *L. infantum*-specific cellular immunity in dogs with clinical leishmaniasis at the time of diagnosis. Twenty-six dogs were diagnosed based on physical examination, routine laboratory tests (CBC, biochemistry profile, serum electrophoresis, urinalysis and urinary protein/creatinine ratio) and *L. infantum*-specific antibody levels measured by quantitative ELISA. Heparin whole blood was stimulated with *L. infantum* soluble antigen (LSA) and the mitogen concavalin A (ConA) and incubated during 5 days. Unstimulated whole blood from each dog was used as control. Supernatants were collected and IFN-gamma concentration was measured with a commercial sandwich ELISA. The majority of dogs (n = 16) were classified as LeishVet stage II (moderate disease). The rest of dogs were classified as stage I (n = 3), stage III (n = 4) and stage IV (n = 2). Twelve dogs (stage I, n = 2; stage IIa: n = 9, stage III: n = 1) produced IFN-gamma after stimulation with LSA (mean ± SD: 2137 ± 1526 pg/mL) and ConA (mean ± SD: 6596 ± 4448 pg/mL). In contrast, 13 dogs (stage IIa: n = 5; stage IIb: n = 3; stage III: n = 3; stage IV, n = 2) did not produce detectable IFN-gamma after stimulation with LSA but 12 dogs produced IFN-gamma after stimulation with ConA (mean ± SD: 5665 ± 4923 pg/mL) while one dog was unresponsiveness to ConA. No differences in IFN-gamma concentration were found between IFN-gamma producer and non-producer dogs when blood was stimulated with ConA ($P = 0.6$). Interestingly, IFN-gamma producer sick dogs presented with a lower antibody levels (mean ± SD: 1068 ± 1217 ELISA units (EU)) when compared with IFN-gamma non-producer sick dogs (mean ± SD: 11448 ± 17602 EU) but differences were not statistically significant ($P = 0.1$). The results of this study suggest that sick dogs with a more exaggerated humoral response and a more severe disease lack *L. infantum* specific IFN-gamma production in stimulated blood.

Disclosures: No disclosures to report.

ISCAID-O-3

ANAPLASMA PLATYS INFECTION IN DOGS: EPIDEMIOLOGICAL AND CLINICAL FEATURES FROM 24 NATURALLY OCCURRING CLINICAL CASES. T. Bouzouraa¹, M. René-Martellet¹, L. Isabelle², J. Chêne¹, M. Léon³, A. Leal³, S. Bavadel², C. Ducrot², K. Chalvet-Montfray¹, J.L. Cadore¹, L. Halos³, L. Chabanne¹. ¹VetAgro Sup Lyon, Marcy l'étoile, France, ²INRA Clermont, Theix, France, ³Merial France, Lyon, France

Canine *Anaplasma platys* infection (CAPI) results in thrombocytopenia, but is considered as a subclinical disease in the United States where the disease was first identified. In Europe, where the disease seems to be more severe, it has been suggested that circulating strains are more pathogenic, although co-infection with other vector-borne pathogens (VBP) may also contribute to the expression of clinical signs. However, the availability of PCR-based investigation of the impact of co-infection in naturally infected dogs is limited, compromising the assessment of their clinical significance under field conditions.

The aim of the present study was to describe epidemiological and clinical features of CAPI under field conditions in areas endemic for several canine VBP.

A study was conducted in veterinary clinics across Italy, Spain and Portugal. Sick animals were included when fitting at least 3 clinical and/or biological criteria compatible with ehrlichial disease. Serological tests (SNAP[®]4Dx, SNAP[®]Leish tests) and diagnostic PCR for *Ehrlichia canis*, *Anaplasma platys*, *Anaplasma phagocytophilum*, *Babesia/Theileria* spp, *Hepatozoon canis* and *Leishmania infantum* detection were performed to identify the etiological agents. CAPI was considered on the basis of suggestive signs associated with positive PCR-based assay for *Anaplasma platys*.

Among the 366 dogs included, 24 were PCR positive for *A. platys*. The annual incidence risk of CAPI was 0.02% and the

probability to diagnose CAPI when facing 3 clinical and/or biological signs suggestive of ehrlichial disease was evaluated at 7.1%. Nine dogs were mono-infected, and 11 dogs were co-infected with *E.canis* (3), *L.infantum* (2), *Babesia* sp. (2) and *H.canis* (5). For 4 dogs, all tests were not performed. Anorexia (58%) and weight loss (46%) were common reasons for visit. Lymphadenomegaly (42%), hyperthermia and cutaneous signs (38%) were frequent findings whereas musculoskeletal disorders (25%), petechiae/ecchymosis (21%), splenomegaly (17%), dehydration and ocular lesions (8%) then epistaxis (4%) were less common. Haematological abnormalities included thrombocytopenia and anaemia (81%), leucopenia (25%) and leucocytosis (35%). A risk-analysis conducted between mono- and co-infected dogs didn't highlight significant differences except for anorexia that was significantly more frequent in mono-infected dogs.

This study illustrates the magnitude of CAPI in the Mediterranean basin and supports the existence of virulent strains in this area. Co-infections were common but had a weak impact on clinical expression. These results emphasize also the importance of testing dogs for multiple VBP due to the difficulty in assigning a specific symptom or haematological abnormality to a specific vector-borne infection in endemic areas.

Disclosures: No disclosures to report.

ISCAID-O-4

PROGNOSTIC VALUES OF SERUM ELECTROLYTES AND ANION GAP IN DOGS WITH NATURAL OCCURRING LEPTOSPIROSIS: A COHORT STUDY IN 156 DOGS. M. Caldin¹, V. Pantaleo², A. Zoia², A. Natale³, L. Lucchese³, T. Furlanello¹. ¹Laboratorio d'Analisi Veterinarie San Marco, Padova, Italy, ²San Marco Veterinary Clinic, Padova, Italy, ³Istituto Zooprofilattico Sperimentale delle Venezie, Legnaro, Italy

Leptospirosis is a worldwide zoonotic disease with high mortality rate in humans and dogs. Clinicopathologic changes may reflect renal disease, hepatic disease, or both causing often vomiting, polyuria/polydipsia and diarrhea. Therefore, severe electrolytes and anion gap (AG) abnormalities could be expected. The aim of this cohort study was to investigate serum electrolytes and AG in dogs with natural occurring leptospirosis and to assess their prognostic values.

The electronic data-base of the San Marco Veterinary Clinic P.O.A System-Plus 9.0[®] was searched between October-2004 and April-2015 for dogs with diagnosis of leptospirosis (group 1; n = 52). Inclusion criteria for group 1 were consistent clinicopathologic signs and a positive microscopic agglutination test (titer \geq 1:1600 in vaccinated dogs, titer \geq 1:800 in nonvaccinated dogs or \geq 4-fold increase in convalescent titer) and/or a positive PCR (urine and/or blood) for leptospirosis. Parameters studied were: serum electrolytes (sodium, chloride, potassium), AG, and AG albumin-adjusted ($AG_{alb-adjusted} = AG + 2.5 \times (3.2 - [alb])$). Two control populations of randomly healthy dogs (group 2; n = 52) and sick dogs without leptospirosis (group 3; n = 52) dogs were created and matched to group 1 for age (± 6 months), sex (including sexual status) and breed. Statistical differences between groups were evaluated by Kruskal-Wallis test and post-test analysis were performed by Wilcoxon-Mann-Whitney. Mortality relative risk (MRR) at 28 days post-admission between group 1 and group 3 was evaluated. ROC curves were used to identify the best prognostic analyte. Significance level for all statistical test was set at $P < 0.05$.

Serum sodium and chloride concentrations were significantly decreased in group 1 compared to group 2 and 3 ($P < 0.0001$ for both comparisons). Serum potassium concentration was significantly decrease in group 1 compared to group 2 ($P = 0.038$), while no difference was present between group 1 and 3 ($P = 0.466$). Serum AG and $AG_{alb-adjusted}$ were significantly increased in group 1 compared to group 2 and 3 ($P < 0.0001$ for all comparisons). There was a significantly increased in mortality rate in group 1 (n = 20, 38.5%) compared to group 3 (n = 5, 10.4%) (MRR = 4.0; 95% CI = 1.72–9.75). Between the variables studied serum potassium (AUC = 75%; $P = 0.0002$) and chloride (AUC = 73%; $P = 0.0028$), AG (AUC = 78%; $P = 0.0002$) and $AG_{alb-adjusted}$ (AUC = 80%; $P < 0.0001$) were prognostic.

Serum electrolytes, AG, and $AG_{alb-adjusted}$ were significantly different in dogs with leptospirosis compared to healthy and sick

dogs without leptospirosis with the exception of serum potassium that was similar between sick dogs with and without leptospirosis. Between the variables studied the $AG_{alb-adjusted}$ resulted the best parameter in predicting death in dogs with leptospirosis.

Disclosures: No disclosures to report.

ISCAID-O-5

EMERGENCE OF HUMAN PATHOGENIC ENTEROCOCCUS FAECALIS CC2 LINEAGES IN COMPANION ANIMALS. C. Aboim¹, C. Marques¹, A. Belas¹, M. Coelho², V. Pereira², C. Pomba¹. ¹Faculty of Veterinary Medicine, University of Lisbon, Lisbon, Portugal, ²VetinLab, Lisbon, Portugal

Enterococci causes urinary tract infection (UTI) in companion animals and may carry important resistance genes such as for the bifunctional enzyme. Furthermore, their virulence factors are seldomly reported in veterinary medicine. Thus, this study aims to characterize the uropathogenic enterococci antimicrobial resistance, virulence genes and the clonality of high-level gentamicin resistance (HLGR) *Enterococcus faecalis*.

Antimicrobial susceptibility testing of 74 clinical uropathogenic enterococci isolated from dogs and cats with UTI, isolated between 1999–2015, was performed by the disc diffusion method. CLSI clinical breakpoints were applied. Strains showing HLGR were screened for *aac(6')-Ieaph(2'')-Ia* and *aph(2'')-Id* genes by PCR. *E. faecalis* harbouring HLGR genes were typed by multi-locus-sequencing. Fifty-nine strains were further characterized by PCR for the presence of *gel E* (gelatinase), *ace* (collagen binding antigen), *asa-1* (aggregation substance), and *efa A* (endocarditis) virulence genes.

E. faecalis was the most frequently isolated (81.1%, n = 60/74) followed by *Enterococcus faecium* (12.2%, n = 9/74). Overall, antimicrobial susceptibility results were: 11.8% (n = 8/74) resistance to penicillin/ampicillin; 58.1% (n = 43/74) resistance to fluoroquinolones (enrofloxacin or ciprofloxacin); 10.0% (n = 7/70) resistance to nitrofurantoin; 11.4% (n = 8/70) resistance to chloramphenicol and 69.6% (n = 48/69) resistance to tetracycline. HLGR was detected in 14.1% (n = 9/64) enterococci, namely 7 *E. faecalis* and two *E. faecium*. All HLGR *E. faecalis* were *aac(6')-Ieaph(2'')-Ia* carriers. One *E. faecium* was positive for *aac(6')-Ieaph(2'')-Ia* whereas the other was positive for *aph(2'')-Id*. Interestingly, ampicillin-resistance was only detected in *E. faecium* (8 out of 9 isolates). Furthermore, all HLGR *E. faecium* were also ampicillin-resistant. HLGR *E. faecalis* were found to belong to ST16, ST6, ST35, and ST59 major lineages circulating in both hospital and community settings in Portugal.

Considering all enterococci, 64.4% (n = 38/59), 71.2% (n = 42/59), 32.2% (n = 19/59) and 78.0% (n = 46/59) were positive for *gel E*, *ace*, *asa-1* and *efa A* virulence genes, respectively. Uropathogenic *E. faecium* were only positive for *ace* gene (2 out of 8), thus *E. faecalis* had higher virulence genes frequencies.

In this study we detected important human HLGR *E. faecalis* belonging to the clonal complex 2, such as *E. faecalis* ST6, among uropathogens in companion animals. The presence of major clonal lineages in companion animals highlights their role as community-associated hosts and possible reservoirs of putative human pathogenic enterococci.

Disclosures: Conflicts of interest: Cátia Marques currently receives a PhD grant funded by the Portuguese Foundation for Science and Technology.

ISCAID-O-6

POLYMERASE CHAIN REACTION (PCR) SURVEY OF FELINE HAEMOPLASMA INFECTIONS IN SERBIA. E. Sarvani¹, S. Tasker¹, M. Kovacevic Filipovic², J. Francuski², A. Andric³, L. Aquino³, S. English¹, C. Helps¹, K. Papisoulitios¹. ¹University of Bristol, Bristol, UK, ²Belgrade University, Belgrade, Serbia and Montenegro, ³University of Brasília, Brasilia, Brazil

Haemotropic mycoplasmas (haemoplasmas) can cause haemolytic anaemias in many species, including people. Three feline

haemoplasmas have been identified: *Mycoplasma haemofelis* (Mhf), 'Candidatus *Mycoplasma haemominutum*' (CMhm), 'Candidatus *Mycoplasma turicensis*' (CMT). Mhf is considered the most pathogenic, whilst CMhm and CMT usually only cause anaemia in cats with concurrent disease or immunosuppression. The aim of this study was to estimate the prevalence of feline haemoplasmas in Serbia and identify potential risk factors for infection.

Surplus EDTA blood samples from 375 cats in the Belgrade region were used. For each cat, the following variables were recorded: age, health status, gender, outdoor access, presence of ectoparasites and haematological results. Samples were stored at -20°C and transported to the University of Bristol for haemoplasma quantitative PCR testing. Serology (PetChek, Idexx) was performed for FeLV ($n = 310$) and FIV ($n = 331$) infection. Statistical analysis was performed using SPSS; univariable associations between variables and haemoplasma status were first evaluated (χ^2 for categorical variables, t-test/Mann-Whitney U test for continuous variables) followed by multivariable analysis.

Two samples were negative for internal control 28S rDNA and excluded from the study. Of the remaining 373 cats, 64 (17.2%) were infected with one or more haemoplasma species; 43 were singly infected (3 Mhf, 31 CMhm, 9 CMT), 16 dually infected (7 Mhf/CMhm, 5 Mhf/CMT, 4 CMhm/CMT) and 5 triple infected. The overall prevalences of Mhf, CMhm and CMT were 5.3%, 12.6% and 6.2%, respectively. 4/310 (1.3%) cats were FeLV infected whilst 78/331 (23.6%) were FIV infected. Multivariable analysis identified significant associations between haemoplasma infection and anaemia (anaemic/non-anaemic, odds ratio (OR) 2.7, CI 1.04–7.1, $P = 0.041$), male gender (male/female, OR 4.5, CI 2.22–9.03, $P < 0.0005$), outdoor access (yes/no, OR 5.2, CI 2.28–11.92, $P < 0.0005$), non-pedigree breed (non-pedigree/pedigree, OR 5.5, CI 1.24–24.84, $P = 0.025$) and FIV positive status (positive/negative, OR 2.4, CI 1.21–4.83, $P = 0.012$).

The overall prevalence of feline haemoplasmas in Serbia (17.2%) is similar to that reported in other European countries (12.6–43.4%). CMhm was the most prevalent haemoplasma species (12.6%) in the current study, similar to other European studies (range: 9.9–41.6%). Most previous studies reported that CMT infection is the least prevalent feline haemoplasma species, but in the current study the prevalence of CMT was greater than that of Mhf. Similarly to previous studies, the presence of anaemia, male gender, outdoor access, non-pedigree status and FIV infection were significantly associated with haemoplasma infection.

Disclosures: No disclosures to report.

ISCAID-O-7
EXCRETION OF CANINE PARVOVIRUS TYPE 2 (CPV-2) DURING GESTATION AND LACTATION IN BITCHES AND PUPPIES. D. Broussou¹, H. Mila², A. Grellet³, A. Feugier³, C. Mariani³, J.L. Pingret⁴, C. Boucraut-Baralon⁴, S. Chastant-Mailard². ¹UMR INRA/ENVN 1225 IHAP, Ecole Nationale Vétérinaire de Toulouse, Toulouse, France, ²UMR INRA/ENVN 1225 IHAP, Ecole Nationale Vétérinaire de Toulouse, Toulouse, France, ³Royal Canin, Aimargues, France, ⁴Scanelis, Colomiers, France

Canine parvovirus type 2 (CPV-2) is a frequent digestive pathogen in dogs, responsible for high mortality rates in puppies. The control of the infection by disinfection and isolation of patients is of limited efficiency, raising questions about the contagion sources. The aim of our study was to evaluate the epidemiological role of dams in viral circulation during the reproductive period.

A total of 73 bitches (mean \pm standard deviation: 4.4 ± 1.9 years old) from one kennel were enrolled in the study. All were annually vaccinated (Nobivac DHPPi-Lepto vaccine; MSD, Beaucouzé, France). 41 dams were followed from mating to whelping and 32 dams were followed from whelping until weaning. All puppies from the 32 lactating dams ($n = 134$) were followed since 3 until 8 weeks of age. CPV-2 fecal excretion was evaluated by real time PCR on rectal swabs [1] every 14 days during gestation (dams) and every 7 days during lactation (dams and puppies). Data were analyzed through logistic regression and mixed linear models.

A total of 1241 samples were collected. During pregnancy, 80% of the bitches excreted CPV2 at least once, but only one sample was above the quantification threshold (2.10^5 copies/g feces). Dur-

ing lactation, all bitches were found positive at least once (and 3 times in mean) and 64% went above the quantification threshold at least once. During lactation, excreted viral loads were significantly higher at D42 (5.10^8 /g feces; $P = 0.001$), D49 (8.10^8 /g feces; $P < 0.001$) and D56 (10^9 /g feces; $P < 0.001$) compared to the early lactation ($<10^6$ copies/g feces; D7 to D28). Despite threshold for a clinical parvovirus is 5.10^8 /g feces, none of the bitches expressed any symptom. In 28% of the cases, the dam excreted before her puppies. Viral loads excreted by puppies were not correlated with those excreted by dams. The proportion of puppies excreting viral loads above the clinical threshold increased from D17 to D52 (from 2 to 76% per litter), with overall mortality of only 3% (4/134).

This study demonstrates that appropriately vaccinated adult female dogs may excrete CPV2 during gestation and lactation. Due to the high quantity of CPV-2 excreted, females probably represent a major source of contamination for their puppies. Viral excretion by bitches after lactation until the next breeding period and by males would be interesting to follow to better understand the role of adults in CPV2 circulation.

[1] Grellet A. et al Prev Vet Med, 2012, 106, 315-323.

Disclosures: No disclosures to report.

ISCAID-O-8
FELINE PANLEUKOPENIA: CLINICAL PREDICTORS IN 177 CASES (2011–2013). E. Porporato¹, M.C. Horzinek², F. Ferri¹, G. Gerardi³, B. Contiero³, E. Auriemma¹, H. Lutz⁴, E. Zini⁴. ¹Istituto Veterinario di Novara, Granzo Con Monticello, Italy, ²Faculty of Veterinary Medicine, Utrecht, The Netherlands, ³Department of Animal Medicine, Production and Health, Padova University, Padova, Italy, ⁴Vetsuisse Faculty, Zurich University, Zurich, Switzerland

Feline panleukopenia virus (FPV) is responsible for one of the most severe infectious diseases in cats, but only few studies have addressed factors of prognostic importance. In an earlier investigation spanning over 15 years, leukopenia, thrombocytopenia, hypoalbuminemia and hypokalemia were found associated with poor outcome. Here, we aimed at identifying outcome predictors during shelter outbreaks of panleukopenia between 2011 and 2013; we limited our analysis to fresh cases treated and followed until recovery or death at the same institution.

Clinical records of the affected cats were reviewed and information was collected at diagnosis and during hospitalization. The data included anamnestic history, physical examination, complete blood count, biochemical profile, blood gas analysis and treatments, including types of antibiotic, antiviral, antiemetic, analgesic, crystalloid, colloid and hemoderivative administered. Outcome predictors were analyzed using logistic regression and mixed-design analysis of variance.

The study included 177 cats diagnosed with panleukopenia based on clinical findings and positive fecal ELISA, of which 75.4% were <12 months old, and 52.5% females. Clinical signs at diagnosis included lethargy (38.0%), vomiting (36.2%) and diarrhea (33.8%). At admission, median (range) leukocyte counts were 1,200/ μL (0–32,000) and platelets 119,000/ μL (0–949,000); 30.2% had hypoalbuminemia and 8.1% hypokalemia. Treatments included administrations of amoxicillin-clavulanate (21.5%), interferon- ω (39.6%) and intravenous glucose solution (50%). Overall, 79.1% of the cats did not survive. Lethargic cats were more likely to die (OR: 6.05, CI 95%: 1.73–21.11, $P < 0.01$). Leukocyte counts at diagnosis were not associated with outcome, but were after 3 days of hospitalization; in particular, cats alive at 3 days, which succumbed later, had leukocyte counts of 900/ μL (100–20,300) whereas survivors had 7,500/ μL (200–32,300) ($P < 0.01$). Survivors were more likely to have received amoxicillin-clavulanate (OR:3.26, CI95%:1.01–10.60, $P < 0.05$) and less likely intravenous glucose solutions (OR:0.09, CI95%:0.03–0.32, $P < 0.01$). Thrombocytopenia, hypoalbuminemia, hypokalemia and administration of interferon- ω were not associated with the outcome.

Our results suggest that infected cats with lower leukocyte counts later during hospitalization are more likely to die despite treatment. In this study, and different from previous data, lower leukocyte counts at admission did not predict outcome, possibly due to inclusion of cats with early FPV diagnosis. Administration

of intravenous glucose was associated with poor outcome, perhaps because of an increased risk of sepsis; also, cats in critical conditions were more likely to receive intravenous glucose. The beneficial role of amoxicillin-clavulanate in sick cats might be due to its broad-spectrum bactericidal activity; interferon- ω did not show any conspicuous effect.

Disclosures: No disclosures to report.

ISCAID-O-9

ANTIBODY PRODUCTION AS REACTION TO FELINE PANLEUCOPENIA VIRUS VACCINATION IN HEALTHY ADULT CATS. M. Bergmann¹, S. Schwertler¹, U. Truyen², K. Hartmann¹. ¹Clinic of Small Animal Medicine, Munich, Germany, ²Institute of Animal Hygiene and Veterinary Public Health, Leipzig, Germany

According to prior studies up to 30% of cats in Southern Germany do not have protective antibodies against feline panleukopenia virus and thus, are likely susceptible for feline panleukopenia infection. Until now, it is unknown how healthy adult cats with different antibody titers react to feline panleukopenia vaccination in the field. Therefore, the aim of the study was to measure antibody titers in healthy adult cats within 28 days after feline panleukopenia vaccination.

One hundred and twelve healthy adult cats were vaccinated with a RCP vaccine. Before vaccination (day 0) and on days 7 and 28 antibodies against panleukopenia virus were determined by hemagglutination inhibition. In 21.3% (19/112) of the cats, no antibodies prior to vaccination were detected; 4 of these cats were vaccinated regularly. Nearly one third of the cats (31.4%; 28/112) showed no antibody increase after vaccination and in 17.9% (16/112) of the cats, antibody titer decreased despite vaccination within the 28 days. However, all of these cats were likely protected by their preexisting antibody titer. In 5 cats no antibodies were detected neither prior to nor after vaccination.

A large number of adult cats has no protective antibodies and is therefore at risk for feline panleukopenia virus infection. On the other hand, many other cats show high antibody titers and do not develop antibodies due to vaccination. Therefore, evaluation of individual antibody status in cats and vaccination only in those cats, that have no antibodies or low titers, should be recommended.

Disclosures: Independent study financed by Merial. There was no influence on the results of the study by Merial and there is no co-authorship planned with Merial.

ISCAID-O-10

SPIKE GENE MUTATIONS IN FELINE CORONAVIRUS AND THEIR CORRELATION TO FELINE INFECTIOUS PERITONITIS. C.M. Leutenegger¹, J.M. Rottier², J. Jane¹, N. Nancy¹. ¹IDEXX Laboratories, Inc., West Sacramento, CA, USA, ²Utrecht University, Utrecht, The Netherlands

The feline coronaviruses (FCoV) occur as 2 pathotypes with an enigmatic, even controversial, relationship: the low virulence or nonvirulent feline enteric coronavirus (FECV) and the highly lethal feline infectious peritonitis virus (FIPV). Recently, sequence differences within the spike gene region encoding the putative fusion peptide were described and proposed to correlate with the mutated form of FECV (i.e. FIPV) leading to the clinical presentation of feline infectious peritonitis (FIP). In this presentation, the development and validation of an allelic discrimination real-time PCR typing test which can identify each mutation separately will be described.

The diagnostic sensitivity and specificity will be reported from a set of 203 European clinical samples acquired from either FIP confirmed cats or from healthy cats that previously tested FCoV positive. Of these archived samples, 187 FCoV positive samples were included into the validation. From these, 13 samples did not pass

quality control and 17 had virus levels that were below the limit of detection of the PCR assay. Of the remaining 157 samples, 156 were typed correctly with an accuracy of 99.4%. One FIP characterized sample was typed FECV (diagnostic sensitivity 98.6%) while all of the healthy cats were typed FECV (100% diagnostic specificity).

To confirm that these spike gene mutations are not unique to European cats with FIP, additional validation studies from US and Japanese samples were conducted. The US clinical study included 68 cases, 46 from FIP suspicious cases and 22 with non-FIP compatible disease. The FIPV RealPCR biotyping assay was able to accurately differentiate between the FIP or non-FIP (FECV) etiologies ($P < 0.0001$) and did not biotype cats with confirmed non-FIP disease as FIPV, confirming the high diagnostic specificity of the molecular test.

Disclosures: Leutenegger, Robertson & Sanders are employees of IDEXX Laboratories, Inc.

ISCAID-O-11

COMPARISON BETWEEN THE DIAGNOSTIC ACCURACY OF CLINICO-PATHOLOGICAL AND MOLECULAR TESTS FOR FELINE INFECTIOUS PERITONITIS (FIP). A. Stranieri, S. Lauzi, C. Giudice, V. Cannito, A. Giordano, S. Paltrinieri. University of Milan, Milan, Italy

Feline Infectious Peritonitis (FIP) is an ubiquitous, deadly disease of felids caused by a mutated form of feline coronavirus and by an inadequate immune response of the host.

The aim of this study was to compare the diagnostic accuracy for FIP of conventional clinico-pathological tests (routine hematology, serum protein electrophoresis, α_1 -acid glycoprotein - AGP - measurement and analysis of the effusions) with that of molecular tests such as routine PCR and PCR followed by the sequencing of the Spike (S) gene.

Blood, effusion and tissues specimens were collected from 21 cats with symptoms imputable to FIP. The in vivo examination consisted of clinico-pathological tests such as complete blood count, serum protein electrophoresis, AGP measurement, cytological and biochemical examination as well as the evaluation of the Sysmex DTNC of effusions, when present, and of molecular tests such as a screening PCR (directed towards the 3'UTR region) and the PCR directed towards the S gene followed by sequencing of the amplification products in order to detect the aminoacidic substitution considered diagnostic for FIP.¹

The same molecular techniques were applied to the tissues samples collected during necropsy, which also allowed to divide the cats in a FIP group (13 cats) and in a non FIP group (5 cats) based on histology and immunohistochemistry.

The diagnostic accuracy (sensitivity, specificity, negative and positive predictive values) of each test was calculated.

The best test on tissues was immunohistochemistry (sens: 92.3%; spec: 100%), while the screening PCR suffered of low sensitivity and very low specificity (sens: 92.3%; spec: 33.3%). The S gene sequencing, positive when revealing the mutated nucleotide, showed very low sensitivity (sens: 69.2; spec: 100%).

On effusions, the best tests resulted the screening PCR and cytology (sens and spec: 100%) in comparison with the DTNC measurement (sens: 85.7%; spec: 100%) and the S gene sequencing (sens: 42.8%; spec: 100%).

In blood samples, AGP measurement demonstrated the best diagnostic accuracy (sens: 81.8%; spec: 100%), while serum protein electrophoresis showed a surprisingly low sensitivity (sens: 41.7%; spec: 100%). Screening PCR (sens: 55.6%; spec: 100%) and S gene sequencing (sens: 33.3%; spec: 100%) proved again low accuracy, demonstrating that a negative result with these molecular tests does not allow to exclude FIP.

1. Chang HW, Egberink HF, Halpin R, Spiro DJ, Rottier PJM "Spike protein fusion peptide and feline coronavirus virulence" *Emerg Infect Dis* 18 (2012) 1089-1095

Disclosures: No disclosures to report.

ISCAID-O-12

DIAGNOSTIC UTILITY OF AN IMMUNOCYTOCHEMICAL ASSAY FOR FELINE INFECTIOUS PERITONITIS USING AQUEOUS HUMOR. S. Felten¹, K. Matiassek², S. Gruendl¹, L. Sangl¹, K. Hartmann¹. ¹Clinic of Small Animal Medicine, Ludwig-Maximilians-Universitaet Munich, Munich, Germany, ²Institute of Veterinary Pathology, Ludwig-Maximilians-Universitaet Munich, Munich, Germany

Diagnosis in feline infectious peritonitis (FIP) is still challenging, especially in cats without body cavity effusion. Uveitis in cats with FIP commonly presents without effusion, which makes a definitive confirmation of FIP difficult. The aim of this study was to evaluate the diagnostic utility of an immunocytochemical (ICC) assay using aqueous humor in cats suspected of having FIP.

Samples of 26 cats with immunohistochemically confirmed FIP and 13 cats that were suspected of having FIP due to similar clinical or laboratory changes, but that were definitively diagnosed with another disease were examined. Aqueous humor was collected post-mortem after the cats were euthanized due to their diagnosed diseases. ICC analysis was carried out using an anti-feline coronavirus mouse monoclonal IgG2A and an avidin-biotin complex method. Sensitivity, specificity, negative and positive predictive values were determined and 95% confidence intervals (95% CI) calculated.

Of the 39 aqueous humor samples, 18 (16 with FIP, 2 controls) revealed positive ICC results. False positive ICC results were obtained in 2 cats suffering from lymphoma and pulmonary adenocarcinoma. Diagnostic sensitivity of the ICC assay in aqueous humor was 64.0% (95% CI 42.5–82.0); diagnostic specificity was 80.0% (95% CI 44.4–97.5); the negative predictive value was 47.1% (95% CI 23.0–72.2); the positive predictive value was 88.9% (95% CI 65.3–98.6).

Unfortunately, false positive results occurred, and specificity, which is considered the most important parameter in a fatal disease like FIP, was only 80.0%. Positive ICC results in aqueous humor should be interpreted cautiously and cannot confirm a suspicion of FIP.

Disclosures: No disclosures to report.

SCH-O-1

HEPATOCTYDE-DERIVED MICRORNA-122 AS AN EARLY SERUM BIOMARKER OF HEPATOCELLULAR INJURY IN DOGS. K. Dirksen¹, H. Fieten¹, B. Spee¹, T. Verzijl¹, I.A. Burger¹, T.S.G.A.M. van den Ingh². ¹Utrecht University, Utrecht, The Netherlands, ²TCCI Consultancy BV, Utrecht, The Netherlands

Alanine aminotransferase (ALT) level in plasma is the most commonly used indicator for hepatocellular injury in dogs. However, dogs with advanced liver disease can present with ALT levels within reference range. Recent studies have shown the potential of circulating microRNAs as a biomarker for liver injury. Hepatocyte-derived microRNA-122 (miR-122) was identified to be liver specific with superior sensitivity over ALT levels in mice and humans. The aim of the present study was to investigate the potential for circulating miR-122 to serve as a diagnostic serum biomarker of hepatocellular injury in dogs. Hereto, liver biopsies of 46 Labrador retrievers were collected. Liver histology, including grade of hepatitis and stage of fibrosis, was reviewed by a board-certified veterinary pathologist (TSGAMvdI). Concurrently, serum samples were collected and analyzed for ALT levels and miR-122 levels. Dogs were included into one of the following groups: normal liver and normal ALT levels (control group), liver pathology and normal ALT levels, or liver pathology and high ALT levels. Comparative statistics between groups were performed using the Mann-Whitney U test and associations between miR-122 and ALT levels, grade, stage and hepatic copper concentrations were analyzed using the Spearman's rank correlation coefficient. Logistic regression models were used to assess the accuracy of miR-122 and ALT to detect the presence of hepatocellular injury. In total, 8 dogs had normal liver histology and normal ALT levels. Thirty-eight dogs had liver pathology whereof only 14 dogs had increased ALT levels. In the high ALT group the median level of miR-122 was 57 (range, 3 - 794) times higher compared to the control

group ($P < 0.001$). Even in dogs with liver pathology and normal ALT levels, the median miR-122 level was 3 (range, 0.4 - 35) times higher compared to the control group ($P < 0.05$). Univariate logistic regression showed that only miR-122 and not ALT level was a significant predictor for abnormal liver histology ($P < 0.05$). Serum levels of miR-122 were positively correlated with ALT levels, histological grade and stage of fibrosis ($R = 0.71$, $R = 0.62$, $R = 0.48$, respectively, $P < 0.001$ for all).

This study highlights the potential of miR-122 as an early and sensitive biomarker for liver injury in dogs and is more sensitive than ALT levels. Early diagnosis of hepatocellular injury opens the opportunity to institute treatment in a subclinical stage of disease with a possibly more favorable outcome.

Disclosures: This study was financially supported by the ECVIM clinical studies fund. The authors declare no further conflict of interest.

SCH-O-2

THE USE OF HYALURONIC ACID AND TGF- β IN 83 DOGS WITH DIFFERENT STAGE OF LIVER FIBROSIS. A. Lecoin-dre¹, B. Rannou¹, M. Menard², M. Chevallier³, M. Hugonnard⁴, G. Benckekroun², J. Hernandez⁴, R. Oliveira Leal⁴, A. Pagnon⁵, O. Toulza⁶, M. Destro⁷, V. Miette⁷, J.L. Cadore¹, P. Lecoin-dre⁸. ¹Vetagro-sup Veterinary school Lyon, Marcy l'étoile, France, ²National Veterinary School of Alfort, Paris, France, ³Biomnis, Lyon, France, ⁴Fregis veterinary clinic, Paris, France, ⁵Novotec, Lyon, France, ⁶Aquivet, Bordeaux, France, ⁷Echosens, Paris, France, ⁸CVC veterinary clinic, Lyon, France

The evaluation of liver fibrosis is of major importance for the management of chronic liver disease and the prediction of prognosis. Although liver biopsy is the gold standard for evaluation of fibrosis, non-invasive tests enable the clinician to stage and monitor a variety of liver diseases in human medicine. As such transforming growth factor b (TGF-b) and hyaluronic acid (HA) are biomarkers of hepatic fibrogenesis, that reflect the activity of the fibrogenic and fibrinolytic process, their use has not been validated in dogs.

The aim of this study was to evaluate the measurement of TGF-b and HA and assess their sensibility and specificity for the monitoring of 83 dogs with different level of hepatic fibrosis.

Eighty three adult dogs were prospectively enrolled based on a persistent elevation of ALT, with the exclusion of those with focal hepatic lesions on ultrasound examination. All dogs underwent liver biopsy and serum blood collection. LF was staged according to histopathological WSAVA criteria and the amount of collagen was measured through morphometric analysis. Quantitative variables were expressed as mean \pm SD. Bean plots described the relationships between variables. Bivariate analysis between HA, ALT and PAL with LF were performed by Spearman correlations. A parametric test (Student test) was carried out to assess the relationship between TGF β and LF. Diagnostic cut-offs were determined according to the maximum Youden Index [sensitivity (Se) + specificity (Spe) -1].

Preliminary results in 42 dogs showed that 92.9% of the individuals with HA below 48 ng/mL had a density of <3.5% collagen. The serum concentration of HA was significantly (P -value = 0.01) higher in the group whose fibrosis density was $\geq 3.5\%$. TGF-b was the most sensitive marker but its specificity to diagnose dogs with more than 3.5% of collagen was quite low.

The preliminary results show a potential interest of HA as a biomarker to detect liver fibrosis in dogs but the interest of the TGF β could not be demonstrated. HA combines a good sensitivity with a fair specificity. The complete results of the study will help to refine the cut-off value and to improve the diagnostic performance of AH and to evaluate the interest of TGF β . A combination of several markers would be helpful to elaborate a sensitive and specific diagnostic test for liver fibrosis.

Disclosures: The speaker declares a potential conflict of interest with the company Echosens.

Echosens covers a part of the biological measurements expenses in the clinical trial associated to this abstract.

SCH-O-3

DOES SYSTEMIC INFLAMMATORY RESPONSE SYNDROME PREDICT POOR OUTCOME IN DOGS WITH HEPATOPATHIES. S. Kilpatrick¹, M. Dreistadt¹, P. Frowde², R. Powell², A. Gow¹, R. Mellanby¹. ¹University of Edinburgh, Edinburgh, UK, ²Davie Veterinary Specialists, Higham Gobion, UK

Primary hepatitis is a common disorder in dogs. Treatments for primary hepatitis are typically symptomatic and importantly, predicting prognosis at point of diagnosis remains challenging. In contrast to human medicine, where the type of hepatitis is defined by the inciting cause, few causes of chronic hepatitis have been identified in the dog, and the majority of cases are idiopathic. Systemic inflammation is well recognised in humans with liver disease. Systemic Inflammatory Response Syndrome (SIRS) is the clinical expression of the action of complex intrinsic mediators of the acute phase reaction. The presence of SIRS has been linked to a poor outcome in various liver diseases. The prevalence and predictive value of a SIRS in dogs with primary hepatitis has not been examined in dogs with liver disease. This is surprising given the accumulating evidence that SIRS is linked to the development of hepatic encephalopathy (HE) in dogs with liver disease. Although the pathogenesis of HE is not completely understood, it has been indicated that ammonia and inflammatory cytokines play a crucial role in the development of HE. HE is an important cause of morbidity and mortality in patients with liver disease.

The hypothesis of this study was to examine the prevalence and severity of SIRS in dogs with histologically confirmed primary hepatopathies. Eighty dogs with primary hepatopathies (confirmed with histopathology) were included in this study. A SIRS score was calculated for each (respiration rate >24 breaths per minute; heart rate >120 beats per minute; total white blood cell count <6 or >16 × 10⁹/L and rectal temperature <38.1 or >39.2 °C). SIRS scores presented as a value from 0 to 4. Patient's date of arrival in hospital and date of death were all recorded; therefore survival time (days) could be determined. SIRS scoring was applied and survival time was recorded. The median survival for SIRS (0–1) was 237 days, while SIRS (2–4) had a median survival of 7 days (*P* value <0.001, log rank test). This study demonstrates that SIRS is a common feature of dogs with primary hepatitis and is valuable in predicting clinical outcome.

Disclosures: No disclosures to report.

SCH-O-4

INVESTIGATING THE PREVALENCE OF CONGENITAL PORTOSYSTEMIC SHUNTS IN DEERHOUNDS. L.C. Kerbridge¹, D.A. Feller¹, M.K. Levin², S.A.F. Helps³, P.J. Watson¹. ¹University of Cambridge, Cambridge, UK, ²The Scottish Deerhound Club of America, USA, ³The Deerhound Club, UK

The aim of this study was to determine the prevalence of congenital portosystemic shunts (cPSS) in Deerhounds, focussing on the UK and the USA, and to determine how many Deerhound breeders routinely test their puppies for cPSS.

Congenital portosystemic shunts (cPSS) are over-represented in certain breeds such as Irish Wolfhounds, Maltese and Yorkshire Terriers. Anecdotal evidence suggests that there is also an increased prevalence in Deerhounds. This has not been confirmed, however.

The study was questionnaire-based, distributed online to Deerhound breeders worldwide (particularly the USA and UK). In addition it was distributed by post in the UK. The questionnaire passed ethical review at the Department of Veterinary Medicine, University of Cambridge.

Fifty-six breeders worldwide returned questionnaires (UK 27, USA 21, other countries 8). The UK response rate was 5.4% (including postal and online responses). The prevalence of shunts was found to be 0.8% of puppies with prevalences in the UK and the USA of 1.1% and 0.4%, respectively.

Worldwide, 71% of breeders were found to test routinely for cPSS in their puppies, while the proportions in the UK and the USA were 96% and 48%, respectively.

The prevalence of cPSS in UK and USA Deerhounds found in this study was higher than was found for mixed-breed dogs (0.05%) in a separate study. This suggests a genetic component to the disease in Deerhounds. A lower proportion of breeders rou-

tinely tested for cPSS in the USA compared with the UK. The prevalence of cPSS was also lower in the USA. These 2 findings may be related. It would be advisable for all breeders to routinely test their puppies for cPSS before sale, and to avoid breeding from affected animals.

Disclosures: St Catharine's College, Cambridge, contributed to the cost of this study.

The Deerhound Club (UK) and The Scottish Deerhound Club of America gave their support, helping to distribute and advertise the study.

VBPS-O-1

NT-PROBNP IN HYPERTENSIVE CATS WITH AND WITHOUT TARGET ORGAN DAMAGE. E.S. Bijsmans, R.E. Jepson, H.M. Syme, J. Elliott. Royal Veterinary College, London, UK

Measurement of neuroendocrine markers can offer diagnostic, prognostic, and therapeutic information that cannot be obtained by clinical examination. NT-proBNP is a potential biomarker for hypertensive target organ damage (TOD). Circulating concentrations of this biomarker are increased in human hypertensive patients with TOD and with poor response to antihypertensive treatment. Cats with hypertension and TOD have significantly higher NT-proBNP concentrations than non-hypertensive cats. The aim of this study was to investigate the utility of NT-proBNP as a biomarker of hypertension, TOD and efficacy of antihypertensive treatment.

Plasma samples from hypertensive cats seen at 2 first opinion practices were retrospectively identified. Hypertension was diagnosed based on systolic blood pressure (SBP) ≥160 mmHg with evidence of hypertensive retinopathy (TOD-group; n = 24) or SBP ≥170 mmHg on 2 consecutive visits 1–2 weeks apart without evidence of retinal pathology (noTOD-group; n = 25). All cats achieved SBP control (defined as <160 mmHg) on 0.625–1.25 mg amlodipine once daily and had samples available on both a hypertensive visit and the first visit target SBP was achieved. Additionally, healthy cats ≥ 9 years old (n = 25) and normotensive cats diagnosed with CKD (plasma creatinine ≥177 μmol/L in conjunction with USG <1.035; n = 25) were identified. NT-proBNP concentration was measured at an external laboratory. If necessary, variables were log-transformed to meet normality of distribution. Binary logistic regression was used to investigate NT-proBNP as a predictor of hypertension (using the healthy and CKD cats as comparator group) and TOD (using noTOD as comparator group). Comparisons between groups and of response to treatment were performed using Mann-Whitney U and Wilcoxon rank sum tests respectively.

Higher NT-proBNP concentration significantly increased the probability for a cat to be hypertensive (Odds ratio log(NT-proBNP) = 1.7, [95% confidence interval 1.1, 2.6], *P* < 0.01), but could not reliably predict TOD (*P* = 0.092). NT-proBNP concentration was however significantly higher in cats with TOD than in cats with no TOD (295.0 [123.8, 543.5] pmol/L versus 124.0 [77.0, 283.0] pmol/L; *P* < 0.05). NT-proBNP concentration decreased by 61.5% (*P* < 0.01) with antihypertensive treatment (to 113.5 [71.6, 246.3] pmol/L) in cats with TOD, and by 33.1% (to 83.0 [77.0, 188.5] pmol/L) in cats with noTOD. SBP was not significantly different between groups at time of diagnosis of hypertension (182.8 [168.2, 204.6] versus 180 [175.8, 187.2] mmHg, *P* = 0.747).

These data suggest that increased plasma NT-proBNP concentration predicts hypertensive status in cats. Cats without TOD have significantly lower NT-proBNP concentrations at diagnosis of hypertension than cats with TOD. NT-proBNP concentration decreases with effective antihypertensive treatment. Further studies are required to determine whether NT-proBNP remains elevated in cats with poorly controlled blood pressure.

Disclosures: Esther Bijsmans's PhD is funded by Zoetis.

Jonathan Elliott:

Consultancies: Bayer Animal Health, CEVA Animal Health, Orion Inc, Elanco Animal Health, Zoetis Ltd, Boehringer Ingelheim, Vetoquinol Ltd., Waltham Centre for Pet Nutrition, Idexx Ltd., Research Funding, Novartis Animal Health, Royal Canin Ltd, Zoetis, CEVA Animal Health / Orion Inc.

Membership of advisory groups supported by industry: International Renal Interest Society, European Emesis Council.

ESCG-P-1**HYPOVITAMINOSIS D IS ASSOCIATED WITH POOR OUTCOME IN DOGS WITH PROTEIN LOSING ENTEROPATHY.**
K. Allenspach, J. Rizzo, Y.M. Chang. Royal Veterinary College, North Mymms, UK

Hypovitaminosis D has previously been shown to be prevalent amongst dogs with protein losing enteropathy (PLE). Outcome is generally poor in canine PLE, and there is a lack of studies identifying underlying risk factors. The hypothesis of this study was that low vitamin D₃ serum concentrations could be a risk factor for bad outcome in such patients. Medical records for dogs seen at the Royal Veterinary College between 2005 and 2014 were reviewed to identify dogs with a diagnosis of PLE confirmed by histopathology. Dogs were included in the study if they had serum samples frozen within 30 minutes after sampling, had been kept at -80 degrees C until analysis, and if clinical activity scoring (CCECAI) had been recorded at the time of diagnosis. Forty-three dogs were included in the study. Follow-up with referring veterinarians was made to determine outcome of patients. Patients were divided into 2 groups: patients deceased due to PLE (poor outcome group, n = 22) and patients alive or deceased due to another disease (good outcome group, n = 21). Treatments for patients were allocated to 2 groups: one group consisted of patients who were prescribed diet only and the other group received diet and immunosuppressive agents. Samples were sent on dry ice to Michigan State University's Diagnostic Center for Population and Animal Health. Ionised calcium (iCa) was measured using an ion specific electrode and 25(OH)D was measured using a commercially available radio-immunoassay that has been validated for use in veterinary medicine. Comparisons of outcome groups for age, CCECAI, treatment, serum 25(OH)D and iCa were performed using a Mann-Whitney U test or Chi². Logistic regression analysis was performed to determine possible risk factors for poor outcome.

Results: CCECAI scores, age, and iCa concentrations between the 2 groups were not significantly different. There was a significantly greater number of dogs treated with food alone in the group with good outcome (13/22) than in the poor outcome group (2/21, $P = 0.001$). Furthermore, median serum 25(OH)D concentration was significantly lower in patients with poor outcomes (16.5 nmol/L, range 0–66 nmol/L) compared to patients with good outcomes (37 nmol/L, range 6–81 nmol/L, $P = 0.017$). Using logistical regression, 25(OH)D serum concentration was a statistically significant factor for poor outcome ($P = 0.03$), with an increase of 25(OH)D serum concentration reducing the odds of having a poor outcome (odds ratio = 0.96, 95% CI: 0.93–0.997).

Further studies are required to investigate vitamin D as a potential adjuvant therapeutic agent in PLE patients.

Disclosures: No disclosures to report.

ESCG-P-2**PATHOGENICITY INVESTIGATION OF *CAMPYLOBACTER JEJUNI*, *C. UPSALIENSIS* AND *C. HELVETICUS* ISOLATED FROM DOGS AND CATS USING *GALLERIA MELLONELLA* LARVAE.**
K. Bojanic, A.C. Midwinter, P.J. Biggs, J.C. Marshall, E. Acke. Massey University, Palmerston North, New Zealand

Campylobacter jejuni (CJ), *C. upsaliensis* (CU) and *C. helveticus* (CH) are commonly isolated from dog and cat faeces but association with clinical signs is discordant or lacking. CJ is a recognized human pathogen, CU is considered an 'emerging' pathogen and CH is not considered pathogenic despite a high level of genetic similarity. Recently, the Greater Wax Moth, *Galleria mellonella*, was described as an animal model of disease; these invertebrates have a high degree of functional and structural homology with the mammalian innate immune system. This study aimed to evaluate the pathogenic potential of CJ, CU and CH using the *Galleria mellonella* larvae model.

Twelve isolates of CJ, 14 of CU and 11 of CH from dogs and cats were used for the inoculation of 2490 larvae. Inocula were prepared by suspending isolates in phosphate-buffered saline (PBS) from which 3 100-fold dilutions were made. Each dilution was tested in duplicate sets of 10 larvae. Each larva was injected with 10–15 µL into the haemocoel via the last left pro-leg using 31G

insulin syringes. Controls consisted of 246 PBS inoculated larvae and 267 un-inoculated larvae. Survival of larvae at 37 °C in a H₂-enriched microaerobic atmosphere was monitored for 8 days post-injection. One subset of isolates was grown in Mueller-Hinton broth and used for the preparation of secretory products, and another grown on blood-agar and suspended in PBS for heat inactivation of 10 minutes at 100 °C for testing of whole-cell lysates and heat-stable insoluble and soluble components.

The overall median survival of larvae was 80% with CJ [IQR 10–100], 100% with CU [IQR 80–100], 100% with CH [IQR 60–100], 100% with PBS [IQR 92–100] and 100% for un-inoculated larvae [IQR 100–100]. A dose-dependent association was evident for each species with larval survival being similar between a low bacterial dose and PBS. Larval survival presented a consistent pattern between species for medium and high bacterial loads; CJ had a higher and faster larval death rate than CU and CH ($P < 0.001$), but no difference was observed between CU and CH ($P = 0.06$). There were no significant differences between species in any of the assays with secretory products, inactivated cells and soluble/insoluble cellular components. The observations within this invertebrate disease model support a varying pathogenic potential between the species studied that appears related to the (patho)biology of the species rather than their cellular components or metabolic products. The invertebrate animal model is promising in comparative pathogenicity studies.

Disclosures: No disclosures to report.

ESCG-P-3**THE INFLUENCE OF A MODERATE INTENSITY SHORT DURATION EXERCISE ON SERUM C-REACTIVE PROTEIN AND FECAL S100A12 CONCENTRATIONS IN ADULT DOGS.**
A. Grellet¹, S. Dubois¹, A. Feugier¹, C. Girardet², S. Magnan², V. Andréo², G. Trombini², C.A. Boehringer¹, J. Suchodolski³, J. Steiner³. ¹Royal Canin, Aimargues, France, ²Veterinary Department of the French Army Health Service, Suippes, France, ³Gastrointestinal Laboratory, Texas A&M University, College Station, TX, USA

Acute stress from medium or high duration high-intensity exercise has been reported to be associated with an increase in serum C-reactive protein (CRP) concentrations, an important acute-phase reactant in dogs. However, the effect of exercise on fecal S100A12 concentration, a biomarker of intestinal inflammation has not previously been evaluated in dogs. The goal of this study was to determine if moderate intensity short duration exercise causes an increase in CRP and/or S100A12 concentrations in dogs, potentially leading to misinterpretation of their results.

37 adult military working dogs (German and Belgian Shepherd dogs; 36 males; mean age = 4 years [1.3–7.9]) were included in the study. Fecal quality, fecal S100A12, and serum CRP concentrations were evaluated just before and after standardized exercise (30 minutes of bikejoring at a speed of 16 km/h). Fecal quality was evaluated based on a 5-point scale (from 1: liquid to 5: dry and hard feces). Fecal S100A12 and CRP concentrations were assayed with previously validated ELISA tests. Data were analyzed with an ANOVA test for repeated measurements (SAS software). Results are presented as medians and ranges.

Serum CRP concentrations increased significantly after exercise (median before and after exercise 5 mg/L [2–12] and 6 mg/L [5–12] ($P = 0.002$)). Also, fecal S100A12 concentrations were significantly higher after exercise compared with baseline concentrations (6 ng/g [2–437] versus 4 ng/g [1–389], $P = 0.043$). No significant effect of exercise on fecal score was observed (4 [2.5–4.5] before and after the exercise; $P = 0.482$).

Our study demonstrates that a moderate-intensity, short-duration effort performed by healthy army dogs causes significant increases in fecal S100A12 and serum CRP concentrations, as compared with baseline values, but within the respective reference intervals. Therefore, a moderate exercise does not present a confounding variable in the interpretation of fecal S100A12 or serum CRP concentrations in healthy dogs.

Disclosures: This study was performed thanks the financial support of Royal Canin.

ESCG-P-4

ASSESSMENT OF IMAGE QUALITY PRODUCED BY A NOVEL GI IMAGING DEVICE USED IN CLIENT-OWNED DOGS. T. Hardy¹, J.A. Solomon¹, T.M. Archer², J. Thomason², M. Denburg³. ¹Infiniti Medical, Menlo Park, CA, USA, ²Mississippi State University, Mississippi State, USA, ³University of Pennsylvania, Philadelphia, PA, USA

Imaging is an integral part of the work-up of canine gastrointestinal (GI) disease. Radiography and ultrasonography are non-invasive modalities that can evaluate the bowel, but many findings lack desirable sensitivity or specificity. Endoscopy directly visualizes GI mucosa, but is limited by the length of the endoscope and the need for general anesthesia, advanced training and expensive equipment. Ambulatory light-based imaging (ALI) is a new imaging modality that utilizes high-resolution cameras, a microprocessor, and LED illumination to non-invasively visualize the gastrointestinal mucosa. ALI is performed by oral administration of a fully automated device the size of a pill that is propelled by peristalsis.

The aim of this study was to analyze image quality and GI transit times in a series of 5 client owned dogs undergoing ALI. Dogs were food-restricted for 24 hours before and 8 hours after capsule administration. Capsules were retrieved and images were downloaded and analyzed. Video clips of 300 frames duration were obtained from the stomach; proximal, middle and distal small intestine; and proximal colon for assessment of image quality. 3 internists rated the images on a scale of 1–10 (1 = poor, 10 = excellent) based on clarity and resolution of images, and obscuration of the mucosa by fluid, bubbles or debris. Scores for each region were compared using general estimating equation analysis.

Gastric and small intestine transit time were calculated based on visualization of passage of the capsule from the stomach to duodenum, and ileum to colon. Clinical analysis of the entire video was performed by one of the authors.

ALI was successfully performed in 5/5 patients, with no adverse effects. Average study duration was 15.7±4.1 hours and mean image acquisition count was 22,572±17,315. Gastric and small intestinal transit times were 79.2±39.8 minutes and 119.4±43.7 minutes, respectively. Median (range) image quality scores were 9 (8–10), 8 (6–10) and 6 (5–9), for the stomach, SI and colon, respectively. Image quality scores were significantly higher in the stomach and SI than in the colon ($P < 0.001$). Visualized lesions were consistent with GI ulcers (2 dogs), inflammatory bowel disease (1 dog), and bilious vomiting syndrome (1 dog). One dog receiving chronic NSAIDs had a normal study.

Ambulatory light-based imaging resulted in good to excellent image quality throughout most of the GI tract. Bowel preparation should be considered to enhance visualization of the colon. ALI was safe and easy to perform in ambulatory dogs, and should therefore be considered in the work-up of canine GI disease.

Disclosures: Drs. Hardy and Solomon are employed by Infiniti Medical

ESCG-P-6

ESTABLISHMENT OF A SEVERITY SCORING SYSTEM FOR OUTCOME PREDICTION IN DOGS WITH PANCREATITIS. P.C. Liu¹, F.R. Wu², Y.J. Lee³, B.L. Su³. ¹Graduate Institute of Veterinary Medicine, National Taiwan University, Taipei, Taiwan, ²National Taiwan University Veterinary Hospital, National Taiwan University, Taipei, Taiwan, ³Institute of Veterinary Clinical Sciences, National Taiwan University, Taipei, Taiwan

Canine pancreatitis is the most common exocrine pancreatic disorder. The prognosis of canine pancreatitis is variably and no logistic regression constructed severity scoring systems are available. Four hundred and thirty nine dogs diagnosed as pancreatitis with acute onset of compatible clinical signs, a positive SNAP[®] cPL[™] Test, and/or associated abdominal ultrasonographic abnormalities between January 2009 and December 2012 were presented at National Taiwan University Veterinary Hospital (NTUVH). One hundred and three dogs hospitalized with complete medical therapy and outcomes were selected for further analysis. The 103 dogs were divided into survival (n = 61) and non-survival (n = 42) groups. Forty-seven parameters including signalment, clinical

signs, physical examinations, clinicopathological examination, complications and concurrent diseases were analyzed and compared between the 2 groups. Logistic regression analyses were performed in this study. Variables with $P \leq 0.1$ were considered for further analyses. The mortality in this study was 40.8%. Age, heart rate, respiratory rate, white blood cell count, albumin, BUN, creatinine, potassium, presence of systemic inflammatory response syndrome (SIRS) and presence of oliguria or anuria were selected for constructing the scores. Continuous variables outside the reference interval were separated into quartiles to yield quartile-specific odds ratios (ORs) for survival. Based on the integer value of the OR, the scoring system was then developed by incorporating weighting factors assigned to each quartile. A predictive total score was calculated for each dog by summing all weighting factors. The total scores of each dog ranged from 10 to 70. The severity scores in this study achieved an area under the receiver operating characteristic (AUROC) of 0.871. The optimal cut-off point for discriminating outcome was 24.5 with a sensitivity of 78.6% and specificity of 90.2%, respectively. The mortality was 84.6% with a score ≥ 25 , whereas 14.1% with a score ≤ 24 . There was a significant difference ($P < 0.001$) between the 2 groups separated by the cut-off point. The severity scoring system of this study provides a reliable and clinical applicable method to predict clinical outcome in dogs with pancreatitis.

Disclosures: No disclosures to report.

ESCG-P-7

THE CANINE INTESTINE – IMPORTANT FOR INDEPENDENT GLUCOCORTICOID METABOLISM? N.B. Luckschan-der-Zeller. University of Veterinary Medicine, Vienna, Austria

Glucocorticoids (Gcs) are known for their anti-inflammatory and immunomodulatory properties and are therefore often used in the therapy of canine inflammatory bowel disease (IBD). It was recently shown that endogenous Gcs are also produced in the intestinal epithelium of men and mice and influence the gastrointestinal immune system in case of inflammatory or neoplastic conditions.

Thus, the aim of this project was to prove that Gcs can be produced or metabolized in the canine intestinal epithelium.

Five healthy Beagle dogs were included into this prospective study. All dogs were clinically examined, given a clinical score using the canine IBD activity index (CIBDAI) scoring system, also gastrointestinal endoscopy was performed. Mucosal biopsy specimens from duodenum were examined histologically from a board certified pathologist using the WSAVA grading. Biopsy incubation of 8–10 endoscopic mucosal biopsies in tissue culture medium with ³H-labeled progesterone in the absence of any stimulation was performed. The mean age of the included dogs was 3.24±1.9 years, the mean weight was 17.8±1.8 kg. All Beagle dogs had a mean clinical score of 0+0. The mean WSAVA scoring was 2+1.2. After 4 hours, supernatant was harvested and radioactive progesterone metabolites formed were detected using high performance liquid chromatography plus liquid scintillation counting.

In all dogs the ³H-progesterone was metabolized into various steroid species, nevertheless a local production of cortisol could not be proven.

In summary, it could be shown that precursors of Gcs can be metabolized by healthy canine intestinal mucosal tissue.

Disclosures: No disclosures to report.

ESCG-P-8

CARDIAC INJURY DETECTED BY TROPONIN IS ASSOCIATED WITH PANCREATITIS DETECTED BY DGGR-LIPASE IN DOGS AND CATS. J. O'Brien, K. McConnell. University College Dublin, Dublin, Ireland

We studied the relationship between pancreatitis and cardiac injury in dogs and cats. Previously, we validated a cardiac troponin I (cTnI; Vet J 185:50–7, 2010) assay for sensitive and specific detection of cardiac injury in domestic animals. We found various non-cardiac diseases of dogs and cats were associated with

cardiac injury detected by serum cardiac troponin I, including some cases of pancreatitis. Also, we validated the DGGR-lipase assay for cost-effective, sensitive and specific detection of pancreatitis in dogs and cats (Vet Clin Path 41:E10-11, 2012; 42:E14-15, 2013). Herein, we tested the hypothesis that pancreatitis was associated with cardiac injury. cTnI was measured by Advia Centaur TnI-Ultra assay; DGGR-lipase by the Randox colourimetric assay. We retrospectively analysed data from dogs and cats admitted to UCD veterinary hospital in which both cTn and lipase had been measured. Upper limit of reference range for lipase in dogs is 80 U/L; we consider 80–150 indicative of mild pancreatitis, 150–500 moderate, and >500 as marked. Upper limit of reference range for lipase in cats is 25. Reference range for cTnI is < 0.054 ug/L for dogs and cats. We consider 0.054–0.15 indicative of mild cardiac injury, 0.15–1 as moderate, and >1.0 as marked. 145 dogs and 19 cats had both lipase and cTnI measured. 78 dogs had normal troponin; 113 had normal lipase and 43 had normal lipase and normal cTnI. 32 dogs (22%) had pancreatitis as indicated by increased lipase. In 18(56%), pancreatitis was mild, in 9(28%) it was moderate, and in 5(16%) it was marked. 67 of 145 dogs had increased cTnI: mild in 33(49%), moderate in 22(33%), and marked in 12(18%). Cardiac injury in dogs with pancreatitis was absent in 28%, mild in 34%, moderate in 25%, and marked in 13%. 13 of 19 cats had normal cTn; 10 had normal lipase. 6 of 19 cats had pancreatitis, severely in 3. Lipase and cTnI was correlated ($r = 0.7$) for dogs and cats. We conclude that both pancreatitis and cardiac injury, as indicated by high-sensitivity and high-specificity assays Randox-DGGR-lipase and Centaur-cTnI, respectively, are not uncommon in veterinary hospital cases. We confirm and extend our previous work. Pancreatitis in dogs and cats is typically associated with cardiac injury. Severities of pancreatitis and cardiac injury are correlated. For ~40% of dogs and cats with pancreatitis, cardiac injury is moderate to marked.

Disclosures: No disclosures to report.

ESCG-P-9

COMPARISON OF CONFOCAL ENDOMICROSCOPY AND OTHER DIAGNOSTIC MODALITIES TO DETECT INTRACELLULAR HELICOBACTER IN DOGS. M. J. Sharman¹, K.W. Simpson², B. Bacci¹. ¹University of Melbourne, Parkville, Vic., Australia, ²Cornell University, Ithaca, NY, USA

Intracellular colonization may serve as a protected niche where *Helicobacter* spargonisms evade effective treatment, contributing to recolonization. Confocal endomicroscopy (CEM) is an endoscopic modality allowing in vivo gastrointestinal imaging at high resolution; and has aided real-time identification of *Helicobacter pylori* and intracellular and mucosally associated bacterial. In dogs, non-*Helicobacter pylori*-*Helicobacter* (NHPH) are described intracellularly. The objective of this study was to determine the utility of CEM to identify NHPH in dogs compared with other diagnostic modalities; and to assess its ability to identify intracellular organisms.

Fourteen clinically healthy dogs underwent standard gastroendoscopy followed by CEM using topical acriflavine. Images were obtained using CEM at a minimum of 5 sites within the stomach. Endoscopic pinch biopsies were obtained for histopathology, polymerase chain reaction (PCR) and fluorescence *in situ* hybridisation (FISH). Methodologies were compared for their sensitivity in detecting the presence and distribution of NHPH and their ability to identify intracellular organisms.

CEM provided high quality images allowing in vivo identification of NHPH in 13 dogs, as did FISH post-procedure analysis. Standard histopathology identified NHPH in only 11. NHPH were identified within the superficial gastric mucus, and gastric pits. Distribution throughout the stomach was diffuse and multi-focal. CEM findings correlated with FISH and PCR, however only FISH enabled identification of intracellular NHPH which were present in 13 of 14 dogs.

CEM provides in vivo histology images and is capable of identifying NHPH during gastroscopy, but is unable to identify intracellular organisms using the current fluorophore protocol. NHPH in the canine stomach are commonly identified intracellularly.

Disclosures: Dr Sharman has shares in Optiscan Imaging Pty Ltd.

ESCG-P-10

ORAL COBALAMIN SUPPLEMENTATION IN CATS WITH HYPOCOBALAMINEMIA. L. Toresson¹, J.M. Steiner², J. Suchodolski², M. Göransson¹, L. Elmgren¹, T. Spillmann³. ¹Evidensia Specialist Animal Hospital, Helsingborg, Sweden, ²GI Lab, Texas A&M University, College station, TX, USA, ³Helsinki University, Helsinki, Finland

Chronic enteropathies (CE) and exocrine pancreatic insufficiency (EPI) can both cause hypcobalaminemia in cats. Current supplementation protocols for cobalamin in cats call for repeated parenteral injections. In humans, several studies have reported equal efficacy of oral administration of cobalamin. There is also evidence that oral supplementation is effective in dogs with hypcobalaminemia. Recently, it has also been reported that oral cobalamin substitution restores normocobalaminemia in healthy elderly cats. The purpose of this retrospective case series was to evaluate whether oral cobalamin supplementation can restore normocobalaminemia in hypcobalaminemic cats with chronic enteropathies.

A computerized database search for cats treated at Evidensia Specialist Animal Hospital, Helsingborg, Sweden during 2012–2015 was performed. Inclusion criteria were cats with symptoms of CE, an initial serum cobalamin concentration below 275 pmol/L (reference interval: 199–984 pmol/L) and daily oral treatment with cyanocobalamin (1 mg/tablet; 1/8–1/4 tablet/cat daily). Follow-up serum cobalamin concentration was measured 28 to 94 days after initiation of daily oral cobalamin supplementation.

Thirteen cats aged 2–14 years (median 8) of 4 different breeds met the inclusion criteria. Presenting complaints included vomiting (7/13), anorexia (5/13), diarrhea (3/13), weight loss (2/13), and lethargy (2/13). Increased Pancreas Specific Lipase (Spec fPL[®]) serum concentrations were reported in 3/11 cats and 4/13 had increased serum alanine transaminase activity. Feline serum trypsin like immunoreactivity (fTLI) was determined in 5/13 cats revealing results within the reference interval. All cats had an abdominal ultrasound, 9/13 had changes related to the gastrointestinal tract such as mild-moderate thickening of the small intestinal wall, thickening of the muscularis layer, poor definition of intestinal wall layers, and/or enlargement of the mesenteric lymph nodes. Histopathology was performed in 6/13 cats, revealing small intestinal inflammation in 5 cats and small intestinal lymphoma in one. Serum cobalamin increased in all cats with treatment. The concentration difference ranged from 517 to 1330 pmol/L (mean: 760 pmol/L). Mean (\pm standard deviation) serum cobalamin concentrations were 177 (\pm 49) pmol/L before and 931 (\pm 324) pmol/L after supplementation. This difference was statistically significant ($P < 0.0001$, paired t-test).

Our results suggest that oral cobalamin supplementation is effective in normalizing serum cobalamin concentrations in cats with various enteropathies. Prospective studies are warranted comparing cellular cobalamin status in cats being treated with parenteral or oral cobalamin supplementation.

Disclosures: No disclosures to report.

ESCG-P-11

EVALUATION OF MICROPARTICLE PROCOAGULANT ACTIVITY IN DOGS WITH IDIOPATHIC INFLAMMATORY BOWEL DISEASE. A. M. Leça Jacinto¹, B. Griensteidl², E. Milne¹, S. Wright¹, D. Shaw¹, A. Ridyard³. ¹R^DSVS and The Roslin Institute, Roslin, Scotland, ²Department for Companion Animals and Horses, University of Veterinary Medicine, Vienna, Austria, ³University of Glasgow Small Animal Hospital, School of Veterinary Medicine, Glasgow, Scotland

Pulmonary thromboembolism (PTE) is observed in dogs with idiopathic-inflammatory-bowel disease (IBD) and particularly with protein-losing enteropathy (PLE). Hypercoagulability has been attributed to antithrombin (AT) loss although the pathogenesis is likely to be more complex.

In humans, where venous thromboembolism (TE) is a well-recognised complication of Crohn's disease and Ulcerative colitis, the pathogenesis of TE is still not completely understood. Derangements in procoagulant and anticoagulant factors have been demonstrated, including increased circulating procoagulant microparticles (MPs).

The aim of this pilot study was to evaluate MP-procoagulant activity in the plasma of dogs with IBD and PLE using a functional ELISA assay (Zymuphen-MP-Activity, Aniara). We hypothesised that all dogs with PLE and a subset of dogs with IBD but without PLE would have increased levels of circulating MPs.

The study group consisted of 11 dogs with IBD, including 4 with PLE. Diagnosis was based on compatible clinical and histopathology and exclusion of other causes of chronic gastrointestinal disease. PLE was defined as IBD plus hypoproteinaemia (serum total protein <58 g/l) and hypoalbuminaemia (serum albumin <26 g/l). PTE was diagnosed in one dog with PLE, and suspected in a second.

A control group comprised 8 healthy dogs undergoing blood sampling for reasons unrelated to the study including blood donor screening (n = 6) and health assessment (n = 2). Dogs were considered healthy based on owner evaluation, physical examination, haematology and serum biochemistry.

Median MP procoagulant activity in dogs with IBD was 10.38 nM (range 0.00–32.08) compared with 7.25 nM (range 0.00–70.73) in the control group. Median MP activity in PLE dogs was 23.16 nM (range 0.00–32.08) compared with 7.86 nM (range 2.9–21.32) in non-PLE IBD dogs. Using Kruskal-Wallis test for non-parametric data and Dunn's multiple comparisons test the groups were not statistically different.

Interestingly, MP-procoagulant activity value in the dog with documented PTE was 0.0 nM; in the dog with high clinical suspicion for PTE, MP-procoagulant activity was 32.08 nM.

The highest MP-procoagulant activity was detected in a healthy control dog, raising concerns for pre-analytical or sampling error. Removing this measurement had no impact on statistical analysis, which remained nonsignificant.

MP-procoagulant activity >10 nM is considered clinically relevant in humans. Employing a similar cut-off, 2/8 of controls, 6/11 of IBD and 3/4 of PLE group would be defined as having increased levels of circulating MPs.

Further studies are required to fully evaluate the clinical relevance and diagnostic potential of MP evaluation.

Disclosures: No disclosures to report.

ESCG-P-12

ANALYSIS OF THE ILEAL AND COLONIC MUCOSAL MICROBIOTA IN CANINE CHRONIC ENTEROPATHIES. E. Cassmann¹, R. White¹, T. Atherly², C. Wang¹, Y. Sun¹, S. Khoda³, C. Moser¹, M. Ackermann¹, A. Jergens¹. ¹Iowa State University, Ames, IA, USA, ²USDA-ARS, Ames, IA, USA, ³University of Iowa, Iowa City, IA, USA

The intestinal microbiota is increasingly linked to the pathogenesis of chronic enteropathies (CE) in dogs. While imbalances in duodenal and fecal microbial communities have been associated with mucosal inflammation, relatively little is known about alterations in mucosal bacteria seen with CE involving the ileum and colon. The aim of the present study was to use fluorescence in situ hybridization (FISH) techniques to investigate the composition and spatial organization of mucosal microbiota in endoscopic biopsies obtained from dogs with CE and controls. Tissue sections from the ileum and colon from 19 dogs with inflammatory bowel disease (IBD), 6 dogs with granulomatous colitis (GC), 12 dogs with intestinal neoplasia, and 15 controls were studied by FISH targeting the 16S rRNA genes of total bacteria, group-specific organisms, and individual bacterial species shown to be relevant in human IBD. The numbers of mucosal bacteria were analyzed using generalized linear models for each of the colon and ileum tissues, with Spearman's rank correlation coefficients used to test the correlation between mucosal microbiota and inflammatory (CIBDAI score, histopathology) indices. The ileal and colonic mucosa of healthy dogs and dogs with CE was predominantly colonized by bacteria localized to free and adherent mucus compartments. Dogs with CE harbored more ($P < 0.05$) mucosal bacteria belonging to the *Clostridium-coccoides*/*Eubacterium rectale* group, *Bacteroides*, *Enterobacteriaceae*, and *Escherichia coli* versus controls. Within the CE group, IBD dogs had increased ($P < 0.05$) *Enterobacteriaceae* and *E. coli* bacteria attached onto surface epithelia or invading within the intestinal mucosa. Bacterial invasion with *E. coli* was present in the ileal and colonic mucosa of dogs with GC ($P < 0.05$). Dogs with intestinal neoplasia had increased ($P < 0.05$) adherent (total bacteria, *Enterobacteriaceae*, *E. coli*)

and invasive (*Enterobacteriaceae*, *E. coli*, and *Bacteroides*) bacteria in biopsy specimens versus all other groups. Increased numbers of total bacteria adherent to the colonic mucosa were associated with clinical disease severity (CIBDAI score) in IBD dogs ($P < 0.05$). These results indicate that histopathologic lesions of canine CE are associated with different populations in ileal and colonic mucosal microbiota. These spatial, segment-specific structure and differential response of select bacterial groups to intestinal inflammation may be pivotal regarding the functional consequences of these alterations in the pathogenesis of canine CE.

Disclosures: No disclosures to report.

ESVCN-P-1

INACCURACY WHEN USING TAPE MEASURES TO MAKE ZOOMETRIC MEASUREMENTS IN DOGS. A. J. German, S. L. Holden. University of Liverpool, Neston, UK

Abdominal girth is used as an indicator of human adiposity, with such measurements being made by tape measure. Given concerns in precision and accuracy of repeat measurements, some tape measure designs have inbuilt mechanisms to improve consistency. Although body condition scoring is the most common method of assessing adiposity in dogs, zoometric systems have also been developed requiring the use of a tape measure. However, the precision and accuracy of such zoometric measurements are not known. The aim of this study was to determine the precision and accuracy of 3 different types of tape measure for a variety of dimensional measurements.

A variety of length (head, forelimb, hindlimb) and circumferential (neck, thorax, and abdomen) were made using 3 different tape measures, 2 of which were designed to improve precision (standard tape; Myotape™ and Gulick II™). To assess intra-operator variability, 12 measurements were taken for 5 consecutive days from 4 healthy dogs; to assess inter-operator variability, 3 operators independently took 12 measurements from a group of 16 dogs of various breeds and sizes.

For intra-operator comparisons, precision was good overall (coefficient of variation [CV] ≤3% for all measurements). For inter-operator comparisons, precision was more variable and, although reasonable on average (mean CV 2–5%), it varied depending upon tape measure type ($P = 0.027$; greatest for standard tape measure, least for Gulick II™), and could be highly variable for some measurements in individual dogs (maximum CV 16% for head measurements with standard tape measure). Significant differences also existed in the absolute results of circumferential measurements taken by the different tape measure types (neck $P = 0.012$; thorax $P < 0.001$; abdomen $P < 0.001$). Finally, significant operator differences were also evident for some measurements (head $P = 0.023$; hindlimb $P = 0.004$), but not for others (forelimb $P = 0.053$; neck $P = 0.102$; thorax $P = 0.073$; abdomen $P = 0.062$).

In summary, although precision for individual operators making zoometric measurements is good, significant inter-operator and tape type differences exist. These results have implications for systems using a range of zoometric measures to assess adiposity. In order to ensure precision and accuracy, it is recommended that the same operator take all measurements with the same type of tape.

Disclosures: The study conducted was not supported by a research grant. AJG's Readership is funded by Royal Canin; AJG has also received financial remuneration and gifts for providing educational material, speaking at conferences, and consultancy work; SLH's post at the University of Liverpool is also funded by Royal Canin.

ESVCN-P-2

IDENTIFICATION OF THE PALPATION SITE IN THE DIAGNOSIS OF BODY CONDITION SCORE IN DOGS. K. Koizumi¹, M. Noda¹, C. Shimokawa¹, A. Kusumi², T. Kobayashi¹, T. Watari³, K. Otsuji¹. ¹Teikyo University of Science, Tokyo, Japan, ²Grace Animal Hospital, Tokyo, Japan, ³Nihon University, Fujisawa, Japan

Body condition score (BCS) is a method that is commonly used in the diagnosis of nutritional status in small animals. However,

this method is subjective due to its sensory evaluation. Therefore, the improvement of the precision of the BCS diagnosis is expected. Our previous study has shown that the BCS model that we created improved the precision of the BCS diagnosis (1). However, a palpation site was not identified. A palpation site must be the site where thickness of subcutaneous fat is able to capture for measuring animal's obesity status. Therefore the objective of this study was to find a remarkable body site of the changes with obesity status using ultrasonic diagnostic equipment.

Nine dogs which varied in the percent of body fat were used in this study. The percent of body fat was measured by a body fat analyzer for dog (Kao). The image analysis of a palpation site was evaluated using echo, Xario SSA-660A (Toshiba) which attached to a linear probe. The measurement points were 1, 2 and 3 o'clock positions on the ribs of T6, T9 and T12. The distance (D) from skin surface to the rib was measured in the echogram. The distance (L) from scapula to ilium was measured to offset the difference in physique by dog breeds. The D/L was used to compare relative value of the quantity of fat at each measurement point.

BCS of dogs which used in this study were from BCS of 2 to BCS of 4. There were no dogs in BCS of 1 and BCS of 5. A statistically significant correlation was found between BCS and D/L value. The D/L value increased in order of T6, T9 and T12 in BCS of 3 and 4. This suggests that the thickness of subcutaneous fat in the chest is thicker at the head side than the tail side. Also, as for the D/ L value from back to abdomen, the highest value was found at the position of 11:00 and 1:00. This tendency was the most remarkable in BCS of 4 but no difference in the D/L value was recognized in the dogs in BCS of 2. In conclusion, the position of 1:00 or 11:00 on the T6 is the suitable palpation point at the chest.

(1) K. Otsuji, M. Suzuki, N. Furukawa, N. Kobayashi, A. Koizumi, A. Kusumi, T. Kobayashi. Efficacy of the body condition score (BCS) model in the BCS diagnosis WSAVA Proceeding p481, 2014.

Disclosures: No disclosures to report.

ESVCN-P-3

EFFICACY OF THE BODY CONDITION SCORE MODEL IN THE NUTRITIONAL DIAGNOSIS IN DOGS. K. Otsuji, K. Koizumi, S. Mitsuhashi, T. Kaneko, N. Kobayashi, T. Kobayashi. Teikyo University of Science, Tokyo, Japan

Body condition score (BCS) is a method that is commonly used in the diagnosis of nutritional status in small animals. BCS has been recognized as one of the screen method of nutrition diagnosis by American Animal Hospital Association in 2010. However, this method is subjective due to its sensory evaluation. Therefore we made a BCS model to increase the precision of the BCS diagnosis and have shown the efficacy of the BCS model (1). However, the prototype model which we have reported before tended to have higher BCS than a target BCS. Therefore, we improved the BCS model in this study.

Sixty seven dogs which varied in the BCS were used in this study. Body fat percentage was measured by using a body fat analyzer for dogs (Kao Healthlab BIF-10).

The BCS model was improved by using several rubber sheets. Relative hardness of stacking rubber sheets in each BCS was measured by Durometer MJ-DUA-C2 (SATOTEC Tokyo, Japan). BCS diagnosis of dogs was performed by pet owner by using the BCS model.

BCS of 1 represents the most hard in the BCS model and the hardness decreased linearly and it was the lowest in 5 of BCS. These values were as expected. □High correlation was recognized between BCS and body fat percentage. These results suggested the efficacy of BCS model. However, the body fat percentage in the dogs diagnosed as BCS of 1 was higher than body fat percentage which has been reported in the previous paper. There were no dogs with the body fat percentage <10% which were diagnosed as BCS of 1. We need more study in future to make clear the difference of body fat percentage between our data and data of the previous research.

The completion of this BCS model will help provide the precision of nutritional diagnosis in dogs.

(1) K. Otsuji, M. Suzuki, N. Furukawa, N. Kobayashi, A. Koizumi, A. Kusumi, T. Kobayashi. Efficacy of the body condition score (BCS) model in the BCS diagnosis WSAVA Proceeding p841, 2014.

Disclosures: No disclosures to report.

ESVCN-P-4

ALTERATIONS IN PLASMA PROTEOME OF DOGS WITH OBESITY-RELATED METABOLIC DYSFUNCTION. PRELIMINARY RESULTS. A. Tvarijonaviute¹, C. de Torre², B. Beer-Ljubić³, S.L. Holden⁴, V. Biourge⁵, P.J. Morris⁶, J. Pastor¹, J.J. Ceron⁷, A.J. German⁴. ¹Universidad Autonoma de Barcelona, Barcelona, Spain, ²Hospital Clínico Universitario Virgen de la Arrixaca ^{HCUVA}, Murcia, Spain, ³University of Zagreb, Zagreb, Croatia, ⁴University of Liverpool, Liverpool, UK, ⁵Royal Canin Research, Aimargues, France, ⁶Waltham-on-the-Wolds, Melton mowbray, UK, ⁷Universidad de Murcia, Murcia, Spain

In humans the metabolic syndrome (MS) is a well-recognised and extensively studied entity that comprises obesity, hypertension, dyslipidaemia, and glucose intolerance. It is associated with an increased risk of cardiovascular diseases and diabetes. Recently, human MS criteria were adapted for dogs to define the condition of obesity-related metabolic dysfunction (ORMD). It was observed that ORMD was associated with increased circulating insulin and decreased adiponectin concentrations, suggesting that in dogs, as in humans, there are links between obesity, ORMD, and associated diseases, although pathogenetic mechanisms and health significance for dogs remain unknown. The main aim of the present study was to compare plasma proteomes of obese dogs with and without ORMD, so as to investigate the mechanisms associated with canine ORMD and their possible significance in the health status.

Eight obese dogs referred for weight management at the Royal Canin Weight Management Clinic, University of Liverpool participated in the study. Clinical assessments included physical examination, body condition scoring, blood pressure measurement and routine clinicopathological analysis. Surplus plasma was used in proteomic analysis. Samples were first treated with ProteoMiner for the depletion of high-abundance proteins and subsequently analysed by using 2-DE DIGE methodology.

Of the 8 dogs in the study, 4 dogs had ORMD and 4 dogs did not. Image analysis and further statistical analysis allowed identification of 8 spots with differential expression concentration between dogs with and without ORMD. Among the 8 spots, 3 were over-expressed and 5 were down-expressed in dogs with ORMD than in dogs that did not presented ORMD.

Although the results of the present study are preliminary and still the identification of the spots is up to be performed, the observed data reveal that dogs with ORMD present alterations in their plasma proteomes that could be responsible for the development of ORMD-related pathologies.

Disclosures: The study was funded by WALTHAM. AJG's Readership is funded by Royal Canin; AJG has also received financial remuneration and gifts for providing educational material, speaking at conferences, and consultancy work; SLH's post at the University of Liverpool is also funded by Royal Canin. VB is an employee of Royal Canin and PJM is an employee of WALTHAM.

ESVC-P-1

THE DIAGNOSTIC VALUE OF CARDIO-THORACIC RATIO FOR DETECTING THE HEART SIZE CHANGES IN DOGS. R.A. Baisan, D. Mocanu, O. Birisan, V. Vulpe. Faculty of Veterinary Medicine, Iasi, Romania

The aim of the study was to assess the diagnostic value and the discrimination potential between the normal heart size and microcardia or cardiomegaly of a method which calculates the cardiothoracic ratio (CTR) using area measurement, compared to the

vertebral heart scale method (VHS) used as reference for the cardiac size, in dogs.

One hundred-nine dog X-rays were accepted into study. The patients belonged to small and medium size breeds, 47 were males and 62 females with age between 1 and 17 years. The analogic X-rays were scanned and transferred to a computer where the VHS and CTR was calculated for each patient with a commercial software and the data was collected and processed in a statistical analysis software. The patients were distributed into groups by respiratory phase and heart size.

There was a low correlation between the VHS and CTR ($r^2 = 0.650$), but statistically significant ($p < 0.01$). A good correlation was obtained between VHS and CTR in microcardia, normal heart size and cardiomegaly groups ($P < 0.01$). Furthermore, between the CTR in dogs with microcardia and those with normal cardiac size, as well as between CTR in dogs with normal cardiac size and those with cardiomegaly, a significantly statistic difference ($P < 0.05$), respectively ($P < 0.01$), was obtained. Among the groups distributed by respiratory phase and VHS, a statistically significant difference was obtained only between normal cardiac size and cardiomegaly during inspiratory phase groups ($P > 0.01$). For the X-rays taken in inspiratory phase, a cutoff of 31.31 had a sensitivity of 80% and a specificity of 75% for diagnosing cardiomegaly.

The CTR can be considered a valid method being able to discriminate between the patients with microcardia and cardiomegaly from those with normal heart size. Moreover, it was found that a CTR over the cutoff of 31.31, measured during inspiratory phase is a good predictor for cardiomegaly.

Key words: cardiac, cardio-thoracic ratio, dog, X-ray.

Disclosures: No disclosures to report.

ESVC-P-2

ELECTROCARDIOGRAPHIC CHANGES DURING NORMAL CANINE PUERPERIUM. P.R. Batista¹, C. Gobello¹, J.P. Barrena¹, N. Re¹, S. Olguín¹, Y. Corrada¹, D.O. Arias¹, P.G. Blanco². ¹Faculty of Veterinary Sciences, National University of La Plata, La Plata, Argentina, ²CONICET, La Plata, Argentina

The canine cardiac conduction system is modified by anatomical and functional adaptations of the maternal heart during gestation. However, it is not clear if these changes persist or are modified after parturition. Therefore, the aim of this study was to describe canine electrocardiographic features during the course of normal puerperium.

Twenty healthy pure-bred, 2-5 (3.85±0.16) year-old, weighing 1.5-6 kg (3.55±0.26) bitches were included in this study. All the animals whelped healthy puppies at term which were weaned on day 60 after parturition (day 0). All the dogs were electrocardiographically evaluated on days -3, 3, 10, 17, 24, 38, 52 and 80. Mean electrical axis (MEA; degrees), P wave amplitude (Pa; mv) and duration (Pd; ms), P-R interval (PR; ms), QRS complex amplitude (QRSa; mv) and duration (QRSd; ms), Q-T interval (QT; ms), and S-T segment (ST; mv) were calculated at 50 mm/s of velocity. The RR interval immediately preceding each complex was recorded and QT interval was corrected (QTc) by Van de Water formula [QTc = QT-0.087(RR-1000)]. Later, lead II was recorded at 25 mm/sec to analyze heart rate (HR; bpm) and cardiac rhythm (CR; normal sinus rhythm or sinus arrhythmia). Values of HR, MEA, Pa, Pd, PR, QRSa, QRSd, QT, RR and QTc were analyzed by ANOVA for repeated measures followed by Tukey test. Cardiac rhythm was analyzed by Chi square test (SPSS 17.0, SPSS Inc. Chicago, IL, USA). $P < 0.05$ was considered significant.

During the study period, HR ($P < 0.01$) and QTc ($P < 0.01$) progressively decreased, while RR ($P < 0.01$) and Pa increased ($P < 0.01$). QRS complex amplitude diminished in the second week after parturition and then increased during the following weeks ($P < 0.01$). Mean electrical axis shifted to the right during this period ($P < 0.01$). On day -3, most of the bitches presented normal sinus rhythm in contrast with day 3, in which most of the bitches presented sinus arrhythmia ($P < 0.01$). From day 10 onward, all the bitches showed sinus arrhythmia. P wave duration, PR, QRSd, QT and ST remained unchanged during puerperium.

It is concluded that most electrophysiological adaptive changes of canine gestation reverted during normal puerperium. The pre-

sent study contributes to the understanding of canine cardiac physiology during this reproductive stage.

Disclosures: No disclosures to report.

ESVC-P-3

ECHOCARDIOGRAPHIC ASSESSMENT OF PREGNANT QUEENS. P.G. Blanco, R. Rodríguez, A. Carranza, A. Rube, R. Vercellini, P.R. Batista, M. Tórtora, C. Gobello. National University of La Plata, La Plata, Argentina

Cardiovascular adaptation during gestation guarantees an appropriate development of the fetuses and maternal cardiovascular maladaptation is highly correlated with adverse pregnancy outcome. While, the hemodynamic changes occurring during canine pregnancy have been described there is scarce information concerning maternal cardiac variations during feline gestation. Thus, the aim of this study was to describe cardiac morphology and systolic function variations during normal feline pregnancy.

Eighteen pregnant queens were echocardiographically evaluated (Toshiba Nemio XG, Japan, 10 MHz transducer) every 10 days from day 0 (defined as day of mating) to parturition. Left ventricular dimensions were measured in the short axis view, during M-mode tracing. Shortening fraction was calculated as (LVDd - LVDs)/LVDd x 100 to assess systolic function. Stroke volume (mL) was calculated as the product of the velocity time integral (measured by pulsed-wave Doppler) and the cross-sectional area of the aorta. Cardiac output (L/min) was calculated as the product of stroke volume and heart rate (bpm) derived from electrocardiographic monitoring. Uterine artery resistance index (RI) was obtained by Doppler ultrasound. All the parameters were analyzed by repeated measures ANOVA.

All the queens delivered healthy kittens at term. Throughout the study period, interventricular septum in diastole ($P < 0.01$) and systole ($P < 0.01$) and left ventricular diameter in diastole ($P < 0.01$) augmented during gestation. Shortening fraction ($P < 0.01$), cardiac output ($P < 0.01$) and maternal heart rate ($P < 0.01$) also increased up to parturition. Conversely, uterine artery resistance index decreased in the same period ($P < 0.01$).

It is concluded that cardiac structure and function varied during normal pregnancy in these queens. Cardiac eccentric hypertrophy, systolic function and cardiac output increases appear to be the consequences of the hemodynamic modifications occurring during pregnancy. The assessment of maternal cardiovascular function may prove a useful screening tool to detect pregnancy complications in feline reproduction.

Disclosures: No disclosures to report.

ESVC-P-4

REPRODUCIBILITY AND INFLUENCE OF AGE OF TRICUSPID ANNULAR PLANE SYSTOLIC EXCURSION (TAPSE) IN BEAGLE DOGS. A. Caro-Vadillo¹, F. Moreno-Martínez², L. García-Guasch³, J. Manubens², E. Carretón⁴, J.A. Montoya-Alonso⁴. ¹Universidad Complutense Madrid, Madrid, Spain, ²C.V. Corralejo, Fuerteventura, Spain, ³H. V. Molins, Barcelona, Spain, ⁴Universidad Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, Spain

Tricuspid annular plane systolic excursion (TAPSE) is an echocardiographic measure that allows to assess right ventricular systolic function. It has been described reference values for TAPSE in normal adult dogs, but there is no reference to influence of age in TAPSE in dogs. This influence has been reported in humans. Thus, the goal of this study is to determine the reproducibility of the measure TAPSE in normal dogs and to determine the relationship between TAPSE and age in healthy beagle dogs.

TAPSE was measured from an M-mode recording of the lateral aspect of the tricuspid valve annulus obtained through a left parasternal apical 4-chamber view. TAPSE values were averaged from measurements on 5 consecutive beats during sinus rhythm. The measurements were recorded by 2 different persons (C-V, A.; M-M F.) with different grade of experience in canine echocardiography studies. All patients had a complete 2-dimensional and Doppler study using an Envisor CHD (Philips®) ultrasound system.

Twenty-three healthy beagles were used. The study was approved by the ethical committee of Veterinary Medicine Service of Las Palmas de Gran Canaria University (Spain) and it was carried out in accordance with the current European legislation on animal protection. These dogs were divided in 3 different groups according to age: group 1 included 12 dogs under 4 years, group 2 included 3 dogs between 4 and 10 years, group 3 included eight dogs older than 10 years. We analyzed differences between groups using non-parametric (Kruskal Wallis and Wilcoxon scores (rank sums)) test. There were no differences with respect to sex. Dogs in group 1 presented higher TAPSE values than group 2 or 3 (1.33 ± 0.26 cm versus 0.98 ± 0.14 cm versus 1.13 ± 0.18 cm; $P < 0.05$). Statistic intra-observer and inter-observer agreement using the intraclass correlation coefficient was 0.99 ($P < 0.05$).

This study showed that TAPSE measurement is easily obtainable with a standard echocardiography system, and has adequate interobserver agreement. This study showed higher values of TAPSE in normal young dogs with respect to older dogs. These results are similar to the results obtained in humans, and could reflect a less effective right ventricle with age.

The values presented should be taken with caution due to the relatively small number of patients included. It may also be necessary to validate results in future studies with a second independent sample of dogs of other races.

Disclosures: No disclosures to report.

ESVC-P-5

TETRALOGY OF FALLOT IN DOGS AND CATS: A RETROSPECTIVE STUDY OF 31 CASES (2003–2014). V. Chetboul¹, I. Pitsch², R. Tissier¹, V. Gouni¹, C. Misbach¹, E. Trehiou-Sechi¹, A. Petit¹, C. Damoiseaux¹, J.L. Pouchelon¹, E. Bomassi². ¹Ecole Vétérinaire de Maisons Alfort, Maisons Alfort, France, ²CHV des Cordeliers, Meaux, France

Tetralogy of Fallot (TOF) is a congenital heart disease characterized by 4 abnormalities, i.e., pulmonic stenosis, ventricular septal defect (VSD), aortic overriding and secondary right ventricular hypertrophy, caused by anterior deviation and abnormal septation of the conal septum during the embryonic period. Few studies have reported the hemodynamic consequences and clinical outcome of TOF in small animals. The objective of this retrospective study was therefore to document the epidemiological, clinical, echo-Doppler findings, and survival, in a canine and feline population with TOF. The case records of animals diagnosed with TOF by combined use of echocardiography and Doppler examination were reviewed (2003–2014). Tetralogy of Fallot was identified in 31 animals (15 dogs, 16 cats). The most commonly represented breeds were Terriers for dogs (7/15, 46.7%), and Domestic Shorthair for cats (12/16, 75.0%). Most included animals (28/31, 90.3%) were clinically affected at the time of diagnosis. Pulmonic stenosis was characterized by a variable systolic Doppler-derived pressure gradient both in dogs (median [range] 106 mmHg [39–255]) and cats (109 mmHg [26–169]), and associated with hypoplasia of the pulmonary trunk in one third of the cases (35.7%). Most VSD were large, with a median VSD:aorta ratio of 0.60 [0.35–1.02] in dogs and 0.59 [0.18–1.15] in cats. Median age at death from cardiac cause was 23.4 months [3.5–92.9] without significant difference between dogs and cats ($P = 0.298$). These results suggest that in both cats and dogs TOF-related death occurs predominantly in young adult animals with major hemodynamic consequences at the time of diagnosis.

Disclosures: No disclosures to report.

ESVC-P-6

AGE-RELATED CHANGES IN VERTEBRAL HEART SCALE AND ECHOCARDIOGRAPHIC INDICES IN HEALTHY GERIATRIC CATS. S.H. Chiu, H.P. Huang. The Institute of Veterinary Clinical Science, National Taiwan University, Taipei, Taiwan

The aim of this study was to assess whether and how radiographic and echocardiographic cardiovascular variables differ

across age bands of healthy cats. A cohort of 98 clinically healthy cats were categorized into 3 groups: adolescent-adult (0.6–6 years; $n = 45$), middle-aged (7–10 years; $n = 28$), and geriatric (11–17 years; $n = 25$). All cats underwent a full physical examination, a complete blood count, routine biochemical profile, a baseline serum total thyroxine concentration, auscultation, non-invasive blood pressure measurements, thoracic radiography, electrocardiography, and echocardiography. Cats with hypertension, hyperthyroidism, cardiac, or renal disease were excluded from the study. Body weight, body condition score, systolic blood pressure, heart rate, and all echocardiographic indices were similar across the 3 groups. The mean (\pm standard deviation [SD]) vertebral heart scale (VHS) value obtained for the geriatric group (7.7 ± 0.6) was significantly greater than that obtained for the adolescent-adult group (7.4 ± 0.4 ; $P = 0.018$). The mean ratio of the distance between the cardiac base and dorsal sternum to thoracic cavity height at the point of the cardiac base was significantly less in the middle-aged (0.64 ± 0.04) and geriatric (0.61 ± 0.05) groups than in the adolescent-adult group (0.69 ± 0.04 ; both $P < 0.001$). The mean angle between the cardiac long axis and the body axis was significantly smaller in middle-aged ($40.4 \pm 7.7^\circ$) and geriatric cats ($40.0 \pm 7.9^\circ$) than in adolescent-adult cats ($53.1 \pm 7.3^\circ$; both $P < 0.001$). The mean angle between the cardiac long axis and the sternum of middle-aged ($36.8 \pm 6.6^\circ$) and geriatric cats ($36.2 \pm 7.9^\circ$) was significantly smaller than that in adolescent-adult cats ($42.6 \pm 5.7^\circ$; $P = 0.006$ and $P = 0.002$, respectively). Additionally, the degree of undulation of the thoracic aorta correlated positively with age ($r^2 = 0.307$, $P = 0.003$). These findings suggest that differences in the horizontal alignment of the heart, thoracic-aorta undulation, and VHS in healthy geriatric cats, relative to observations in younger cats, can be considered to be age-related.

Disclosures: No disclosures to report.

ESVC-P-7

IRREVERSIBLE PULMONARY HYPERTENSION AND TRICUSPID REGURGITATION IN YOUNG CATS SECONDARY TO DIFFERENT LUNGWORM INFECTIONS. P.E. Crisi, C. Civitella, C. Carnabuci, A. Luciani, D. Santori, D. Traversa, A. Di Cesare, G. Aste, D. Di Francesco, A. Boari. University of Teramo, Teramo, Italy

The aim of this study was to investigate the presence of pulmonary hypertension (PH) in young cats affected by single or mixed lungworm infections. Twenty-three cats infected with lungworms were examined at the Veterinary Teaching Hospital of Teramo, Italy, in 2013–2014. Animals underwent to a complete physical examination and to 2- or 3-views radiographic analysis of the thorax. A minimum database (i.e. CBC, serum biochemistry, serology for FIV antibody and FeLV antigen) was obtained for each patient. Nine cats were excluded for concomitant diseases, while 14 cats were included in the study. Microscopic identification of parasites was confirmed by molecular tests and all cats received an anthelmintic treatment.

A single infection by *Aelurostrongylus abstrusus* was diagnosed in 11 cats, while 3 cats had a *Troglostrongylus brevior* infection either alone or in combination with *A. abstrusus*. Transthoracic echocardiography was performed using an ultrasound unit with a 5 MHz phased array transducer. No structural abnormalities of the tricuspid valve and sign of pulmonary stenosis were detected. The 2-dimensional and M-mode echocardiography showed a cardiac involvement in 3 cats. One cat, infected by *A. abstrusus* and *T. brevior* showed a mild systolic tricuspid regurgitant jet with Color Doppler of 1.64 m/sec, while another *A. abstrusus*-infected cat, had mild TR of 2.2 m/sec with a mean PAPs of 29 mmHg which resolved within 4 weeks after therapy. One cat diagnosed with troglostrongylosis, showed a marked right-sided cardiac enlargement of 6 mm, and a large systolic tricuspid regurgitant jet with a TR peak velocity of 3.1 m/s recorded at continuous-wave Doppler via a Color Doppler echocardiography. The minimum pressure difference between the right ventricle and the right atrium was estimated 38 mmHg and the PAPs was at least 48 mmHg. The echocardiographic and Doppler evidence of mild PH persisted at further examination performed until 3 months after diagnosis.

PH is rare in cats, despite cases of reversible PH are known in cat aelurostrongylosis. In this study the first case of irreversible PH infection in a cat affected by *T. brevior* is presented and this finding further supports the high pathogenicity of troglstrongylosis, especially in young patients. In cats with lungworm infection, possible cardiovascular complications must be taken into account and these infections should be always considered in the differential diagnosis in cats with cardiorespiratory signs.

Disclosures: No disclosures to report.

ESVC-P-8

QUANTIFICATION OF SYSTOLIC AND DIASTOLIC RIGHT VENTRICULAR FUNCTION BY CONVENTIONAL ECHOCARDIOGRAPHY AND SPECKLE TRACKING IMAGING: A PROSPECTIVE STUDY IN 104 HEALTHY DOGS WITH DOCUMENTED PULMONARY ARTERIAL PRESSURE AND LEFT VENTRICULAR FUNCTION. C.C.M. Damoiseaux¹, L. Desquilbet², V. Gouni¹, C. Misbach¹, E. Trehou-Sechi¹, A.M. Petit¹, J.-L. Pouchelon¹, V. Chetboul¹. ¹Ecole Nationale Vétérinaire d'Alfort, Maisons-alfort, France, ²Unité d'épidémiologie Clinique et Biostatistiques, ENVA, Maisons Alfort, France

Although uncommonly assessed in veterinary cardiology,^a right ventricular (RV) function has been shown to be an important prognostic determinant of many congenital and acquired heart diseases in human patients. Our group has already demonstrated that 2-dimensional (2D) color tissue Doppler imaging provides a non-invasive evaluation of systolic and diastolic RV function in the awake dog with adequate repeatability and reproducibility.^b However, other noninvasive ultrasound imaging variables reflecting RV function need to be further investigated, particularly in correlation with pulmonary arterial pressure (PAP) values and left ventricular (LV) function.

The aim of this prospective study was therefore to assess several indices of systolic and diastolic RV function using conventional echocardiography and speckle tracking echocardiography (STE) in 104 healthy awake dogs of different breeds with documented systolic PAP (SPAP) and LV function (LV ejection fraction and global LV systolic strain assessed using the Simpson's derived method of disks and STE, respectively).

Imaging RV tested variables included Tricuspid Annular Plane Systolic Excursion (TAPSE), Right Fractional Area Change (RFAC, %), STE longitudinal systolic strain of the RV free wall (RVFW, %) and of the whole RV (i.e., global RV strain, %), STE longitudinal systolic strain rate (SR, s⁻¹) and diastolic early:late SR ratio. Additionally, 2D-guided M-mode ventricular measurements included the end-diastolic RV:LV diameter ratio (RVDD:LVDD) and the end-systolic RVFW:LVFW ratio. Correlations between imaging variables were calculated by using Spearman's correlation coefficients.

Means of age and body weight (\pm SD; range) of the study population were 4.3 years (\pm 2.6; 0.6–11.6) and 20.4 kg (\pm 10.7; 3.3–49.0), respectively.

No correlations were found between RV morphological variables (i.e., RVDD:LVDD and RVFW:LVFW ratios) and all indices of systolic and diastolic RV function. Global RV strain (mean \pm SD = 26.4 \pm 3.8%) and RVFW strain (31.9 \pm 6.2%) were positively correlated ($P < 0.01$) with RFAC (50.6 \pm 10.5%, $r = 0.36$ and $r = 0.32$, respectively), and negatively correlated ($P < 0.05$) with SPAP (17.4 \pm 7.0 mmHg [7.0–30.0], $r = -0.21$ and $r = -0.24$, respectively). SPAP was also negatively correlated with the TAPSE:body weight ratio and systolic SR ($r = -0.31$ and -0.34 respectively, $P < 0.01$).

There was no correlation between indices of LV function and STE indices of RV function, and no correlation either between STE RV indices of systolic function and the diastolic early:late SR ratio.

In conclusion, STE provides a rapid and non-invasive evaluation of RV function that may be used for clinical investigations in canine cardiology.

a Visser et al., *J Vet Cardiol* 2014.

b Chetboul et al., *J Vet Intern Med* 2005.

Disclosures: No disclosures to report.

ESVC-P-9

LEFT VENTRICLE FUNCTION ASSESSMENT BY NON-INVASIVE DP/DT IN DOGS WITH CHRONIC MITRAL VALVE DISEASE. C.N. Duarte, J.R. Castro, A.M. Gimenes, M. Mantovani, M.Y. Ueda, P.H. Itikawa, L.C. Petrus, B. Real, L.F. Beccari, G.T. Goldfeder, M.H.M.A. Larsson, D. Schwartz. School of Veterinary Medicine and Animal Science – University of São Paulo, São Paulo, Brazil

Doppler-derived +dP/dt and -dP/dt from mitral regurgitation are considered indexes for assessment of systolic and diastolic function respectively, that have less load dependence than the ejection phase indexes. This study aimed to determine correlation between Doppler-derived dP/dt and other systolic and diastolic echocardiographic indexes, and if they can be used to identify dogs with and without remodeling, with or without congestive heart failure (CHF) and for evaluation of chronic mitral valve disease (CMVD) severity. Fifty-seven dogs with CMVD (stages B1, B2, C+D) were included prospectively in an observational cross-sectional clinical study and distributed in groups regarding the presence of remodeling and CHF, to evaluate +dP/dt and -dP/dt, and distributed according to TDI-diastolic pattern to compare -dP/dt. Group C+D (2142 mmHg/s, P₂₅-P₇₅ = 2023–2456) had +dP/dt significantly lower compared to B1 (2865 mmHg/s, P₂₅-P₇₅ = 2383–3308) and B2 (2721 mmHg/s, P₂₅-P₇₅ = 2241–3186) ($P = 0.0023$). Group C+D also had lower -dP/dt, compared to B1 (968.5 mmHg/s \pm 266.8 and 1198 mmHg/s \pm 165.7; $P = 0.0115$). Dogs with CHF compared to those without CHF, presented lower +dP/dt (2142 mmHg/s, P₂₅-P₇₅ = 2023–2456; 2858 mmHg/s, P₂₅-P₇₅ = 2299–3241; $P = 0.0007$) and -dP/dt (968.5 mmHg/s \pm 266.8; 1155 mmHg/s \pm 199.0; $P = 0.0041$). Regarding diastolic function, -dP/dt was lower for the restrictive pattern group (769.7 mmHg/s \pm 124.1) compared to those without diastolic dysfunction, (1132 mmHg/s \pm 204.0), delayed relaxation (1229 mmHg/s \pm 186.9) and pseudonormal patterns (1107 mmHg/s \pm 223.4) ($P < 0.0001$). When +dP/dt < 1800 mmHg/s, the post-test chance for the dog with CMVD to have CHF is twice the chance than not having it. For -dP/dt < 800 mmHg/s the post-test chance of having CHF is 8 times higher than not having it. In conclusion, Doppler-derived +dP/dt and -dP/dt may contribute respectively, for systolic and diastolic assessment of dogs with CMVD.

Disclosures: No disclosures to report.

ESVC-P-10

SUCCESS OF PULMONARY BALLOON VALVULOPLASTY IN RELATION TO VALVE ANATOMY IN DOGS: A MULTI-CENTER FOLLOW UP STUDY. H. Estrada¹, R. Pariat², S. Hemsley³, E. Lamb⁴, A. Powell¹, N. Moise³. ¹University of Florida College of Veterinary Medicine, Gainesville, FL, USA, ²Louisiana State University, Baton Rouge, LA, USA, ³Cornell University, Ithaca, NY, USA, ⁴Lamb Consulting, West St Paul, MN, USA

Pulmonic stenosis (PS) is one of the most common congenital heart defects seen in veterinary cardiology practice. Pulmonary balloon valvuloplasty (PBV) is considered to be the treatment of choice for dogs with severe stenosis. Whether dogs with moderate stenosis benefit from PBV remains unclear, and variables such as degree of hypertrophy, valve morphology, amount of tricuspid insufficiency and presence or absence of clinical signs are generally used when recommendations are made to pet owners. In this study we report the effect of valve type on PBV outcome in 110 dogs treated at 3 different academic speciality cardiology practices. Baseline echocardiographic images were evaluated at each institution and valve morphology was classified as either type A (N = 78, 137.96 mmHg, range 53–278) or type B (N = 33, 153.72 mmHg, range 81–300) and 'no' (N = 87, 140 mmHg, range 53–279) or 'yes' (N = 24, 151 mmHg, range 87–300) for presence of pulmonary annular hypoplasia when diameter was compared to aortic annulus. Twenty four hours following PBV both type A (56 mmHg, range 17–210) and type B (78 mmHg, range 25–197) valves had significant reduction in gradient compared to baseline ($P < 0.0001$). This reduction remained significant at 30 days (A: 77 mmHg, range 22–193; B: 60 mmHg, range 30–116; $P < 0.0001$ for both). Dogs with annular hypoplasia (65 mmHg, range 25–

197) and without annular hypoplasia (69 mmHg range 17–210) had a significant reduction in gradient 24 hours post PBV. It remained significant at 30 days (with annular hypoplasia: 77 mmHg, range 30–116; without annular hypoplasia: 61 mmHg, range 22–193; $P < 0.0001$ for both). When comparing to baseline, considering valve type, there was no significant difference in percent reduction in gradient for type A versus type B valves at both the 24-hour (A: 58%, range 17–88; B: 48%, range 12–82; $P = 0.1014$) and 30-day (A: 43%, range 23–89; B: 58%, range 33–81; $P = 0.0544$) recheck evaluation time points. Additionally, there was no significant difference in gradient reduction when looking only at whether or not there was annular hypoplasia at 24 hours (yes: 57%, range 24–78; no: 49%, range 17–89; $P = 0.2673$) and 30 days (yes: 48%, range 25–81; no: 47%, range 22–89; $P = 0.4695$). In conclusion, classification of dogs with PS according to valve type and annulus morphology did not help predict the 30-day response to PBV.

Disclosures: No disclosures to report.

ESVC-P-11

PREVALENCE OF HYPERTROPHIC CARDIOMYOPATHY (HCM) IN FELINE POPULATION EXAMINED BY THE OSSERVATORIO ITALIANO HCM FELINA. M.E. Giorgi¹, F. Biretoni¹, P. Ferrari², P. Knafelz³, M. Rishniw⁴, D. Caivano¹, A. Cala², M. Longeri⁵, F. Porciello¹. ¹Università degli studi di Perugia, Perugia, Italy, ²Clinica Veterinaria Orobica, Bergamo, Italy, ³Ospedale Veterinario Gregorio VII, Roma, Italy, ⁴College of Veterinary Medicine, Cornell University, Ithaca, NY, USA, ⁵Dipartimento Scienze Veterinarie e Sanità Pubblica, Università di Milano, Milano, Italy

Hypertrophic Cardiomyopathy (HCM) is the most common feline inherited cardiac disease and it is a major cause of morbidity and mortality. The Osservatorio Italiano HCM Felina was formed in 2008 by a network of clinicians, geneticists and breeders, to monitor and study HCM in Italian cats.

Since April 2008, 1308 adult cats, belonging to various breeds, including Maine coon, Siberian, Norwegian Forest Cats, Ragdoll, Sphynx, British SH, Birman and others have been prospectively enrolled. Recheck evaluations were performed in 287 cats. Each cat underwent a clinical examination, echocardiography, and blood collection for genetic testing (when appropriate) and storage in the Italian Feline Bio-bank.

The disease status was defined by echocardiography according to established guidelines (left ventricular diastolic wall thickness < 5.5 mm = HCM negative, $= 5.5$ but < 6 mm = HCM equivocal; $= 6$ mm = HCM positive).

The prevalence of HCM in the population was 6% (74 cats); equivocal diagnoses were conferred on 4% (57 cats). These prevalences did not differ between breeds. The prevalence of HCM in the Italian feline population was lower compared to those reported by other investigators.

Evaluation of data from the entire population demonstrated that left ventricular end-diastolic wall thicknesses and aortic diameter showed a weak positive correlation with body weight ($P < 0.0001$, $r^2 < 0.12$ for all variables), suggesting that weight-dependent limits on wall thickness should be considered in cats as is currently practiced in dogs.

The lower prevalence of HCM in Italian cat breeds compared with those examined elsewhere might be explained by different criteria for determining presence or absence of disease, differences in ages at which the subjects were examined, or a selection bias by breeders in presenting cats they consider 'normal'.

Disclosures: No disclosures to report.

ESVC-P-12

EPIDEMIOLOGICAL CHARACTERIZATION OF A PORTUGUESE POPULATION OF DOGS WITH CANINE CHRONIC MITRAL VALVE DISEASE: 542 CASES. L. Lobo¹, G. Petrucci¹, M. Domingues². ¹Hospital Veterinário do Porto, Porto, Portugal, ²Universidade Lusófona de Humanidades e Tecnologias, Lisboa, Portugal

Chronic mitral valve disease is by far the most common cardiovascular disease in dogs. The disease is caused by myxomatous degeneration of the mitral valve leaflets and, in approximately 30% of cases, it's accompanied by degeneration of the tricuspid valve. It is also described in previous studies that approximately 14% of affected dogs also have evidence of associated pulmonary arterial hypertension.

The prevalence of the disease is higher in small breed dogs (under 20Kg), although large breeds can also be affected and it occurs more frequently in males than in females.

The present study aims to characterize the disease in a population of dogs in Portugal. We retrospectively reviewed the medical records of dogs presented to Hospital Veterinário do Porto, with an echocardiographic diagnosis of canine chronic mitral valve disease, during a period of 13 years.

From this records, 542 cases were identified, from which 331 (61.1%) were males and 211 (38.9%) were females. Most of the dogs were mixed breed (215) and 48 different breeds of dogs were represented. The Poodle was by far the most represented breed ($n = 101$; 39.7%), followed by English Cocker Spaniel (18.6%), Yorkshire Terrier (2.8%), Boxer (2.6%), Épagneul Breton (2.6%), Dalmatian (2.4%), Pekingese (2.4%), Labrador Retriever (2%) and Portuguese Podengo (1.8%). All other breeds represented 16.2% of the population.

Regarding weight, 79.8% of the dogs ($n = 395$) weighted < 20 kg, with a mean body weight of 13.45 kg (range 1.6–62 kg). The mean age at diagnosis was 11.34 years old.

We also observed that 42.1% of the dogs ($n = 278$) had concomitant degeneration of the tricuspid valve and 19.4% ($n = 105$) pulmonary arterial hypertension (PH). We categorized these dogs according to the severity of PH, in mild PH if they had a Doppler echocardiography derived systolic pulmonary arterial pressure (SPAP) of 30–50 mm/Hg, moderate PH (SPAP 51–75 mm/Hg) and severe PH (SPAP > 75 mm/Hg). We found that 72.7% ($n = 72$) of dogs had mild PH; 19.2% ($n = 19$) moderate PH and 8.1% ($n = 8$) severe PH.

As described in previous studies, the disease affects mainly males and small breed dogs, with a breed distribution that reflects the canine population in the country, including very including very popular large breed dogs in Portugal, as the Boxer and Labrador.

Both the presence of concomitant tricuspid valve disease and PH had a higher prevalence in our study than previously described.

Disclosures: No disclosures to report.

ESVC-P-13

ANEMIA IN DOGS WITH MITRAL VALVE DISEASE: PREVALENCE AND ASSOCIATED RISK FACTORS. C. Locatelli¹, A. Savarese¹, E. Martinelli¹, P. Scarpa¹, S. Paltrinieri¹, P.G. Brambilla². ¹University of Milan, Milan, Italy, ²Xxxx, Italy

In people anemia is frequent in patients with heart failure (HF) and it is associated with poor outcomes. The most likely pathogenic factors include iron deficiency, chronic kidney disease (CKD), and cytokine production, although other factors may contribute. Little is known about the prevalence of anemia in dog with cardiovascular disease.

The aim of this retrospective study was to define the prevalence of anemia (Hct $\leq 37\%$) in dogs with mitral valve disease (MVD) and to investigate associated risk factors (age, weight, azotemia, HF, IRIS/ACVIM class).

Medical records of dogs presented at the Cardiology Service, DIVET, University of Milan (January 2003 - March 2015) were retrospectively evaluated. Dogs with MVD with complete physical, thoracic and echocardiographic examinations, and serum biochemical panel, including serum creatinine (sCr), were included in the study. Dogs with other heart or systemic diseases, except CKD, or neoplasm were excluded. Statistical analysis was performed using JMP 12.0 (SAS Institute). A p value < 0.05 was considered significant.

Two hundred and ninety dogs (161 males/129 females), 11.6±2.9 years of age, 12.5±9.2 kg of body weight fulfilled the inclusion criteria. The 22% of males and the 30% of females were neutered. The most represented breeds were mongrel (40%), miniature Poodle (12%), York Shire Terrier (7%), and Cavalier King Charles (5%). Dogs were 29% B1, 13% B2, 54% C and 4% D ACVIM class. While the 72% of the dogs were normoazotemic (sCr <1.4 mg/dl), 13.5% were staged in IRIS 2, 13% in IRIS 3 and 1.5% in IRIS 4.

The prevalence of anemia in dogs with MVD was 17% (50/290): 40 showed mild (30≤ Hct ≤37%) and 10 moderate (20≤ Hct ≤29%) anemia. Sixteen dogs were in B1, 5 in B2, 27 in C and 2 in D ACVIM class; 34 were normoazotemic (68%). Anemic dogs showed a significant higher sCr. Normoazotemic dog showed significant higher Hb, Hct and RBC both in the overall population and in the anemic group. In the overall population dogs in different IRIS class showed statistically different Hb, Hct and RBC and Hb was significantly lower in decompensated HF dogs.

In conclusion although a relationship between anemia and azotemia/CKD was documented in our study, it is important to emphasize that most of the anemic dog were normoazotemic: anemia is not an exclusive finding of cardiorenal syndrome and should be considered as possible complication in dogs with MVD alone.

Disclosures: No disclosures to report.

ESVC-P-14

LEFT ATRIAL DYSFUNCTION IN DOGS WITH SYMPTOMATIC CHRONIC MITRAL VALVE DISEASE. M. Mantovani, J.R. Castro, A.M. Gimenes, L.C. Petrus, C.N. Duarte, M. Ueda, P.H. Itikawa, B. Real, L.F. Beccari, G.T. Goldfeder, M.H.M.A. Larsson, D. Schwartz. School of Veterinary Medicine and Animal Science, University of São Paulo, Sao Paulo, Brazil

The objective of this study was to evaluate left atrial (LA) function by left atrial total fractional area change (LA-FACtotal) and left atrial ejection fraction (LAEF) in dogs affected with chronic mitral valve disease (CMVD) naturally acquired with and without congestive heart failure (CHF). Our hypothesis was that LA-FACtotal and LAEF decrease with severity of CMVD. Eighty dogs were included in a prospective observational cross-section clinical study, grouped according to CMVD severity based on echocardiographic evaluation and clinical signs. The dogs were equally distributed in each group: A, B1, B2 and C, according to American College of Veterinary Internal Medicine staging system. Indicators of LA function were calculated with the following equations: LA-FACtotal = 100 × (LAmaximum area - LAminimum area)/LAmaximum area, measured by apical 4 view; and LAEF = 100 × (LAmaximum volume - LAminimum volume)/LAmaximum volume, by biplane area-length method from the left apical 4 and 2-chamber views. LA-FACtotal showed lower values ($P < 0.0001$) in group C (31.88%, P25–75% = 26.47–41.12) compared with groups A (52.75%, P25–75% = 48.08–56.07), B1 (48.38%, P25–75% = 42.57–51.91) and B2 (46.15%, P25–75% = 41.17–50). Group C had lower LAEF (40.69%, P25–75% = 34.89–52.09) than groups A (68.12%, P25–75% = 64.96–69.91), B1 (58.72%, P25–75% = 52.25–64.60) and B2 (56.98%, P25–75% = 52.08–61) ($P < 0.0001$). Left atrial function, assessed by LA-FACtotal and LAEF, was reduced in dogs with CMVD and CHF compared with healthy and asymptomatic CMVD groups.

Disclosures: No disclosures to report.

ESVC-P-15

CARDIORENAL SYNDROME IN DOGS WITH MITRAL VALVE DISEASE: A PROSPECTIVE STUDY. E. Martinelli¹, P. Brambilla², C. Locatelli², S. Crosara¹, A.M. Zanaboni², C. Quintavalla¹. ¹University of Parma, Parma, Italy, ²University of Milan, Milan, Italy

Recurrent episodes of heart and/or kidney failure are considered one of the causes leading to worsening heart/renal functions in

human patients. The aim of this prospective study was to assess the influence of heart/kidney worsening on elected parameters of heart/kidney function in dogs affected by mitral valve disease (MVD).

Between July 2012 and May 2013, dogs affected by MVD in ACVIM class B2 and without comorbidities were included in the study group. The control group was constituted by healthy dogs, matched with the cases for age (older than 6 years) and gender.

All the dogs underwent physical examination, thorax radiography, ECG, echocardiography, systemic blood pressure assessment, a complete blood count, serum biochemical analysis, including assessment of serum creatinine (sCr), serum urea nitrogen (UREA) and glycaemia (GLY) and urine analysis with urine protein/creatinine ratio (UPC). Dogs were re-evaluated every 6-month until October 2014. Statistical analysis was performed using IBM SPSS Statistics 20 (p value significant if <0.05).

Twenty-one dogs affected by MVD (cases) were included and 20 healthy dogs (controls) were randomly selected among the eligible population. The 33% of cases experienced at least one episode of congestive heart failure (CHF), but none of these patients developed chronic kidney disease (CKD). The 14% of cases developed CKD while remaining in ACVIM class B2. No dogs in the control group developed CKD or MVD. Correlations between worsening renal function (WRF - sCr elevation ≥0.3 mg/dl or 25% from baseline), furosemide administration, UPC levels, radiographic parameters of heart enlargement and echocardiographic parameter were investigated. Only a statistically significant difference in IRIS class between the groups according to WRF and in the echocardiographic parameter left atrium to aortic root (LA/Ao) according to furosemide amount were observed. Both these results were expected. None of the cases included experienced renal damage (WRF or IRIS class change or UPC change) concomitant to episodes of CHF. The persistence of normal renal condition regardless of CHF events and therapy administration was unexpected. In conclusion, experiencing CHF seems not to directly affect renal function. To authors' opinion, the use of WRF, better than single sCr and UREA levels, may be useful in the long term management of aged patients affected by MVD. However, the small number of cases included in this study represents a great limit. We consider this work a pilot study.

Disclosures: No disclosures to report.

ESVC-P-16

PREVALENCE OF HYPERTROPHIC CARDIOMYOPATHY ON A POPULATION OF 150 CATS. M.M. Monzo¹, L. Rubens², L. Lobo³. ¹CardioCare, Lisboa, Portugal, ²Hospital Veterinário de Massamá, Lisbon, Portugal, ³Hospital Veterinário do Porto, Porto, Portugal

Hypertrophic cardiomyopathy (HCM) is a primary myocardial disease characterized by inappropriate thickening of the myocardium in absence of other causes of hypertrophy including Hypertension, Hyperthyroidism, aortic stenosis and acromegaly. It is also the most common heart disease in cats. HCM presents a wide variety of clinical signs depending on the severity and location of the hypertrophy.

Cats affected with HCM have a mean age of 5.5–6.5 years old at the time of the diagnosis however this disease can affect cats as young as 3 months although this later age is unusual

HCM is a heterogeneous disease both in terms of phenotypic degree of hypertrophy and clinical outcome. Hallmark histopathological hallmarks lesions of HCM are myocyte disarray, small coronary arteriosclerosis and interstitial fibrosis replacement

In order to confirm HCM echocardiography has to be made. Primary hypertrophy diagnosis is made based on the presence of ventricular hypertrophy, symmetric or asymmetric, in the absence of systemic disorders.

The purpose of this study was to assess the prevalence of HCM in a feline population. In order to achieve this goal echocardiograms were made in all cats older of 6 years clinically asymptomatic with or without cardiac murmur. All echocardiograms were made according to the guidelines of the ACVIM published in 1993. Diagnosis of ventricular hypertrophy was made from the right parasternal window using the B mode to measure the diameter of the LVFW and the IVS in diastole. Cats with more than

6 mm of wall thickness measured T4, Bun, Crea, Blood pressure. Only cats within the normal limits of the later parameters were considered HCM positive.

Total number of cats in this study was 150 cats 89 male and 61 female. From this population 94 had no defined breed, 37 were Persian, 6 Maine Coon, 4 Norwegian Woods, 8 Siamese, 1 Chartreux.

No murmur was detected in 64 (42.7%) cats, S3 or S4 was detected in 9 (6%) cats and different degree of murmur was detected in 77 (51.3%) cats.

Hypertrophy was detected in 69 cats. From this cats 41 (59.4%) were diagnosed as HCM, 28 (40.6%) cats were excluded either because of lack of values of T4 and/or because they had high values of blood pressure, T4 levels or CREA.

In this study 27.3% of the population had HCM. The epidemiological and phenotype distribution is highly variable. The average age at diagnosis of HCM in this study was 11.33 years.

Disclosures: No disclosures to report.

ESVC-P-19

INCREASED SERUM C-REACTIVE PROTEIN CONCENTRATIONS IN DOGS WITH CONGESTIVE HEART FAILURE DUE TO MYXOMATOUS MITRAL VALVE DISEASE. M.J. Reimann¹, I. Ljungvall², A. Hillström², J.E. Møller³, R. Hagman², T. Falk⁴, K. Höglund², J. Häggström², L.H. Olsen¹. ¹University of Copenhagen, Frederiksberg C., Denmark, ²Swedish University of Agricultural Sciences, Uppsala, Sweden, ³Odense University Hospital, Odense, Denmark, ⁴Din Veterinär, Helsingborg, Sweden

Mildly increased concentrations of CRP are associated with cardiovascular disease in humans and dogs. It is not known whether increased concentrations of CRP are associated with myxomatous mitral valve disease (MMVD) in dogs, or rather its sequel, congestive heart failure (CHF). The aim of this study was to investigate whether serum concentrations of CRP, determined using a novel automated canine-specific high-sensitivity CRP assay (Gentian hsCRP), were associated with severity of MMVD and certain clinical variables in dogs.

The study included 188 client-owned dogs with different severities of MMVD. Disease severity was determined by medical history, physical examination, echocardiography and response to diuretic therapy. Dogs were allocated into groups based on ACVIM consensus statement guidelines (group A (n = 62), group B1 (n = 55), group B2 (n = 35) and group C (n = 36)). Data were analysed using descriptive statistics and multiple regression analysis.

Dogs with CHF (group C) had significantly higher serum CRP concentrations (2.65 mg/L, [1.09; 5.09]) (median, [quartile 1; quartile 3]) compared to dogs in groups A (0.96 mg/L, [<0.50; 1.82]) ($P = 0.0004$), B1 (0.80 mg/L, [<0.50; 1.73]) ($P < 0.0001$) and B2 (0.53 mg/L, [<0.50; 1.26]) ($P < 0.0001$). Other measures of disease severity including left atrial to aortic root ratio and left ventricular end-diastolic diameter normalized for body weight were positively correlated with serum CRP concentration.

In conclusion, slightly higher serum CRP concentrations were found in dogs with CHF whereas the severity of asymptomatic MMVD showed limited association with serum CRP concentrations.

Disclosures: No disclosures to report.

ESVC-P-20

CARDIOVASCULAR EFFECTS OF MEDETOMIDINE IN STAGE B2 MYXOMATOUS MITRAL VALVE DISEASE. V. Saponaro¹, A. Avé². ¹QUALIVET, Taverny, France, ²UNIVET, Cannes, France

Medetomidine is a α_2 -agonist widely employed for sedation in dogs but its use is discouraged in cardiac patients even those suffering from myxomatous mitral valve disease (MMVD). However, only one investigation was previously conducted in a wide range - regarding the class of the disease - of MMVD patients, reporting a general safety of that protocol. The present study was focused just on class B2 of MMVD, with the aim to provide more detailed

information on the cardiovascular effects of medetomidine in such patients, by the analysis of clinical and instrumental parameters suggestive of disease severity or congestive heart failure.

Dogs weighing <15 kg, needing a soft clinical procedure and showing a systolic apical heart murmur were screened and selected for the study if LA/Ao < 1.6. The sedative protocol consisted in an IV injection of 30 μ g/kg medetomidine antagonized, after the clinical procedure, by an IM injection of the recommended dose of atipamezole. Clinical parameters, echocardiographic variables, thoracic radiographs and oscillometric blood pressure measurements were collected at baseline (T0), 30 minutes after medetomidine administration (T1) and 3 hours after atipamezole injection (T2).

Of 13 dogs screened, 8 were definitively enrolled. At T1 a significant decrease in the right parasternal regurgitant jet area (RP-ARJ/LAA), peak velocity of mitral regurgitation and shortening fraction was observed along with an increase in LVIDs ($P < 0.05$). Left parasternal ARJ/LAA decreased without reaching statistical significance but showing a high correlation with RP-ARJ/LAA ($r = 0.7$). Interestingly, LA/Ao changed only mildly and never reached a value > 1.6. The other echocardiographic variables did not show a particular trend. Systolic blood pressure showed values at the upper physiologic limit at T0, lower values than T0 at T1, and an increase above the initial value at T2 but without significance. Thoracic radiographs were evocative of heart enlargement without pulmonary venous congestion or pulmonary oedema both at T0 and T2. Respiratory rate did not change between T0 and T2. The degree of sedation was optimal during the clinical procedure in all cases.

Sedation with 30 μ g/kg medetomidine is safe in dogs suffering from MMVD in stage B2 (LA/Ao < 1.6). The decrease observed in peak velocity and color-Doppler appearance of mitral regurgitation at T1 could be due to a reduction of both myocardial contractility and systolic blood pressure, by a lowering of sympathetic activity via baroreceptors stimulation.

Disclosures: No disclosures to report.

ESVC-P-21

TRANSARTERIAL PATENT DUCTUS ARTERIOSUS OCCLUSION USING DIFFERENT DEVICES IN 25 DOGS. R.M. Ventura¹, J.S. Orvalho². ¹Faculdade de Medicina Veterinária, Universidade de Lisboa, Lisboa, Portugal, ²University of California Veterinary Medical Center - San Diego, San Diego, CA, USA

In the last decade, several transvascular occlusion device techniques have been developed and transvascular occlusion has largely replaced surgical ligation of patent ductus arteriosus (PDA) in dogs.

In this retrospective study were included a total of 25 client-owned dogs, undergoing transarterial occlusion of PDA with MRye[®] Flipper Detachable Embolization coil (n = 7), Amplatzer[®] Canine Duct Occluder (ACDO; n = 16) and Amplatzer[®] Vascular Plug (n = 2). Device size selection was based on PDA dimensions assessed by transesophageal echocardiography (TEE) in 10 cases and transthoracic echocardiography (TTE) in 15 cases. Angiography was performed during the procedure to assess the success of the occlusion, and it confirmed complete occlusion in 20 dogs and a trivial residual flow in 5 dogs. The following day, transthoracic color-Doppler echocardiography revealed that complete ductal closure was achieved in all dogs. The procedure was hemodynamically successful, as evidenced, by a reduction in indexed left ventricular internal diameter in diastole (LVIDd; $P < 0.01$), fractional shortening (FS; $P < 0.01$) and left atrial to aortic ratio (LA: Ao; $P < 0.001$) within 24 hours after procedure. Four months after surgery, indexed LVIDd was significantly reduced ($P = 0.03$) and LA:Ao remained constant. Secondary complications included pulmonary arterial embolization of an ACDO and a late rotation of an Amplatzer[®] Vascular Plug resulting in an increased flow through the PDA. The dog with the rotated device required subsequent surgical ligation of the PDA.

At this time, 23 dogs were reported to be alive and the other 2 dogs were lost to follow up. Only one dog remained on congestive heart failure therapy after the PDA occlusion.

We can conclude that PDA occlusion using an ACDO for dogs with more than 3 kg and a transarterial coil embolization for dogs

with <3 kg had a high rate of immediate complete occlusion. PDA occlusion using those devices proved to be a safe and effective therapeutic method for PDA in dogs.

Disclosures: No disclosures to report.

ESVC-P-22

COMPARISON OF TWO ECHOCARDIOGRAPHIC VIEWS FOR EVALUATING THE RIGHT PULMONARY ARTERY DISTENSIBILITY INDEX IN DOGS. T. Vezzosi¹, F. Marchesotti², R. Tognetti¹, L. Venco³, O. Domenech². ¹University of Pisa, San Piero a Grado - Pisa, Italy, ²Istituto Veterinario di Novara, Granozzo con Monticello, Italy, ³Veterinary Hospital Città di Pavia, Pavia, Italy

Echocardiographic evaluation of the right pulmonary artery distensibility index (RPAD index) was recently described as a valuable method for early detection and severity evaluation of pulmonary arterial hypertension in dogs. RPAD index is calculated as the percentage change in diameter of the right pulmonary artery (RPA) between systole and diastole, obtained by M-mode echocardiography from the right parasternal long axis view. The aim of this study was to compare the RPAD index obtained by 2 different echocardiographic views in dogs. The study design was a prospective, multicenter, observational study. Forty-five client-owned dogs from different breeds were included: 31 dogs with heart disease and 14 healthy dogs. Two different right parasternal views, long axis (RPLA) and short axis (RPSA), were used to measure the RPAD index. From the RPLA view (method 1) and RPSA view (method 2) a short axis and a long axis image were respectively optimized for the right pulmonary artery. The RPAD index was calculated by M-mode as the percentage change in diameter of the right pulmonary artery: [(systolic diameter - diastolic diameter) / systolic diameter] * 100. Measurements were done off-line as an average of 5 consecutive cardiac cycles by a single investigator blinded to the dogs' diagnosis. A Pearson and a Bland-Altman test were used to assess correlation and agreement between the 2 methods, respectively. Intra- and inter-observer measurement variability was quantified by average coefficient of variation (CV). Level of significance was set at $P < 0.05$. M-mode evaluation of the RPAD index was satisfactorily obtained by both methods in all dogs. Pearson test showed a strong positive linear correlation between the values of RPAD index obtained from both methods ($r^2 = 0.9346$, $P < 0.0001$). Bland-Altman test showed a good agreement between the 2 methods in estimating RPAD index (bias = 0.51%, SD = 2.96%, 95% limits of agreement = -5.30, 6.33%). The mean difference between the 2 methods was 0.51% (95% confidence interval = -0.35; 1.35). Intra- and inter-observer measurement variability was clinically acceptable (CV < 10%). The study showed a good agreement between short axis and long axis M-mode evaluation of RPA. Both methods can be used interchangeably to evaluate RPAD index. Further studies are needed to evaluate the RPAD index in a larger population of healthy dogs and the diagnostic and prognostic role of this echocardiographic parameter in dogs with different types of pulmonary hypertension.

Disclosures: No disclosures to report.

ESVE-P-1

PREVALENCE AND CLINICAL FEATURES OF NATURALLY OCCURRING HYPOADRENOCORTICISM IN GREAT PYRENEES IN A REFERRED POPULATION IN MONTREAL, CANADA: 11 CASES (2005-2014). M. Decôme, M.C. Blais. Centre Hospitalier Universitaire Vétérinaire, University of Montreal, Saint-Hyacinthe, QC, Canada

Naturally occurring hypoadrenocorticism (Addison's disease) is an uncommon illness. Its prevalence in the general canine population is estimated between 0.06 and 0.28%. Certain breeds appear to have an increased risk for developing hypoadrenocorticism, including Bearded Collie, Standard Poodle, Portuguese water dog and Nova Scotia Duck Tolling Retriever, with reported prevalence of 9.4, 8.6, 1.5 and 1.4%, respectively.

The objective is to evaluate the prevalence and clinical features of naturally occurring hypoadrenocorticism in Great Pyrenees (GP) presented at the Centre Hospitalier Universitaire Vétérinaire (CHUV) of the University of Montreal.

This retrospective study (March 2005 to October 2014) includes 11 client-owned Great Pyrenees diagnosed with hypoadrenocorticism. The medical records of dogs with a diagnosis of naturally occurring hypoadrenocorticism were reviewed, with an emphasis on Great Pyrenees' record. The prevalence of hypoadrenocorticism in the studied population, as well as the prevalence per breed, was calculated. Data collected included breed, clinical signs, laboratory findings, age at diagnosis, treatment, and cause of the death.

One hundred dogs were diagnosed with naturally occurring hypoadrenocorticism, representing 0.38% of the overall canine population studied. Thirty-five breeds were represented, with a prevalence per breed varying between 0.17% and 9.73%. A high prevalence was observed in West Highland White Terriers (4.66%), Great Danes (1.87%), Standard Poodles (1.76%), Saint-Bernards (1.72%) and Jack Russell Terriers (1.48%). Out of 114 GP presented during that period of time, 9.73% (n = 11) were diagnosed with hypoadrenocorticism. Median age at diagnosis was 4.71 years (range: 0.39 to 11.07) in dogs with hypoadrenocorticism, and 3.51 years (1.02 to 8.21) in GP. The main reason for presentation of the Addisonian GP was lethargy (n = 7) and anorexia (n = 5). Clinical findings included hypotension (n = 7), poor body condition (n = 3), and heart murmur (n = 3). The majority (n = 9) had serum electrolytes abnormalities, with a Na:K ratio ranging from 15.2 to 22.45. Other major laboratory findings included azotemia (n = 8), anemia (n = 7) and the absence of a stress leukogram (n = 5). The majority (n = 9) received fludrocortisone, with prednisone as needed. One GP was euthanized at time of diagnosis.

Great Pyrenees diagnosed with hypoadrenocorticism were over-represented in the studied population, with a prevalence of hypoadrenocorticism in our GP population of 9.73%. Therefore, an inherited susceptibility can be suspected. Reason for presentation and clinical signs were nonspecific, and similar to what is reported in other breed.

ESVE-P-3

THE USE OF A NOVEL LATEX IMMUNOAGGLUTINATION INHIBITION METHOD FOR HAEMOGLOBIN A1C MEASUREMENTS IN DOGS. S. Spence, A. Hope, I.K. Ramsey. Glasgow University, Glasgow, Scotland

In human medicine, haemoglobin A1c (HbA1c), a form of glycosylated haemoglobin, is used as the standard measure of average glycaemic control over 2 to 3 months. The measurement of HbA1c in dogs has been previously demonstrated however high pressure liquid chromatography techniques are too technically difficult for routine use and other methods are no longer available. The objective of this study was to assess the use of latex immunoagglutination inhibition using a monoclonal antibody for the measurement of HbA1c in dogs, using the Siemens DCA Vantage®.

Repeatability was assessed by measuring 4 samples 5 times within 45 minutes. The effect of storage on EDTA anticoagulated samples was examined by measuring 3 samples stored at 4 °C every day for up to 5 days. Storage was further assessed by freezing 5 samples and measuring them at 0, 4 and 8 weeks. The machine was then used to compare the HbA1c values in 3 groups of dogs with diabetes mellitus (Group 1, n = 16), hyperadrenocorticism (Group 2, n = 5) or non-diabetic/cushingoid hospitalised patients (Group 3, n = 23). Differences in the groups were examined for significance using a Kruskal-Wallis analysis of variance. The reference range of HbA1c has been previously calculated to be 3.7-5.6% (17 - 38 mmol/mol) and values of 4.9 - >13% (30 - >119 mmol/mol) are seen in diabetic animals using high pressure liquid chromatography.

The median coefficient of variation for the repeatability study was found to be 5% (range 3% to 6%). It was possible to store samples at 4 °C for up to 5 days (median CV% = 3%, range 2% to 3%) and at -20 °C for at least 8 weeks (median CV% = 6%, range 4% to 9%). The median HbA1c concentrations were Group 1; 5.6% (38 mmol/mol), Group 2; 3.4% (14.2 mmol/mol) and

Group 3; 3.3% (13 mmol/mol). Group 1 was significantly different from the other 2 groups using Kruskal-Wallis analysis of variance.

In conclusion, the latex immunoagglutination method was repeatable for the measurement of HbA1c in dogs. In addition, HbA1c in canine EDTA anticoagulated samples were stable at 4 °C for up to 5 days and, if frozen, could be stored for at least 8 weeks without significant sample deterioration. The assay provides the expected results in dogs with and without abnormalities of glycaemic control.

Disclosures: The Siemens DCA Vantage was provided on loan from Siemens, as well as the cartridges used on this machine to run all samples in the study.

ESVE-P-4

VALIDATION OF AN ENZYME FLUORESCENCE ASSAY (ELFA) TO MEASURE TOTAL THYROXINE IN DOGS AND CATS. A. Wehner¹, R. Anderson¹, S. Reese², K. Hartmann¹.

¹Clinic of Small Animal Medicine, Munich, Germany, ²Institute of Veterinary Anatomy, Histology and Embryology, Munich, Germany

Measurement of total thyroxine (T4) is often the first diagnostic step in the work up of thyroid disease in dogs and cats. Blood samples are routinely sent to a reference laboratory causing a delay in testing which might impact the results.

The aim of this study was to validate an enzyme fluorescence assay (ELFA) as an inhouse method to measure T4 in dogs and cats.

T4 was measured in sera of 162 dogs and 88 cats by 2 methods, an enzyme immunoassay (EIA) and an enzyme fluorescence assay (ELFA). The EIA served as the standard method to which the ELFA results were compared. The ELFA was performed with the miniVidas automated analyser (bioMérieux, Craponne, France) according to the manufacturers instructions.

Coefficient of variation (CV) of the ELFA in dogs sera was 5.8% and of the EIA 6–9.5%, respectively. CV of the ELFA in cats sera was 0.7–3.4% and of the EIA 7.6–15.7%, respectively. Overall bias of the ELFA in dogs was 1.4%; however up to –26.7% in lower T4 ranges. Maximal bias of the ELFA in cats was 6.9%. Correlation of both methods was linear only in cats. Using Bland Altman plots limits of agreement were –74–72% in dogs and –58–72% in cats. Cohen's kappa revealed only slight agreement between both methods in dogs, but a good to very good agreement in cats.

The ELFA is a fast method with a high precision and can be recommended to measure T4 in cats, but cannot be recommended for dogs.

Disclosures: No disclosures to report.

ESVIM-P-1

ANALYSES OF CEREBROSPINAL FLUID (CSF) SAMPLES OF 210 DOGS WITH NEUROLOGICAL SYMPTOMS. D. Breu, J. Guthardt, E. Müller. Laboklin GmbH, Bad Kissingen, Germany

Dysfunctions of the central nervous system (CNS) are the most frequent causes of neurological disorders in dogs. Our study aimed to find (1) if some CNS diseases could be associated with a selected group of common microbial or viral pathogens in dogs and (2) if CNS diseases have any characteristic profile with regard to 2 parameters, C-reactive protein (CRP) and IgA, that are reported to be potentially useful but unspecific markers of CNS diseases. We analysed 210 cerebrospinal fluid samples obtained from dogs with varying neurological signs between June and November 2014. Real-time PCR was employed with probes for *Toxoplasma gondii*, *Neospora caninum*, *Anaplasma phagocytophilum* and *Canine distemper virus*. IgG-antibodies to Tick-borne encephalitis virus (TBE) were assayed and IgA titres were measured using ELISA, while CRP concentrations were determined by immunoturbidimetric assay. The dogs had a median age of 4 years (range: 0.5–14) and comprised 60 breeds most frequently involving Chihuahuas, Labrador Retrievers, Bernese Mountain Dogs and Boxers. Gender distribution was 22.4%

female, 12.9% spayed bitches, 42.8% male, 15.7% neutered male, and 6.2% non-identified. None of the cases were PCR-positive for *Toxoplasma gondii* or *Canine distemper virus*. One dog was positive for *Anaplasma phagocytophilum* and another for *Neospora caninum*. Antibodies to TBE virus were within the borderline range in 6/210 dogs. The 210 dogs could be divided into 2 age groups: 60 (=28.6%) for young dogs (<2 years, median 1 year) and 150 (=71.4%) for older dogs (≥2 years, median 6 years). IgA-high (>0.1 mg/dl) cases represented 95% and 90% for young and older dogs, respectively. CRP-high (>1.0 mg/l) cases were almost half and equal: 51.7% and 56.0% in young and older dogs, respectively. Compared with older dogs, young dogs had higher levels of CRP ($P = 0.022$) and IgA ($P = 0.054$). Within the IgA-high cohorts, CRP-high and CRP-low cases distributed almost equally (46.7% versus 48.3%) in young dogs but disproportionate (52.0% versus 38.0%) in older dogs. There were no [IgA-low/CRP-low] cases in young dogs but 6.0% in older dogs. Our present data suggest that (1) canine CNS disorders were largely characterized by high IgA and particularly in young dogs (2) inflammatory types (CRP-high) were almost equal in both groups and (3) although the significance remains yet to be determined, pathogens like *Anaplasma phagocytophilum* and *Neospora caninum* could be detected in a few cases of canine CNS disorders.

Disclosures: The authors Breu D and Guthardt J are employed at Laboklin GmbH & Co KG, Germany. Müller, E is owner/manager of the Laboklin GmbH & Co KG.

ESVIM-P-2

PET OWNERS USE OF THE INTERNET FOR THEIR PETS' HEALTH. A. Chatard, M. Hugonnard. VetAgro Sup, Marcy l'etoile, France

Internet is a potential source of medical information for pet owners. Therefore, it could play an indirect but important role in the veterinary practice. This survey assesses the online search behaviour of French pet owners for their pets' health and its influence on a veterinary consultation. In April 2013, 260 French pet owners coming in a veterinary teaching hospital for a medical or a surgical consultation were surveyed. 239 (91.9%) owners fulfilled the questionnaire on a voluntary basis. The survey contained 26 questions dealing with 3 topics: the online search behaviour of owners for their pets' health, their perception of the information found online and the internet's influence on a consultation and on the veterinarian/client relationship. 73.6% of owners use the Internet to obtain information on their pets' health. Among them, 32.6% use it rarely and 28.9% occasionally. They mainly look for information on a disease (51.1%), a symptom (51.1%), a breed (50%) or a nutritional advice (48.9%). 79.7% of owners try to verify the accuracy of the information found, most often by questioning their veterinarian (82.8%). Few owners (15.4%) think that online information is always trustworthy. Most of the research (81.9%) is randomly made, websites being found through search engines. The majority of pet owners (81.3%) aren't aware of any health certification label for websites. Internet enables certain pet owners to feel more at ease with their pets' health care: they ask more questions to their veterinarian (88.9%) and feel more involved in medical choices (55.6%). 37.9% of owners consider that the Internet can positively impact their relationship with the veterinarian. Relief is the most common (73.6%) emotional response to online research for medical information. However, 58.8% of owners feel overwhelmed by the amount of information found, 56% are confused and 35.2% frightened by the serious or graphic nature of the information found online.

This study emphasizes the frequent but measured use of the Internet by French pet owners for their pets' health. They seem to consider information found on the net with a critical mind. Unexpectedly, it appears that the Internet could be an ally for veterinarians by promoting exchanges between the clients and the veterinarian and by improving compliance with the care project.

Disclosures: No disclosures to report.

ESVIM-P-3

EVALUATION OF TOPIC 1% CLOTRIMAZOLE CREAM AS THE ONLY TREATMENT FOR CANINE SINONASAL ASPERGILLOSIS: 9 CASES (2008–2015). A. Cocci, C.M. Mortellaro, V. Greci. Clinica Veterinaria Cà Bianca, Milano, Italy

Sinonasal aspergillosis is a well-known and described fungal infection of the sinonasal cavities in dogs.

Topical treatment either with enilconazole or itraconazole infusion administered surgically or endoscopically are effective. The use of 1% clotrimazole cream have been described in a surgical setting after itraconazole infusion by Sissener et al. in 2006.

The aim of the work was to report the effectiveness of the use of topical 1% clotrimazole cream as the only treatment for sinonasal aspergillosis in dogs.

Inclusion criteria were a full medical record with radiological and endoscopic imaging, record of clotrimazole discharge after instillation and endoscopic control between 60 and 90 days after procedure. The 1% clotrimazole cream was applied through catheters placed under direct endoscopic vision after fungal plaques removal.

Nine dogs were included. Three dogs were mixed breed dogs, 2 dogs Golden Retriever, one dog German Shepherd and one Old English Sheepdog, one Bull Terrier and one Cane Corso. Six dogs were male (one neutered) and 3 female (one intact). Mean age was 6.8 years. Main clinical signs were muco-purulent discharge (8), pain at sinonasal palpation (8), nasal planum alterations (6), epistaxis (3). Nasal discharge was bilateral in 5 dogs. Mean duration of clinical signs was 1.5 months. Main radiological findings were turbinates lysis (9), frontal sinus empyema (8), frontal bone thickening (3) and frontal bone lysis (4).

Rhinoscopy disclosed lysis and remodelling of the nasal turbinates (9), easy access to the frontal sinus (7), septum lysis (5), bilateral sinonasal aspergillosis (2), monolateral nasal aspergillosis (2), monolateral sinonasal aspergillosis and contralateral nasal aspergillosis (2), monolateral frontal aspergillosis (3). Main duration of nasal cream discharge was 3.5 days. All dogs underwent endoscopic control between 60 and 90 days after the procedure. Seven dogs were disease free; 2 dogs had persistent fungal plaques and underwent a second treatment. Success rate was 77.8%.

Success rate of this study is comparable to other studies with larger and smaller case series. Endoscopic removal of the fungal plaques can be time consuming and topical administration of either enilconazole or itraconazole require an additional hour. The catheter placement and the 1% clotrimazole cream application lasted 5 minutes for each cavity in the dogs here reported.

The use of 1% clotrimazole cream as the only treatment for sinonasal aspergillosis needs further evaluation on a larger case series.

Disclosures: No disclosures to report.

ESVIM-P-4

SURVEY OF EUTHANASIA PRACTICES OF DOGS AND CATS BY FRENCH VETERINARY PRACTITIONERS. A. Diquérou, A. Fordin, D. Concordet, P. Sans. Ecole Nationale Vétérinaire de Toulouse, Toulouse Cedex 3, France

Few studies exist on euthanasia in small animal practice. However, such an act belongs to veterinary procedures, more or less frequently depending of the kind of practice, and may deeply impact both owners and veterinarians.

We intended to study practical, ethical and psychological aspects of euthanasia of dogs and cats among French veterinary practitioners.

From October 2014 to February 2015, an on-line 79-item questionnaire on small animals' euthanasia, addressing practical aspects of euthanasia, communication with the owners, ethical problems, owners' and veterinarians' perceptions, was emailed via professional associations and networks. Results were analyzed using commercial software (Sphinx IQ® and Excel®).

2770 French veterinarians practicing small animal medicine completed the questionnaire, representing >20% of this population.

Euthanasia occurs rarely at home. Over 85% of veterinarians propose the owners some time alone with their pet, and to stay during euthanasia, performed most commonly by intravenous injection (91.4%) mainly after sedation/anesthesia (95.9%).

Ninety nine percent of veterinarians consider communication, including description of events' sequence, and disposal of the

body, as important. Estimated minimum communication time required varies from 5–15 to 15–30 minutes. Following euthanasia, 64.4% are often thanked by the owners.

Most veterinarians (>85%) have refused a euthanasia, considered unjustified, or had their own suggestion of euthanasia rejected. Reasons for such a suggestion include intractable pain (98.7%), non-acceptable complications (79.9%), financial considerations (44.1%) or animal considered dangerous (71.6%).

Veterinarians think most owners (63.9%) experience some sense of guilt during euthanasia. Themselves perceive euthanasia most commonly as relief of animal's suffering (81.7%) and part of veterinary practice (64%), less frequently as a defeat (22.6%). Almost all veterinarians have experienced emotionally challenging euthanasia, and 72.4% estimate that practicing euthanasia influences their perception of death. Practical (74%) and psychological (48.4%) aspects of euthanasia have been discussed in most teams.

Veterinarians' gender influences euthanasia management, mostly concerning some communicational and practical aspects.

Euthanasia is definitely not an ordinary veterinary act, neither for the owner nor for the veterinarian. Therefore, this act must be performed with as much care and communication as possible.

Disclosures: No disclosures to report.

ESVIM-P-5

CANINE PANCYTOPENIA: A RETROSPECTIVE STUDY OF 119 CASES. P. S. Frezoulis¹, M.E. Mylonankis¹, E. Aggelidou², D.I. Karnezi¹, I. Oikonomidis¹, M. Kritsepi-Konstantinou¹, D. Kasabalis². ¹Aristotle university of Thessaloniki, Thessaloniki, Greece, ²University of Thessaly, Karditsa, Greece

Canine pancytopenia is associated with a range of intra-marrow or extra-marrow causes, including though not limited to, infectious agents, drugs, toxins and neoplasms. There is currently limited information regarding the clinicopathological features of the underlying causes or the prognosis in pancytopenic dogs. The objective of this retrospective study was to better define the spectrum of diseases associated with canine pancytopenia, to establish possible clinicopathological discriminators for the common causes and to investigate if the severity of pancytopenia or the underlying disease were associated with the clinical outcome (death or survival). Medical records of dogs with a comprehensive diagnostic investigation admitted in a veterinary teaching hospital were retrospectively reviewed. Pancytopenia was defined by a hematocrit (HCT) <37% (<30% for dogs <5 months of age), white blood cell counts (WBC) <6,000/μL and platelet counts (PLT) <200,000/μL. A control group of 238 dogs without any evidence of blood cytopenia(s) was also established. In total, 119 pancytopenic dogs were studied. Bone marrow aspiration cytology was examined in 42 cases and aplasia of all hematopoietic lineages was observed in 22 (52.4%) dogs. The most common diagnoses included monocytic ehrlichiosis (CME) (n = 43), leishmaniosis (CanL) (n = 28), parvoviral enteritis (PE) (n = 19), and concurrent CME and CanL (n = 12). Mixed breed dogs were more likely to develop pancytopenia as compared to purebreds and pancytopenic dogs tended to be younger than the controls (conditional dependent logistic regression model, $P = 0.013$ and $P = 0.001$, respectively). Among the most common diseases associated with pancytopenia, the mean WBC counts were significantly lower in dogs with CME and PE compared to dogs with CanL (one way ANOVA with Bonferroni test for multiple comparisons, $P = 0.004$ and $P = 0.03$, respectively), while PLT counts were significantly lower in CME compared to CanL ($P < 0.0001$) or PE ($P < 0.0001$). Total protein concentrations were significantly lower in dogs with PE compared to CME ($P < 0.0001$) and CanL ($P < 0.0001$). Using a univariable logistic regression analysis model, no association was established between the underlying disease and the final outcome. However, higher HCT (by at least one percentage unit), WBC (by at least 1,000/μL) and PLT (by at least 10,000/μL) values tended to significantly increase the odds of survival ($P = 0.025$, $P < 0.0001$ and $P = 0.006$, respectively). In the present study, CME, CanL and PE were the major causes of canine pancytopenia. Potentially useful diagnostic indicators included severe leucopenia (CME, PE), thrombocytopenia (CME) and hypoproteinemia (PE).

Disclosures: No disclosures to report.

ESVIM-P-6

DIFFERENCES OF BREATHING PATTERNS BETWEEN CATS WITH LARYNGEAL MASSES AND FELINE BRONCHIAL DISEASES BY USING BAROMETRIC WHOLE-BODY PLETHYSMOGRAPHY. L. García-Guasch¹, A. Caro-Vadillo², J. Manubens¹, C. Sá Borges¹, J.A. Montoya-Alonso³, H.V. Molins, Sant vicens dels Horts, Spain, ²Med. Cir. Anim., UCM, Madrid, Spain, ³Int. Med., ULPGC, Las Palmas, Spain

Laryngeal masses (LM) usually produce air flow limitation during inspiration, expiration or transiently during subsegments of both breathing phases. Feline bronchial diseases (FBD) have predominantly expiratory flow restrictions. Barometric whole-body plethysmography (BWBP) is a non-invasive pulmonary function test (PFT) that allows a dynamic study of breathing patterns widely used to evaluate lower airway responsiveness.

The objective of this preliminary study was to evaluate if there were significant differences in respiratory rate [RR(rpm)], tidal volume [TV(mL)], minute volume [MV(mL)], inspiratory [Ti(s)] and expiratory [Te(s)] intervals, peak inspiratory and expiratory flows [PIF and PEF(mL/s)], end expiratory pause [EEP(ms)], Enhanced pause [Penh] and Pause [PAU] between cats with LM and with FBD by using BWBP. The study was approved by the ethical committee of Veterinary Medicine Service of Las Palmas de Gran Canaria University (Spain) and it was carried out in accordance with the current European legislation on animal protection.

Thirteen client-owned cats were included [LM (n = 3), FBD (n = 10)]. Cats did not have a previous history of upper airway, cardiac or systemic diseases and had negative results when tested for heartworm and FeLV/FIV diseases. Cats were placed in the BWBP chamber and after an adaptation period of time in a quiet and silent environment, four 3-minute periods were registered and data were shown as means with standard deviations. A *P*-value <0.05 was considered statistically significant.

BWBP results were: RR = 28.27±23.54; TV = 99.97±43.04; MV = 2168.34±872.70; Ti = 1.41±0.77; Te = 1.83±1.18; PIF = 126.99±25.92; PEF = 237.62±67.03; EEP = 724.02±862.09; Penh = 3.391±0.960 and PAU = 1.654±0.258 for LM cats, and RR = 78.76±60.77; TV = 28.56±14.86; MV = 1663.88±761.04; Ti = 0.46±0.18; Te = 0.67±0.24; PIF = 97.21±40.31; PEF = 87.97±51.40; EEP = 15.63±12.62; Penh = 0.857±0.287 and PAU = 0.914±0.211 for FBD cats.

BWBP detects both upper and lower airways diseases because any site of airway obstruction will result in increased pressure changes associated with breathing. Nevertheless our results suggest that there are significant differences in TV (*P* = 0.0001), Ti (*P* = 0.0001), PEF (*P* = 0.0001), EEP (*P* = 0.003), Penh (*P* = 0.0001) and PAU (*P* = 0.0001) between LM and FBD cats. No other significant difference in BWBP parameters was found.

Upper airway obstructions have been previously evaluated in cats by using PFT (McKieman, 1993, Lin, 2014) but in authors' knowledge this is the first study designed to compare upper and lower airway obstructions by using BWBP. Attending our results, there is the evidence that BWBP can help characterize mechanical dysfunction of the airways in cats with LM obstruction. However we must keep in mind some limits of this study as the low number of animals, individual variability in breathing pattern and to have the chance of doing bronchoreactivity tests.

Disclosures: No disclosures to report.

ESVIM-P-7

RISK FACTORS FOR MORTALITY IN AGED GUIDE DOGS. S. Hoummady¹, J. Hua², C. Muller³, J.L. Pouchelon⁴, M. Blondot⁵, C. Gilbert¹, A.A. Bourachid⁶, L. Desquilbet¹. ¹Alfort Veterinary School / CNRS-MNHN, Maisons-alfort, France, ²Dr Lacol Veterinarian Clinic, Drancy, France, ³Saint Bernard Veterinarian clinic, Lomme, France, ⁴Alfort Veterinary School, Maisons-alfort, France, ⁵Paris guide dog school, Vincennes, France, ⁶MNHN, Paris, France

The median lifespan of domestic dogs has been estimated to 9–12 years, but little is known about risk factors for mortality in aged dogs: most mortality studies in dogs have been carried out among diseased dogs (renal or heart diseases, cancers, post-operative death). To determine which characteristics are associated with

mortality in *a priori* healthy aged dogs, a prospective cohort study has been conducted in 116 guide dogs, followed from a systematic geriatric examination (GE) to either (all-cause) death or cut-off date (July 16th, 2013). Survival analyses (Kaplan-Meier estimators, log-rank tests, and multivariate Cox proportional hazards models) were used to assess the associations with time to death. Median age at GE was 8.9 years, all dogs were neutered, and 50% were female. The majority of dogs were Golden Retriever (n = 48) and Labrador Retriever (n = 27). Among these 116 dogs, 16% were obese, 47% presented skin nodules and 90% used bus as transportation. A total of 76 dogs died during follow-up, leading to a median survival time from GE of 4.4 years. After adjustment for demographic and biochemical variables (age, sex, total proteins, cholesterol and ALP), an increased alanine aminotransferase level (≥102 UI/L; adjusted Hazard Ratio [aHR], 6.0), presenting skin nodules (aHR, 2.3), and not being a Labrador (aHR, 3.3) were independently associated with a shorter time to death (*P* < 0.05). Public transportation tended to be associated with mortality (aHR, 3.0; *P* = 0.06), highlighting the importance of environment in mortality. Neither sex nor other biochemical parameters were significantly associated with mortality.

The alanine aminotransferase level and the presence of skin nodules seem predictors of mortality in senior guide dogs, mostly Labrador, Golden, or mixed breed of Labrador/Golden. The impact of environment, in particular urban environment, on mortality needs further investigation. Studies in other breeds and pets are also necessary to generalize these results.

Disclosures: Sara Hoummady received a grant from MP Labo for his PhD Work about dog aging and Marc Blondot work at the Paris guide dog school.

ESVIM-P-8

LARYNGOSCOPY IN COUGHING DOGS. L.R. Johnson. University of California, Davis, CA, USA

Laryngeal dysfunction is most commonly associated with aspiration pneumonia, however its role in other lower airway diseases has not been investigated. Laryngoscopic and bronchoscopic findings in dogs examined by the author between 2001 and 2014 were evaluated for the presence or absence of laryngeal abnormalities. Dogs that presented for evaluation of inspiratory difficulty or panting were excluded from analysis. Clinical diagnoses of inflammatory airway disease, airway collapse, airway infection, eosinophilic bronchopneumopathy or a combination of these disorders were obtained through bronchoscopy and bronchoalveolar lavage fluid analysis. Detection rates for laryngeal abnormalities were compared among disease groups using Chi Square analysis and Fisher's exact test, with significance set at *P* < 0.05. A total of 138 dogs were evaluated and varied in age between 4 months to 15.5 years (median 8 years). Weight ranged from 1.5–63.4 kg (median 13 kg), with 31 dogs <5 kg, 28 dogs from 5.1–9.9 kg, 24 dogs from 10–20 kg, 45 dogs from 20.1–40 kg, and 9 dogs >40 kg. Laryngeal hyperemia or swelling was found in 73/138 dogs (53%), and detection rate did not differ among disease processes. Laryngeal function was considered suspect in 59/138 cases, prompting administration of doxapram, which normalized function in 30/59 dogs. Laryngeal paresis or paralysis was reported in a total of 26/138 dogs (19%). A substantial number of dogs with chronic cough displayed evidence of abnormal laryngeal structure or function, suggesting that a complete laryngoscopic examination should be performed in all dogs evaluated for cough.

Disclosures: Member of the Feline Advisory Board, Speaker honoraria for international, national, and regional continuing education meetings.

ESVIM-P-9

BRONCHIECTASIS IN DOGS. L.R. Johnson, E.G. Johnson, W. Vernau, B.A. Byrne. University of California, Davis, CA, USA

Bronchiectasis is a poorly characterized disease in dogs identified by airway dilatation on radiographs, computed tomography,

bronchoscopy, or histopathology. Little is known about underlying disease processes associated with bronchiectasis in dogs. Medical records from dogs presented to UC Davis were searched for identification of bronchiectasis. Underlying disease processes and clinical diagnoses were obtained through review of the history, physical examination, respiratory endoscopy and bronchoalveolar lavage fluid analysis and microbiology. Historical reports, results of imaging, bronchoscopy and fluid analysis, and scrutiny of pathologic and clinical diagnoses were comprehensively evaluated to identify the most likely underlying disease process associated with bronchiectasis. Between 2003 and 2014, bronchiectasis was diagnosed in 86/621 dogs (14%) that had bronchoscopy performed. Dogs ranged in age from 0.5 to 14 years (median 10 years) with 1/85 dogs < 6 months, 16/85 dogs (19%) 1–5 years, 37/85 dogs (43%) 5.1–10 years of age and 31/85 dogs (37%) over 10 years of age. Dog breeds affected more than once included 6 Labrador retrievers, 5 Cocker spaniels, 4 Golden retrievers and 4 Standard Poodles. Duration of cough ranged from 3 days to 10 years (median 6 months). Underlying disease processes included pneumonia in 45/86 (52%) dogs, inflammatory airway disease in 24/86 (28%) dogs, and eosinophilic bronchopneumopathy in 10/86 (12%) dogs. Twenty-three of 85 dogs (27%) had positive bacterial cultures, with isolation of *Streptococcus* (n = 6) and enteric species (n = 5) most commonly. This study found that bronchiectasis often occurs in older, large breed dogs with infectious or inflammatory pneumonia.

Disclosures: Johnson: Feline advisory board, speaker honoraria.

ESVIM-P-10
A RETROSPECTIVE STUDY OF CHRONIC RESPIRATORY DISEASE IN 126 DOGS PRESENTING TO A PRIVATE SOUTH AFRICAN VETERINARY CLINIC. J.L. Mclean, R.G. Lobetti. Bryanston Veterinary Hospital, Johannesburg, South Africa

Chronic respiratory disease, often characterized by a chronic cough, is common in dogs.

The purpose of this study was to determine the etiology of chronic respiratory disease in dogs that were presented with persistent and chronic coughing.

A retrospective study of 126 client-owned dogs with signs of persistent and chronic lower respiratory disease, that underwent bronchoscopy together with either an endotracheal wash (ETW) or broncho-alveolar lavage (BAL), was performed.

All dogs were evaluated by means of full clinical examination, hematology and serum biochemistry analyses, survey thoracic radiographs, echocardiography and ECG (if indicated), and bronchoscopy with cytological analysis and aerobic culture of ETW or BAL fluid. An ETW was performed in 112/126 (89%) dogs while a BAL was performed in 15/126 (11%) dogs. A positive aerobic bacterial culture was identified in 42/126 (33%) of submitted ETW/BAL fluid samples. Most commonly isolated bacteria included *Mycoplasma sp.* (24%), *Bordetella bronchiseptica* (24%) and *Pseudomonas aeruginosa* (12%).

A definitive diagnosis was made in 118/126 cases (93.6%). Chronic bronchitis was the most common diagnosis (37.3%), median age 8 years; followed by airway tracheal collapse or bronchomalacia (23%), median age 11 years; and primary bacterial infections (15.8%), median age 3 years. Less common etiologies identified included neoplasia (5.5%), median age 14 years; parasitic infections (4.8%), median age 7 years; and eosinophilic bronchopneumopathy (3.2%), median age 6 years. Rare etiologies identified included primary pulmonary hypertension, primary ciliary dyskinesia, excitement-induced cough, and obesity. Myxomatous mitral valve disease was found concurrently in 12/126 (9.5%) dogs.

This study concluded that by using a structured combination of survey thoracic radiography, bronchoscopy and ETW or BAL with cytology and culture, a diagnosis could be made in the majority of dogs with chronic respiratory disease.

Disclosures: No disclosures to report.

ESVIM-P-11
STERILE STEROID-RESPONSIVE LYMPHADENITIS IN 36 DOGS. A. McPartland¹, I. Battersby², D. Cain², D.J. Walker³, S. Warman⁴, V. Black⁴, N. Van Den Steen⁵, S.W. Tappin¹. ¹Dick White Referrals, Six Mile Bottom, UK, ²Davies Veterinary Specialists, Hertfordshire, UK, ³Anderson Moores Veterinary Specialists, Hampshire, UK, ⁴Langford Veterinary Services, University of Bristol, UK, ⁵Cave Veterinary Specialists, Wellington, UK

Canine sterile steroid-responsive lymphadenitis (CSSRL) is an uncommon cause of lymphadenomegaly. Diagnosis is one of exclusion after extensive investigations exclude infectious, inflammatory or neoplastic aetiologies. Resolution of clinical signs occurs with corticosteroids.

This retrospective study aimed to further define characteristics, progression and treatment regimens. Cases were recruited from 5 UK referral centres between 2009–2015. Diagnostic investigations in each case excluded other potential causes of lymphadenomegaly.

Thirty-six dogs were diagnosed with CSSRL from lymph node cytology and/or histopathology. Eighteen breeds were represented, of which 16 were spaniels. English springer spaniels (ESS) accounted for 10 cases along with Cocker spaniels (4), Cavalier King Charles spaniels (2) and Border collies (3). Median age at presentation was 4 years. ESS, Cocker spaniels, CKCS and Border collies presented at 4.4, 2.5, 2.75 and 2.5 years respectively. Females were over-represented with 22/36 females (15/36 FN and 7/36 FE) and 14 males (10/36 MN and 4/36 ME). 60% of the ESS cases presented were FN dogs.

Clinical presentation varied between dogs. Clinical signs of pyrexia (77%), lethargy (70%) and anorexia (41.6%) were the most common. Other signs included cough, tachypnoea, dyspnoea, dysphagia, vomiting, diarrhoea, neck or spinal pain, abdominal pain, joint effusion or dermatologic signs. Median referral time was 24 days (ESS 25, Cockers 33 and Border collies 8 days).

Twenty-two animals were pyrexia at presentation (mean 39.8 °C, range 39.1–40.9 °C). Thirty-one animals presented with peripheral lymphadenomegaly, but 5 animals displayed only internal lymph node enlargement. Cytology was performed in 30/36 cases; neutrophilic lymphadenitis (20), followed by granulomatous (5), pyogranulomatous (5) and reactive hyperplasia (4). Histopathology was performed in 22/36 cases documenting neutrophilic (5), pyogranulomatous (9) or granulomatous (2) lymphadenitis. Lymph node culture or staining (Gram, PAS, ZN) was performed in 17 and 18 animals respectively, all of which were negative.

Prednisolone was administered in all cases (dose range 0.5–3 mg/kg daily). 24 animals were initiated therapy at 1 mg/kg q 12 hours. Mean treatment length was 18 weeks. 16 dogs relapsed throughout the study period (9 ESS, 3 cockers, 1 CKCS, Border collie, Lurcher and Beagle). 7 ESS relapsed within 18 months of diagnosis. Median relapse time was 26 weeks.

This study documents dogs with CSSRL in the UK suggesting an over-representation in spaniel breeds (particularly ESS), with females and young dogs typically affected. Cytologic and histopathologic examination confirmed sterile lymphadenitis with animals showing marked and rapid clinical improvement with corticosteroids.

Disclosures: No disclosures to report.

ESVIM-P-12
OXIDATIVE STRESS VALUES IN BRACHYCEPHALIC DOGS WITH UPPER AIRWAY OBSTRUCTION. M. Planellas¹, R. Cuenca², M.D. Tabar³, C. Bertolani⁴, C. Poncet⁵, J.M. Closa⁶, J. Lorente⁷, J.J. Cerón⁸, J. Pastor². ¹Hospital Clinic Veterinari, Bellaterra (Barcelona), Spain, ²Animal Medicine and Surgery Department, Faculty of Veterinary Medicine, UAB, Bellaterra (Barcelona), Spain, ³Centro Policlínico Veterinario Raspeig, Alicante, Spain, ⁴Centre Hospitalier Vétérinaire Frégis, Arcueil, France, ⁵Centre Hospitalier Vétérinaire Frégis, Arcueil, France, ⁶Hospital Ars Veterinaria, Barcelona, Spain, ⁷Otorrinolaringología Service, Hospital Vall d'Hebron, Barcelona, Spain, ⁸Animal Medicine and Surgery Department, Faculty of Veterinary Medicine of Murcia, Murcia, Spain

Brachycephalic dogs have unique upper respiratory anatomy with abnormal breathing patterns similar to those in humans with

obstructive sleep apnea syndrome (OSAS). Oxidative stress in the body represents the imbalance between the production of reactive oxidative species and the ability of antioxidant defense mechanisms to detoxify the reactive intermediates. Oxidative stress is involved in the pathogenesis of many diseases, including hemolytic anemia, atherosclerosis, tissue reperfusion injury and has also carcinogenic potential. Several studies have clearly shown an association between obstructive sleep apnea syndrome in humans and oxidative stress, but detailed underlying pathomechanism remains unclear. Due to the consideration of brachycephalic dogs as an animal model of human OSAS, this study was designed to evaluate oxidative stress (Paraoxonase type-1 activity; PON1 and total antioxidant status; TAC) in brachycephalic dogs with Brachycephalic Airways Obstructive Syndrome (BAOS) before and after surgery compared to control dogs.

This study was conducted on 37 dogs with BAOS and 34 control dogs. Twenty out of 37 BAOS dogs were evaluated 1–2 months after surgical correction. Mean values of TAC and PON1 in different studied groups were as follows: control dogs (TAC: 0.614; PON1:2.53), BAOS dogs (TAC: 0.233; PON1: 2.438), BAOS dogs post-surgery (TAC:0.177; PON1: 2.705)

A statistically significant difference on TAC levels is observed between dogs with BAOS and control dogs ($P < 0.05$). No statistically significant differences were observed in PON1 and TAC levels before and after surgery. On the other hand, no differences have been observed between PON1 and TAC levels in BAOS dogs according type of brachycephalic breed, grade of respiratory and digestive signs or presence of everted ventricular laryngeals.

The results of our study showed a statistically significant difference in TAC values between control and dogs with BAOS, confirming the oxidative stress previously described in humans. Even that human patients with OSAS can partially reverse their increase in oxidative stress by using a nasal continuous positive airway pressure treatment, in dogs with BAOS no differences were observed before and 1 month after surgical treatment. BAOS surgical treatment is not useful to reduce PON-1 or TAC levels, probably because BAOS does not induce such an evident inflammatory process in dogs as in human patients with OSAS.

Disclosures: No disclosures to report.

ESVIM-P-13

CHEMOKINE (CC-MOTIF) LIGAND 2 AS A PROGNOSTIC SERUM MARKER IN CANINE IDIOPATHIC PULMONARY FIBROSIS. E. Roels¹, S. Holopainen², E. Teske¹, M.M. Rajamäki², C. Clercx¹. ¹University of Liège, Liège, Belgium, ²University of Helsinki, Helsinki, Finland

Canine idiopathic pulmonary fibrosis (CIPF) is a progressive interstitial lung disease mainly affecting West Highland white terriers (WHWTs). The CIPF course varies greatly among dogs from rapid deterioration to slowly progressive forms and the survival time from onset of clinical signs ranges from a few months to several years. In human IPF, increased chemokine (CC-motif) ligand 2 (CCL2) concentrations in bronchoalveolar lavage fluid (BALF) are indicative of a poor outcome and serum concentrations are correlated with clinical parameters of lung function. In dogs, serum and BALF CCL2 concentrations were shown to be elevated in WHWTs with CIPF compared with healthy WHWTs. The aim of the present study was to investigate whether serum CCL2 concentrations measured in WHWTs with CIPF at diagnosis (1) can be used as an indicator of prognosis and (2) correlate with lung function parameters. CCL2 concentrations were determined by ELISA (Canine CCL2 Quantikine ELISA kit, R&D Systems) in the serum of 60 WHWTs suspected of CIPF (median age 11.7 years, range 5.7 - 14.5), for which a follow-up was available (median follow-up time 8.6 months, range 0 - 71.8). Serum sampling extended from May 2007 to January 2015. CIPF diagnosis was confirmed by thoracic high resolution computed tomography, lung histopathology, or both examinations in 17, 6 and 27 WHWTs respectively. Kaplan-Meier analysis was conducted to investigate differences in survival times according to serum CCL2 concentrations at diagnosis. Spearman analysis was used to assess

correlations between serum CCL2 concentrations and lung function parameters, namely the distance walked in the 6-minute walking test (6MWD) and the arterial partial pressure of oxygen (pO₂). Among the 60 CIPF WHWTs included, 31 died or were euthanized for CIPF-related reason, 12 died or were euthanized for non-CIPF-related reason and 17 were still alive at the end of the study. The median survival of WHWTs with CIPF-related death or euthanasia was 6.4 (range 0.4 - 71.9) months from diagnosis. Serum CCL2 concentrations above 700 pg/mL were significantly associated with a shorter survival time in WHWTs affected with CIPF ($P = 0.02$). A weak negative correlation was found between serum CCL2 concentrations and the 6MWD ($r = -0.382$, $P = 0.03$, $n = 31$), while no correlation was observed with arterial pO₂ values ($n = 49$). In conclusion, serum CCL2 concentration provides prognostic information in WHWTs suffering from CIPF, while this marker is weakly correlated with the clinically lung function parameters available in the present study.

Disclosures: No disclosures to report.

ESVIM-P-14

STANDARDIZED CHARACTERIZATION OF THORACIC HIGH-RESOLUTION COMPUTED TOMOGRAPHIC FINDINGS IN WEST HIGHLAND WHITE TERRIER WITH CANINE IDIOPATHIC PULMONARY FIBROSIS AND COMPARISON BETWEEN SEDATED AND ANESTHETIZED EXAMINATIONS. E. Roels¹, T. Couvreur², C. Soete¹, C. Clercx¹, J. Verschakelen³, G. Bolen¹. ¹University of Liège, Liège, Belgium, ²CHC Liège, Liège, Belgium, ³KU Leuven, Leuven, Belgium

Canine idiopathic pulmonary fibrosis (CIPF) is a progressive interstitial lung disease mainly affecting West Highland white terriers (WHWTs). This study was intended to (1) describe thoracic high-resolution computed tomography (T-HRCT) findings obtained in CIPF dogs under general anesthesia (GA) using the glossary of the Fleischner Society and (2) compare images obtained under GA (T-HRCT^{GA}) with those obtained under sedation (T-HRCT^S). T-HRCT images from 11 WHWTs with CIPF and 9 control WHWTs were retrospectively reviewed by 3 observers in consensus. Specific T-HRCT features were assessed and graded for each lung lobe (0 = absence, 1 = mild, 2 = moderate and 3 = severe). A global score was then calculated. The K_{hi}² test with the threshold 5% was used for the statistical analysis. Ground glass opacity (GGO) was observed in all CIPF WHWTs and in 5/9 of controls ($P = 0.013$). In controls, GGO was mild and localised mainly in cranial lobes. In CIPF WHWTs, GGO was mild, moderate or severe in 2, 4 and 5 dogs respectively, without lobe predilection. Consolidation was observed in 5/11 CIPF WHWTs but not in controls ($P = 0.020$) and was mild (3/5) to moderate (2/5). A mosaic pattern, suggestive of air trapping, was noticed in 8/11 CIPF WHWTs but not in controls ($P = 0.001$) and was mild, moderate or severe in 3, 2 and 3 WHWTs respectively, without lobe predilection. Nodules were present in 3/11 CIPF WHWTs but not in controls. Reticulation, subpleural bands and parenchymal bands were noticed in 1, 1, and 3/11 CIPF WHWTs respectively. Honeycombing, emphysema, pleural effusion and pleural thickening were never observed. Bronchial wall thickening and mild bronchiectasis were present in 6/11 and 3/11 CIPF WHWTs respectively but not in controls ($P = 0.008$ and $P = 0.09$). The overall T-HRCT^S quality was good in 10/17 examinations compared with 16/20 for T-HRCT^{GA} ($P = 0.160$). The presence of motion artefacts was higher for T-HRCT^S ($P < 0.001$), but were most frequently graded as mild ($P < 0.001$). T-HRCT^S allowed identification of a mosaic pattern in 2 additional CIPF WHWTs, while consolidation could not be identified in 2 others. There was no difference in identification or gradation for the other features between T-HRCT^{GA} and T-HRCT^S. In conclusion, GGO, consolidation, mosaic pattern and bronchial wall thickening are the main T-HRCT features of CIPF in WHWTs. Honeycombing, the major feature of IPF in humans, was never observed, which suggests a different pathophysiology between the 2 entities. T-HRCT^S images are in accordance with T-HRCT^{GA} and can be used for CIPF diagnosis.

Disclosures: No disclosures to report.

ESVIM-P-15

RETROSPECTIVE CHARACTERIZATION OF MESENTERIAL PURULENT LYMPHADENITIS AND LYMPH NODE ABSCESSES IN DOGS REVEALS AN INCREASED RISK FOR THE SMALL MUNSTERLANDER. S. Schmitz. Small Animal Hospital Justus Liebig University Giessen, Giessen, Germany

Literature on mesenterial lymphadenitis (LAD) or mesenterial lymph node abscesses (LAB) in small animals is scarce. Case files from 2005 to 2014 were searched for dogs with the diagnosis of mesenterial LAD/LAB based on cytology and/or histopathology. Of 24 cases identified, 5 had to be excluded due to incomplete data. The remaining dogs were of mixed breed (n = 6), small Munsterlander (n = 4) and one each of other breeds. Nine dogs were male and 10 female. Median age was 47 months (range 6–167). Diagnosis was based on fine needle aspiration (FNA; n = 9), histopathology (n = 1) or both (n = 9). Significant findings in the dogs' history included gastrointestinal signs (n = 2), 1 puppy whose mother had mastitis, bite wounds/abscesses of the skin (n = 2), pulmonic stenosis (n = 1) and orthopaedic diseases (n = 3). Most common presenting complaints were lethargy (n = 13), hyperthermia (n = 12), diarrhoea (n = 7), vomiting/nausea (n = 6), inappetence/anorexia (n = 5), back/abdominal pain (n = 4) and lameness (n = 2). Diagnostic tests performed included haematology/serum biochemistry (n = 19), thoracic (n = 12) and abdominal (n = 7) radiographs, abdominal ultrasound (n = 19), CT/MRI (n = 3), FNAs of other organs (n = 7), urinalysis (n = 12) with culture (n = 7), coagulation profiles (n = 5), orthopaedic radiographs (n = 2), cPL (n = 5), blood cultures (n = 1), and CSF/joint taps (n = 2). Dogs were retrospectively divided into group A (n = 9): dogs with no other disease than LAD/LAB ("idiopathic") and group B (n = 10): dogs with other diseases diagnosed simultaneously. These included neoplasia (carcinoma n = 1, lymphoma n = 2, leiomyosarcoma n = 1, histiocytic neoplasia n = 1, prostate carcinoma n = 1), gastroenteritis (n = 3), presumed pancreatitis (n = 2), purulent monoarthritis (n = 1), purulent hepatitis/splenitis (n = 2), fungal infection at a distant site (n = 1), and mycobacteriosis (n = 1). Eleven dogs received surgical treatment and antibiotics, and 8 dogs conservative medical management consisting of supportive treatment and antibiotics. All dogs were discharged alive. Dogs in group A were hospitalized longer (mean 8 days, SD 3.4) than dogs in group B (mean 3 days, SD 2.2) ($P = 0.004$). The median follow-up time was 67 days (4–784 days). There was no difference in pretreatment with antibiotics or anti-inflammatories between groups. t-tests or Kruskal-Wallis tests showed that dogs in group A were borderline significantly younger ($P = 0.052$), had significantly higher respiratory rate ($P = 0.004$), rectal temperature ($P = 0.007$), monocyte count ($P = 0.014$) and CRP concentration ($P = 0.027$) than dogs in group B. The small Munsterlander had an odds ratio of 32 over other breeds to suffer from LAD/LAB. In conclusion, idiopathic mesenterial LAD/LAB was seen in young dogs with hyperthermia and gastrointestinal signs. Diagnosis of purulent LAD/LAB on FNA does not exclude the presence of another underlying pathogenesis.

Disclosures: No disclosures to report.

ESVIM-P-16

CLINICAL AND LABORATORY PARAMETERS IN DOGS WITH CANINE INFECTIOUS RESPIRATORY DISEASE (CIRD). B. Schulz, S. Kurz, K. Weber, K. Hartmann. Medizinische Kleintierklinik der LMU Muenchen, Muenchen, Germany

Canine infectious respiratory disease (CIRD) is a disease complex caused by different viral and bacterial pathogens. Aim of the study was to evaluate clinical and laboratory factors associated with different infectious agents.

Dogs were included, if they showed respiratory signs (<14 days) consistent with CIRD and if non-infectious respiratory conditions could be excluded. Nasal and pharyngeal swabs were taken from 61 dogs with CIRD and tested for respiratory pathogens, including canine parainfluenza virus (CPIV), canine adenovirus (CAV), canines distemper virus (CDV), canine herpes virus (CHV), canine

respiratory coronavirus (CRCoV), canines influenza virus (CIV), and *Bordetella bronchiseptica* (*B. bronchiseptica*) by polymerase chain reaction. Results of clinical and laboratory data were correlated with the underlying pathogen using fisher's exact test and chi-square test ($p \leq 0.05$).

CPIV was detected in 23, CRCoV in 6, and *B. bronchiseptica* in 48 dogs; 23 patients showed infections with more than one pathogen. There was no significant difference for age and gender distribution between the 3 groups; however, dogs infected with CPIV more likely originated from a shelter ($P = 0.037$). When clinical data were compared, there was no significant difference for the parameters depression, fever, cough, nasal discharge, dyspnoea, and abnormal lung sounds. Furthermore, there was no significant difference regarding abnormalities of erythrocytes, platelets, leukocytes, and differential count between groups.

The study shows that in dogs with CIRD clinical and laboratory parameters cannot indicate the underlying pathogen. Furthermore, diseases severity does not seem to depend on the infectious organism involved.

Disclosures: No disclosures to report.

ESVIM-P-17

PERIPHERAL BLOOD LYMPHOCYTE SUBPOPULATIONS IN IRISH WOLFHOUNDS WITH PNEUMONIA. S.J. Viitanen, M.M. Rajamäki. University of Helsinki, Helsinki, Finland

Breed related predisposition to bacterial bronchopneumonia (BP) has been reported in Irish wolfhounds (IWHs). Underlying factors are unknown, however immune deficit, ciliary dysfunction and aspiration have been suggested as predisposing factors. The purpose of this prospective study was to evaluate lymphocyte subpopulations in IWHs with one or more previous BP and compare results to elderly IWHs without any previous bacterial respiratory infections. Additionally, healthy dogs of other breeds were included as controls.

Previous BP was confirmed in 11 IWHs (median age 5.1 years, interquartile range 2.2–7.0 years). Healthy IWHs (n = 13, 6.8, 6.3–8.2 years) or dogs of other breeds (n = 15, 5.5, 3.5–6.3 years) had no history or findings suggestive of previous BP. EDTA blood samples, collected from all dogs when they were healthy, were stained with fluorescent Mouse anti Dog CD3, CD4, CD8, CD21 and MHC class II antibodies (ABD Serotec[®]) and flow cytometry analysis was performed with BD FACSAria[®] II Cell Sorter and FACSDiva[®] software. Statistical comparison between groups and the effect of age was studied using analysis of covariance (ANCOVA) models.

The number of leucocytes did not differ significantly between groups. The total numbers of lymphocytes and numbers of major lymphocyte subpopulations (B-cells, CD4+ and CD8+ T-cells) were significantly lower in healthy IWHs and IWHs with previous BP compared to dogs of other breeds (lymphocytes $P < 0.001$ and $P < 0.001$; B-cells $P = 0.013$ and $P = 0.005$; CD4+ T-cells $P = 0.026$ and $P = 0.029$; CD8+ T-cells $P < 0.001$ and $P = 0.001$ respectively). Percentage and number of MHC class II+ non-B lymphocytes was significantly higher in both IWH groups than in dogs of other breeds ($P < 0.001$ in all comparisons). Lymphocyte numbers and subpopulations did not differ significantly in healthy IWHs compared to IWHs with previous BP. An age-related decline in the total number of lymphocytes ($P = 0.015$), T-cells ($P = 0.007$), CD4+ T-cells ($P = 0.007$) and MHC class II+ non B-cells ($P < 0.001$) was noticed only in the group of IWHs with previous BP.

These preliminary results indicate that IWHs may have significantly lower numbers of lymphocytes, B-cells as well as CD4+ and CD8+ T-cells than dogs of other breeds. Further studies are needed to determine whether these alterations represent a breed related phenomenon or are connected to the predisposition to BP. An age-related decline in lymphocyte, total T-cell and CD4+ T-cell numbers was detected in IWHs with previous BP. In humans, age related changes in CD4+ T-cells have been associated with increased susceptibility to infections.

Disclosures: No disclosures to report.

ESVNU-P-2

LONG TERM SURVEY OF THE EFFECT OF IMIDAPRIL ON THE GLOMERULAR FILTRATION RATE IN CATS SUFFERING FROM CHRONIC KIDNEY DISEASE. E. Grandemange, J. Blanc, A. Paulin, L. Lucats, F. Woehrlé. Vetoquinol SA, Lure, France

Feline Chronic Kidney Disease (CKD) is a common feature of ageing cats. Angiotensin-converting enzyme inhibitors (ACEi) are recommended to treat hypertension associated with CKD to limit target-organ damage and especially glomerular hypertension. In addition, the International Renal Interest Society (IRIS) guidelines recommends the prescription of an ACEi in patients with CKD and proteinuria. To our knowledge no study has demonstrated the effects of long term administration of ACEi in a client owned population of cats suffering from CKD on glomerular filtration rate (GFR).

The aim of the study was to evaluate the effect of an ACEi (imidapril, Prilium[®], Vetoquinol SA) on the GFR of cats suffering from naturally occurring chronic kidney disease (CKD) over 12 months.

Sixty-six cats presenting with clinical and biological signs of CKD were enrolled by 20 European investigators and followed up till 24 months in this randomized blinded study. Thirty-two cats provided suitable data for GFR analysis; 17 animals received imidapril at the dosage of 0.5 mg/kg/day and 15 received placebo. Animals with no available GFR value on Day0 or with no data after Day0 were excluded as well as animals for which the iohexol clearance could not be determined. Follow up was censored after 12 months due to small sample sizes for statistical comparisons. On Day0, Month3, Month6 and Month12, cats were sampled 30, 60 and 120 minutes after intravenous administration of 647 mg of iohexol. GFR was based on determination of the iohexol clearance which was calculated with the Phoenix[®] WinNonlin 6.3 software. Statistical analyses were performed with SAS/STAT 9.2 software. As GFR were not available on each time point for a given animal, the 2 treatment groups were compared on each GFR determination point using an ANCOVA (analysis of covariance) with the GFR determined on Day0 as the covariate.

On D0, GFR were 1.53 ± 0.68 and 1.68 ± 0.60 mL/kg/min in the imidapril and placebo group, respectively. A significant statistical difference (1.62 ± 0.63 versus 1.24 ± 0.59 mL/kg/min in the imidapril and placebo group respectively, $P = 0.029$) was observed in favor of a higher GFR in the imidapril treated animals on Month6. Higher GFR were also observed in the imidapril group on Month3 and Month12 but not significantly different from the placebo group.

Daily long term imidapril treatment compared to placebo, may be an effective treatment to slow the progression of renal failure in cats with naturally occurring chronic kidney disease.

Disclosures: Authors are employees of Vetoquinol.

ESVONC-P-1

EVALUATION OF ENVIRONMENTAL EXPOSURE TO VINCRISTINE AND CYCLOPHOSPHAMIDE IN VETERINARY MEDICINE. A. Baril¹, S. Ndaw², F. Denis², D. Rosenberg³, C. Maurey¹. ¹Ecole Nationale Veterinaire D'alfort, Maisons alfort, France, ²Institut National de Recherche et de Sécurité pour la prévention des accidents d, Vandoeuvre, France, ³MICEN VET, Créteil, France

There is a concern over the potential of cytotoxic drugs which could harm exposed workers.

The speciality of Oncology of the ECVIM-CA published guidelines in order to prevent that risk.

However few data exist for evaluation of the real risk of occupational exposure. This concern was the aim of our study. Biomarkers used were vincristine and cyclophosphamide.

Surface samples were collected in the consultation room and ward dedicated for chemotherapy. Samples were collected with wet filter paper on 10×10 cm surfaces, or objects (computers for instance). Samples were analysed by liquid chromatography and mass spectrometric method. The limit of quantification was 0.2 ng/100 cm² (or 0.2 g/object) for vincristine and 0.02 ng/100 cm² (or 0.02 g/object) for cyclophosphamide.

Samples in consultation room were collected after treating 2 dogs with vincristine and after cleaning. Samples in dedicated ward were collected after cleaning and after 2-days stay of treated dogs. 18 aeras/objects were tested in consultation room; 15 in dedicated ward for vincristine; 9 in ward for cyclophosphamide.

After treatment of dogs in consultation room, traces of vincristine were detected on the floor and the laboratory bench top (0.47 to 0.50 ng/100 cm²). Moreover, the surface of auscultation table and extern side of gloves were contaminated after preparation and administration of vincristine (respectively 0.90, 314 and 510 ng/objet). After cleaning, 32% of samples in consultation room were positive. Traces of vincristine were detected on the floor or objects (wall otoscope...: 0.47 to 0.49 ng/100 cm²).

After cleaning, 40% of samples in ward were positive. Traces of vincristine were detected on the floor and objects (boxes, wastebin, bowls...: 0.48 to 0.64 ng/objet) after cleaning and animals treatment. Cyclophosphamide were detected on all areas tested (0.04 à 2.23 ng/objet).

Despite protective guidelines to avoid spread of cytotoxic drug, environmental exposure was demonstrated. However contaminations were limited and show that handling procedures of cytotoxic drugs are well controlled.

Most-elevated contamination level for vincristin were noticed on extern side of gloves despite of using appropriate material. Workers should pay a particular attention for gloves withdrawal to limit exposure. Small amounts of vincristine were found in inappropriate places: computer mouse... Even if there is few of those residues, we thought about people working on a regular basis in this room for other activities than chemotherapy, and we decided to adapt our clinical practices.

Evaluation of occupational exposure to cytotoxic drugs is an important step to prevent incidents and height awareness of nursing staff to apply those good clinical practices.

Disclosures: No disclosures to report.

ESVONC-P-2

INTRATUMORAL CD3+ T-LYMPHOCYTES IMMUNOEXPRESSION AND ITS ASSOCIATION WITH C-KIT AND ANGIOGENESIS IN MALIGNANT CANINE MAMMARY TUMORS: A MULTIVARIATE SURVIVAL ANALYSIS. M.I. Carvalho¹, M. Dias¹, I. Pires¹, J. Prada¹, L. Lobo², F.L. Queiroga¹. ¹University of Trás-os-Montes and Alto Douro, Vila Real, Portugal, ²Hospital Veterinário do Porto, Porto, Portugal

The tumor-associated inflammatory response had the effect of enhancing mammary tumorigenesis, helping incipient neoplasias to acquire hallmark capabilities, both in human and dogs. T-cells migration to the tumor site and the following activation may be the essential requirement for their promoting effect on tumors. In human breast cancer the signaling pathways of c-kit have been described as possibly being involved in differentiation, migration, survival, and maturation of T-cells and other inflammatory cells into tumor sites. In order to clarify this subject in canine mammary tumors (CMT), 80 malignant neoplasms were studied by using immunohistochemistry comparing the intratumoral CD3+ T-lymphocytes and c-kit expression together with VEGF, microvessel density (MVD) and clinicopathological characteristics of tumor aggressiveness. CD3+ T cells and high c-kit immunoeexpression revealed a positive and statistically significant correlation with VEGF ($r = 0.503$, $P < 0.0001$; $r = 0.284$, $P = 0.023$ for CD3 and c-kit respectively) and CD31 ($r = 0.654$, $P < 0.0001$; $r = 0.365$, $P = 0.003$ for CD3 and c-kit respectively). A statistically significant association ($P = 0.039$) and a positive correlation ($r = 0.263$, $P = 0.039$) between CD3+ T-lymphocytes and c-kit was also observed. Tumors with high c-kit expression showed higher counts of CD3+ T-cells. The MVD of high CD3/VEGF tumors was significantly more elevated ($P < 0.0001$). A similar association was observed for high c-kit/VEGF tumors ($P < 0.001$). In this study high CD3/VEGF, high c-kit/VEGF and high CD3/c-kit tumors were statistically significantly associated with elevated grade of malignancy ($P < 0.0001$ for CD3/VEGF, c-kit/VEGF and CD3/c-kit), presence of neoplastic intravascular emboli ($P < 0.0001$ for CD3/VEGF and CD3/c-kit; $P = 0.002$ for c-kit/VEGF) and presence of lymph node metastasis ($P < 0.0001$ for CD3/VEGF, c-kit/VEGF and CD3/c-kit). Tumors with high CD3/VEGF ($P = 0.006$), high c-kit/VEGF ($P < 0.0001$) and high CD3/c-kit ($P = 0.002$) expression were associated with shorter OS time. Inter-

estingly the group of tumors with high c-kit/VEGF retained their significance by multivariate analysis arising as independent predictor of OS. Results of this study suggest that T-lymphocytes may share common signaling pathways with c-kit and VEGF in CMT progression and may contribute to increased angiogenesis, aggression and shorter OS in these tumors.

Disclosures: No disclosures to report.

ESVONC-P-4

EPIDEMIOLOGICAL DATA OF FELINE LARGE GRANULAR LYMPHOCYTE LYMPHOMA: A CASE CONTROL STUDY IN 176 CATS. A. Zoia¹, M. Campigli¹, M. Drigo², ¹San Marco Veterinary Clinic, Padova, Italy, ²Sanità Pubblica Veterinaria, Padova, Italy

Few epidemiological data have been published on feline large granular lymphocyte (LGL) lymphoma. A recent study (Krick et al. 2008) described clinicopathologic features in cats with LGL lymphoma, but no comparisons were made with cats with other diseases or other forms of feline lymphoma. Therefore, the objective of this study was to assess differences in prevalence, signalment (breed, sex, and age), physical exam findings (body weight, body condition score, body temperature, heart rate, respiratory rate, and systolic blood pressure), and FeLV/FIV status between cats with LGL lymphoma (group 1) and all other type of feline lymphoma (group 2).

The electronic data-base of the San Marco Veterinary Clinic was searched between January-2007 and December-2014 for cats with a cytological or histopathological diagnosis of lymphoma. Differences between groups were assessed by T-Test, Mann Whitney, Pearson-Chi square, Pearson Chi square Yates corrected, and Fisher's exact test.

During the study period 176 out of 3858 sick cats seen at the clinic were diagnosed with lymphoma (group 1: n = 32; group 2: n = 144). The prevalence of all type of feline lymphoma between 2007 and 2014 compared to sick cats did not change over time ranging from 3.7% to 6.5% per year ($P = 0.42$; overall prevalence 4.5%, 95% CI 3.8–5.1). The lymphoma LGL prevalence between 2007 and 2014 compared to all types of lymphoma did not change over time ranging from 11.1% to 30.0% per year ($P = 0.73$; overall prevalence 17.9%, 95% CI 12.2–23.6). Among the variables studied, only sex (group 1: 19 [59.4%] females, 13 [40.6%] males; group 2: 54 [37.5%] females, 90 [62.5%] males; $P = 0.023$) and age (group 1: 126±34 months; group 2: 110±57 months; $P = 0.037$) were significantly different between groups. Sixteen out of 32 cats with LGL lymphoma were tested for their FeLV/FIV status resulting all FeLV- and one (6.3%) FIV+. Seventy-four out of 144 cats with all other types of lymphoma were tested for their FeLV/FIV status resulting 28 (37.8%) FeLV+ and 13 (17.6%) FIV+. Five cats (6.6%) were both FeLV+/FIV+. Prevalence of FeLV infection was significantly lower ($P = 0.002$) in group 1 compared to group 2. There was no difference in prevalence of FIV infection between groups.

Lymphoma LGL affects more females and older cats compared to all other type of feline lymphoma. Opposite to all other type of lymphoma, and in accordance to previous literature information, FeLV+ status does not play a role in the pathogenesis of feline LGL lymphoma.

Disclosures: No disclosures to report.

ESVONC-P-5

INTRATUMORAL FOXP3 EXPRESSION IN MALIGNANT CANINE MAMMARY TUMORS: ITS ASSOCIATION WITH CLINICOPATHOLOGICAL PARAMETERS, ANGIOGENESIS AND PROGNOSIS. M.I. Carvalho, I. Pires, J. Prada, F.L. Queiroga. University of Trás-os-Montes and Alto Douro, Vila Real, Portugal

The activity of T regulatory cells (Tregs) is known to be closely associated with the expression of FoxP3 transcription factor. FoxP3 regulatory T cells (FoxP3Treg) are a distinct group of T

lymphocytes that have immunosuppressive properties. Normally these cells work for prevention of harmful autoimmune responses, however can also interfere with beneficial immune responses such as anti-tumor immunity. In human breast cancer these cells play a crucial role in tumor progression. In canine mammary tumors (CMT) there are only a few studies and this topic are not well-documented. In this study we included 80 malignant CMT and studied, by immunohistochemistry, the intratumoral FoxP3 expression together with vascular endothelial growth factor (VEGF), microvessel density (MVD, by CD31 antibody) and several clinicopathological characteristics. Abundant FoxP3Treg cells was statistically associated with presence of tumor necrosis ($P = 0.004$), nuclear grade ($P = 0.001$), poor differentiation of tumors ($P < 0.0001$), high mitotic grade ($P < 0.0001$), high histological grade of malignancy ($P < 0.0001$), presence of neoplastic intravascular emboli ($P < 0.0001$) and presence of lymph node metastasis ($P < 0.0001$). Intratumoral FoxP3 levels were correlated with the levels of VEGF ($r = 0.427$; $P < 0.0001$) and intratumoral MVD ($r = 0.520$; $P < 0.0001$). Additionally tumors with abundant FoxP3Treg cells were associated with shorter overall survival (OS) time ($P = 0.0001$). Results suggest that Treg cells play a role in CMT progression and may contribute to increased angiogenesis and aggression in these tumors. The association of intratumoral FoxP3 expression with shorter OS of animals suggests a utility of Treg cells activity as a prognostic marker.

Disclosures: No disclosures to report.

ISCAID-P-2

THE FIRST PREVALENCE STUDY OF HAEMOPLASMA SPECIES, LEISHMANIA SPP., BARTONELLA HENSELAE, EHRLICHIA/ANAPLASMA SPP., FELINE IMMUNODEFICIENCY VIRUS AND FELINE LEUKAEMIA VIRUS IN CATS FROM CYPRUS. C.H. Attipa. School of Veterinary Sciences, University of Bristol, Langford, UK

Cyprus is an island state in the eastern Mediterranean basin. No epidemiological studies have yet been performed on infectious agents in cats from Cyprus. The aim of this study was to determine the prevalence of several infectious agents, including some vector-borne infections, in cats from Cyprus.

Surplus EDTA-blood and serum samples were recruited from 176 Cypriot cats, from which signalment and lifestyle characteristics were recorded. DNA was extracted and real-time quantitative polymerase chain reaction (qPCR) assays were used to detect haemoplasmas (*Mycoplasma haemofelis*, '*Candidatus Mycoplasma haemominutum*' and '*Candidatus Mycoplasma turicensis*'), *Leishmania* spp. and *Bartonella henselae*. Conventional PCR assays were used to detect *Ehrlichia/Anaplasma* spp. Samples yielding positive results for *Leishmania* spp. or *Ehrlichia/Anaplasma* spp. underwent further characterisation (sequencing). ELISAs were performed for the detection of *L. infantum* antibodies, feline leukaemia virus (FeLV) antigen and feline immunodeficiency virus (FIV) antibodies. Statistical analysis was performed using SPSS for the assessment of any associations between variables and infectious agents.

Of the 176 samples extracted, 2 were excluded due to failure of \geq one internal control PCR. Of the remaining 174 samples, 46 (26.4%) were positive by PCR for haemoplasma including 13 (7.5%) for *M. haemofelis*, 36 (20.7%) for '*Ca. M. haemominutum*' and 12 (6.9%) for '*Ca. M. turicensis*'. Nineteen (10.9%) were positive for *B. henselae*. One cat (0.6%) was PCR positive for *Ehrlichia/Anaplasma* spp. and sequencing revealed identity with *Anaplasma platys*. *Leishmania* spp. DNA was detected in 6 of the 174 (3.4%) cats; sequencing revealed *L. infantum* in 4 of these cases. *L. infantum* serology was positive in 7 of the 162 cats tested (4.3%). Only one cat was positive for both *Leishmania* PCR and serology. Of the 166 cats that underwent retroviral serology, 11 (6.6%) were FeLV and 30 (18.4%) were FIV positive.

Statistical analysis identified several significant associations ($P < 0.05$) including the following; haemoplasma infection and both outdoor access and feral-shelter cat origin, FeLV or FIV infection and both anaemia and feral-shelter cat origin.

This study documents, for the first time, the presence of haemoplasmas, *L. infantum*, *B. henselae*, *A. platys*, FeLV and FIV in the feline population of Cyprus. The prevalence of haemoplasma, FIV and *B. henselae* infections were among the highest reported in cats

from Mediterranean countries, while that of *Leishmania* spp. was similar. This is the second report of *A. platys* infection in a cat from a Mediterranean country.

Disclosures: No disclosures to report.

ISCAID-P-3

PREVALENCE OF BARTONELLA SPECIES INFECTIONS IN CATS IN SOUTHERN GERMANY. M. Bergmann¹, T. Englert¹, B. Stuetzer¹, S. Schwertler¹, U. Truyen², K. Hartmann¹. ¹Clinic of Small Animal Medicine, Munich, Germany, ²Institute of Animal Hygiene and Veterinary Public Health, Leipzig, Germany

Bartonella species (spp.) are zoonotic pathogens, and infections in cats are common. Prevalence in cats from Southern Germany is still unknown. The aim of this study was to determine the prevalence of *Bartonella* spp. DNA in blood of cats in Southern Germany and to evaluate associations between *Bartonella* bacteremia, housing conditions, feline immunodeficiency virus (FIV), and feline leukemia virus (FeLV) status, including progressive, regressive, and abortive FeLV infection.

Blood samples of 479 cats that were presented to different veterinary clinics in Southern Germany for various reasons were tested for *Bartonella* spp. DNA using a previously published conventional polymerase chain reaction (PCR) targeting a fragment of the 16S-23S rRNA intergenic spacer region. For statistical analysis, Fisher's exact test was used.

Prevalence rate of *Bartonella* spp. bacteremia was 2.5% (12/479; CI: 0.01% - 0.04%). *B. henselae* was amplified in 11 of these cats. One cat was positive for *B. clarridgeiae* DNA. Most of the infected cats were clinically healthy, but half of the cats had thrombocytopenia, potentially caused by their *Bartonella* spp. infection. There was no significantly higher risk to be infected with *Bartonella* spp. when living mainly outdoors or being FIV- or FeLV-infected.

Prevalence of *Bartonella* spp. bacteremia is low in Southern German cats, but there is still a risk of human *Bartonella* infection associated with cat ownership. Most clinical changes of the *Bartonella* spp.-infected cats were related to other diseases. However, thrombocytopenia was common and further studies are required to define its potential clinical relevance.

Disclosures: No disclosures to report.

ISCAID-P-4

DETECTION OF FELINE CORONAVIRUS SPIKE GENE MUTATIONS AS A TOOL TO DIAGNOSE FELINE INFECTIOUS PERITONITIS. S. Felten¹, K. Weider², S. Doenges¹, S. Gruendl¹, K. Matiasek³, W. Hermanns³, E. Mueller², L. Matiasek¹, A. Fischer¹, K. Weber¹, J. Hirschberger¹, G. Wess¹, K. Hartmann¹. ¹Clinic of Small Animal Medicine, Ludwig-Maximilians-Universitaet Munich, Munich, Germany, ²Laboklin GmbH & Co.KG, Bad Kissingen, Germany, ³Institute of Veterinary Pathology, Ludwig-Maximilians-Universitaet Munich, Munich, Germany

Ante-mortem diagnosis of feline infectious peritonitis (FIP) is still challenging. The aim of this study was to evaluate sensitivity and specificity of a 'combined reverse transcription nested polymerase chain reaction (RT-nPCR) and sequencing approach', detecting mutations at 2 different nucleotide positions within the spike gene, that previously were shown to correlate with the FIP phenotype.

The study population consisted of 64 cats with confirmed FIP and a defined control group of 63 cats for which FIP was considered an important differential diagnosis, but that were definitively diagnosed with other diseases. Blood and/or effusion samples were examined for feline coronavirus (FCoV) RNA by RT-nPCR and, if positive, nucleotide positions 23531 and 23537 were sequenced for nucleotide transitions. Sensitivity, specificity, negative and posi-

tive predictive values were determined and 95% confidence intervals (95% CI) calculated.

RT-nPCR detected FCoV in 38 cats in blood (n = 3) and/or effusion (n = 36); all of them had FIP. One of the mutations of interest was found in 2/3 of the PCR-positive blood samples and in 32/36 of the PCR-positive effusion samples. Diagnostic specificity of the 'combined RT-nPCR and sequencing approach' was 100% in blood (95% CI 83.9–100.0) and effusion (95% CI 93.0–100.0). Diagnostic sensitivity was 6.5% (95% CI 0.8–21.4) in blood and 65.3% (95% CI 50.4–78.3) in effusion.

A positive test result therefore confirms a suspicion of FIP. A negative result, however, cannot be used to rule out FIP, especially if only blood is available. Therefore, if no effusion is present, diagnosis of FIP still remains challenging.

Disclosures: Dr. Elisabeth Mueller is the Managing Director of Laboklin GmbH & Co.KG. Dr. Karola Weider is employed at Laboklin GmbH & Co.KG. This laboratory offered the 'combined RT-nPCR and sequencing approach' on a commercial basis and performed the testing in this study.

ISCAID-P-5

SEQUENCING OF 3c AND SPIKE GENES IN FELINE INFECTIOUS PERITONITIS: WHICH SAMPLES ARE THE MOST RELEVANT FOR ANALYSIS ? A RETROSPECTIVE STUDY OF 33 CASES FROM 2008 TO 2014. G.M. Freiche¹, C.L. Guidez¹, M. Duarte², Y.B. Le Poder². ¹Université Paris-Est, Ecole Nationale Vétérinaire d'Alfort, Maisons alfort, France, ²UMR 1161 Virologie INRA-ENVA-ANSES, Université Paris-Est, Maisons-Alfort, France

Feline Infectious Peritonitis (FIP) is a viral disease caused by the virulent strain of Feline Coronavirus (FIPV). The disease can appear under 2 clinical forms, dry or effusive, both leading to a fatal outcome. Diagnosis was based on histopathologic lesions on necropsy until the recent discovery of mutations associated with the FIPV strain in the 3c and spike (S) genes. Our main goal was to detail the distribution of 3c or S gene mutations in different biological samples of cats suffering from FIP.

This was a retrospective, observational study of 33 cats showing clinical signs compatible with FIP. Ten out of 33 cats were of pure breed. 57.7% were males and 42.3% females. Median age was 36.5 months at presentation. The clinical presentation, pathologic findings and virologic data were reviewed. According to clinical signs, 11 cats were classified with a dry form and 22 with a wet form of FIP. The main clinical signs included dehydration, hyperthermia, icterus, abnormal abdominal palpation, neurological and ocular disorders.

When possible blood, fecal material, effusion, fine needle aspiration (FNA) from relevant organs or a combination of these, was recovered from each cat. Feline Coronavirus (FCoV) was first researched by RT-PCR, then the 3c and part of the S genes were sequenced to determine the eventual presence of mutations.

Among the 11 dry cases, FCoV was detected in 2/8 blood samples, 3/8 fecal samples and FNA (11/11). Among the 22 wet cases, 9/15 blood samples, 12/14 fecal samples and all effusion samples (21/21) were positive for the presence of FCoV. 3c mutations were never found in fecal samples but were found in 6/10 effusion samples and in 8/8 FNA. S mutations were detected in 4/9 fecal samples, 8/9 FNA and 14/15 effusion samples. For 3 cats, no mutation, neither in 3c or S genes was identified despite the confirmation of FIP by necropsy.

S gene mutation is more frequently observed than 3c gene despite in 2 cases where only 3c mutations were identified. Moreover the presence of strains harbouring S mutation in feces has never been described before and could suggest the possible diffusion of FIPV among feline population.

In conclusion, viral diagnosis of FIP based on RT-PCR sequencing in effusion and FNA samples is essential. RT-PCR resulting from blood samples should be carefully interpreted because of high risk of missing FIPV.

Finally, searching for mutations in both S and 3c genes is recommended.

Disclosures: No disclosures to report.

ISCAID-P-6**OCCURRENCE OF METHICILLIN RESISTANT STAPHYLOCOCCUS AUREUS (MRSA) ISOLATES FROM CLINICAL SPECIMENS OF HOUSEHOLD DOGS.** C. Giacobello, F. Lo Piccolo, M. Foti, E. Giudice, V. Fisichella. Department of Veterinary Sciences - University of Messina, Messina, Italy

Methicillin Resistant *Staphylococcus aureus* (MRSA) has recently become a great concern for pet animals' disease and zoonotic infection. MRSA strains transfer between pet animals and humans could occur. The aim of the present study was to determine the occurrence of MRSA in 34 household dogs.

From January to June 2012, clinical samples were collected from 34 dogs, patients of the Veterinary Teaching Hospital of the Department of Veterinary Sciences of Messina (Italy), affected by several diseases of various origins. All samples were processed by bacteriological conventional methods for isolation and identification. All strains were tested for phenotypic susceptibility to oxacillin and were subjected to a PCR protocol for the detection of *mecA* gene. Strains carrying the gene were considered Methicillin Resistant (MRS). Lastly, on both MRS and Methicillin Sensitive (MSS) strains, Kirby-Bauer disk diffusion susceptibility testing were performed to highlight resistance profiles using 44 molecules belonging to the main classes of antimicrobials used in veterinary practice. Strains resistant to at least one molecule of 3 or more classes of antibiotics were considered multidrug-resistant (MDR). The statistical analysis of the results was made using the Z-test by a Primer[®] software.

Forty *Staphylococcus* spp. strains were isolated, belonging to 12 species. The most frequently isolated microorganisms were *Staphylococcus aureus* with 14 isolations (35%) and *Staphylococcus pseudintermedius* with 11 isolations (27.5%), followed by *Staphylococcus epidermidis* with 4 isolations (10%) and *Staphylococcus cohnii* and *Staphylococcus warneri*, both with 2 isolations (5%). A single isolation (2.5%) was obtained for each of the species *Staphylococcus chromogenes*, *Staphylococcus haemolyticus*, *Staphylococcus lentus*, *Staphylococcus lugdunensis*, *Staphylococcus saprophyticus*, *Staphylococcus simulans* and *Staphylococcus sciuri*. Thirteen (32.5%) strains of *Staphylococcus* spp. were phenotypically resistant to oxacillin and 3 *Staphylococcus aureus* (7.5%; n.2 from pyoderma, n.1 from exudative pleural effusion) were positive for the *mecA* gene. All 40 strains of *Staphylococcus* spp. were MDR. Our results showed the presence of MRSA and multidrug-resistant staphylococcal strains in household dogs. A lack of correspondence between antimicrobial susceptibility tests and molecular methods was found in the present study.

Disclosures: No disclosures to report.

ISCAID-P-8**MOLECULAR DETECTION OF HAEMOTROPIC MYCOPLASMAS INFECTING DOMESTIC CATS FROM SOUTHERN CHILE.** A. Müller Pereira¹, R. Walker¹, F. Morera¹, N. Almosny², P. Bittencourt¹, M. Gomez¹. ¹Universidad Austral de Chile, Valdivia, Chile, ²Universidade Federal Fluminense, Niterói, Brazil

Haemotropic *Mycoplasmas* (haemoplasmas) are bacteria that infect domestic cats. Approximately 25% of ill cats have haemoplasma infection. Three main feline haemoplasma species have been detected worldwide; *Mycoplasma haemofelis* (Mhf), '*Candidatus M. haemominutum*' (CMhm) and '*Candidatus M. turicensis*' (CMt). A fourth haemoplasma called '*Candidatus M. haematoparvum-like*' (CMhp) was latter identified in cats. The only published study in Chile was carried out in 30 cats, with prevalences by PCR of 3.3% to Mhf, and 10% to CMhm. The aim of this study was to perform molecular detection of haemoplasmas in cats from Valdivia, southern Chile. Blood samples were taken from 384 cats and used for haemoplasmas DNA detection by Quantitative Real Time PCR (qPCR) at Universidad Austral de Chile. qPCR protocol was based on detection of feline DNA targeting 28S Housekeeping gene and *Mycoplasma* spp. 16S rRNA gene (universal primers, MY16SF forward, MY16SR1 y MY16SR2, both reverse) by SYBR Green method. The melting Temperature (Tm) analysis allowed identifying the infecting *Mycoplasma* species (Mhf, CMhm, CMt). It was not possible to identify

haemoplasmas species on co infected cats, so a second qPCR specie specific protocol was applied on these samples. Second qPCR protocol was based on 16S rRNA gene, with specific primers to detect Mhf, CMhm, CMt and CMhp. All samples (384/384) were positive to 28S gene, proving presence of cat DNA. From the 384 cats, 15.1% (58/384) were positive to haemoplasmas, where 7.8% (30/384) corresponded to CMhm (Tm 73.5–75.0 °C), 4.4% (17/384) to Mhf (Tm 75.0–76.5 °C), 2% (4/384) to CMt (Tm 76.5–78.0 °C) and 1.8% (7/384) to co infections. Associations between CMhm+Mhf, CMhm+CMt, CMhm+CMhp and CMhm+Mhf+CMhp were detected on co infected animals. These results agree with those found in previous reports from Chile, Europe, EUA and Brazil, where CMhm is the most prevalent species and co infections are less frequent. Valdivia cats are infected by 4 different haemoplasma species and CMt and CMhp are reported for the first time in Chile. Founding: DID UACH, Project S-2014-25

Disclosures: No disclosures to report.

ISCAID-P-9**MYOCARDIAL LESIONS IN DOGS WITH VISCERAL LEISHMANIASIS.** A. Pacheco¹, H.F. Ferrari², K. Y. Hirata¹, F. A. Rosa³, T. Y. Tomokane⁴, M. D. Laurenti⁴, M. Marcondes¹. ¹UNESP – Araçatuba, Araçatuba, Brazil, ²Adamantinienses Integrated Schools, Adamantina, Brazil, ³UNESP – Jaboticabal, Jaboticabal, Brazil, ⁴Department of Pathology, University of São Paulo, São Paulo, Brazil

Clinical manifestations of canine visceral leishmaniasis (CanL) are non-specific and include progressive weight loss, anemia, lymphadenomegaly, hepatosplenomegaly, dermatological, renal and ocular alterations. Cardiac lesions resulting in clinical signs has been scarcely described in dogs with VL, and the presence of the parasite in the cardiac tissue has been involved in few reports. Accordingly, the present study aimed to evaluate histopathological abnormalities in cardiac tissue from dogs naturally infected by *Leishmania infantum chagasi*. A total of 20 dogs were evaluated. All dogs were symptomatic but no one presented clinical signs of cardiac involvement. In compliance with a federal law and under the owners' signed consent, all dogs were submitted to euthanasia and comprehensive post-mortem evaluation. Samples from right atrium free wall (RA), right ventricle free wall (RV), interventricular septum (IVS) and left ventricle free wall (LV) were collected and evaluated. Tissue samples were fixed in formalin, embedded in paraffin, sectioned at 5 mm, and stained with hematoxylin and eosin (HE) and Anti-*Leishmania* immunohistochemistry was also performed. The study was approved by the Ethics Committee in Animal Experimentation and Animal Welfare (protocol number 0463/2013). Histopathological changes were observed in at least one of the 4 evaluated cardiac regions in 75% (15/20) of the dogs. The most frequent cardiac injury was an inflammatory reaction, characterized by the presence of mononuclear cell infiltrate in different degrees. Of the evaluated regions, RA was the one with the highest incidence of histopathological changes, observed in 80% (12/15) of the animals, followed by RV, LV and SIV, affected in 73.3% (11/15), 66.7% (10/15) and 53.3% (8/15) of the dogs, respectively. Immunohistochemistry revealed amastigotes in the cardiac tissue in 70% (14/20) of the dogs. A positive correlation was found between cardiac lesions and the presence of amastigotes in the myocardium ($P < 0.05$).

Disclosures: No disclosures to report.

ISCAID-P-10**URINARY ADVERSE EFFECTS OF ALLOPURINOL TREATMENT IN DOGS WITH LEISHMANIOSIS: A PROSPECTIVE STUDY (PRELIMINARY DATA).** M. Planellas¹, I. Espada¹, X. Roura², R. Altuzarra¹, J. Pastor¹, L. Solano-Gallego¹. ¹Faculty of Veterinary Medicine, Universitat Autònoma Barcelona, Cerdanyola, Spain, ²Hospital Clínic Veterinari, Internal Medicine Service, Barcelona, Spain

Canine leishmaniosis is a life threatening zoonotic disease. The combination of meglumine antimoniate and allopurinol is consid-

ered the most effective therapy for canine leishmaniosis and constitutes the first line protocol against this disease. Allopurinol is a parasitostatic drug used in long-term to maintain low parasite loads and to avoid clinical relapses. Traditionally, allopurinol is considered a very safe drug in the dog. However, some reports indicate that xanthinuria and xanthine urolithiasis is produced after prolonged therapy with allopurinol in the dog. The aim of this prospective study was to evaluate the prevalence of urinary adverse effects of allopurinol treatment (10 mg/kg/BID/PO) in dogs with leishmaniosis. Diagnosis was made by compatible clinicopathological abnormalities with leishmaniosis and high *Leishmania infantum*-specific antibody levels assessed by quantitative ELISA. Once leishmaniosis was diagnosed, a close follow-up (day 0, 30, 90, 180 and 360 during treatment) including physical examination, baseline laboratory tests (CBC, biochemistry profile, serum electrophoresis, urinalysis, urinary protein/creatinine ratio) and abdominal ultrasound was performed. In our preliminary results, 13 dogs were included. Dogs did not present any urinary abnormalities based on biochemistry profile, urinalysis and abdominal ultrasound at the time of diagnosis. Four out of 13 presented xanthinuria (day-30 (n = 3), day-90 (n = 4), and day-180 (n = 4)). Two out of 13 dogs presented renal mineralization at day-90 of treatment. Two out of 13 dogs presented bladder urolithiasis since day-90 of treatment. Xanthinuria was presented initially in all dogs that developed renal mineralization or bladder urolithiasis. Dogs with renal mineralization and urolithiasis were treated with a restricted protein diet and, so far, they did not develop renal disease.

The present study describes early xanthinuria, renal mineralization and urolithiasis as adverse effects due to chronic allopurinol treatment in dogs with leishmaniosis. Neither mineral analysis nor renal biopsy was performed to confirm the origin of these lesions, but no urinary abnormality was present before allopurinol treatment was instituted. A thorough monitoring of dogs treated against leishmaniosis combined with urinalysis and abdominal ultrasound should be performed to evaluate urinary adverse effects and to help in the clinical management of these adverse effects.

Disclosures: No disclosures to report.

ISCAID-P-11

GIARDIA DUODENALIS IN DOGS AND CATS: AN EPIDEMIOLOGICAL STUDY. S. Rehbein¹, C. Klotz², E. Müller³, A. Aebischer², B. Kohn¹. ¹Freie Universität Berlin, Berlin, Germany, ²Robert Koch-Institut, Berlin, Germany, ³Laboklin, Berlin, Germany

Giardia duodenalis is one of the most important gastrointestinal parasites in dogs and cats with a zoonotic potential. In Germany the prevalence in dogs and cats reaches up to 29% and 24%, respectively. Genotypes of 2 genetic assemblages of the parasites infect humans (assemblages A and B) and other mammals including small animals. In contrast, parasites of the assemblages C and D are specific for dogs, assemblage F for cats.

Objectives of the study were to analyse the prevalence, potential epidemiological risk factors and symptoms of *G. duodenalis* infections in dogs and cats.

To detect *G. duodenalis*, feces from dogs and cats was analysed with an ELISA technique. After DNA extraction real time PCR as well as multi-locus sequence typing was performed for the following gene loci: triosephosphate isomerase-, glutamate dehydrogenase-, beta-giardin-gene, ssu rRNA. With a questionnaire possible epidemiological risk factors were evaluated. Statistical analyses were performed using SPSS 21 (Odds ratio, Kolmogorow-Smirnow test, Spearman correlation).

Fecal samples of 618 dogs and 156 cats were collected over a time period of 23 months. The ELISA test was positive in 101/618 dogs and 10/156 cats. 67 of 101 *Giardia* positive dogs and 9 of 10 positive cats had gastrointestinal signs. Genotyping was successful in 54 of 101 dog samples and were assigned to assemblages as follows: assemblage A (n = 12), A/C (n = 2), A/D (n = 4), B (n = 2), B/D (n = 1), C (n = 7), C/D (n = 2), D (n = 24). Only one of 10 positive cat samples could be genotyped and was atypically identified as assemblage D. Significant correlations between *Giardia* infection and age, clinical signs, deworming status and staying abroad were found.

In this monocenter study a prevalence rate of 16.3% in dogs and 6.4% in cats was detected, which is in good accordance with previous studies. The study further highlights a high rate (34%) of asymptotically *G. duodenalis* infected animals. As potential zoonotic assemblages were detected, transmission of *Giardia* from small animals to humans (and vice versa) cannot be excluded. Especially young and not dewormed animals had a higher prevalence.

Disclosures: No disclosures to report.

ISCAID-P-12

CANINE PARVOVIRAL ENTERITIS: A RETROSPECTIVE STUDY OF 147 CASES (2003–2013). M.L. Theron, A. Savary, D. Concordet, O. Dossin. National Veterinary School, Toulouse cedex 3, France

Canine parvoviral enteritis remains a common cause of morbidity and mortality in young dogs. The goal of this study was to document a large cohort of affected dogs and analyze several factors as possible predictors of fatal outcome.

Medical records were retrospectively searched for dogs with parvoviral enteritis diagnosed with a positive fecal antigenic test or a fecal PCR. Dogs were included only if the medical records were complete. The population was compared to the reference population of the hospital on the same time period with Chi square tests and several factors were analyzed as possible predictors of death with a logistic regression.

One hundred and forty seven cases were included. Seventy percent of the dogs were non vaccinated puppies under the age of 6 months. Intact females and Rottweiler, American Staffordshire Terrier and French Beauce Shepherd dogs were over-represented. Clinical signs such as vomiting, diarrhea and dehydration were present in 92.7%, 86.4% and 70.1% of the dogs respectively. Hyperthermia, anemia and leucopenia were observed in 17.8%, 26.5% and 36.1% of dogs respectively. The majority of the affected dogs were hospitalized for 3 to 6 days and the mortality rate was 14.3% (21/147 dogs). Hypoglycemia at admission was observed in 11/81 (13.6%) dogs in which blood glucose was measured and was the only risk factor associated with death ($P < 0.05$).

In this study, a predisposition of Rottweiler, American Staffordshire Terrier and French Beauce Shepherd dogs was observed and hypoglycemia at admission was the only predictor of fatal outcome.

Disclosures: No disclosures to report.

ISCAID-P-13

EVALUATION OF THE IMPACT OF RESIDUAL MATERNALLY DERIVED ANTIBODIES AGAINST CANINE PARVOVIRUS ON THE EFFICACY OF A STANDARD PRIMARY VACCINATION PROTOCOL. J.C. Thibault, J. Bouvet, L. Cupillard, P.M. Guigal. Merial SAS, Lyon, France

Canine parvovirus (CPV) infections in dogs remain widespread around the world and still represent a major health threat in puppies. All vaccine manufacturers include this component in their core vaccination package, recommending 2 injections at 3–5 weeks interval from 7 to 8 weeks of age. Despite broad vaccination coverage, number of reports suggesting lack of efficacy in vaccinated dogs have been reported, which implicate vaccines belonging to all major manufacturers. These cases are usually considered as being linked to the interference with maternal antibodies (MatAb), able to persist beyond 12 weeks of age, which has led most expert groups to recommend a third vaccination around 16 weeks of age.

Persistence of MatAb actually represents a major issue when immunizing puppies against parvovirus. Indeed, MatAb titres higher than 1/40 in the haemagglutination inhibition (HI) test can still inhibit vaccine uptake whereas such titres do not prevent field virus infection. In contrast, HI titres higher than 1/80 to 1/120 are usually considered as protective against disease and virus excretion. This “immunity gap” is therefore a critical period for the puppy and the outcome of the vaccination.

In order to evaluate the impact of residual MDA on the efficacy of a standard primary vaccination protocol, we performed a vaccination field trial with serological follow-up.

88 puppies from 7 to 24 weeks of age presented at veterinary practice received 2 injections at 4 weeks interval. Serology was performed by ELISA before (at D0/V1), during (at D28/V2) and after (D42) vaccination.

Average maternal antibodies titres were strongly correlated with the age of the puppy at primary vaccination, remaining at vaccine inhibiting level until ~10 week of age. Average titres increased significantly after 1st injection of primary vaccination in most groups and in all groups after the 2nd injection of primary vaccination. Individual variability remained significant: vaccine uptake was inversely and strongly correlated to the pre-vaccinal MatAb titre at vaccination. 7 out of 88 puppies (8%) didn't seroconvert, despite vaccination complying to the recommended schedule. Vaccination was started in such dogs between 8.5 and 10.5 weeks and completed between 12.5 and 14.5 weeks and average initial MatAb titre was 2.4 log10 compared to 1.6 for the general population.

In conclusion, this trial supports the recommendation of an additional injection of primary vaccination at 16 weeks, especially in areas of high parvovirus prevalence / pressure, where high levels of MatAb are likely to be transferred to puppies.

Disclosures: All authors are employees of Merial.

ISCAID-P-14

C-REACTIVE PROTEIN ELEVATION IN DOGS NATURALLY INFECTED WITH BACTERIUM ANAPLASMA PHAGOCYTOPHILUM. N. Tozon, Z. Rihar, U. Ravnik. Veterinary Faculty, UL, Ljubljana, Slovenia

Anaplasmosis, caused by bacterium *Anaplasma phagocytophilum* (*A. phagocytophilum*) is the second most important zoonosis and probably the most important tick-borne disease in dogs in Slovenia. In our retrospective study, we demonstrated 73.8% (553/754) seroprevalence of *A. phagocytophilum* infection in dogs in Slovenia (1999–2011). 5.3% of the dogs were PCR positive. The aim of our study was to evaluate the usefulness of determining serum level of C-reactive protein (CRP) in dogs naturally infected with bacterium *A. phagocytophilum* as a possible indicator of the clinical phase of the disease.

PCR and/or IFA positive dogs with clinical presentation and/or thrombocytopenia were included in the study. Based on the results, the dogs were divided into 4 groups: PCR positive dogs; IFA positive (subdivided according to titer level from 1:128 - >1:2048) and PCR negative dogs; positive control group - PCR and IFA negative dogs with clinical signs and/or thrombocytopenia; negative control group - clinically healthy, PCR and IFA negative dogs. Serum level of CRP was determined using LifeAssays® Canine CRP (LifeAssays, Lund, Sweden).

An elevated concentration of CRP (> 35 mg/L) was determined in PCR positive and IFA positive dogs with an IFA titer \geq 1:2048 and coincides with the presence of clinical signs (most commonly general clinical signs, elevated body temperature, gastrointestinal problems) and/or mild (14.3%) or severe (71%) thrombocytopenia.

The assessment of CRP concentration, in correlation with certain clinical alterations and thrombocytopenia, suggests that CRP concentration is elevated in the acute phase of the disease and is in correlation with the aforementioned changes therefore can serve as an additional diagnostic parameter. The CRP concentration in IFA positive dogs, regardless of IFA titer levels, and with present clinical signs and thrombocytopenia is higher (above detectable level, > 10 mg/L) than in dogs without clinical signs or laboratory alterations, which may speak in favor of reinfection or reactivation of a persistent infection at least in cases when no other cause of inflammation can be found. Specific treatment would therefore be reasonable in such cases, especially in cases of rising CRP concentration.

Disclosures: No disclosures to report.

SCH-P-1

GALLBLADDER AGENESIS IN 15 DOGS. K. Sato, M. Sakai, S. Hayakawa, K. Kutara, K. Asano, T. Watari. Nihon University, Fujisawa Kanagawa, Japan

Gallbladder agenesis is a very rare cause of elevated liver enzymes in dogs. In this study, we evaluated the features of 15 dogs [6 males (3 castrated) and 9 females (2 spayed)] with suspected gallbladder agenesis on ultrasonography.

Five different breeds were included: Chihuahua (n = 9), Toy poodle (3), German shepherd (1), Jack Russell terrier (1), and Shiba dog (1). The median age was 1.9 (0.7–7.4) years. Ten dogs were asymptomatic, while the other 5 dogs showed decreased appetite (3), vomiting (3), ascites (2), seizure (1), and diarrhea (1). All dogs showed elevated liver enzymes, with high alanine aminotransferase levels (median, 306 U/L; 38–1374 U/L) in 13 dogs and high gamma-glutamyl transpeptidase levels (median, 12 U/L; 3–19 U/L) in 11. Gallbladder agenesis was confirmed using laparoscopy in 12 dogs and laparotomy in 3. Liver biopsy samples were obtained from all dogs. Additional computed tomography cholangiography was performed for 12 dogs using a 16-slice multidetector computed tomography (MDCT) scanner following the intravenous administration of contrast medium (meglumine iotroxate). The obtained images were analyzed on a workstation, and they revealed an absent gallbladder in 9 dogs and a vestigial gallbladder in 3. The common bile duct was dilated in 5 dogs. For all dogs, laparotomy or laparoscopy was used to visualize the gallbladder and liver abnormalities, including malformed lobes and surface irregularities. Acquired portal systemic collaterals were visually confirmed in 5 dogs, who also exhibited hypoplasia of the portal vein on histological examination.

In conclusion, most animals with gallbladder agenesis were asymptomatic in our study, indicating a good long-term prognosis. However, symptoms associated with portal hypertension must be monitored in animals with primary portal vein hypoplasia.

Disclosures: No disclosures to report.

VBPS-P-1

COMPARISON OF MEASUREMENT OF SYSTOLIC ARTERIAL BLOOD PRESSURE BY DOPPLER METHOD IN DIFFERENT BODY POSITIONS IN CONSCIOUS DOGS. P.H. Itikawa, M.M. Mantovani, J.R. Castro, G.T. Goldfeder, D.S. Schwartz, M.H.M.A. Larsson. School of Veterinary Medicine and Animal Science – University of Sao Paulo (USP), São Paulo, Brazil

Assessment of systolic arterial blood pressure (SAP) is an important tool in small animal internal medicine practice, especially with diseases or clinical conditions that can cause hypertension or hypotension. The Doppler method is noninvasive and has several advantages compared to oscillometric method. There are few studies about the effect of body position on SAP in conscious dogs. The hypothesis was that animal positioning during measurement alters SAP values. The study design was prospective and randomized regarding order of positioning measurements. One hundred and twenty client-owned, conscious, healthy or sick adult dogs, weighing up to 10 kg were included. SAP was recorded by Doppler ultrasonography following American College of Veterinary Internal Medicine consensus statement with animals positioned in sternal recumbency, right lateral recumbency and with the dog laying down on owner's lap. The order of body position was raffled at the time of measurement. Five consecutive measurements on each body position were performed always on left forelimb and the average was calculated. SAP values were higher in sternal recumbency (153 mmHg, $P_{25\%-75\%} = 134-176.5$; $P < 0.0126$) compared to those obtained on the owner's lap (139 mmHg, $P_{25\%-75\%} = 125.5-159.8$), and both were similar to right lateral recumbency (141 mmHg, $P_{25\%-75\%} = 125-159$). These results suggest that SAP measurement obtained on owner's lap or right lateral recumbency can be used on clinic routine, but SAP measurement obtained on sternal recumbency should be avoided, because such measures may be overestimated.

Disclosures: No disclosures to report.

VBPS-P-2**REPEATABILITY OF HYPERTENSION DIAGNOSIS BASED ON NONINVASIVE BLOOD PRESSURE ASSESSMENT IN CLINICAL CANINE PATIENTS.** R.L. Stepien, E.M. Casper. University of Wisconsin School of Veterinary Medicine, Madison, WI, USA

Canine patients may be presented for blood pressure (BP) assessment when clinical diseases associated with systemic hypertension (HT) are suspected but not confirmed; this population may encompass patients that have normal BP, true HT or situational HT. The clinician's aim is to identify animals with HT reliably, while minimizing false positives.

This prospective study investigated the repeatability of duplicate within-visit systolic BP assessments (SBP1 and SBP2) in consecutive canine patients presented for BP assessment in the small animal clinic (91 duplicate SBP recorded from 70 dogs) and in a control group of healthy dogs (37 duplicate SBP obtained from 19 control dogs), resulting in 128 duplicate measurements for analysis. Doppler methods were used for 16 duplicate assessments and oscillometric methods were used for 112 duplicate assessments; cuff size/location were consistent within any dog. SBP \leq 160 mmHg was considered normal (NML); SBP $>$ 160 mmHg was considered abnormal (ABN). Median (range) elapsed time between duplicate readings was 30 (5–310) minutes; 75% of SBP2 were obtained within 80 minutes of SBP1. There was no correlation between elapsed time and change in SBP ($P = 0.40$). 70% of SBP2 were equal to or lower than SBP1; median decrease was 18 (0–78) mmHg. 30% SBP2 values increased; median increase was 14 (2–46) mmHg.

47/128 (37%) SBP1 readings were NML; median [range] SBP1 in this group (145 [118–160] mmHg) did not differ from SBP2 (148 [118–172] mmHg, $P = 0.20$). SBP2 increased to ABN in 6/47 dogs (13%) with NML SBP1, but remained \leq 172 mmHg in each case. 81/128 (63%) of dogs had ABN SBP1; median [range] SBP1 in this group (181 [161–271] mmHg) was significantly higher than SBP2 (168 [110–231] mmHg, $P < 0.0001$). 30/81 dogs (37%) with ABN SBP1 had NML SBP2; 51/81 (63%) maintained ABN SBP2. No dog with SBP1 $>$ 200 mmHg ($n = 15$) had NML SBP2. More dogs with ABN SBP1 were panting (26/71 scored, 37%) compared to the group with dogs with NML SBP1 (6/44 scored, 14%, $P = 0.02$). SBP2 of dogs that stopped panting (14/23, 61%) tended to decrease ($P = 0.16$).

Within-visit repeatability of BP diagnosis was good in dogs with NML SBP1, but apparent false positive diagnoses of HT occurred in 37% of dogs with ABN SBP1. SBP1 $>$ 200 mmHg was repeatable in all dogs. Panting may be associated with increased measured SBP by these methods. Duplicate within-day measurements may help identify false positive HT diagnoses in dogs with initial SBP measurements $>$ 160 mmHg.

Disclosures: No disclosures to report.

ESCG-P-1**HYPOVITAMINOSIS D IS ASSOCIATED WITH POOR OUTCOME IN DOGS WITH PROTEIN LOSING ENTEROPATHY.** K. Allenspach, J. Rizzo, Y.M. Chang. Royal Veterinary College, North Mymms, UK

Hypovitaminosis D has previously been shown to be prevalent amongst dogs with protein losing enteropathy (PLE). Outcome is generally poor in canine PLE, and there is a lack of studies identifying underlying risk factors. The hypothesis of this study was that low vitamin D₃ serum concentrations could be a risk factor for bad outcome in such patients. Medical records for dogs seen at the Royal Veterinary College between 2005 and 2014 were reviewed to identify dogs with a diagnosis of PLE confirmed by histopathology. Dogs were included in the study if they had serum samples frozen within 30 minute after sampling, had been kept at -80 degrees C until analysis, and if clinical activity scoring (CCECAI) had been recorded at the time of diagnosis. Forty-three dogs were included in the study. Follow-up with referring veterinarians was made to determine outcome of patients. Patients were divided into two groups: patients deceased due to PLE (poor outcome group, $n = 22$) and patients alive or deceased due to another disease (good outcome group, $n = 21$). Treatments for patients were allocated to two groups: one group consisted of patients who were prescribed diet only and the other group received diet and

immunosuppressive agents. Samples were sent on dry ice to Michigan State University's Diagnostic Center for Population and Animal Health. Ionised calcium (iCa) was measured using an ion specific electrode and 25(OH)D was measured using a commercially available radio-immunoassay that has been validated for use in veterinary medicine. Comparisons of outcome groups for age, CCECAI, treatment, serum 25(OH)D and iCa were performed using a Mann-Whitney U test or Chi². Logistic regression analysis was performed to determine possible risk factors for poor outcome.

Results: CCECAI scores, age, and iCa concentrations between the two groups were not significantly different. There was a significantly greater number of dogs treated with food alone in the group with good outcome (13/22) than in the poor outcome group (2/21, $P = 0.001$). Furthermore, median serum 25(OH)D concentration was significantly lower in patients with poor outcomes (16.5 nmol/L, range 0–66 nmol/L) compared to patients with good outcomes (37 nmol/L, range 6–81 nmol/L, $P = 0.017$). Using logistical regression, 25(OH)D serum concentration was a statistically significant factor for poor outcome ($P = 0.03$), with an increase of 25(OH)D serum concentration reducing the odds of having a poor outcome (odds ratio = 0.96, 95% CI: 0.93–0.997).

Further studies are required to investigate vitamin D as a potential adjuvant therapeutic agent in PLE patients.

Disclosures: No disclosures to report.

ESCG-P-2**PATHOGENICITY INVESTIGATION OF CAMPYLOBACTER JEJUNI, C. UPSALIENSIS AND C. HELVETICUS ISOLATED FROM DOGS AND CATS USING GALLERIA MELLONELLA LARVAE.** K. Bojanic, A.C. Midwinter, P.J. Biggs, J.C. Marshall, E. Acke. Massey University, Palmerston North, New Zealand

Campylobacter jejuni (CJ), *C. upsaliensis* (CU) and *C. helveticus* (CH) are commonly isolated from dog and cat faeces but association with clinical signs is discordant or lacking. CJ is a recognized human pathogen, CU is considered an "emerging" pathogen and CH is not considered pathogenic despite a high level of genetic similarity. Recently, the Greater Wax Moth, *Galleria mellonella*, was described as an animal model of disease; these invertebrates have a high degree of functional and structural homology with the mammalian innate immune system. This study aimed to evaluate the pathogenic potential of CJ, CU and CH using the *Galleria mellonella* larvae model.

Twelve isolates of CJ, 14 of CU and 11 of CH from dogs and cats were used for the inoculation of 2490 larvae. Inocula were prepared by suspending isolates in phosphate-buffered saline (PBS) from which three 100-fold dilutions were made. Each dilution was tested in duplicate sets of 10 larvae. Each larva was injected with 10–15 μ L into the haemocoel via the last left pro-leg using 31G insulin syringes. Controls consisted of 246 PBS inoculated larvae and 267 un-inoculated larvae. Survival of larvae at 37 °C in a H₂-enriched microaerobic atmosphere was monitored for 8 days post-injection. One subset of isolates was grown in Mueller-Hinton broth and used for the preparation of secretory products, and another grown on blood-agar and suspended in PBS for heat inactivation of 10 minutes at 100 °C for testing of whole-cell lysates and heat-stable insoluble and soluble components.

The overall median survival of larvae was 80% with CJ [IQR 10–100], 100% with CU [IQR 80–100], 100% with CH [IQR 60–100], 100% with PBS [IQR 92–100] and 100% for un-inoculated larvae [IQR 100–100]. A dose-dependent association was evident for each species with larval survival being similar between a low bacterial dose and PBS. Larval survival presented a consistent pattern between species for medium and high bacterial loads; CJ had a higher and faster larval death rate than CU and CH ($P < 0.001$), but no difference was observed between CU and CH ($P = 0.06$). There were no significant differences between species in any of the assays with secretory products, inactivated cells and soluble/insoluble cellular components. The observations within this invertebrate disease model support a varying pathogenic potential between the species studied that appears related to the (patho)biology of the species rather than their cellular components or metabolic products. The invertebrate animal model is promising in comparative pathogenicity studies.

Disclosures: No disclosures to report.

ESCG-P-3

THE INFLUENCE OF A MODERATE INTENSITY SHORT DURATION EXERCISE ON SERUM C-REACTIVE PROTEIN AND FECAL S100A12 CONCENTRATIONS IN ADULT DOGS. A. Grellet¹, S. Dubois¹, A. Feugier¹, C. Girardet², S. Magnan², V. Andréo², G. Trombini², C.A. Boehringer¹, J. Suchodolski³, J. Steiner². ¹Royal Canin, Aimargues, France, ²Veterinary Department of the French Army Health Service, Suippes, France, ³Gastrointestinal Laboratory, Texas A&M University, College station, TX, USA

Acute stress from medium or high duration high-intensity exercise has been reported to be associated with an increase in serum C-reactive protein (CRP) concentrations, an important acute-phase reactant in dogs. However, the effect of exercise on fecal S100A12 concentration, a biomarker of intestinal inflammation has not previously been evaluated in dogs. The goal of this study was to determine if moderate intensity short duration exercise causes an increase in CRP and/or S100A12 concentrations in dogs, potentially leading to misinterpretation of their results.

Thirty-seven adult military working dogs (German and Belgian Shepherd dogs; 36 males; mean age = 4 years [1.3–7.9]) were included in the study. Fecal quality, fecal S100A12, and serum CRP concentrations were evaluated just before and after standardized exercise (30 minutes of bikejoring at a speed of 16 km/h). Fecal quality was evaluated based on a 5-point scale (from 1: liquid to 5: dry and hard feces). Fecal S100A12 and CRP concentrations were assayed with previously validated ELISA tests. Data were analyzed with an ANOVA test for repeated measurements (SAS software). Results are presented as medians and ranges.

Serum CRP concentrations increased significantly after exercise (median before and after exercise 5 mg/L [2–12] and 6 mg/L [5–12] ($P = 0.002$). Also, fecal S100A12 concentrations were significantly higher after exercise compared with baseline concentrations (6 ng/g [2–437] vs. 4 ng/g [1–389], $P = 0.043$). No significant effect of exercise on fecal score was observed (4 [2.5–4.5] before and after the exercise; $P = 0.482$).

Our study demonstrates that a moderate-intensity, short-duration effort performed by healthy army dogs causes significant increases in fecal S100A12 and serum CRP concentrations, as compared with baseline values, but within the respective reference intervals. Therefore, a moderate exercise does not present a confounding variable in the interpretation of fecal S100A12 or serum CRP concentrations in healthy dogs.

Disclosures: This study was performed thanks the financial support of Royal Canin.

ESCG-P-4

ASSESSMENT OF IMAGE QUALITY PRODUCED BY A NOVEL GI IMAGING DEVICE USED IN CLIENT-OWNED DOGS. T. Hardy¹, J.A. Solomon¹, T.M. Archer², J. Thomason², M. Denburg³. ¹Infinitti Medical, Menlo Park, CA, USA, ²Mississippi State University, Mississippi State, MS, USA, ³University of Pennsylvania, Philadelphia, PA, USA

Imaging is an integral part of the work-up of canine gastrointestinal (GI) disease. Radiography and ultrasonography are non-invasive modalities that can evaluate the bowel, but many findings lack desirable sensitivity or specificity. Endoscopy directly visualizes GI mucosa, but is limited by the length of the endoscope and the need for general anesthesia, advanced training and expensive equipment. Ambulatory light-based imaging (ALI) is a new imaging modality that utilizes high-resolution cameras, a microprocessor, and LED illumination to non-invasively visualize the gastrointestinal mucosa. ALI is performed by oral administration of a fully automated device the size of a pill that is propelled by peristalsis.

The aim of this study was to analyze image quality and GI transit times in a series of five client owned dogs undergoing ALI. Dogs were food-restricted for 24 hour before and 8 hour after capsule administration. Capsules were retrieved and images were downloaded and analyzed. Video clips of 300 frames duration were obtained from the stomach; proximal, middle and distal small intestine; and proximal colon for assessment of image quality. 3 internists rated the images on a scale of 1–10 (1 = poor, 10 = ex-

cellent) based on clarity and resolution of images, and obscuration of the mucosa by fluid, bubbles or debris. Scores for each region were compared using general estimating equation analysis.

Gastric and small intestine transit time were calculated based on visualization of passage of the capsule from the stomach to duodenum, and ileum to colon. Clinical analysis of the entire video was performed by one of the authors.

ALI was successfully performed in 5/5 patients, with no adverse effects. Average study duration was 15.7 ± 4.1 hour and mean image acquisition count was 22.572 ± 17.315 . Gastric and small intestinal transit times were 79.2 ± 39.8 minute and 119.4 ± 43.7 minute, respectively. Median (range) image quality scores were 9 (8–10), 8 (6–10) and 6 (5–9), for the stomach, SI and colon, respectively. Image quality scores were significantly higher in the stomach and SI than in the colon ($P < 0.001$). Visualized lesions were consistent with GI ulcers (2 dogs), inflammatory bowel disease (1 dog), and bilious vomiting syndrome (1 dog). One dog receiving chronic NSAIDs had a normal study.

Ambulatory light-based imaging resulted in good to excellent image quality throughout most of the GI tract. Bowel preparation should be considered to enhance visualization of the colon. ALI was safe and easy to perform in ambulatory dogs, and should therefore be considered in the work-up of canine GI disease.

Disclosures: Drs. Hardy and Solomon are employed by Infinitti Medical.

ESCG-P-6

ESTABLISHMENT OF A SEVERITY SCORING SYSTEM FOR OUTCOME PREDICTION IN DOGS WITH PANCREATITIS. P.C. Liu¹, F.R. Wu², Y.J. Lee³, B.L. Su³. ¹Graduate Institute of Veterinary Medicine, National Taiwan University, Taipei, Taiwan, ²National Taiwan University Veterinary Hospital, National Taiwan University, Taipei, Taiwan, ³Institute of Veterinary Clinical Sciences, National Taiwan University, Taipei, Taiwan

Canine pancreatitis is the most common exocrine pancreatic disorder. The prognosis of canine pancreatitis is variably and no logistic regression constructed severity scoring systems are available. Four hundred and thirty nine dogs diagnosed as pancreatitis with acute onset of compatible clinical signs, a positive SNAP[®] cPL[TRADEMARK] Test, and/or associated abdominal ultrasonographic abnormalities between January 2009 and December 2012 were presented at National Taiwan University Veterinary Hospital (NTUVH). One hundred and three dogs hospitalized with complete medical therapy and outcomes were selected for further analysis. The 103 dogs were divided into survival ($n = 61$) and non-survival ($n = 42$) groups. Forty-seven parameters including signalment, clinical signs, physical examinations, clinicopathological examination, complications and concurrent diseases were analyzed and compared between the two groups. Logistic regression analyses were performed in this study. Variables with $P \leq 0.1$ were considered for further analyses. The mortality in this study was 40.8%. Age, heart rate, respiratory rate, white blood cell count, albumin, BUN, creatinine, potassium, presence of systemic inflammatory response syndrome (SIRS) and presence of oliguria or anuria were selected for constructing the scores. Continuous variables outside the reference interval were separated into quartiles to yield quartile-specific odds ratios (ORs) for survival. Based on the integer value of the OR, the scoring system was then developed by incorporating weighting factors assigned to each quartile. A predictive total score was calculated for each dog by summing all weighting factors. The total scores of each dog ranged from 10 to 70. The severity scores in this study achieved an area under the receiver operating characteristic (AUROC) of 0.871. The optimal cut-off point for discriminating outcome was 24.5 with a sensitivity of 78.6% and specificity of 90.2%, respectively. The mortality was 84.6% with a score ≥ 25 , whereas 14.1% with a score ≤ 24 . There was a significant difference ($P < 0.001$) between the two groups separated by the cut-off point. The severity scoring system of this study provides a reliable and clinical applicable method to predict clinical outcome in dogs with pancreatitis.

Disclosures: No disclosures to report.

ESCG-P-7**THE CANINE INTESTINE – IMPORTANT FOR INDEPENDANT GLUCOCORTICOID METABOLISM?. N.B. Luckschaner-Zeller, University of Veterinary Medicine, Vienna, Austria**

Glucocorticoids (Gcs) are known for their anti-inflammatory and immunomodulatory properties and are therefore often used in the therapy of canine inflammatory bowel disease (IBD). It was recently shown that endogenous Gcs are also produced in the intestinal epithelium of men and mice and influence the gastrointestinal immune system in case of inflammatory or neoplastic conditions.

Thus, the aim of this project was to prove that Gcs can be produced or metabolized in the canine intestinal epithelium.

Five healthy Beagle dogs were included into this prospective study. All dogs were clinically examined, given a clinical score using the canine IBD activity index (CIBDAI) scoring system, also gastrointestinal endoscopy was performed. Mucosal biopsy specimens from duodenum were examined histologically from a board certified pathologist using the WSAVA grading. Biopsy incubation of 8–10 endoscopic mucosal biopsies in tissue culture medium with ³H-labeled progesterone in the absence of any stimulation was performed. The mean age of the included dogs was 3.24 + 1.9 years, the mean weight was 17.8 + 1.8 kg. All Beagle dogs had a mean clinical score of 0 + 0. The mean WSAVA scoring was 2 + 1.2. After 4 hours, supernatant was harvested and radioactive progesterone metabolites formed were detected using high performance liquid chromatography plus liquid scintillation counting.

In all dogs the ³H-progesterone was metabolized into various steroid species, nevertheless a local production of cortisol could not be proven.

In summary, it could be shown that precursors of Gcs can be metabolized by healthy canine intestinal mucosal tissue.

Disclosures: No disclosures to report.

ESCG-P-8**CARDIAC INJURY DETECTED BY TROPONIN IS ASSOCIATED WITH PANCREATITIS DETECTED BY DGGR-LIPASE IN DOGS AND CATS. J. O'Brien, K. McConnell. University College Dublin, Dublin, Ireland**

We studied the relationship between pancreatitis and cardiac injury in dogs and cats. Previously, we validated a cardiac troponin I (cTnI; Vet J 185:50-7, 2010) assay for sensitive and specific detection of cardiac injury in domestic animals. We found various non-cardiac diseases of dogs and cats were associated with cardiac injury detected by serum cardiac troponin I, including some cases of pancreatitis. Also, we validated the DGGR-lipase assay for cost-effective, sensitive and specific detection of pancreatitis in dogs and cats (Vet Clin Path 41:E10-11, 2012; 42:E14-15, 2013). Herein, we tested the hypothesis that pancreatitis was associated with cardiac injury. cTnI was measured by Advia Centaur TnI-Ultra assay; DGGR-lipase by the Randox colourimetric assay. We retrospectively analysed data from dogs and cats admitted to UCD veterinary hospital in which both cTn and lipase had been measured. Upper limit of reference range for lipase in dogs is 80 U/L; we consider 80–150 indicative of mild pancreatitis, 150–500 moderate, and >500 as marked. Upper limit of reference range for lipase in cats is 25. Reference range for cTnI is <0.054 ug/L for dogs and cats. We consider 0.054–0.15 indicative of mild cardiac injury, 0.15–1 as moderate, and >1.0 as marked. 145 dogs and 19 cats had both lipase and cTnI measured. Seventy-eight dogs had normal troponin; 113 had normal lipase and 43 had normal lipase and normal cTnI. 32 dogs (22%) had pancreatitis as indicated by increased lipase. In 18(56%), pancreatitis was mild, in 9(28%) it was moderate, and in 5(16%) it was marked. Sixty-seven of 145 dogs had increased cTnI: mild in 33(49%), moderate in 22 (33%), and marked in 12(18%). Cardiac injury in dogs with pancreatitis was absent in 28%, mild in 34%, moderate in 25%, and marked in 13%. 13 of 19 cats had normal cTnI; 10 had normal lipase. 6 of 19 cats had pancreatitis, severely in 3. Lipase and cTnI was correlated ($r = 0.7$) for dogs and cats. We conclude that both pancreatitis and cardiac injury, as indicated by high-sensitivity and high-specificity assays Randox-DGGR-lipase and Centaur-cTnI, respectively, are not uncommon in veterinary hospital cases. We

confirm and extend our previous work. Pancreatitis in dogs and cats is typically associated with cardiac injury. Severities of pancreatitis and cardiac injury are correlated. For ~40% of dogs and cats with pancreatitis, cardiac injury is moderate to marked.

Disclosures: No disclosures to report.

ESCG-P-9**COMPARISON OF CONFOCAL ENDOMICROSCOPY AND OTHER DIAGNOSTIC MODALITIES TO DETECT INTRACELLULAR HELICOBACTER IN DOGS. M.J. Sharman¹, K.W. Simpson², B. Bacci¹. ¹University of Melbourne, Parkville, Vic., Australia, ²Cornell University, Ithaca, NY, USA**

Intracellular colonization may serve as a protected niche where *Helicobacter* sp. organisms evade effective treatment, contributing to recolonization. Confocal endomicroscopy (CEM) is an endoscopic modality allowing *in vivo* gastrointestinal imaging at high resolution; and has aided real-time identification of *Helicobacter pylori* and intracellular and mucosally associated bacterial. In dogs, non-*Helicobacter pylori*-*Helicobacter* (NHPH) are described intracellularly. The objective of this study was to determine the utility of CEM to identify NHPH in dogs compared with other diagnostic modalities; and to assess its ability to identify intracellular organisms.

Fourteen clinically healthy dogs underwent standard gastroendoscopy followed by CEM using topical acriflavine. Images were obtained using CEM at a minimum of five sites within the stomach. Endoscopic pinch biopsies were obtained for histopathology, polymerase chain reaction (PCR) and fluorescence *in situ* hybridisation (FISH). Methodologies were compared for their sensitivity in detecting the presence and distribution of NHPH and their ability to identify intracellular organisms.

CEM provided high quality images allowing *in vivo* identification of NHPH in 13 dogs, as did FISH post-procedure analysis. Standard histopathology identified NHPH in only 11. NHPH were identified within the superficial gastric mucus, and gastric pits. Distribution throughout the stomach was diffuse and multi-focal. CEM findings correlated with FISH and PCR, however only FISH enabled identification of intracellular NHPH which were present in 13 of 14 dogs.

CEM provides *in vivo* histology images and is capable of identifying NHPH during gastroscopy, but is unable to identify intracellular organisms using the current fluorophore protocol. NHPH in the canine stomach are commonly identified intracellularly.

Disclosures: Dr Sharman has shares in Optiscan Imaging Pty Ltd.

ESCG-P-10**ORAL COBALAMIN SUPPLEMENTATION IN CATS WITH HYPOCOBALAMINEMIA. L. Toresson¹, J.M. Steiner², J. Suchodolski², M. Göransson¹, L. Elmgren¹, T. Spillmann³. ¹Evidensia Specialist Animal Hospital, Helsingborg, Sweden, ²GI Lab, Texas A&M University, College Station, TX, USA, ³Helsinki University, Helsinki, Finland**

Chronic enteropathies (CE) and exocrine pancreatic insufficiency (EPI) can both cause hypcobalaminemia in cats. Current supplementation protocols for cobalamin in cats call for repeated parenteral injections. In humans, several studies have reported equal efficacy of oral administration of cobalamin. There is also evidence that oral supplementation is effective in dogs with hypcobalaminemia. Recently, it has also been reported that oral cobalamin substitution restores normocobalaminemia in healthy elderly cats. The purpose of this retrospective case series was to evaluate whether oral cobalamin supplementation can restore normocobalaminemia in hypcobalaminemic cats with chronic enteropathies.

A computerized database search for cats treated at Evidensia Specialist Animal Hospital, Helsingborg, Sweden during 2012–2015 was performed. Inclusion criteria were cats with symptoms of CE, an initial serum cobalamin concentration below 275 pmol/L (reference interval: 199–984 pmol/L) and daily oral treatment with cyanocobalamin (1 mg/tablet; 1/8–1/4 tablet/cat daily). Follow-up

serum cobalamin concentration was measured 28–94 days after initiation of daily oral cobalamin supplementation.

Thirteen cats aged 2–14 years (median 8) of 4 different breeds met the inclusion criteria. Presenting complaints included vomiting (7/13), anorexia (5/13), diarrhea (3/13), weight loss (2/13), and lethargy (2/13). Increased Pancreas Specific Lipase (Spec fPL[®]) serum concentrations were reported in 3/11 cats and 4/13 had increased serum alanine transaminase activity. Feline serum trypsin like immunoreactivity (fTLI) was determined in 5/13 cats revealing results within the reference interval. All cats had an abdominal ultrasound, 9/13 had changes related to the gastrointestinal tract such as mild-moderate thickening of the small intestinal wall, thickening of the muscularis layer, poor definition of intestinal wall layers, and/or enlargement of the mesenteric lymph nodes. Histopathology was performed in 6/13 cats, revealing small intestinal inflammation in five cats and small intestinal lymphoma in one. Serum cobalamin increased in all cats with treatment. The concentration difference ranged from 517 to 1330 pmol/L (mean: 760 pmol/L). Mean (\pm standard deviation) serum cobalamin concentrations were 177 (\pm 49) pmol/L before and 931 (\pm 324) pmol/L after supplementation. This difference was statistically significant ($P < 0.0001$, paired t-test).

Our results suggest that oral cobalamin supplementation is effective in normalizing serum cobalamin concentrations in cats with various enteropathies. Prospective studies are warranted comparing cellular cobalamin status in cats being treated with parenteral or oral cobalamin supplementation.

Disclosures: No disclosures to report.

ESCG-P-11

EVALUATION OF MICROPARTICLE PROCOAGULANT ACTIVITY IN DOGS WITH IDIOPATHIC INFLAMMATORY BOWEL DISEASE. A.M. Leça Jacinto¹, B. Griensteid², E. Milne¹, S. Wright¹, D. Shaw¹, A. Ridyard³. ¹R(D)SVS and The Roslin Institute, Roslin, UK, ²Department for Companion Animals and Horses, University of Veterinary Medicine, Vienna, Austria, ³University of Glasgow Small Animal Hospital, School of Veterinary Medicine, Glasgow, UK

Pulmonary thromboembolism (PTE) is observed in dogs with idiopathic-inflammatory-bowel disease (IBD) and particularly with protein-losing enteropathy (PLE). Hypercoagulability has been attributed to antithrombin (AT) loss although the pathogenesis is likely to be more complex.

In humans, where venous thromboembolism (TE) is a well-recognised complication of Crohn's disease and Ulcerative colitis, the pathogenesis of TE is still not completely understood. Derangements in procoagulant and anticoagulant factors have been demonstrated, including increased circulating procoagulant microparticles (MPs).

The aim of this pilot study was to evaluate MP-procoagulant activity in the plasma of dogs with IBD and PLE using a functional ELISA assay (Zymuphen-MP-Activity, Aniara). We hypothesised that all dogs with PLE and a subset of dogs with IBD but without PLE would have increased levels of circulating MPs.

The study group consisted of 11 dogs with IBD, including 4 with PLE. Diagnosis was based on compatible clinical and histopathology and exclusion of other causes of chronic gastrointestinal disease. PLE was defined as IBD plus hypoproteinaemia (serum total protein <58 g/L) and hypoalbuminaemia (serum albumin <26 g/L). PTE was diagnosed in one dog with PLE, and suspected in a second.

A control group comprised 8 healthy dogs undergoing blood sampling for reasons unrelated to the study including blood donor screening ($n = 6$) and health assessment ($n = 2$). Dogs were considered healthy based on owner evaluation, physical examination, haematology and serum biochemistry.

Median MP procoagulant activity in dogs with IBD was 10.38 nM (range 0.00–32.08) compared with 7.25 nM (range 0.00–70.73) in the control group. Median MP activity in PLE dogs was 23.16 nM (range 0.00–32.08) compared with 7.86 nM (range 2.9–21.32) in non-PLE IBD dogs. Using Kruskal-Wallis test for non-parametric data and Dunn's multiple comparisons test the groups were not statistically different.

Interestingly, MP-procoagulant activity value in the dog with documented PTE was 0.0 nM; in the dog with high clinical suspicion for PTE, MP-procoagulant activity was 32.08 nM.

The highest MP-procoagulant activity was detected in a healthy control dog, raising concerns for pre-analytical or sampling error. Removing this measurement had no impact on statistical analysis, which remained nonsignificant.

MP-procoagulant activity >10 nM is considered clinically relevant in humans. Employing a similar cut-off, 2/8 of controls, 6/11 of IBD and 3/4 of PLE group would be defined as having increased levels of circulating MPs.

Further studies are required to fully evaluate the clinical relevance and diagnostic potential of MP evaluation.

Disclosures: No disclosures to report.

ESCG-P-12

ANALYSIS OF THE ILEAL AND COLONIC MUCOSAL MICROBIOTA IN CANINE CHRONIC ENTEROPATHIES. E. Cassmann¹, R. White¹, T. Atherly², C. Wang¹, Y. Sun¹, S. Khoda³, C. Moser¹, M. Ackermann¹, A. Jergens¹. ¹Iowa State University, Ames, IA, USA, ²USDA-ARS, Ames, IA, USA, ³University of Iowa, Iowa City, IA, USA

The intestinal microbiota is increasingly linked to the pathogenesis of chronic enteropathies (CE) in dogs. While imbalances in duodenal and fecal microbial communities have been associated with mucosal inflammation, relatively little is known about alterations in mucosal bacteria seen with CE involving the ileum and colon. The aim of the present study was to use fluorescence in situ hybridization (FISH) techniques to investigate the composition and spatial organization of mucosal microbiota in endoscopic biopsies obtained from dogs with CE and controls. Tissue sections from the ileum and colon from 19 dogs with inflammatory bowel disease (IBD), 6 dogs with granulomatous colitis (GC), 12 dogs with intestinal neoplasia, and 15 controls were studied by FISH targeting the 16S rRNA genes of total bacteria, group-specific organisms, and individual bacterial species shown to be relevant in human IBD. The numbers of mucosal bacteria were analyzed using generalized linear models for each of the colon and ileum tissues, with Spearman's rank correlation coefficients used to test the correlation between mucosal microbiota and inflammatory (CIB-DAI score, histopathology) indices. The ileal and colonic mucosa of healthy dogs and dogs with CE was predominantly colonized by bacteria localized to free and adherent mucus compartments. Dogs with CE harbored more ($P < 0.05$) mucosal bacteria belonging to the *Clostridium-coccoides*/*Eubacterium rectale* group, *Bacteroides*, *Enterobacteriaceae*, and *Escherichia coli* versus controls. Within the CE group, IBD dogs had increased ($P < 0.05$) *Enterobacteriaceae* and *E. coli* bacteria attached onto surface epithelia or invading within the intestinal mucosa. Bacterial invasion with *E. coli* was present in the ileal and colonic mucosa of dogs with GC ($P < 0.05$). Dogs with intestinal neoplasia had increased ($P < 0.05$) adherent (total bacteria, *Enterobacteriaceae*, *E. coli*) and invasive (*Enterobacteriaceae*, *E. coli*, and *Bacteroides*) bacteria in biopsy specimens versus all other groups. Increased numbers of total bacteria adherent to the colonic mucosa were associated with clinical disease severity (CIBDAI score) in IBD dogs ($P < 0.05$). These results indicate that histopathologic lesions of canine CE are associated with different populations in ileal and colonic mucosal microbiota. These spatial, segment-specific structure and differential response of select bacterial groups to intestinal inflammation may be pivotal regarding the functional consequences of these alterations in the pathogenesis of canine CE.

Disclosures: No disclosures to report.

ESVCN-P-1

INACCURACY WHEN USING TAPE MEASURES TO MAKE ZOOMETRIC MEASUREMENTS IN DOGS. A.J. German, S.L. Holden. University of Liverpool, Neston, UK

Abdominal girth is used as an indicator of human adiposity, with such measurements being made by tape measure. Given concerns in precision and accuracy of repeat measurements, some tape measure designs have inbuilt mechanisms to improve consistency.

Although body condition scoring is the most common method of assessing adiposity in dogs, zoometric systems have also been developed requiring the use of a tape measure. However, the precision and accuracy of such zoometric measurements are not known. The aim of this study was to determine the precision and accuracy of 3 different types of tape measure for a variety of dimensional measurements.

A variety of length (head, forelimb, hindlimb) and circumferential (neck, thorax, and abdomen) were made using three different tape measures, two of which were designed to improve precision (standard tape; Myotape™ and Gulick II™). To assess intra-operator variability, 12 measurements were taken for 5 consecutive days from 4 healthy dogs; to assess inter-operator variability, 3 operators independently took 12 measurements from a group of 16 dogs of various breeds and sizes.

For intra-operator comparisons, precision was good overall (coefficient of variation [CV] $\leq 3\%$ for all measurements). For inter-operator comparisons, precision was more variable and, although reasonable on average (mean CV 2–5%), it varied depending upon tape measure type ($P = 0.027$; greatest for standard tape measure, least for Gulick II™), and could be highly variable for some measurements in individual dogs (maximum CV 16% for head measurements with standard tape measure). Significant differences also existed in the absolute results of circumferential measurements taken by the different tape measure types (neck $P = 0.012$; thorax $P < 0.001$; abdomen $P < 0.001$). Finally, significant operator differences were also evident for some measurements (head $P = 0.023$; hindlimb $P = 0.004$), but not for others (forelimb $P = 0.053$; neck $P = 0.102$; thorax $P = 0.073$; abdomen $P = 0.062$).

In summary, although precision for individual operators making zoometric measurements is good, significant inter-operator and tape type differences exist. These results have implications for systems using a range of zoometric measures to assess adiposity. In order to ensure precision and accuracy, it is recommended that the same operator take all measurements with the same type of tape.

Disclosures: The study conducted was not supported by a research grant. AJG's Readership is funded by Royal Canin; AJG has also received financial remuneration and gifts for providing educational material, speaking at conferences, and consultancy work; SLH's post at the University of Liverpool is also funded by Royal Canin.

ESVCN-P-2

IDENTIFICATION OF THE PALPATION SITE IN THE DIAGNOSIS OF BODY CONDITION SCORE IN DOGS. K. Koizumi¹, M. Noda¹, C. Shimokawa¹, A. Kusumi², T. Kobayashi¹, T. Watari³, K. Otsuji¹. ¹Teikyo University of Science, Tokyo, Japan, ²Grace Animal Hospital, Tokyo, Japan, ³Nihon University, Fujisawa, Japan

Body condition score (BCS) is a method that is commonly used in the diagnosis of nutritional status in small animals. However, this method is subjective due to its sensory evaluation. Therefore, the improvement of the precision of the BCS diagnosis is expected. Our previous study has shown that the BCS model that we created improved the precision of the BCS diagnosis (1). However, a palpation site was not identified. A palpation site must be the site where thickness of subcutaneous fat is able to capture for measuring animal's obesity status. Therefore the objective of this study was to find a remarkable body site of the changes with obesity status using ultrasonic diagnostic equipment.

Nine dogs which varied in the percent of body fat were used in this study. The percent of body fat was measured by a body fat analyzer for dog (Kao). The image analysis of a palpation site was evaluated using echo, Xario SSA-660A (Toshiba) which attached to a linear probe. The measurement points were 1, 2 and 3 o'clock positions on the ribs of T6, T9 and T12. The distance (D) from skin surface to the rib was measured in the echogram. The distance (L) from scapula to ilium was measured to offset the difference in physique by dog breeds. The D/L was used to compare relative value of the quantity of fat at each measurement point.

BCS of dogs which used in this study were from BCS of 2 to BCS of 4. There were no dogs in BCS of 1 and BCS of 5. A statistically significant correlation was found between BCS and D/L

value. The D/L value increased in order of T6, T9 and T12 in BCS of 3 and 4. This suggests that the thickness of subcutaneous fat in the chest is thicker at the head side than the tail side. Also, as for the D/L value from back to abdomen, the highest value was found at the position of 11:00 and 1:00. This tendency was the most remarkable in BCS of 4 but no difference in the D/L value was recognized in the dogs in BCS of 2. In conclusion, the position of 1:00 or 11:00 on the T6 is the suitable palpation point at the chest.

(1) K. Otsuji, M. Suzuki, N. Furukawa, N. Kobayashi, A. Koizumi, A. Kusumi, T. Kobayashi

Efficacy of the body condition score (BCS) model in the BCS diagnosis WSAVA Proceeding p481, 2014

Disclosures: No disclosures to report.

ESVCN-P-3

EFFICACY OF THE BODY CONDITION SCORE MODEL IN THE NUTRITIONAL DIAGNOSIS IN DOGS. K. Otsuji¹, K. Koizumi, S. Mitsuhashi, T. Kaneko, N. Kobayashi, T. Kobayashi. Teikyo University of Science, Tokyo, Japan

Body condition score (BCS) is a method that is commonly used in the diagnosis of nutritional status in small animals. BCS has been recognized as one of the screen method of nutrition diagnosis by American Animal Hospital Association in 2010. However, this method is subjective due to its sensory evaluation. Therefore we made a BCS model to increase the precision of the BCS diagnosis and have shown the efficacy of the BCS model (1). However, the prototype model which we have reported before tended to have higher BCS than a target BCS. Therefore, we improved the BCS model in this study.

Sixty seven dogs which varied in the BCS were used in this study. Body fat percentage was measured by using a body fat analyzer for dogs (Kao Healthlab BIF-10).

The BCS model was improved by using several rubber sheets. Relative hardness of stacking rubber sheets in each BCS was measured by Durometer MJ-DUA-C2 (SATOTEC Tokyo, Japan). BCS diagnosis of dogs was performed by pet owner by using the BCS model.

BCS of 1 represents the most hard in the BCS model and the hardness decreased linearly and it was the lowest in 5 of BCS. These values were as expected. High correlation was recognized between BCS and body fat percentage. These results suggested the efficacy of BCS model. However, the body fat percentage in the dogs diagnosed as BCS of 1 was higher than body fat percentage which has been reported in the previous paper. There were no dogs with the body fat percentage <10% which were diagnosed as BCS of 1. We need more study in future to make clear the difference of body fat percentage between our data and date of the previous research.

The completion of this BCS model will help provide the precision of nutritional diagnosis in dogs.

(1) K. Otsuji, M. Suzuki, N. Furukawa, N. Kobayashi, A. Koizumi, A. Kusumi, T. Kobayashi

Efficacy of the body condition score (BCS) model in the BCS diagnosis WSAVA Proceeding p841, 2014

Disclosures: No disclosures to report.

ESVCN-P-4

ALTERATIONS IN PLASMA PROTEOME OF DOGS WITH OBESITY-RELATED METABOLIC DYSFUNCTION. PRELIMINARY RESULTS. A. Tvarijonaviciute¹, C. de Torre², B. Beer-Ljubic³, S.L. Holden⁴, V. Biourge⁵, P.J. Morris⁶, J. Pastor¹, J.J. Ceron⁷, A.J. German⁴. ¹Universidad Autonoma de Barcelona, Barcelona, Spain, ²Hospital Clínico Universitario Virgen de la Arrixaca (HCUVA), Murcia, Spain, ³University of Zagreb, Zagreb, Croatia, ⁴University of Liverpool, Liverpool, UK, ⁵Royal Canin Research, Aimargues, France, ⁶Waltham-on-the-Wolds, Melton mowbray, UK, ⁷Universidad de Murcia, Murcia, Spain

In humans the metabolic syndrome (MS) is a well-recognised and extensively studied entity that comprises obesity, hypertension,

dyslipidaemia, and glucose intolerance. It is associated with an increased risk of cardiovascular diseases and diabetes. Recently, human MS criteria were adapted for dogs to define the condition of obesity-related metabolic dysfunction (ORMD). It was observed that ORMD was associated with increased circulating insulin and decreased adiponectin concentrations, suggesting that in dogs, as in humans, there are links between obesity, ORMD, and associated diseases, although pathogenetic mechanisms and health significance for dogs remain unknown. The main aim of the present study was to compare plasma proteomes of obese dogs with and without ORMD, so as to investigate the mechanisms associated with canine ORMD and their possible significance in the health status.

Eight obese dogs referred for weight management at the Royal Canin Weight Management Clinic, University of Liverpool participated in the study. Clinical assessments included physical examination, body condition scoring, blood pressure measurement and routine clinicopathological analysis. Surplus plasma was used in proteomic analysis. Samples were first treated with ProteoMiner for the depletion of high-abundance proteins and subsequently analysed by using 2-DE DIGE methodology.

Of the eight dogs in the study, 4 dogs had ORMD and 4 dogs did not. Image analysis and further statistical analysis allowed identification of 8 spots with differential expression concentration between dogs with and without ORMD. Among the 8 spots, 3 were over-expressed and 5 were down-expressed in dogs with ORMD than in dogs that did not present ORMD.

Although the results of the present study are preliminary and still the identification of the spots is up to be performed, the observed data reveal that dogs with ORMD present alterations in their plasma proteomes that could be responsible for the development of ORMD-related pathologies.

Disclosures: The study was funded by WALTHAM. AJG's Readership is funded by Royal Canin; AJG has also received financial remuneration and gifts for providing educational material, speaking at conferences, and consultancy work; SLH's post at the University of Liverpool is also funded by Royal Canin. VB is an employee of Royal Canin and PJM is an employee of WALTHAM.

ESVC-P-1

THE DIAGNOSTIC VALUE OF CARDIO-THORACIC RATIO FOR DETECTING THE HEART SIZE CHANGES IN DOGS.

R.A. Baisan, D. Mocanu, O. Birsan, V. Vulpe. Faculty of Veterinary Medicine, IASI, Romania

The aim of the study was to assess the diagnostic value and the discrimination potential between the normal heart size and microcardia or cardiomegaly of a method which calculates the cardio-thoracic ratio (CTR) using area measurement, compared to the vertebral heart scale method (VHS) used as reference for the cardiac size, in dogs.

One hundred-nine dog X-rays were accepted into study. The patients belonged to small and medium size breeds, forty-seven were males and sixty-two females with age between 1 and 17 years. The analogic X-rays were scanned and transferred to a computer where the VHS and CTR was calculated for each patient with a commercial software and the data was collected and processed in a statistical analysis software. The patients were distributed into groups by respiratory phase and heart size.

There was a low correlation between the VHS and CTR ($r^2 = 0.650$), but statistically significant ($P < 0.01$). A good correlation was obtained between VHS and CTR in microcardia, normal heart size and cardiomegaly groups ($P < 0.01$). Furthermore, between the CTR in dogs with microcardia and those with normal cardiac size, as well as between CTR in dogs with normal cardiac size and those with cardiomegaly, a significant statistical difference ($P < 0.05$), respectively ($P < 0.01$), was obtained. Among the groups distributed by respiratory phase and VHS, a statistically significant difference was obtained only between normal cardiac size and cardiomegaly during inspiratory phase groups ($P > 0.01$). For the X-rays taken in inspiratory phase, a cutoff of 31.31 had a sensitivity of 80% and a specificity of 75% for diagnosing cardiomegaly.

The CTR can be considered a valid method being able to discriminate between the patients with microcardia and cardiomegaly from those with normal heart size. Moreover, it was found that a CTR over the cutoff of 31.31, measured during inspiratory phase is a good predictor for cardiomegaly.

Key words: cardiac, cardio-thoracic ratio, dog, X-ray.

Disclosures: No disclosures to report.

ESVC-P-2

ELECTROCARDIOGRAPHIC CHANGES DURING NORMAL CANINE PUERPERIUM.

P.R. Batista¹, C. Gobello¹, J.P. Barrena¹, N. Re¹, S. Olguín¹, Y. Corrada¹, D.O. Arias¹, P.G. Blanco². ¹Faculty of Veterinary Sciences, National University of La Plata, La Plata, Argentina, ²CONICET, La Plata, Argentina

The canine cardiac conduction system is modified by anatomical and functional adaptations of the maternal heart during gestation. However, it is not clear if these changes persist or are modified after parturition. Therefore, the aim of this study was to describe canine electrocardiographic features during the course of normal puerperium.

Twenty healthy pure-bred, 2-5 (3.85 ± 0.16) year-old, weighing 1.5-6 kg (3.55 ± 0.26) bitches were included in this study. All the animals whelped healthy puppies at term which were weaned on day 60 after parturition (day 0). All the dogs were electrocardiographically evaluated on days -3, 3, 10, 17, 24, 38, 52 and 80. Mean electrical axis (MEA; degrees), P wave amplitude (Pa; mv) and duration (Pd; ms), P-R interval (PR; ms), QRS complex amplitude (QRSa; mv) and duration (QRSd; ms), Q-T interval (QT; ms), and S-T segment (ST; mv) were calculated at 50 mm/s of velocity. The RR interval immediately preceding each complex was recorded and QT interval was corrected (QTc) by Van de Water formula [$QTc = QT - 0.087(RR - 1000)$]. Later, lead II was recorded at 25 mm/s to analyze heart rate (HR; bpm) and cardiac rhythm (CR; normal sinus rhythm or sinus arrhythmia). Values of HR, MEA, Pa, Pd, PR, QRSa, QRSd, QT, RR and QTc were analyzed by ANOVA for repeated measures followed by Tukey test. Cardiac rhythm was analyzed by Chi square test (SPSS 17.0, SPSS Inc. Chicago, IL, USA). $P < 0.05$ was considered significant.

During the study period, HR ($P < 0.01$) and QTc ($P < 0.01$) progressively decreased, while RR ($P < 0.01$) and Pa increased ($P < 0.01$). QRS complex amplitude diminished in the second week after parturition and then increased during the following weeks ($P < 0.01$). Mean electrical axis shifted to the right during this period ($P < 0.01$). On day -3, most of the bitches presented normal sinus rhythm in contrast with day 3, in which most of the bitches presented sinus arrhythmia ($P < 0.01$). From day 10 onward, all the bitches showed sinus arrhythmia. P wave duration, PR, QRSd, QT and ST remained unchanged during puerperium.

It is concluded that most electrophysiological adaptive changes of canine gestation reverted during normal puerperium. The present study contributes to the understanding of canine cardiac physiology during this reproductive stage.

Disclosures: No disclosures to report.

ESVC-P-3

ECHOCARDIOGRAPHIC ASSESSMENT OF PREGNANT QUEENS.

P.G. Blanco, R. Rodríguez, A. Carranza, A. Rube, R. Vercellini, P.R. Batista, M. Tórtora, C. Gobello. National University of La Plata, La Plata, Argentina

Cardiovascular adaptation during gestation guarantees an appropriate development of the fetuses and maternal cardiovascular maladaptation is highly correlated with adverse pregnancy outcome. While, the hemodynamic changes occurring during canine pregnancy have been described there is scarce information concerning maternal cardiac variations during feline gestation. Thus, the aim of this study was to describe cardiac morphology and systolic function variations during normal feline pregnancy.

Eighteen pregnant queens were echocardiographically evaluated (Toshiba Nemio XG, Japan, 10 MHz transducer) every 10 days

from day 0 (defined as day of mating) to parturition. Left ventricular dimensions were measured in the short axis view, during M-mode tracing. Shortening fraction was calculated as $(LVDd - LVDs)/LVDd \times 100$ to assess systolic function. Stroke volume (mL) was calculated as the product of the velocity time integral (measured by pulsed-wave Doppler) and the cross-sectional area of the aorta. Cardiac output (L/minute) was calculated as the product of stroke volume and heart rate (bpm) derived from electrocardiographic monitoring. Uterine artery resistance index (RI) was obtained by Doppler ultrasound. All the parameters were analyzed by repeated measures ANOVA.

All the queens delivered healthy kittens at term. Throughout the study period, interventricular septum in diastole ($P < 0.01$) and systole ($P < 0.01$) and left ventricular diameter in diastole ($P < 0.01$) augmented during gestation. Shortening fraction ($P < 0.01$), cardiac output ($P < 0.01$) and maternal heart rate ($P < 0.01$) also increased up to parturition. Conversely, uterine artery resistance index decreased in the same period ($P < 0.01$).

It is concluded that cardiac structure and function varied during normal pregnancy in these queens. Cardiac eccentric hypertrophy, systolic function and cardiac output increases appear to be the consequences of the hemodynamic modifications occurring during pregnancy. The assessment of maternal cardiovascular function may prove a useful screening tool to detect pregnancy complications in feline reproduction.

Disclosures: No disclosures to report.

ESVC-P-4

REPRODUCIBILITY AND INFLUENCE OF AGE OF TRICUSPID ANNULAR PLANE SYSTOLIC EXCURSION (TAPSE) IN BEAGLE DOGS. A. Caro-Vadillo¹, F. Moreno-Martínez², L. García-Guasch³, J. Manubens³, E. Carretón⁴, J.A. Montoya-Alonso⁴. ¹Universidad Complutense Madrid, Madrid, Spain, ²C.V. Corralejo, Fuerteventura, Spain, ³H. V. Molins, Barcelona, Spain, ⁴Universidad Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, Spain

Tricuspid annular plane systolic excursion (TAPSE) is an echocardiographic measure that allows to assess right ventricular systolic function. It has been described reference values for TAPSE in normal adult dogs, but there is no reference to influence of age in TAPSE in dogs. This influence has been reported in humans. Thus, the goal of this study is to determine the reproducibility of the measure TAPSE in normal dogs and to determine the relationship between TAPSE and age in healthy beagle dogs.

TAPSE was measured from an M-mode recording of the lateral aspect of the tricuspid valve annulus obtained through a left parasternal apical 4-chamber view. TAPSE values were averaged from measurements on 5 consecutive beats during sinus rhythm. The measurements were recorded by two different persons (C-V, A.; M-M F.) with different grade of experience in canine echocardiography studies. All patients had a complete two-dimensional and Doppler study using an Envisor CHD (Philips®) ultrasound system.

Twenty-three healthy beagles were used. The study was approved by the ethical committee of Veterinary Medicine Service of Las Palmas de Gran Canaria University (Spain) and it was carried out in accordance with the current European legislation on animal protection. These dogs were divided in three different groups according to age: group 1 included twelve dogs under 4 years, group 2 included three dogs between 4 and 10 years, group 3 included eight dogs older than 10 years. We analyzed differences between groups using non-parametric (Kruskal Wallis and Wilcoxon scores [rank sums]) test. There were no differences with respect to sex. Dogs in group 1 presented higher TAPSE values than group 2 or 3 (1.33 ± 0.26 cm vs 0.98 ± 0.14 cm vs 1.13 ± 0.18 cm; $P < 0.05$). Statistic intra-observer and inter-observer agreement using the intraclass correlation coefficient was 0.99 ($P < 0.05$).

This study showed that TAPSE measurement is easily obtainable with a standard echocardiography system, and has adequate interobserver agreement. This study showed higher values of TAPSE in normal young dogs with respect to older dogs. These results are similar to the results obtained in humans, and could reflect a less effective right ventricle with age.

The values presented should be taken with caution due to the relatively small number of patients included. It may also be necessary to validate results in future studies with a second independent sample of dogs of other races.

Disclosures: No disclosures to report.

ESVC-P-5

TETRALOGY OF FALLOT IN DOGS AND CATS: A RETROSPECTIVE STUDY OF 31 CASES (2003–2014). V. Chetboul¹, I. Pitsch², R. Tissier¹, V. Gouni¹, C. Misbach¹, E. Trehiou-Sechi¹, A. Petit¹, C. Damoiseaux¹, J.L. Pouchelon¹, E. Bomassi². ¹Ecole Vétérinaire de Maisons Alfort, Maisons Alfort, France, ²CHV des Cordeliers, Meaux, France

Tetralogy of Fallot (TOF) is a congenital heart disease characterized by 4 abnormalities, i.e., pulmonic stenosis, ventricular septal defect (VSD), aortic overriding and secondary right ventricular hypertrophy, caused by anterior deviation and abnormal septation of the conal septum during the embryonic period. Few studies have reported the hemodynamic consequences and clinical outcome of TOF in small animals. The objective of this retrospective study was therefore to document the epidemiological, clinical, echo-Doppler findings, and survival, in a canine and feline population with TOF. The case records of animals diagnosed with TOF by combined use of echocardiography and Doppler examination were reviewed (2003–2014). Tetralogy of Fallot was identified in 31 animals (15 dogs, 16 cats). The most commonly represented breeds were Terriers for dogs (7/15, 46.7%), and Domestic Shorthair for cats (12/16, 75.0%). Most included animals (28/31, 90.3%) were clinically affected at the time of diagnosis. Pulmonic stenosis was characterized by a variable systolic Doppler-derived pressure gradient both in dogs (median [range] 106 mmHg [39–255]) and cats (109 mmHg [26–169]), and associated with hypoplasia of the pulmonary trunk in one third of the cases (35.7%). Most VSD were large, with a median VSD: aorta ratio of 0.60 [0.35–1.02] in dogs and 0.59 [0.18–1.15] in cats. Median age at death from cardiac cause was 23.4 months [3.5–92.9] without significant difference between dogs and cats ($P = 0.298$). These results suggest that in both cats and dogs TOF-related death occurs predominantly in young adult animals with major hemodynamic consequences at the time of diagnosis.

Disclosures: No disclosures to report.

ESVC-P-6

AGE-RELATED CHANGES IN VERTEBRAL HEART SCALE AND ECHOCARDIOGRAPHIC INDICES IN HEALTHY GERIATRIC CATS. S.H. Chiu, H.P. Huang. The Institute of Veterinary Clinical Science, National Taiwan University, Taipei, Taiwan

The aim of this study was to assess whether and how radiographic and echocardiographic cardiovascular variables differ across age bands of healthy cats. A cohort of 98 clinically healthy cats were categorized into three groups: adolescent-adult (0.6–6 years; $n = 45$), middle-aged (7–10 years; $n = 28$), and geriatric (11–17 years; $n = 25$). All cats underwent a full physical examination, a complete blood count, routine biochemical profile, a baseline serum total thyroxine concentration, auscultation, non-invasive blood pressure measurements, thoracic radiography, electrocardiography, and echocardiography. Cats with hypertension, hyperthyroidism, cardiac, or renal disease were excluded from the study. Body weight, body condition score, systolic blood pressure, heart rate, and all echocardiographic indices were similar across the three groups. The mean (\pm standard deviation [SD]) vertebral heart scale (VHS) value obtained for the geriatric group (7.7 ± 0.6) was significantly greater than that obtained for the adolescent-adult group (7.4 ± 0.4 ; $P = 0.018$). The mean ratio of the distance between the cardiac base and dorsal sternum to thoracic cavity height at the point of the cardiac base was significantly less in the middle-aged (0.64 ± 0.04) and geriatric (0.61 ± 0.05) groups than in the adolescent-adult group (0.69 ± 0.04 ; both

$P < 0.001$). The mean angle between the cardiac long axis and the body axis was significantly smaller in middle-aged ($40.4 \pm 7.7^\circ$) and geriatric cats ($40.0 \pm 7.9^\circ$) than in adolescent-adult cats ($53.1 \pm 7.3^\circ$; both $P < .001$). The mean angle between the cardiac long axis and the sternum of middle-aged ($36.8 \pm 6.6^\circ$) and geriatric cats ($36.2 \pm 7.9^\circ$) was significantly smaller than that in adolescent-adult cats ($42.6 \pm 5.7^\circ$; $P = 0.006$ and $P = 0.002$, respectively). Additionally, the degree of undulation of the thoracic aorta correlated positively with age ($r^2 = 0.307$, $P = 0.003$). These findings suggest that differences in the horizontal alignment of the heart, thoracic-aorta undulation, and VHS in healthy geriatric cats, relative to observations in younger cats, can be considered to be age-related.

Disclosures: No disclosures to report.

ESVC-P-7

IRREVERSIBLE PULMONARY HYPERTENSION AND TRICUSPID REGURGITATION IN YOUNG CATS SECONDARY TO DIFFERENT LUNGWORM INFECTIONS. P.E. Crisi, C. Civitella, C. Carnabuci, A. Luciani, D. Santori, D. Traversa, A. Di Cesare, G. Aste, D. Di Francesco, A. Boari. University of Teramo, Teramo, Italy

The aim of this study was to investigate the presence of pulmonary hypertension (PH) in young cats affected by single or mixed lungworm infections. Twenty-three cats infected with lungworms were examined at the Veterinary Teaching Hospital of Teramo, Italy, in 2013–2014. Animals underwent to a complete physical examination and to two- or three-views radiographic analysis of the thorax. A minimum database (i.e. CBC, serum biochemistry, serology for FIV antibody and FeLV antigen) was obtained for each patient. Nine cats were excluded for concomitant diseases, while 14 cats were included in the study. Microscopic identification of parasites was confirmed by molecular tests and all cats received an anthelmintic treatment.

A single infection by *Aelurostrongylus abstrusus* was diagnosed in eleven cats, while three cats had a *Troglostrongylus brevior* infection either alone or in combination with *A. abstrusus*. Transthoracic echocardiography was performed using an ultrasound unit with a 5 MHz phased array transducer. No structural abnormalities of the tricuspid valve and sign of pulmonary stenosis were detected. The two-dimensional and M-mode echocardiography showed a cardiac involvement in three cats. One cat, infected by *A. abstrusus* and *T. brevior* showed a mild systolic tricuspid regurgitant jet with Color Doppler of 1.64 m/s, while another *A. abstrusus*-infected cat, had mild TR of 2.2 m/s with a mean PAPs of 29 mmHg which resolved within 4 weeks after therapy. One cat diagnosed with troglostrongylosis, showed a marked right-sided cardiac enlargement of 6 mm, and a large systolic tricuspid regurgitant jet with a TR peak velocity of 3.1 m/s recorded at continuous-wave Doppler via a Color Doppler echocardiography. The minimum pressure difference between the right ventricle and the right atrium was estimated 38 mmHg and the PAPs was at least 48 mmHg. The echocardiographic and Doppler evidence of mild PH persisted at further examination performed until 3 months after diagnosis.

PH is rare in cats, despite cases of reversible PH are known in cat aelurostrongylosis. In this study the first case of irreversible PH infection in a cat affected by *T. brevior* is presented and this finding further supports the high pathogenicity of troglostrongylosis, especially in young patients. In cats with lungworm infection, possible cardiovascular complications must be taken into account and these infections should be always considered in the differential diagnosis in cats with cardiorespiratory signs.

Disclosures: No disclosures to report.

ESVC-P-8

QUANTIFICATION OF SYSTOLIC AND DIASTOLIC RIGHT VENTRICULAR FUNCTION BY CONVENTIONAL ECHOCARDIOGRAPHY AND SPECKLE TRACKING IMAGING: A PROSPECTIVE STUDY IN 104 HEALTHY DOGS WITH DOCUMENTED PULMONARY ARTERIAL PRESSURE AND LEFT VENTRICULAR FUNCTION. C.C.M. Damoiseaux¹, L. Desquilbet², V. Gouni¹, C. Misbach¹, E. Trehou-Sechi¹, A.M. Petit¹, J.-L. Pouchelon¹, V. Chetboul¹. ¹Ecole Nationale Vétérinaire d'Alfort, Maisons-Alfort, France, ²Unité d'épidémiologie Clinique et Biostatistiques, ENVA, Maisons Alfort, France

Although uncommonly assessed in veterinary cardiology,^a right ventricular (RV) function has been shown to be an important prognostic determinant of many congenital and acquired heart diseases in human patients. Our group has already demonstrated that two-dimensional (2D) color tissue Doppler imaging provides a non-invasive evaluation of systolic and diastolic RV function in the awake dog with adequate repeatability and reproducibility.^b However, other noninvasive ultrasound imaging variables reflecting RV function need to be further investigated, particularly in correlation with pulmonary arterial pressure (PAP) values and left ventricular (LV) function.

The aim of this prospective study was therefore to assess several indices of systolic and diastolic RV function using conventional echocardiography and speckle tracking echocardiography (STE) in 104 healthy awake dogs of different breeds with documented systolic PAP (SPAP) and LV function (LV ejection fraction and global LV systolic strain assessed using the Simpson's derived method of disks and STE, respectively).

Imaging RV tested variables included Tricuspid Annular Plane Systolic Excursion (TAPSE), Right Fractional Area Change (RFAC, %), STE longitudinal systolic strain of the RV free wall (RVFW, %) and of the whole RV (i.e., global RV strain, %), STE longitudinal systolic strain rate (SR, s^{-1}) and diastolic early:late SR ratio. Additionally, 2D-guided M-mode ventricular measurements included the end-diastolic RV:LV diameter ratio (RVDD:LVDD) and the end-systolic RVFW:LVFW ratio. Correlations between imaging variables were calculated by using Spearman's correlation coefficients.

Means of age and body weight (\pm SD; range) of the study population were 4.3 years (± 2.6 ; 0.6–11.6) and 20.4 kg (± 10.7 ; 3.3–49.0), respectively.

No correlations were found between RV morphological variables (i.e., RVDD:LVDD and RVFW:LVFW ratios) and all indices of systolic and diastolic RV function. Global RV strain (mean \pm SD = $26.4 \pm 3.8\%$) and RVFW strain ($31.9 \pm 6.2\%$) were positively correlated ($P < 0.01$) with RFAC ($50.6 \pm 10.5\%$, $r = 0.36$ and $r = 0.32$, respectively), and negatively correlated ($P < 0.05$) with SPAP (17.4 ± 7.0 mmHg [7.0–30.0], $r = -0.21$ and $r = -0.24$, respectively). SPAP was also negatively correlated with the TAPSE:body weight ratio and systolic SR ($r = -0.31$ and -0.34 respectively, $P < 0.01$).

There was no correlation between indices of LV function and STE indices of RV function, and no correlation either between STE RV indices of systolic function and the diastolic early:late SR ratio.

In conclusion, STE provides a rapid and non-invasive evaluation of RV function that may be used for clinical investigations in canine cardiology.

^aVisser et al, *J Vet Cardiol* 2014.

^bChetboul et al, *J Vet Intern Med* 2005.

Disclosures: No disclosures to report.

ESVC-P-9

LEFT VENTRICLE FUNCTION ASSESSMENT BY NON-INVASIVE DP/DT IN DOGS WITH CHRONIC MITRAL VALVE DISEASE. C.N. Duarte, J.R. Castro, A.M. Gimenes, M. Mantovani, M.Y. Ueda, P.H. Itikawa, L.C. Petrus, B. Real, L.F. Beccari, G.T. Goldfeder, M.H.M.A. Larsson, D. Schwartz. School of Veterinary Medicine and Animal Science – University of São Paulo, São Paulo, Brazil

Doppler-derived +dP/dt and -dP/dt from mitral regurgitation are considered indexes for assessment of systolic and diastolic function

respectively, that have less load dependence than the ejection phase indexes. This study aimed to determine correlation between Doppler-derived dP/dt and other systolic and diastolic echocardiographic indexes, and if they can be used to identify dogs with and without remodeling, with or without congestive heart failure (CHF) and for evaluation of chronic mitral valvulopathy (CMVD) severity. Fifty-seven dogs with CMVD (stages B1, B2, C+D) were included prospectively in an observational cross-sectional clinical study and distributed in groups regarding the presence of remodeling and CHF, to evaluate $+dP/dt$ and $-dP/dt$, and distributed according to TDI-diastolic pattern to compare $-dP/dt$. Group C+D (2142 mmHg/s, $P_{25}-P_{75}$ = 2023–2456) had $+dP/dt$ significantly lower compared to B1 (2865 mmHg/s, $P_{25}-P_{75}$ = 2383–3308) and B2 (2721 mmHg/s, $P_{25}-P_{75}$ = 2241–3186) (P = 0.0023). Group C+D also had lower $-dP/dt$, compared to B1 (968.5 mmHg/s \pm 266.8 and 1198 mmHg/s \pm 165.7; P = 0.0115). Dogs with CHF compared to those without CHF, presented lower $+dP/dt$ (2142 mmHg/s, $P_{25}-P_{75}$ = 2023–2456; 2858 mmHg/s, $P_{25}-P_{75}$ = 2299–3241; P = 0.0007) and $-dP/dt$ (968.5 mmHg/s \pm 266.8; 1155 mmHg/s \pm 199.0; P = 0.0041). Regarding diastolic function, $-dP/dt$ was lower for the restrictive pattern group (769.7 mmHg/s \pm 124.1) compared to those without diastolic dysfunction, (1132 mmHg \pm 204.0), delayed relaxation (1229 mmHg \pm 186.9) and pseudonormal patterns (1107 mmHg \pm 223.4) (P < 0.0001). When $+dP/dt$ < 1800 mmHg/s, the post-test chance for the dog with CMVD to have CHF is twice the chance than not having it. For $-dP/dt$ < 800 mmHg/s the post-test chance of having CHF is eight times higher than not having it. In conclusion, Doppler-derived $+dP/dt$ and $-dP/dt$ may contribute respectively, for systolic and diastolic assessment of dogs with CMVD.

Disclosures: No disclosures to report.

ESVC-P-10

SUCCESS OF PULMONARY BALLOON VALVULOPLASTY IN RELATION TO VALVE ANATOMY IN DOGS: A MULTI-CENTER FOLLOW UP STUDY. H. Estrada¹, R. Pariaut², S. Hemsley³, E. Lamb⁴, A. Powell¹, N. Moise³. ¹University of Florida College of Veterinary Medicine, Gainesville, FL, USA, ²Louisiana State University, Baton Rouge, LA, USA, ³Cornell University, Ithaca, NY, USA, ⁴Lamb Consulting, West St Paul, MN, USA

Pulmonic stenosis (PS) is one of the most common congenital heart defects seen in veterinary cardiology practice. Pulmonary balloon valvuloplasty (PBV) is considered to be the treatment of choice for dogs with severe stenosis. Whether dogs with moderate stenosis benefit from PBV remains unclear, and variables such as degree of hypertrophy, valve morphology, amount of tricuspid insufficiency and presence or absence of clinical signs are generally used when recommendations are made to pet owners. In this study we report the effect of valve type on PBV outcome in 110 dogs treated at three different academic speciality cardiology practices. Baseline echocardiographic images were evaluated at each institution and valve morphology was classified as either type A (N = 78, 137.96 mmHg, range 53–278) or type B (N = 33, 153.72 mmHg, range 81–300) and “no” (N = 87, 140 mmHg, range 53–279) or “yes” (N = 24, 151 mmHg, range 87–300) for presence of pulmonary annular hypoplasia when diameter was compared to aortic annulus. Twenty-four hours following PBV both type A (56 mmHg, range 17–210) and type B (78 mmHg, range 25–197) valves had significant reduction in gradient compared to baseline (P < 0.0001). This reduction remained significant at 30 days (A: 77 mmHg, range 22–193; B: 60 mmHg, range 30–116; P < 0.0001 for both). Dogs with annular hypoplasia (65 mmHg, range 25–197) and without annular hypoplasia (69 mmHg, range 17–210) had a significant reduction in gradient 24 hours post PBV. It remained significant at 30 days (with annular hypoplasia: 77 mmHg, range 30–116; without annular hypoplasia: 61 mmHg, range 22–193; P < 0.0001 for both). When comparing to baseline, considering valve type, there was no significant difference in percent reduction in gradient for type A versus type B valves at both the 24-hour (A: 58%, range 17–88; B: 48%, range 12–82; P = 0.1014) and 30-day (A: 43%, range 23–89; B: 58%, range 33–81; P = 0.0544) recheck evaluation time points.

Additionally, there was no significant difference in gradient reduction when looking only at whether or not there was annular hypoplasia at 24 hours (yes: 57%, range 24–78; no: 49%, range 17–89; P = 0.2673) and 30 days (yes: 48%, range 25–81; no: 47%, range 22–89; P = 0.4695). In conclusion, classification of dogs with PS according to valve type and annulus morphology did not help predict the 30-day response to PBV.

Disclosures: No disclosures to report.

ESVC-P-11

PREVALENCE OF HYPERTROPHIC CARDIOMYOPATHY (HCM) IN FELINE POPULATION EXAMINED BY THE OSSERVATORIO ITALIANO HCM FELINA. M.E. Giorgi¹, F. Biretoni¹, P. Ferrari², P. Knafelz³, M. Rishniw⁴, D. Caivano¹, A. Cala², M. Longeri⁵, F. Porciello¹. ¹Università degli studi di Perugia, Perugia, Italy, ²Clinica Veterinaria Orobica, Bergamo, Italy, ³Ospedale Veterinario Gregorio VII, Roma, Italy, ⁴College of Veterinary Medicine, Cornell University, Ithaca, NY, USA, ⁵Dipartimento Scienze Veterinarie e Sanità Pubblica, Università di Milano, Milano, Italy

Hypertrophic Cardiomyopathy (HCM) is the most common feline inherited cardiac disease and it is a major cause of morbidity and mortality. The Osservatorio Italiano HCM Felina was formed in 2008 by a network of clinicians, geneticists and breeders, to monitor and study HCM in Italian cats.

Since April 2008, 1308 adult cats, belonging to various breeds, including Maine coon, Siberian, Norwegian Forest Cats, Ragdoll, Sphynx, British SH, Birman and others have been prospectively enrolled. Recheck evaluations were performed in 287 cats. Each cat underwent a clinical examination, echocardiography, and blood collection for genetic testing (when appropriate) and storage in the Italian Feline Bio-bank.

The disease status was defined by echocardiography according to established guidelines (left ventricular diastolic wall thickness < 5.5 mm = HCM negative, = 5.5 but < 6 mm = HCM equivocal; = 6 mm = HCM positive).

The prevalence of HCM in the population was 6% (74 cats); equivocal diagnoses were conferred on 4% (57 cats). These prevalences did not differ between breeds. The prevalence of HCM in the Italian feline population was lower compared to those reported by other investigators.

Evaluation of data from the entire population demonstrated that left ventricular end-diastolic wall thicknesses and aortic diameter showed a weak positive correlation with body weight (P < 0.0001, r^2 < 0.12 for all variables), suggesting that weight-dependent limits on wall thickness should be considered in cats as is currently practiced in dogs.

The lower prevalence of HCM in Italian cat breeds compared with those examined elsewhere might be explained by different criteria for determining presence or absence of disease, differences in ages at which the subjects were examined, or a selection bias by breeders in presenting cats they consider “normal”.

Disclosures: No disclosures to report.

ESVC-P-12

EPIDEMIOLOGICAL CHARACTERIZATION OF A PORTUGUESE POPULATION OF DOGS WITH CANINE CHRONIC MITRAL VALVE DISEASE: 542 CASES. L. Lobo¹, G. Petrucci¹, M. Domingues². ¹Hospital Veterinário do Porto, Porto, Portugal, ²Universidade Lusófona de Humanidades e Tecnologias, Lisboa, Portugal

Chronic mitral valve disease is by far the most common cardiovascular disease in dogs. The disease is caused by myxomatous degeneration of the mitral valve leaflets and, in approximately 30% of cases, it's accompanied by degeneration of the tricuspid valve. It is also described in previous studies that approximately 14% of affected dogs also have evidence of associated pulmonary arterial hypertension.

The prevalence of the disease is higher in small breed dogs (under 20 kg), although large breeds can also be affected and it occurs more frequently in males than in females.

The present study aims to characterize the disease in a population of dogs in Portugal. We retrospectively reviewed the medical records of dogs presented to Hospital Veterinário do Porto, with an echocardiographic diagnosis of canine chronic mitral valve disease, during a period of 13 years.

From this records, 542 cases were identified, from which 331 (61.1%) were males and 211 (38.9%) were females. Most of the dogs were mixed breed (215) and 48 different breeds of dogs were represented. The Poodle was by far the most represented breed ($n = 101$; 39.7%), followed by English Cocker Spaniel (18.6%), Yorkshire Terrier (2.8%), Boxer (2.6%), Épagneul Breton (2.6%), Dalmatian (2.4%), Pekingese (2.4%), Labrador Retriever (2%) and Portuguese Podengo (1.8%). All other breeds represented 16.2% of the population.

Regarding weight, 79.8% of the dogs ($n = 395$) weighted <20 kg, with a mean body weight of 13.45 kg (range 1.6–62 kg). The mean age at diagnosis was 11.34 years old.

We also observed that 42.1% of the dogs ($n = 278$) had concomitant degeneration of the tricuspid valve and 19.4% ($n = 105$) pulmonary arterial hypertension (PH). We categorized these dogs according to the severity of PH, in mild PH if they had a Doppler echocardiography derived systolic pulmonary arterial pressure (SPAP) of 30–50 mm/Hg, moderate PH (SPAP 51–75 mm/Hg) and severe PH (SPAP >75 mm/Hg). We found that 72.7% ($n = 72$) of dogs had mild PH; 19.2% ($n = 19$) moderate PH and 8.1% ($n = 8$) severe PH.

As described in previous studies, the disease affects mainly males and small breed dogs, with a breed distribution that reflects the canine population in the country, including very including very popular large breed dogs in Portugal, as the Boxer and Labrador.

Both the presence of concomitant tricuspid valve disease and PH had a higher prevalence in our study than previously described.

Disclosures: No disclosures to report.

ESVC-P-13

ANEMIA IN DOGS WITH MITRAL VALVE DISEASE: PREVALENCE AND ASSOCIATED RISK FACTORS. C. Locatelli¹, A. Savarese¹, E. Martinelli¹, P. Scarpa¹, S. Paltrimeri¹, P.G. Brambilla². ¹University of Milan, Milan, Italy, ²XXXXX, Italy

In people anemia is frequent in patients with heart failure (HF) and it is associated with poor outcomes. The most likely pathogenic factors include iron deficiency, chronic kidney disease (CKD), and cytokine production, although other factors may contribute. Little is known about the prevalence of anemia in dog with cardiovascular disease.

The aim of this retrospective study was to define the prevalence of anemia (Hct $\leq 37\%$) in dogs with mitral valve disease (MVD) and to investigate associated risk factors (age, weight, azotemia, HF, IRIS/ACVIM class).

Medical records of dogs presented at the Cardiology Service, DIVET, University of Milan (January 2003–March 2015) were retrospectively evaluated. Dogs with MVD with complete physical, thoracic and echocardiographic examinations, and serum biochemical panel, including serum creatinine (sCr), were included in the study. Dogs with other heart or systemic diseases, except CKD, or neoplasm were excluded. Statistical analysis was performed using JMP 12.0 (SAS Institute). A P value < 0.05 was considered significant.

Two hundred and ninety dogs (161 males/129 females), 11.6 ± 2.9 years of age, 12.5 ± 9.2 kg of body weight fulfilled the inclusion criteria. The 22% of males and the 30% of females were neutered. The most represented breeds were mongrel (40%), miniature Poodle (12%), York Shire Terrier (7%), and Cavalier King Charles (5%). Dogs were 29% B1, 13% B2, 54% C and 4% D ACVIM class. While the 72% of the dogs were normoazotemic (sCr <1.4 mg/dL), 13.5% were staged in IRIS 2, 13% in IRIS 3 and 1.5% in IRIS 4.

The prevalence of anemia in dogs with MVD was 17% (50/290): 40 showed mild ($30 \leq \text{Hct} \leq 37\%$) and 10 moderate ($20 \leq \text{Hct} \leq 29\%$) anemia. Sixteen dogs were in B1, 5 in B2, 27 in C and 2 in D

ACVIM class; thirty-four were normoazotemic (68%). Anemic dogs showed a significant higher sCr. Normoazotemic dog showed significant higher Hb, Hct and RBC both in the overall population and in the anemic group. In the overall population dogs in different IRIS class showed statistically different Hb, Hct and RBC and Hb was significantly lower in decompensated HF dogs.

In conclusion although a relationship between anemia and azotemia/CKD was documented in our study, it is important to emphasize that most of the anemic dog were normoazotemic: anemia is not an exclusive finding of cardiorenal syndrome and should be considered as possible complication in dogs with MVD alone.

Disclosures: No disclosures to report.

ESVC-P-14

LEFT ATRIAL DYSFUNCTION IN DOGS WITH SYMPTOMATIC CHRONIC MITRAL VALVE DISEASE. M. Mantovani, J.R. Castro, A.M. Gimenes, L.C. Petrus, C.N. Duarte, M. Ueda, P.H. Itikawa, B. Real, L.F. Beccari, G.T. Goldfeder, M.H.M.A. Larsson, D. Schwartz. School of Veterinary Medicine and Animal Science, University of São Paulo, Sao Paulo, Brazil

The objective of this study was to evaluate left atrial (LA) function by left atrial total fractional area change (LA-FACtotal) and left atrial ejection fraction (LAEF) in dogs affected with chronic mitral valve disease (CMVD) naturally acquired with and without congestive heart failure (CHF). Our hypothesis was that LA-FACtotal and LAEF decrease with severity of CMVD. Eighty dogs were included in a prospective observational cross-section clinical study, grouped according to CMVD severity based on echocardiographic evaluation and clinical signs. The dogs were equally distributed in each group: A, B1, B2 and C, according to American College of Veterinary Internal Medicine staging system. Indicators of LA function were calculated with the following equations: LA-FACtotal = $100 \times (\text{LA}_{\text{maximum area}} - \text{LA}_{\text{minimum area}}) / \text{LA}_{\text{maximum area}}$, measured by apical four view; and LAEF = $100 \times (\text{LA}_{\text{maximum volume}} - \text{LA}_{\text{minimum volume}}) / \text{LA}_{\text{maximum volume}}$, by biplane area-length method from the left apical four and two-chamber views. LA-FACtotal showed lower values ($P < 0.0001$) in group C (31.88%, $P_{25\%-75\%} = 26.47-41.12$) compared with groups A (52.75%, $P_{25\%-75\%} = 48.08-56.07$), B1 (48.38%, $P_{25\%-75\%} = 42.57-51.91$) and B2 (46.15%, $P_{25\%-75\%} = 41.17-50$). Group C had lower LAEF (40.69%, $P_{25\%-75\%} = 34.89-52.09$) than groups A (68.12%, $P_{25\%-75\%} = 64.96-69.91$), B1 (58.72%, $P_{25\%-75\%} = 52.25-64.60$) and B2 (56.98%, $P_{25\%-75\%} = 52.08-61$) ($P < 0.0001$). Left atrial function, assessed by LA-FACtotal and LAEF, was reduced in dogs with CMVD and CHF compared with healthy and asymptomatic CMVD groups.

Disclosures: No disclosures to report.

ESVC-P-15

CARDIORENAL SYNDROME IN DOGS WITH MITRAL VALVE DISEASE: A PROSPECTIVE STUDY. E. Martinelli¹, P. Brambilla², C. Locatelli², S. Crosara¹, A.M. Zanaboni², C. Quintavalla¹. ¹University of Parma, Parma, Italy, ²University of Milan, Milan, Italy

Recurrent episodes of heart and/or kidney failure are considered one of the causes leading to worsening heart/renal functions in human patients. The aim of this prospective study was to assess the influence of heart/kidney worsening on elected parameters of heart/kidney function in dogs affected by mitral valve disease (MVD).

Between July 2012 and May 2013, dogs affected by MVD in ACVIM class B2 and without comorbidities were included in the study group. The control group was constituted by healthy dogs, matched with the cases for age (older than 6 years) and gender.

All the dogs underwent physical examination, thorax radiography, ECG, echocardiography, systemic blood pressure assessment, a complete blood count, serum biochemical analysis, including assessment of serum creatinine (sCr), serum urea nitrogen (UREA)

and glycaemia (GLY) and urine analysis with urine protein/creatinine ratio (UPC). Dogs were re-evaluated every 6-month until October 2014. Statistical analysis was performed using IBM SPSS Statistics 20 (P value significant if <0.05).

Twenty-one dogs affected by MVD (cases) were included and 20 healthy dogs (controls) were randomly selected among the eligible population. The 33% of cases experienced at least one episode of congestive heart failure (CHF), but none of these patients developed chronic kidney disease (CKD). The 14% of cases developed CKD while remaining in ACVIM class B2. No dogs in the control group developed CKD or MVD. Correlations between worsening renal function (WRF – sCr elevation ≥ 0.3 mg/dL or 25% from baseline), furosemide administration, UPC levels, radiographic parameters of heart enlargement and echocardiographic parameter were investigated. Only a statistically significant difference in IRIS class between the groups according to WRF and in the echocardiographic parameter left atrium to aortic root (LA/Ao) according to furosemide amount were observed. Both these results were expected. None of the cases included experienced renal damage (WRF or IRIS class change or UPC change) concomitant to episodes of CHF. The persistence of normal renal condition regardless of CHF events and therapy administration was unexpected. In conclusion, experiencing CHF seems not to directly affect renal function. To authors' opinion, the use of WRF, better than single sCr and UREA levels, may be useful in the long term management of aged patients affected by MVD. However, the small number of cases included in this study represents a great limit. We consider this work a pilot study.

Disclosures: No disclosures to report.

ESVC-P-16

PREVALENCE OF HYPERTROPHIC CARDIOMYOPATHY ON A POPULATION OF 150 CATS. M.M. Monzo¹, L. Rubens², L. Lobo³. ¹CardioCare, Lisboa, Portugal, ²Hospital Veterinário de Massamá, Lisbon, Portugal, ³Hospital Veterinário do Porto, Porto, Portugal

Hypertrophic cardiomyopathy (HCM) is a primary myocardial disease characterized by inappropriate thickening of the myocardium in absence of other causes of hypertrophy including Hypertension, Hyperthyroidism, aortic stenosis and acromegaly. It is also the most common heart disease in cats. HCM presents a wide variety of clinical sings depending on the severity and location of the hypertrophy.

Cats affected with HCM have a mean age of 5.5–6.5 years old at the time of the diagnosis however this disease can affect cats as young as 3 months although this later age is unusual

HCM is a heterogeneous disease both in terms of phenotypic degree of hypertrophy and clinical outcome. Hallmark histopathological hallmarks lesions of HCM are myocyte disarray, small coronary arteriosclerosis and interstitial fibrosis replacement

In order to confirm HCM echocardiography has to be made. Primary hypertrophy diagnosis is made based on the presence of ventricular hypertrophy, symmetric or asymmetric, in the absence of systemic disorders.

The purpose of this study was to assess the prevalence of HCM in a feline population. In order to achieve this goal echocardiograms were made in all cats older of 6 years clinically asymptomatic with or without cardiac murmur. All echocardiograms were made according to the guidelines of the ACVIM published in 1993. Diagnosis of ventricular hypertrophy was made from the right parasternal window using the B mode to measure the diameter of the LVFW and the IVS in diastole. Cats with more than 6 mm of wall thickness measured T4, Bun, Crea, Blood pressure. Only cats within the normal limits of the later parameters were considered HCM positive.

Total number of cats in this study was 150 cats 89 male and 61 female. From this population 94 had no defined breed, 37 were Persian, 6 Maine Coon, 4 Norwegian Woods, 8 Siamese, 1 Chartraux.

No murmur was detected in 64 (42.7%) cats, S3 or S4 was detected in 9 (6%) cats and differente degree of murmur was detected in 77 (51.3%) cats.

Hypertrophy was detected in 69 cats. From this cats 41 (59.4%) were diagnosed as HCM, 28 (40.6%) cats were excluded either

because of lack of values of T4 and or because they had high values of blood pressure, T4 levels or CREA.

In this study 27.3% of the population had HCM. The epidemiological and phenotype distribution is highly variable. The average age at diagnosis of HCM in this study was 11.33 years.

Disclosures: No disclosures to report.

ESVC-P-19

INCREASED SERUM C-REACTIVE PROTEIN CONCENTRATIONS IN DOGS WITH CONGESTIVE HEART FAILURE DUE TO MYXOMATOUS MITRAL VALVE DISEASE. M.J. Reimann¹, I. Ljungvall², A. Hillström², J.E. Möller³, R. Hagman², T. Falk⁴, K. Höglund², J. Häggström², L.H. Olsen¹. ¹University of Copenhagen, Frederiksberg c., Denmark, ²Swedish University of Agricultural Sciences, Uppsala, Sweden, ³Odense University Hospital, Odense, Denmark, ⁴Din Veterinär, Helsingborg, Sweden

Mildly increased concentrations of CRP are associated with cardiovascular disease in humans and dogs. It is not known whether increased concentrations of CRP are associated with myxomatous mitral valve disease (MMVD) in dogs, or rather its sequel, congestive heart failure (CHF). The aim of this study was to investigate whether serum concentrations of CRP, determined using a novel automated canine-specific high-sensitivity CRP assay (Gentian hsCRP), were associated with severity of MMVD and certain clinical variables in dogs.

The study included 188 client-owned dogs with different severities of MMVD. Disease severity was determined by medical history, physical examination, echocardiography and response to diuretic therapy. Dogs were allocated into groups based on ACVIM consensus statement guidelines (group A [n = 62], group B1 [n = 55], group B2 [n = 35] and group C [n = 36]). Data were analysed using descriptive statistics and multiple regression analysis.

Dogs with CHF (group C) had significantly higher serum CRP concentrations (2.65 mg/L, [1.09; 5.09]) (median, [quartile 1; quartile 3]) compared to dogs in groups A (0.96 mg/L, [<0.50 ; 1.82]) ($P = 0.0004$), B1 (0.80 mg/L, [<0.50 ; 1.73]) ($P < 0.0001$) and B2 (0.53 mg/L, [<0.50 ; 1.26]) ($P < 0.0001$). Other measures of disease severity including left atrial to aortic root ratio and left ventricular end-diastolic diameter normalized for body weight were positively correlated with serum CRP concentration.

In conclusion, slightly higher serum CRP concentrations were found in dogs with CHF whereas the severity of asymptomatic MMVD showed limited association with serum CRP concentrations.

Disclosures: No disclosures to report.

ESVC-P-20

CARDIOVASCULAR EFFECTS OF MEDETOMIDINE IN STAGE B2 MYXOMATOUS MITRAL VALVE DISEASE. V. Saponaro¹, A. Avé². ¹QUALIVET, Taverny, France, ²UNIVET, Cannes, France

Medetomidine is a α_2 -agonist widely employed for sedation in dogs but its use is discouraged in cardiac patients even those suffering from myxomatous mitral valve disease (MMVD). However, only one investigation was previously conducted in a wide range – regarding the class of the disease – of MMVD patients, reporting a general safety of that protocol. The present study was focused just on class B2 of MMVD, with the aim to provide more detailed information on the cardiovascular effects of medetomidine in such patients, by the analysis of clinical and instrumental parameters suggestive of disease severity or congestive heart failure.

Dogs weighing <15 kg, needing a soft clinical procedure and showing a systolic apical heart murmur were screened and selected for the study if LA/Ao <1.6 . The sedative protocol consisted in an IV injection of 30 $\mu\text{g}/\text{kg}$ medetomidine antagonized, after the clinical procedure, by an IM injection of the recommended dose of atipamezole. Clinical parameters, echocardiographic variables, thoracic radiographs and oscillometric blood pressure measurements were collected at baseline (T0), 30 minutes after medeto-

midline administration (T1) and 3 hours after atipamezole injection (T2).

Of 13 dogs screened, 8 were definitively enrolled. At T1 a significant decrease in the right parasternal regurgitant jet area (RP-ARJ/LAA), peak velocity of mitral regurgitation and shortening fraction was observed along with an increase in LVIDs ($P < 0.05$). Left parasternal ARJ/LAA decreased without reaching statistical significance but showing a high correlation with RP-ARJ/LAA ($r = 0.7$). Interestingly, LA/Ao changed only mildly and never reached a value >1.6 . The other echocardiographic variables did not show a particular trend. Systolic blood pressure showed values at the upper physiologic limit at T0, lower values than T0 at T1, and an increase above the initial value at T2 but without significance. Thoracic radiographs were evocative of heart enlargement without pulmonary venous congestion or pulmonary oedema both at T0 and T2. Respiratory rate did not change between T0 and T2. The degree of sedation was optimal during the clinical procedure in all cases.

Sedation with 30 $\mu\text{g}/\text{kg}$ medetomidine is safe in dogs suffering from MMVD in stage B2 (LA/Ao <1.6). The decrease observed in peak velocity and color-Doppler appearance of mitral regurgitation at T1 could be due to a reduction of both myocardial contractility and systolic blood pressure, by a lowering of sympathetic activity via baroreceptors stimulation.

Disclosures: No disclosures to report.

ESVC-P-21

TRANSARTERIAL PATENT DUCTUS ARTERIOSUS OCCLUSION USING DIFFERENT DEVICES IN 25 DOGS. R.M. Ventura¹, J.S. Orvalho². ¹Faculdade de Medicina Veterinária, Universidade de Lisboa, Lisboa, Portugal, ²University of California Veterinary Medical Center – San Diego, San Diego, CA, USA

In the last decade, several transvascular occlusion device techniques have been developed and transvascular occlusion has largely replaced surgical ligation of patent ductus arteriosus (PDA) in dogs.

In this retrospective study were included a total of 25 client-owned dogs, undergoing transarterial occlusion of PDA with MReye® Flipper Detachable Embolization coil ($n = 7$), Amplatzer® Canine Duct Occluder (ACDO; $n = 16$) and Amplatzer® Vascular Plug ($n = 2$). Device size selection was based on PDA dimensions assessed by transesophageal echocardiography (TEE) in 10 cases and transthoracic echocardiography (TTE) in 15 cases. Angiography was performed during the procedure to assess the success of the occlusion, and it confirmed complete occlusion in 20 dogs and a trivial residual flow in 5 dogs. The following day, transthoracic color-Doppler echocardiography revealed that complete ductal closure was achieved in all dogs. The procedure was hemodynamically successful, as evidenced, by a reduction in indexed left ventricular internal diameter in diastole (LVIDd; $P < 0.01$), fractional shortening (FS; $P < 0.01$) and left atrial to aortic ratio (LA: Ao; $P < 0.001$) within 24 hours after procedure. Four months after surgery, indexed LVIDd was significantly reduced ($P = 0.03$) and LA:Ao remained constant. Secondary complications included pulmonary arterial embolization of an ACDO and a late rotation of an Amplatzer® Vascular Plug resulting in an increased flow through the PDA. The dog with the rotated device required subsequent surgical ligation of the PDA.

At this time, 23 dogs were reported to be alive and the other 2 dogs were lost to follow up. Only one dog remained on congestive heart failure therapy after the PDA occlusion.

We can conclude that PDA occlusion using an ACDO for dogs with more than 3 kg and a transarterial coil embolization for dogs with <3 kg had a high rate of immediate complete occlusion. PDA occlusion using those devices proved to be a safe and effective therapeutic method for PDA in dogs.

Disclosures: No disclosures to report.

ESVC-P-22

COMPARISON OF TWO ECHOCARDIOGRAPHIC VIEWS FOR EVALUATING THE RIGHT PULMONARY ARTERY DISTENSIBILITY INDEX IN DOGS. T. Vezzosi¹, F. Marchesotti², R. Tognetti¹, L. Venco³, O. Domenech². ¹University of Pisa, San piero a grado, Pisa, Italy, ²Istituto Veterinario di Novara, Granozzo con monticello (no), Italy, ³Veterinary Hospital Città di Pavia, Pavia (pv), Italy

Echocardiographic evaluation of the right pulmonary artery distensibility index (RPAD index) was recently described as a valuable method for early detection and severity evaluation of pulmonary arterial hypertension in dogs. RPAD index is calculated as the percentage change in diameter of the right pulmonary artery (RPA) between systole and diastole, obtained by M-mode echocardiography from the right parasternal long axis view. The aim of this study was to compare the RPAD index obtained by two different echocardiographic views in dogs. The study design was a prospective, multicenter, observational study. Forty-five client-owned dogs from different breeds were included: 31 dogs with heart disease and 14 healthy dogs. Two different right parasternal views, long axis (RPLA) and short axis (RPSA), were used to measure the RPAD index. From the RPLA view (method 1) and RPSA view (method 2) a short axis and a long axis image were respectively optimized for the right pulmonary artery. The RPAD index was calculated by M-mode as the percentage change in diameter of the right pulmonary artery: [(systolic diameter – diastolic diameter)/systolic diameter]*100. Measurements were done off-line as an average of 5 consecutive cardiac cycles by a single investigator blinded to the dogs' diagnosis. A Pearson and a Bland-Altman test were used to assess correlation and agreement between the 2 methods, respectively. Intra- and inter-observer measurement variability was quantified by average coefficient of variation (CV). Level of significance was set at $P < 0.05$. M-mode evaluation of the RPAD index was satisfactorily obtained by both methods in all dogs. Pearson test showed a strong positive linear correlation between the values of RPAD index obtained from both methods ($r^2 = 0.9346$, $P < 0.0001$). Bland-Altman test showed a good agreement between the 2 methods in estimating RPAD index (bias = 0.51%, SD = 2.96%, 95% limits of agreement = -5.30, 6.33%). The mean difference between the two methods was 0.51% (95% confidence interval = -0.35; 1.35). Intra- and inter-observer measurement variability was clinically acceptable (CV $<10\%$). The study showed a good agreement between short axis and long axis M-mode evaluation of RPA. Both methods can be used interchangeably to evaluate RPAD index. Further studies are needed to evaluate the RPAD index in a larger population of healthy dogs and the diagnostic and prognostic role of this echocardiographic parameter in dogs with different types of pulmonary hypertension.

Disclosures: No disclosures to report.

ESVE-P-1

PREVALENCE AND CLINICAL FEATURES OF NATURALLY OCCURRING HYPOADRENOCORTICISM IN GREAT PYRENEES IN A REFERRED POPULATION IN MONTREAL, CANADA: 11 CASES (2005–2014). M. Decôme, M.C. Blais. Centre Hospitalier Universitaire Vétérinaire, University of Montreal, Saint-Hyacinthe, QC, Canada

Naturally occurring hypoadrenocorticism (Addison's disease) is an uncommon illness. Its prevalence in the general canine population is estimated between 0.06 and 0.28%. Certain breeds appear to have an increased risk for developing hypoadrenocorticism, including Bearded Collie, Standard Poodle, Portuguese water dog and Nova Scotia Duck Tolling Retriever, with reported prevalence of 9.4, 8.6, 1.5 and 1.4%, respectively.

The objective is to evaluate the prevalence and clinical features of naturally occurring hypoadrenocorticism in Great Pyrenees (GP) presented at the Centre Hospitalier Universitaire Vétérinaire (CHUV) of the University of Montreal.

This retrospective study (March 2005 to October 2014) includes 11 client-owned Great Pyrenees diagnosed with hypoadrenocorticism. The medical records of dogs with a diagnosis of naturally occurring hypoadrenocorticism were reviewed, with an emphasis on Great Pyrenees' record. The prevalence of hypoad-

renocorticism in the studied population, as well as the prevalence per breed, was calculated. Data collected included breed, clinical signs, laboratory findings, age at diagnosis, treatment, and cause of the death.

One hundred dogs were diagnosed with naturally occurring hypoadrenocorticism, representing 0.38% of the overall canine population studied. Thirty-five breeds were represented, with a prevalence per breed varying between 0.17% and 9.73%. A high prevalence was observed in West Highland White Terriers (4.66%), Great Danes (1.87%), Standard Poodles (1.76%), Saint-Bernards (1.72%) and Jack Russell Terriers (1.48%). Out of 114 GP presented during that period of time, 9.73% (n = 11) were diagnosed with hypoadrenocorticism. Median age at diagnosis was 4.71 years (range: 0.39 to 11.07) in dogs with hypoadrenocorticism, and 3.51 years (1.02–8.21) in GP. The main reason for presentation of the Addisonian GP was lethargy (n = 7) and anorexia (n = 5). Clinical findings included hypotension (n = 7), poor body condition (n = 3), and heart murmur (n = 3). The majority (n = 9) had serum electrolytes abnormalities, with a Na:K ratio ranging from 15.2 to 22.45. Other major laboratory findings included azotemia (n = 8), anemia (n = 7) and the absence of a stress leukogram (n = 5). The majority (n = 9) received fludrocortisone, with prednisone as needed. One GP was euthanized at time of diagnosis.

Great Pyrenees diagnosed with hypoadrenocorticism were over-represented in the studied population, with a prevalence of hypoadrenocorticism in our GP population of 9.73%. Therefore, an inherited susceptibility can be suspected. Reason for presentation and clinical signs were nonspecific, and similar to what is reported in other breed.

ESVE-P-3

THE USE OF A NOVEL LATEX IMMUNOAGGLUTINATION INHIBITION METHOD FOR HAEMOGLOBIN A1C MEASUREMENTS IN DOGS. S. Spence, A. Hope, I.K. Ramsey. Glasgow University, Glasgow, UK

In human medicine, haemoglobin A1c (HbA1c), a form of glycosylated haemoglobin, is used as the standard measure of average glycaemic control over 2–3 months. The measurement of HbA1c in dogs has been previously demonstrated however high pressure liquid chromatography techniques are too technically difficult for routine use and other methods are no longer available. The objective of this study was to assess the use of latex immunoagglutination inhibition using a monoclonal antibody for the measurement of HbA1c in dogs, using the Siemens DCA Vantage®.

Repeatability was assessed by measuring 4 samples 5 times within 45 minutes. The effect of storage on EDTA anticoagulated samples was examined by measuring 3 samples stored at 4 °C every day for up to 5 days. Storage was further assessed by freezing 5 samples and measuring them at 0, 4 and 8 weeks. The machine was then used to compare the HbA1c values in 3 groups of dogs with diabetes mellitus (Group 1, n = 16), hyperadrenocorticism (Group 2, n = 5) or non-diabetic/cushingoid hospitalised patients (Group 3, n = 23). Differences in the groups were examined for significance using a Kruskal–Wallis analysis of variance. The reference range of HbA1c has been previously calculated to be 3.7–5.6% (17–38 mmol/mol) and values of 4.9 to >13% (30 to >119 mmol/mol) are seen in diabetic animals using high pressure liquid chromatography.

The median coefficient of variation for the repeatability study was found to be 5% (range 3–6%). It was possible to store samples at 4 °C for up to 5 days (median CV% = 3%, range 2–3%) and at –20 °C for at least 8 weeks (median CV% = 6%, range 4–9%). The median HbA1c concentrations were Group 1; 5.6% (38 mmol/mol), Group 2; 3.4% (14.2 mmol/mol) and Group 3; 3.3% (13 mmol/mol). Group 1 was significantly different from the other two groups using Kruskal–Wallis analysis of variance.

In conclusion, the latex immunoagglutination method was repeatable for the measurement of HbA1c in dogs. In addition, HbA1c in canine EDTA anticoagulated samples were stable at 4 °C for up to 5 days and, if frozen, could be stored for at least 8 weeks without significant sample deterioration. The assay provides the expected results in dogs with and without abnormalities of glycaemic control.

Disclosures: The Siemens DCA Vantage was provided on loan from Siemens, as well as the cartridges used on this machine to run all samples in the study.

ESVE-P-4

VALIDATION OF AN ENZYME FLUORESCENCE ASSAY (ELFA) TO MEASURE TOTAL THYROXINE IN DOGS AND CATS. A. Wehner¹, R. Anderson¹, S. Reese², K. Hartmann¹. ¹Clinic of Small Animal Medicine, Munich, Germany, ²Institute of Veterinary Anatomy, Histology and Embryology, Munich, Germany

Measurement of total thyroxine (T4) is often the first diagnostic step in the work up of thyroid disease in dogs and cats. Blood samples are routinely sent to a reference laboratory causing a delay in testing which might impact the results.

The aim of this study was to validate an enzyme fluorescence assay (ELFA) as an inhouse method to measure T4 in dogs and cats.

T4 was measured in sera of 162 dogs and 88 cats by two methods, an enzyme immunoassay (EIA) and an enzyme fluorescence assay (ELFA). The EIA served as the standard method to which the ELFA results were compared. The ELFA was performed with the miniVidas automated analyser (bioMérieux, Craponne, France) according to the manufacturers instructions.

Coefficient of variation (CV) of the ELFA in dogs sera was 5.8% and of the EIA 6–9.5%, respectively. CV of the ELFA in cats sera was 0.7–3.4% and of the EIA 7.6–15.7%, respectively. Overall bias of the ELFA in dogs was 1.4%; however up to –26.7% in lower T4 ranges. Maximal bias of the ELFA in cats was 6.9%. Correlation of both methods was linear only in cats. Using Bland Altman plots limits of agreement were –74 to 72% in dogs and –58 to 72% in cats. Cohen's kappa revealed only slight agreement between both methods in dogs, but a good to very good agreement in cats.

The ELFA is a fast method with a high precision and can be recommended to measure T4 in cats, but cannot be recommended for dogs.

Disclosures: No disclosures to report.

ESVIM-P-1

ANALYSES OF CEREBROSPINAL FLUID (CSF) SAMPLES OF 210 DOGS WITH NEUROLOGICAL SYMPTOMS. D. Breu, J. Guthardt, E. Müller. Laboklin GmbH, Bad Kissingen, Germany

Dysfunctions of the central nervous system (CNS) are the most frequent causes of neurological disorders in dogs. Our study aimed to find (1) if some CNS diseases could be associated with a selected group of common microbial or viral pathogens in dogs and (2) if CNS diseases have any characteristic profile with regard to two parameters, C-reactive protein (CRP) and IgA, that are reported to be potentially useful but unspecific markers of CNS diseases. We analysed 210 cerebrospinal fluid samples obtained from dogs with varying neurological signs between June and November 2014. Real-time PCR was employed with probes for *Toxoplasma gondii*, *Neospora caninum*, *Anaplasma phagocytophilum* and *Canine distemper virus*. IgG-antibodies to *Tick-borne encephalitis virus (TBE)* were assayed and IgA titres were measured using ELISA, while CRP concentrations were determined by immunoturbidimetric assay. The dogs had a median age of 4 years (range: 0.5–14) and comprised 60 breeds most frequently involving Chihuahuas, Labrador Retrievers, Bernese Mountain Dogs and Boxers. Gender distribution was 22.4% female, 12.9% spayed bitches, 42.8% male, 15.7% neutered male, and 6.2% non-identified. None of the cases were PCR-positive for *Toxoplasma gondii* or *Canine distemper virus*. One dog was positive for *Anaplasma phagocytophilum* and another for *Neospora caninum*. Antibodies to TBE virus were within the borderline range in 6/210 dogs. The 210 dogs could be divided into two age groups: 60 (=28.6%) for young dogs (<2 years, median 1 year) and 150 (=71.4%) for older dogs (≥2 years, median 6 years). IgA-high (>0.1 mg/dl) cases represented 95% and 90% for young and older dogs, respectively. CRP-high (>1.0 mg/l) cases were almost half and equal: 51.7% and 56.0% in young and older dogs, respectively. Compared with older dogs, young dogs had higher levels of CRP ($P = 0.022$) and IgA ($P = 0.054$). Within the IgA-high cohorts, CRP-high and CRP-low cases distributed almost equally (46.7% versus 48.3%) in young dogs but disproportionate (52.0% versus 38.0%) in older dogs. There were no [IgA-low/CRP-low] cases in young dogs but 6.0% in older dogs. Our present data sug-

gest that (1) canine CNS disorders were largely characterized by high IgA and particularly in young dogs (2) inflammatory types (CRP-high) were almost equal in both groups and (3) although the significance remains yet to be determined, pathogens like *Anaplasma phagocytophilum* and *Neospora caninum* could be detected in a few cases of canine CNS disorders.

Disclosures: The authors Breu D and Guthardt J are employed at Laboklin GmbH & Co KG, Germany. Müller, E is owner/manager of the Laboklin GmbH & Co KG.

ESVIM-P-2

PET OWNERS USE OF THE INTERNET FOR THEIR PETS' HEALTH. A. Chatard, M. Hugonnard. VetAgro Sup, Marcy l'Étoile, France

Internet is a potential source of medical information for pet owners. Therefore, it could play an indirect but important role in the veterinary practice. This survey assesses the online search behaviour of French pet owners for their pets' health and its influence on a veterinary consultation. In April 2013, 260 French pet owners coming in a veterinary teaching hospital for a medical or a surgical consultation were surveyed. 239 (91.9%) owners fulfilled the questionnaire on a voluntary basis. The survey contained 26 questions dealing with three topics: the online search behaviour of owners for their pets' health, their perception of the information found online and the internet's influence on a consultation and on the veterinarian/client relationship. 73.6% of owners use the Internet to obtain information on their pets' health. Among them, 32.6% use it rarely and 28.9% occasionally. They mainly look for information on a disease (51.1%), a symptom (51.1%), a breed (50%) or a nutritional advice (48.9%). 79.7% of owners try to verify the accuracy of the information found, most often by questioning their veterinarian (82.8%). Few owners (15.4%) think that online information is always trustworthy. Most of the research (81.9%) is randomly made, websites being found through search engines. The majority of pet owners (81.3%) aren't aware of any health certification label for websites. Internet enables certain pet owners to feel more at ease with their pets' health care: they ask more questions to their veterinarian (88.9%) and feel more involved in medical choices (55.6%). 37.9% of owners consider that the Internet can positively impact their relationship with the veterinarian. Relief is the most common (73.6%) emotional response to online research for medical information. However, 58.8% of owners feel overwhelmed by the amount of information found, 56% are confused and 35.2% frightened by the serious or graphic nature of the information found online.

This study emphasizes the frequent but measured use of the Internet by French pet owners for their pets' health. They seem to consider information found on the net with a critical mind. Unexpectedly, it appears that the Internet could be an ally for veterinarians by promoting exchanges between the clients and the veterinarian and by improving compliance with the care project.

Disclosures: No disclosures to report.

ESVIM-P-3

EVALUATION OF TOPIC 1% CLOTRIMAZOLE CREAM AS THE ONLY TREATMENT FOR CANINE SINONASAL ASPERGILLOSIS: 9 CASES (2008–2015). A. Cocci, C.M. Mortellaro, V. Greci. Clinica Veterinaria Cà Bianca, Milano, Italy

Sinonasal aspergillosis is a well-known and described fungal infection of the sinonasal cavities in dogs.

Topical treatment either with enilconazole or itraconazole infusion administered surgically or endoscopically are effective. The use of 1% clotrimazole cream have been described in a surgical setting after itraconazole infusion by Sissener et al. in 2006.

The aim of the work was to report the effectiveness of the use of topical 1% clotrimazole cream as the only treatment for sinonasal aspergillosis in dogs.

Inclusion criteria were a full medical record with radiological and endoscopic imaging, record of clotrimazole discharge after instil-

lation and endoscopic control between 60 and 90 days after procedure. The 1% clotrimazole cream was applied through catheters placed under direct endoscopic vision after fungal plaques removal.

Nine dogs were included. Three dogs were mixed breed dogs, two dogs Golden Retriever, one dog a German Shepherd and one Old English Sheepdog, one Bull Terrier and one Cane Corso. Six dogs were male (one neutered) and three female (one intact). Mean age was 6.8 years. Main clinical signs were muco-purulent discharge (8), pain at sinonasal palpation (8), nasal planum alterations (6), epistaxis (3). Nasal discharge was bilateral in 5 dogs. Mean duration of clinical signs was 1.5 months. Main radiological findings were turbinates lysis (9), frontal sinus empyema (8), frontal bone thickening (3) and frontal bone lysis (4).

Rhinoscopy disclosed lysis and remodelling of the nasal turbinates (9), easy access to the frontal sinus (7), septum lysis (5), bilateral sinonasal aspergillosis (2), monolateral nasal aspergillosis (2), monolateral sinonasal aspergillosis and contralateral nasal aspergillosis (2), monolateral frontal aspergillosis (3). Main duration of nasal cream discharge was 3.5 days. All dogs underwent endoscopic control between 60 and 90 days after the procedure. Seven dogs were disease free; two dogs had persistent fungal plaques and underwent a second treatment. Success rate was 77.8%.

Success rate of this study is comparable to other studies with larger and smaller case series. Endoscopic removal of the fungal plaques can be time consuming and topical administration of either enilconazole or itraconazole require an additional hour. The catheter placement and the 1% clotrimazole cream application lasted 5 minutes for each cavity in the dogs here reported.

The use of 1% clotrimazole cream as the only treatment for sinonasal aspergillosis needs further evaluation on a larger case series.

Disclosures: No disclosures to report.

ESVIM-P-4

SURVEY OF EUTHANASIA PRACTICES OF DOGS AND CATS BY FRENCH VETERINARY PRACTITIONERS. A. Diquélou, A. Fordin, D. Concordet, P. Sans. Ecole Nationale Vétérinaire de Toulouse, Toulouse Cedex 3, France

Few studies exist on euthanasia in small animal practice. However, such an act belongs to veterinary procedures, more or less frequently depending of the kind of practice, and may deeply impact both owners and veterinarians.

We intended to study practical, ethical and psychological aspects of euthanasia of dogs and cats among French veterinary practitioners.

From October 2014 to February 2015, an on-line 79-item questionnaire on small animals' euthanasia, addressing practical aspects of euthanasia, communication with the owners, ethical problems, owners' and veterinarians' perceptions, was emailed via professional associations and networks. Results were analyzed using commercial software (Sphinx IQ[®] and Excel[®]).

2770 French veterinarians practicing small animal medicine completed the questionnaire, representing >20% of this population.

Euthanasia occurs rarely at home. Over 85% of veterinarians propose the owners some time alone with their pet, and to stay during euthanasia, performed most commonly by intravenous injection (91.4%) mainly after sedation/anesthesia (95.9%).

Ninety nine percent of veterinarians consider communication, including description of events' sequence, and disposal of the body, as important. Estimated minimum communication time required varies from 5–15 to 15–30 minute. Following euthanasia, 64.4% are often thanked by the owners.

Most veterinarians (>85%) have refused a euthanasia, considered unjustified, or had their own suggestion of euthanasia rejected. Reasons for such a suggestion include intractable pain (98.7%), non-acceptable complications (79.9%), financial considerations (44.1%) or animal considered dangerous (71.6%).

Veterinarians think most owners (63.9%) experience some sense of guilt during euthanasia. Themselves perceive euthanasia most commonly as relief of animal's suffering (81.7%) and part of veterinary practice (64%), less frequently as a defeat (22.6%). Almost all veterinarians have experienced emotionally challenging euthanasia, and 72.4% estimate that practicing euthanasia influences their perception of death. Practical (74%) and psychological (48.4%) aspects of euthanasia have been discussed in most teams.

Veterinarians' gender influences euthanasia management, mostly concerning some communicational and practical aspects.

Euthanasia is definitely not an ordinary veterinary act, neither for the owner nor for the veterinarian. Therefore, this act must be performed with as much care and communication as possible.

Disclosures: No disclosures to report.

ESVIM-P-5

CANINE PANCYTOPENIA: A RETROSPECTIVE STUDY OF 119 CASES. P.S. Frezoulis¹, M.E. Mylonankis¹, E. Aggelidou², D.I. Karnezi¹, I. Oikonomidis¹, M. Kritsepi-Konstantinou¹, D. Kasabalis¹. ¹Aristotle university of Thessaloniki, Thessaloniki, Greece, ²University of Thessaly, Karditsa, Greece

Canine pancytopenia is associated with a range of intra-marrow or extra-marrow causes, including though not limited to, infectious agents, drugs, toxins and neoplasms. There is currently limited information regarding the clinicopathological features of the underlying causes or the prognosis in pancytopenic dogs. The objective of this retrospective study was to better define the spectrum of diseases associated with canine pancytopenia, to establish possible clinicopathological discriminators for the common causes and to investigate if the severity of pancytopenia or the underlying disease were associated with the clinical outcome (death or survival). Medical records of dogs with a comprehensive diagnostic investigation admitted in a veterinary teaching hospital were retrospectively reviewed. Pancytopenia was defined by a hematocrit (HCT) <37% (<30% for dogs <5 months of age), white blood cell counts (WBC) <6,000/ μ L and platelet counts (PLT) <200,000/ μ L. A control group of 238 dogs without any evidence of blood cytopenia(s) was also established. In total, 119 pancytopenic dogs were studied. Bone marrow aspiration cytology was examined in 42 cases and aplasia of all hematopoietic lineages was observed in 22 (52.4%) dogs. The most common diagnoses included monocytic ehrlichiosis (CME) (n = 43), leishmaniosis (CanL) (n = 28), parvoviral enteritis (PE) (n = 19), and concurrent CME and CanL (n = 12). Mixed breed dogs were more likely to develop pancytopenia as compared to purebreds and pancytopenic dogs tended to be younger than the controls (conditional dependent logistic regression model, $P = 0.013$ and $P = 0.001$, respectively). Among the most common diseases associated with pancytopenia, the mean WBC counts were significantly lower in dogs with CME and PE compared to dogs with CanL (one way ANOVA with Bonferroni test for multiple comparisons, $P = 0.004$ and $P = 0.03$, respectively), while PLT counts were significantly lower in CME compared to CanL ($P < 0.0001$) or PE ($P < 0.0001$). Total protein concentrations were significantly lower in dogs with PE compared to CME ($P < 0.0001$) and CanL ($P < 0.0001$). Using a univariable logistic regression analysis model, no association was established between the underlying disease and the final outcome. However, higher HCT (by at least one percentage unit), WBC (by at least 1000/ μ L) and PLT (by at least 10,000/ μ L) values tended to significantly increase the odds of survival ($P = 0.025$, $P < 0.0001$ and $P = 0.006$, respectively). In the present study, CME, CanL and PE were the major causes of canine pancytopenia. Potentially useful diagnostic indicators included severe leucopenia (CME, PE), thrombocytopenia (CME) and hypoproteinemia (PE).

Disclosures: No disclosures to report.

ESVIM-P-6

DIFFERENCES OF BREATHING PATTERNS BETWEEN CATS WITH LARYNGEAL MASSES AND FELINE BRONCHIAL DISEASES BY USING BAROMETRIC WHOLE-BODY PLETHYSMOGRAPHY. L. García-Guasch¹, A. Caro-Vadillo², J. Manubens¹, C. Sá Borges¹, J.A. Montoya-Alonso³. ¹H.V.Molins, Sant vicens dels horts, Spain, ²Med. Cir. Anim., UCM, Madrid, Spain, ³Int. Med., ULPGC, Las Palmas, Spain

Laryngeal masses (LM) usually produce air flow limitation during inspiration, expiration or transiently during subsegments of both breathing phases. Feline bronchial diseases (FBD) have pre-

dominantly expiratory flow restrictions. Barometric whole-body plethysmography (BWBP) is a non-invasive pulmonary function test (PFT) that allows a dynamic study of breathing patterns widely used to evaluate lower airway responsiveness.

The objective of this preliminary study was to evaluate if there were significant differences in respiratory rate [RR (rpm)], tidal volume [TV (mL)], minute volume [MV (mL)], inspiratory [Ti (s)] and expiratory [Te (s)] intervals, peak inspiratory and expiratory flows [PIF and PEF (mL/s)], end expiratory pause [EEP (ms)], Enhanced pause [Penh] and Pause [PAU] between cats with LM and with FBD by using BWBP. The study was approved by the ethical committee of Veterinary Medicine Service of Las Palmas de Gran Canaria University (Spain) and it was carried out in accordance with the current European legislation on animal protection.

Thirteen client-owned cats were included [LM (n = 3), FBD (n = 10)]. Cats did not have a previous history of upper airway, cardiac or systemic diseases and had negative results when tested for heartworm and FeLV/FIV diseases. Cats were placed in the BWBP chamber and after an adaptation period of time in a quiet and silent environment, four 3-minute periods were registered and data were shown as means with standard deviations. A P -value < 0.05 was considered statistically significant.

BWBP results were: RR = 28.27 ± 23.54 ; TV = 99.97 ± 43.04 ; MV = 2168.34 ± 872.70 ; Ti = 1.41 ± 0.77 ; Te = 1.83 ± 1.18 ; PIF = 126.99 ± 25.92 ; PEF = 237.62 ± 67.03 ; EEP = 724.02 ± 862.09 ; Penh = 3.391 ± 0.960 and PAU = 1.654 ± 0.258 for LM cats, and RR = 78.76 ± 60.77 ; TV = 28.56 ± 14.86 ; MV = 1663.88 ± 761.04 ; Ti = 0.46 ± 0.18 ; Te = 0.67 ± 0.24 ; PIF = 97.21 ± 40.31 ; PEF = 87.97 ± 51.40 ; EEP = 15.63 ± 12.62 ; Penh = 0.857 ± 0.287 and PAU = 0.914 ± 0.211 for FBD cats.

BWBP detects both upper and lower airways diseases because any site of airway obstruction will result in increased pressure changes associated with breathing. Nevertheless our results suggest that there are significant differences in TV ($P = 0.0001$), Ti ($P = 0.0001$), PEF ($P = 0.0001$), EEP ($P = 0.003$), Penh ($P = 0.0001$) and PAU ($P = 0.0001$) between LM and FBD cats. No other significant difference in BWBP parameters was found.

Upper airway obstructions have been previously evaluated in cats by using PFT (McKieman, 1993, Lin, 2014) but in authors' knowledge this is the first study designed to compare upper and lower airway obstructions by using BWBP. Attending our results, there is the evidence that BWBP can help characterize mechanical dysfunction of the airways in cats with LM obstruction. However we must keep in mind some limits of this study as the low number of animals, individual variability in breathing pattern and to have the chance of doing bronchoreactivity tests.

Disclosures: No disclosures to report.

ESVIM-P-7

RISK FACTORS FOR MORTALITY IN AGED GUIDE DOGS. S. Hoummady¹, J. Hua², C. Muller³, J.L. Pouchelon⁴, M. Blondot⁵, C. Gilbert¹, A.A. Bourachid⁶, L. Desquilbet¹. ¹Alfort Veterinary School/CNRS-MNHN, Maisons-Alfort, France, ²Dr Lacol veterinarian clinic, Drancy, France, ³Saint Bernard Veterinarian clinic, Lomme, France, ⁴Alfort Veterinary School, Maisons-Alfort, France, ⁵Paris guide dog school, Vincennes, France, ⁶MNHN, Paris, France

The median lifespan of domestic dogs has been estimated to 9–12 years, but little is known about risk factors for mortality in aged dogs: most mortality studies in dogs have been carried out among diseased dogs (renal or heart diseases, cancers, post-operative death). To determine which characteristics are associated with mortality in a priori healthy aged dogs, a prospective cohort study has been conducted in 116 guide dogs, followed from a systematic geriatric examination (GE) to either (all-cause) death or cut-off date (July 16th, 2013). Survival analyses (Kaplan–Meier estimators, log-rank tests, and multivariate Cox proportional hazards models) were used to assess the associations with time to death. Median age at GE was 8.9 years, all dogs were neutered, and 50% were female. The majority of dogs were Golden Retriever (n = 48) and Labrador Retriever (n = 27). Among these 116 dogs, 16% were obese, 47% presented skin nodules and 90% used bus as transportation. A total of 76 dogs died during follow-up, leading

to a median survival time from GE of 4.4 years. After adjustment for demographic and biochemical variables (age, sex, total proteins, cholesterol and ALP), an increased alanine aminotransferase level (≥ 102 UI/L; adjusted Hazard Ratio [aHR], 6.0), presenting skin nodules (aHR, 2.3), and not being a Labrador (aHR, 3.3) were independently associated with a shorter time to death ($P < 0.05$). Public transportation tended to be associated with mortality (aHR, 3.0; $P = 0.06$), highlighting the importance of environment in mortality. Neither sex nor other biochemical parameters were significantly associated with mortality.

The alanine aminotransferase level and the presence of skin nodules seem predictors of mortality in senior guide dogs, mostly Labrador, Golden, or mixed breed of Labrador/Golden. The impact of environment, in particular urban environment, on mortality needs further investigation. Studies in other breeds and pets are also necessary to generalize these results.

Disclosures: Sara Hoummady received a grant from MP Labo for his PhD Work about dog aging and Marc Blondot work at the Paris guide dog school.

ESVIM-P-8 LARYNGOSCOPY IN COUGHING DOGS. L.R. Johnson. University of California, Davis, Davis, CA, USA

Laryngeal dysfunction is most commonly associated with aspiration pneumonia, however its role in other lower airway diseases has not been investigated. Laryngoscopic and bronchoscopic findings in dogs examined by the author between 2001 and 2014 were evaluated for the presence or absence of laryngeal abnormalities. Dogs that presented for evaluation of inspiratory difficulty or panting were excluded from analysis. Clinical diagnoses of inflammatory airway disease, airway collapse, airway infection, eosinophilic bronchopneumopathy or a combination of these disorders were obtained through bronchoscopy and bronchoalveolar lavage fluid analysis. Detection rates for laryngeal abnormalities were compared among disease groups using Chi Square analysis and Fisher's exact test, with significance set at $P < 0.05$. A total of 138 dogs were evaluated and varied in age between 4 months to 15.5 years (median 8 years). Weight ranged from 1.5 to 63.4 kg (median 13 kg), with 31 dogs < 5 kg, 28 dogs from 5.1–9.9 kg, 24 dogs from 10–20 kg, 45 dogs from 20.1–40 kg, and 9 dogs > 40 kg. Laryngeal hyperemia or swelling was found in 73/138 dogs (53%), and detection rate did not differ among disease processes. Laryngeal function was considered suspect in 59/138 cases, prompting administration of doxapram, which normalized function in 30/59 dogs. Laryngeal paresis or paralysis was reported in a total of 26/138 dogs (19%). A substantial number of dogs with chronic cough displayed evidence of abnormal laryngeal structure or function, suggesting that a complete laryngoscopic examination should be performed in all dogs evaluated for cough.

Disclosures: Member of the Feline Advisory Board, Speaker honoraria for international, national, and regional continuing education meetings.

ESVIM-P-9 BRONCHIECTASIS IN DOGS. L.R. Johnson, E.G. Johnson, W. Vernau, B.A. Byrne. University of California, Davis, Davis, CA, USA

Bronchiectasis is a poorly characterized disease in dogs identified by airway dilatation on radiographs, computed tomography, bronchoscopy, or histopathology. Little is known about underlying disease processes associated with bronchiectasis in dogs. Medical records from dogs presented to UC Davis were searched for identification of bronchiectasis. Underlying disease processes and clinical diagnoses were obtained through review of the history, physical examination, respiratory endoscopy and bronchoalveolar lavage fluid analysis and microbiology. Historical reports, results of imaging, bronchoscopy and fluid analysis, and scrutiny of pathologic and clinical diagnoses were comprehensively evaluated to identify the most likely underlying disease process associated with bronchiectasis. Between 2003 and 2014, bronchiectasis was

diagnosed in 86/621 dogs (14%) that had bronchoscopy performed. Dogs ranged in age from 0.5 to 14 years (median 10 years) with 1/85 dogs < 6 months, 16/85 dogs (19%) 1–5 years, 37/85 dogs (43%) 5.1–10 years of age and 31/85 dogs (37%) over 10 years of age. Dog breeds affected more than once included 6 Labrador retrievers, 5 Cocker spaniels, 4 Golden retrievers and 4 Standard Poodles. Duration of cough ranged from 3 days to 10 years (median 6 months). Underlying disease processes included pneumonia in 45/86 (52%) dogs, inflammatory airway disease in 24/86 (28%) dogs, and eosinophilic bronchopneumopathy in 10/86 (12%) dogs. Twenty-three of 85 dogs (27%) had positive bacterial cultures, with isolation of *Streptococcus* ($n = 6$) and enteric species ($n = 5$) most commonly. This study found that bronchiectasis often occurs in older, large breed dogs with infectious or inflammatory pneumonia.

Disclosures: Johnson: Feline advisory board, speaker honoraria.

ESVIM-P-10 A RETROSPECTIVE STUDY OF CHRONIC RESPIRATORY DISEASE IN 126 DOGS PRESENTING TO A PRIVATE SOUTH AFRICAN VETERINARY CLINIC. J.L. Mclean, R.G. Lobetti. Bryanston Veterinary Hospital, Johannesburg, South Africa

Chronic respiratory disease, often characterized by a chronic cough, is common in dogs.

The purpose of this study was to determine the etiology of chronic respiratory disease in dogs that were presented with persistent and chronic coughing.

A retrospective study of 126 client-owned dogs with signs of persistent and chronic lower respiratory disease, that underwent bronchoscopy together with either an endotracheal wash (ETW) or broncho-alveolar lavage (BAL), was performed.

All dogs were evaluated by means of full clinical examination, hematology and serum biochemistry analyses, survey thoracic radiographs, echocardiography and ECG (if indicated), and bronchoscopy with cytological analysis and aerobic culture of ETW or BAL fluid. An ETW was performed in 112/126 (89%) dogs while a BAL was performed in 15/126 (11%) dogs. A positive aerobic bacterial culture was identified in 42/126 (33%) of submitted ETW/BAL fluid samples. Most commonly isolated bacteria included *Mycoplasma sp.* (24%), *Bordetella bronchiseptica* (24%) and *Pseudomonas aeruginosa* (12%).

A definitive diagnosis was made in 118/126 cases (93.6%). Chronic bronchitis was the most common diagnosis (37.3%), median age 8 years; followed by airway tracheal collapse or bronchomalacia (23%), median age 11 years; and primary bacterial infections (15.8%), median age 3 years. Less common etiologies identified included neoplasia (5.5%), median age 14 years; parasitic infections (4.8%), median age 7 years; and eosinophilic bronchopneumopathy (3.2%), median age 6 years. Rare etiologies identified included primary pulmonary hypertension, primary ciliary dyskinesia, excitement-induced cough, and obesity. Myxomatous mitral valve disease was found concurrently in 12/126 (9.5%) dogs.

This study concluded that by using a structured combination of survey thoracic radiography, bronchoscopy and ETW or BAL with cytology and culture, a diagnosis could be made in the majority of dogs with chronic respiratory disease.

Disclosures: No disclosures to report.

ESVIM-P-11 STERILE STEROID-RESPONSIVE LYMPHADENITIS IN 36 DOGS. A. McPartland¹, I. Battersby², D. Cain², D.J. Walker³, S. Warman⁴, V. Black⁴, N. Van Den Steen⁵, S.W. Tappin¹. ¹Dick White Referrals, Six Mile Bottom, UK, ²Davies Veterinary Specialists, Hertfordshire, UK, ³Anderson Moores Veterinary Specialists, Hampshire, UK, ⁴Langford Veterinary Services, University of Bristol, Bristol, UK, ⁵Cave Veterinary Specialists, Wellington, UK

Canine sterile steroid-responsive lymphadenitis (CSSRL) is an uncommon cause of lymphadenomegaly. Diagnosis is one of exclu-

sion after extensive investigations exclude infectious, inflammatory or neoplastic aetiologies. Resolution of clinical signs occurs with corticosteroids.

This retrospective study aimed to further define characteristics, progression and treatment regimens. Cases were recruited from 5 UK referral centres between 2009 and 2015. Diagnostic investigations in each case excluded other potential causes of lymphadenomegaly.

Thirty-six dogs were diagnosed with CSSRL from lymph node cytology and/or histopathology. Eighteen breeds were represented, of which 16 were spaniels. English springer spaniels (ESS) accounted for 10 cases along with Cocker spaniels (4), Cavalier King Charles spaniels (2) and Border collies (3). Median age at presentation was 4 years. ESS, Cocker spaniels, CKCS and Border collies presented at 4.4, 2.5, 2.75 and 2.5 years respectively. Females were over-represented with 22/36 females (15/36 FN and 7/36 FE) and 14 males (10/36 MN and 4/36 ME). 60% of the ESS cases presented were FN dogs.

Clinical presentation varied between dogs. Clinical signs of pyrexia (77%), lethargy (70%) and anorexia (41.6%) were the most common. Other signs included cough, tachypnoea, dyspnoea, dysphagia, vomiting, diarrhoea, neck or spinal pain, abdominal pain, joint effusion or dermatologic signs. Median referral time was 24 days (ESS 25, Cocker 33 and Border collies 8 days).

Twenty-two animals were pyrexial at presentation (mean 39.8 °C, range 39.1–40.9 °C). Thirty-one animals presented with peripheral lymphadenomegaly, but five animals displayed only internal lymph node enlargement. Cytology was performed in 30/36 cases; neutrophilic lymphadenitis (20), followed by granulomatous (5), pyogranulomatous (5) and reactive hyperplasia (4). Histopathology was performed in 22/36 cases documenting neutrophilic (5), pyogranulomatous (9) or granulomatous (2) lymphadenitis. Lymph node culture or staining (Gram, PAS, ZN) was performed in 17 and 18 animals respectively, all of which were negative.

Prednisolone was administered in all cases (dose range 0.5–3 mg/kg daily). Twenty-four animals were initiated therapy at 1 mg/kg q 12 hours. Mean treatment length was 18 weeks. Sixteen dogs relapsed throughout the study period (9 ESS, 3 cockers, 1 CKCS, Border collie, Lurcher and Beagle). Seven ESS relapsed within 18 months of diagnosis. Median relapse time was 26 weeks.

This study documents dogs with CSSRL in the UK suggesting an over-representation in spaniel breeds (particularly ESS), with females and young dogs typically affected. Cytologic and histopathologic examination confirmed sterile lymphadenitis with animals showing marked and rapid clinical improvement with corticosteroids.

Disclosures: No disclosures to report.

ESVIM-P-12

OXIDATIVE STRESS VALUES IN BRACHYCEPHALIC DOGS WITH UPPER AIRWAY OBSTRUCTION. M. Planellas¹, R. Cuenca², M.D. Tabar³, C. Bertolani⁴, C. Poncet⁵, J.M. Closa⁶, J. Lorente⁷, J.J. Cerón⁸, J. Pastor². ¹Hospital Clinic Veterinari, Bellaterra (Barcelona), Spain, ²Animal Medicine and Surgery Department, Faculty of Veterinary Medicine, UAB, Bellaterra (Barcelona), Spain, ³Centro Policlínico Veterinario Raspeig, Alicante, Spain, ⁴Centre Hospitalier Vétérinaire Frégis, Arcueil, France, ⁵Centre Hospitalier Vétérinaire Frégis, Arcueil, France, ⁶Hospital Ars Veterinaria, Barcelona, Spain, ⁷Otorrinolaringology Service, Hospital Vall d'Hebron, Barcelona, Spain, ⁸Animal Medicine and Surgery Department, Faculty of Veterinary Medicine of Murcia, Murcia, Spain

Brachycephalic dogs have unique upper respiratory anatomy with abnormal breathing patterns similar to those in humans with obstructive sleep apnea syndrome (OSAS). Oxidative stress in the body represents the imbalance between the production of reactive oxidative species and the ability of antioxidant defense mechanisms to detoxify the reactive intermediates. Oxidative stress is involved in the pathogenesis of many diseases, including hemolytic anemia, atherosclerosis, tissue reperfusion injury and has also carcinogenic potential. Several studies have clearly shown an association between obstructive sleep apnea syndrome in humans and oxidative stress, but detailed underlying pathomechanism remains

unclear. Due to the consideration of brachycephalic dogs as an animal model of human OSAS, this study was designed to evaluate oxidative stress (Paraoxonase type-1 activity; PON1 and total antioxidant status; TAC) in brachycephalic dogs with Brachycephalic Airways Obstructive Syndrome (BAOS) before and after surgery compared to control dogs.

This study was conducted on 37 dogs with BAOS and 34 control dogs. Twenty out of 37 BAOS dogs were evaluated 1–2 months after surgical correction. Mean values of TAC and PON1 in different studied groups were as follows: control dogs (TAC: 0.614; PON1:2.53), BAOS dogs (TAC: 0.233; PON1: 2.438), BAOS dogs post-surgery (TAC:0.177; PON1: 2.705)

A statistically significant difference on TAC levels is observed between dogs with BAOS and control dogs ($P < 0.05$). No statistically significant differences were observed in PON1 and TAC levels before and after surgery. On the other hand, no differences have been observed between PON1 and TAC levels in BAOS dogs according type of brachycephalic breed, grade of respiratory and digestive signs or presence of everted ventricular laryngeals.

The results of our study showed a statistically significant difference in TAC values between control and dogs with BAOS, confirming the oxidative stress previously described in humans. Even that human patients with OSAS can partially reverse their increase in oxidative stress by using a nasal continuous positive airway pressure treatment, in dogs with BAOS no differences were observed before and 1 month after surgical treatment. BAOS surgical treatment is not useful to reduce PON-1 or TAC levels, probably because BAOS does not induce such an evident inflammatory process in dogs as in human patients with OSAS.

Disclosures: No disclosures to report.

ESVIM-P-13

CHEMOKINE (CC-MOTIF) LIGAND 2 AS A PROGNOSTIC SERUM MARKER IN CANINE IDIOPATHIC PULMONARY FIBROSIS. E. Roels¹, S. Holopainen², E. Teske¹, M.M. Rajamäki², C. Clercx¹. ¹University of Liège, Liège, Belgium, ²University of Helsinki, Helsinki, Finland

Canine idiopathic pulmonary fibrosis (CIPF) is a progressive interstitial lung disease mainly affecting West Highland white terriers (WHWTs). The CIPF course varies greatly among dogs from rapid deterioration to slowly progressive forms and the survival time from onset of clinical signs ranges from a few months to several years. In human IPF, increased chemokine (CC-motif) ligand 2 (CCL2) concentrations in bronchoalveolar lavage fluid (BALF) are indicative of a poor outcome and serum concentrations are correlated with clinical parameters of lung function. In dogs, serum and BALF CCL2 concentrations were shown to be elevated in WHWTs with CIPF compared with healthy WHWTs. The aim of the present study was to investigate whether serum CCL2 concentrations measured in WHWTs with CIPF at diagnosis (1) can be used as an indicator of prognosis and (2) correlate with lung function parameters. CCL2 concentrations were determined by ELISA (Canine CCL2 Quantikine ELISA kit, R&D Systems) in the serum of 60 WHWTs suspected of CIPF (median age 11.7 years, range 5.7–14.5), for which a follow-up was available (median follow-up time 8.6 months, range 0–71.8). Serum sampling extended from May 2007 to January 2015. CIPF diagnosis was confirmed by thoracic high resolution computed tomography, lung histopathology, or both examinations in 17, 6 and 27 WHWTs respectively. Kaplan–Meier analysis was conducted to investigate differences in survival times according to serum CCL2 concentrations at diagnosis. Spearman analysis was used to assess correlations between serum CCL2 concentrations and lung function parameters, namely the distance walked in the 6-minute walking test (6MWD) and the arterial partial pressure of oxygen (pO₂). Among the 60 CIPF WHWTs included, 31 died or were euthanized for CIPF-related reason, 12 died or were euthanized for non-CIPF-related reason and 17 were still alive at the end of the study. The median survival of WHWTs with CIPF-related death or euthanasia was 6.4 (range 0.4–71.9) months from diagnosis. Serum CCL2 concentrations above 700 pg/mL were significantly associated with a shorter survival time in WHWTs affected with CIPF ($P = 0.02$). A weak negative correlation was found between serum CCL2 concentrations and the 6MWD ($r = -0.382$,

$P = 0.03$, $n = 31$), while no correlation was observed with arterial pO_2 values ($n = 49$). In conclusion, serum CCL2 concentration provides prognostic information in WHWTs suffering from CIPF, while this marker is weakly correlated with the clinically lung function parameters available in the present study.

Disclosures: No disclosures to report.

ESVIM-P-14

STANDARDIZED CHARACTERIZATION OF THORACIC HIGH-RESOLUTION COMPUTED TOMOGRAPHIC FINDINGS IN WEST HIGHLAND WHITE TERRIER WITH CANINE IDIOPATHIC PULMONARY FIBROSIS AND COMPARISON BETWEEN SEDATED AND ANESTHETIZED EXAMINATIONS. E. Roels¹, T. Couvreur², C. Soete¹, C. Clercx¹, J. Verschakelen³, G. Bolen¹. ¹University of Liège, Liège, Belgium, ²CHC Liège, Liège, Belgium, ³KU Leuven, Leuven, Belgium

Canine idiopathic pulmonary fibrosis (CIPF) is a progressive interstitial lung disease mainly affecting West Highland white terriers (WHWTs). This study was intended to (1) describe thoracic high-resolution computed tomography (T-HRCT) findings obtained in CIPF dogs under general anesthesia (GA) using the glossary of the Fleischner Society and (2) compare images obtained under GA (T-HRCT^{GA}) with those obtained under sedation (T-HRCT^S). T-HRCT images from 11 WHWTs with CIPF and 9 control WHWTs were retrospectively reviewed by three observers in consensus. Specific T-HRCT features were assessed and graded for each lung lobe (0 = absence, 1 = mild, 2 = moderate and 3 = severe). A global score was then calculated. The K_{hi}^2 test with the threshold 5% was used for the statistical analysis. Ground glass opacity (GGO) was observed in all CIPF WHWTs and in 5/9 of controls ($P = 0.013$). In controls, GGO was mild and localised mainly in cranial lobes. In CIPF WHWTs, GGO was mild, moderate or severe in 2, 4 and 5 dogs respectively, without lobe predilection. Consolidation was observed in 5/11 CIPF WHWTs but not in controls ($P = 0.020$) and was mild (3/5) to moderate (2/5). A mosaic pattern, suggestive of air trapping, was noticed in 8/11 CIPF WHWTs but not in controls ($P = 0.001$) and was mild, moderate or severe in 3, 2 and 3 WHWTs respectively, without lobe predilection. Nodules were present in 3/11 CIPF WHWTs but not in controls. Reticulation, subpleural bands and parenchymal bands were noticed in 1, 1, and 3/11 CIPF WHWTs respectively. Honeycombing, emphysema, pleural effusion and pleural thickening were never observed. Bronchial wall thickening and mild bronchiectasis were present in 6/11 and 3/11 CIPF WHWTs respectively but not in controls ($P = 0.008$ and $P = 0.09$). The overall T-HRCT^S quality was good in 10/17 examinations compared with 16/20 for T-HRCT^{GA} ($P = 0.160$). The presence of motion artefacts was higher for T-HRCT^S ($P < 0.001$), but were most frequently graded as mild ($P < 0.001$). T-HRCT^S allowed identification of a mosaic pattern in 2 additional CIPF WHWTs, while consolidation could not be identified in 2 others. There was no difference in identification or gradation for the other features between T-HRCT^{GA} and T-HRCT^S. In conclusion, GGO, consolidation, mosaic pattern and bronchial wall thickening are the main T-HRCT features of CIPF in WHWTs. Honeycombing, the major feature of IPF in humans, was never observed, which suggests a different pathophysiology between the two entities. T-HRCT^S images are in accordance with T-HRCT^{GA} and can be used for CIPF diagnosis.

Disclosures: No disclosures to report.

ESVIM-P-15

RETROSPECTIVE CHARACTERIZATION OF MESENTERIAL PURULENT LYMPHADENITIS AND LYMPH NODE ABSCESSES IN DOGS REVEALS AN INCREASED RISK FOR THE SMALL MUNSTERLANDER. S. Schmitz. Small Animal Hospital Justus Liebig University Giessen, Giessen, Germany

Literature on mesenterial lymphadenitis (LAD) or mesenterial lymph node abscesses (LAb) in small animals is scarce. Case files from 2005 to 2014 were searched for dogs with the diagnosis of

mesenterial LAD/LAb based on cytology and/or histopathology. Of 24 cases identified, 5 had to be excluded due to incomplete data. The remaining dogs were of mixed breed ($n = 6$), small Munsterlander ($n = 4$) and one each of other breeds. Nine dogs were male and 10 female. Median age was 47 months (range 6–167). Diagnosis was based on fine needle aspiration (FNA; $n = 9$), histopathology ($n = 1$) or both ($n = 9$). Significant findings in the dogs' history included gastrointestinal signs ($n = 2$), 1 puppy whose mother had mastitis, bite wounds/abscesses of the skin ($n = 2$), pulmonic stenosis ($n = 1$) and orthopaedic diseases ($n = 3$). Most common presenting complaints were lethargy ($n = 13$), hyperthermia ($n = 12$), diarrhoea ($n = 7$), vomiting/nausea ($n = 6$), inappetence/anorexia ($n = 5$), back/abdominal pain ($n = 4$) and lameness ($n = 2$). Diagnostic tests performed included haematology/serum biochemistry ($n = 19$), thoracic ($n = 12$) and abdominal ($n = 7$) radiographs, abdominal ultrasound ($n = 19$), CT/MRI ($n = 3$), FNAs of other organs ($n = 7$), urinalysis ($n = 12$) with culture ($n = 7$), coagulation profiles ($n = 5$), orthopaedic radiographs ($n = 2$), cPL ($n = 5$), blood cultures ($n = 1$), and CSF/joint taps ($n = 2$). Dogs were retrospectively divided into group A ($n = 9$): dogs with no other disease than LAD/LAb ("idiopathic") and group B ($n = 10$): dogs with other diseases diagnosed simultaneously. These included neoplasia (carcinoma $n = 1$, lymphoma $n = 2$, leiomyosarcoma $n = 1$, histiocytic neoplasia $n = 1$, prostate carcinoma $n = 1$), gastroenteritis ($n = 3$), presumed pancreatitis ($n = 2$), purulent monoarthritis ($n = 1$), purulent hepatitis/splenitis ($n = 2$), fungal infection at a distant site ($n = 1$), and mycobacteriosis ($n = 1$). Eleven dogs received surgical treatment and antibiotics, and 8 dogs conservative medical management consisting of supportive treatment and antibiotics. All dogs were discharged alive. Dogs in group A were hospitalized longer (mean 8 days, sd 3.4) than dogs in group B (mean 3 days, sd 2.2) ($P = 0.004$). The median follow-up time was 67 days (4–784 days). There was no difference in pretreatment with antibiotics or anti-inflammatories between groups. t -tests or Kruskal-Wallis tests showed that dogs in group A were borderline significantly younger ($P = 0.052$), had significantly higher respiratory rate ($P = 0.004$), rectal temperature ($P = 0.007$), monocyte count ($P = 0.014$) and CRP concentration ($P = 0.027$) than dogs in group B. The small Munsterlander had an odds ratio of 32 over other breeds to suffer from LAD/LAb. In conclusion, idiopathic mesenterial LAD/LAb was seen in young dogs with hyperthermia and gastrointestinal signs. Diagnosis of purulent LAD/LAb on FNA does not exclude the presence of another underlying pathogenesis.

Disclosures: No disclosures to report.

ESVIM-P-16

CLINICAL AND LABORATORY PARAMETERS IN DOGS WITH CANINE INFECTIOUS RESPIRATORY DISEASE (CIRD). B. Schulz, S. Kurz, K. Weber, K. Hartmann. Medizinische Kleintierklinik der LMU Muenchen, Muenchen, Germany

Canine infectious respiratory disease (CIRD) is a disease complex caused by different viral and bacterial pathogens. Aim of the study was to evaluate clinical and laboratory factors associated with different infectious agents.

Dogs were included, if they showed respiratory signs (<14 days) consistent with CIRD and if non-infectious respiratory conditions could be excluded. Nasal and pharyngeal swabs were taken from 61 dogs with CIRD and tested for respiratory pathogens, including canine parainfluenza virus (CPIV), canine adenovirus (CAV), canine distemper virus (CDV), canine herpes virus (CHV), canine respiratory coronavirus (CRCoV), canine influenza virus (CIV), and *Bordetella bronchiseptica* (*B. bronchiseptica*) by polymerase chain reaction. Results of clinical and laboratory data were correlated with the underlying pathogen using fisher's exact test and chi-square test ($P \leq 0.05$).

CPIV was detected in 23, CRCoV in six, and *B. bronchiseptica* in 48 dogs; 23 patients showed infections with more than one pathogen. There was no significant difference for age and gender distribution between the three groups; however, dogs infected with CPIV more likely originated from a shelter ($P = 0.037$). When clinical data were compared, there was no significant difference for the parameters depression, fever, cough, nasal discharge, dyspnoea, and abnormal lung sounds. Furthermore, there was no sig-

nificant difference regarding abnormalities of erythrocytes, platelets, leukocytes, and differential count between groups.

The study shows that in dogs with CIRDC clinical and laboratory parameters cannot indicate the underlying pathogen. Furthermore, diseases severity does not seem to depend on the infectious organism involved.

Disclosures: No disclosures to report.

ESVIM-P-17

PERIPHERAL BLOOD LYMPHOCYTE SUBPOPULATIONS IN IRISH WOLFHOUNDS WITH PNEUMONIA. S.J. Viitanen, M.M. Rajamäki. University of Helsinki, Helsinki, Finland

Breed related predisposition to bacterial bronchopneumonia (BP) has been reported in Irish wolfhounds (IWHs). Underlying factors are unknown, however immune deficit, ciliary dysfunction and aspiration have been suggested as predisposing factors. The purpose of this prospective study was to evaluate lymphocyte subpopulations in IWHs with one or more previous BP and compare results to elderly IWHs without any previous bacterial respiratory infections. Additionally, healthy dogs of other breeds were included as controls.

Previous BP was confirmed in 11 IWHs (median age 5.1 years, interquartile range 2.2–7.0 years). Healthy IWHs ($n = 13$, 6.8, 6.3–8.2 years) or dogs of other breeds ($n = 15$, 5.5, 3.5–6.3 years) had no history or findings suggestive of previous BP. EDTA blood samples, collected from all dogs when they were healthy, were stained with fluorescent Mouse anti Dog CD3, CD4, CD8, CD21 and MHC class II antibodies (ABD Serotec®) and flow cytometry analysis was performed with BD FACSAria® II Cell Sorter and FACSDiva® software. Statistical comparison between groups and the effect of age was studied using analysis of covariance (ANCOVA) models.

The number of leucocytes did not differ significantly between groups. The total numbers of lymphocytes and numbers of major lymphocyte subpopulations (B-cells, CD4+ and CD8+ T-cells) were significantly lower in healthy IWHs and IWHs with previous BP compared to dogs of other breeds (lymphocytes $P < 0.001$ and $P < 0.001$; B-cells $P = 0.013$ and $P = 0.005$; CD4+ T-cells $P = 0.026$ and $P = 0.029$; CD8+ T-cells $P < 0.001$ and $P = 0.001$ respectively). Percentage and number of MHC class II+ non-B lymphocytes was significantly higher in both IWH groups than in dogs of other breeds ($P < 0.001$ in all comparisons). Lymphocyte numbers and subpopulations did not differ significantly in healthy IWHs compared to IWHs with previous BP. An age-related decline in the total number of lymphocytes ($P = 0.015$), T-cells ($P = 0.007$), CD4+ T-cells ($P = 0.007$) and MHC class II+ non B-cells ($P < 0.001$) was noticed only in the group of IWHs with previous BP.

These preliminary results indicate that IWHs may have significantly lower numbers of lymphocytes, B-cells as well as CD4+ and CD8+ T-cells than dogs of other breeds. Further studies are needed to determine whether these alterations represent a breed related phenomenon or are connected to the predisposition to BP. An age-related decline in lymphocyte, total T-cell and CD4+ T-cell numbers was detected in IWHs with previous BP. In humans, age related changes in CD4+ T-cells have been associated with increased susceptibility to infections.

Disclosures: No disclosures to report.

ESVNU-P-2

LONG TERM SURVEY OF THE EFFECT OF IMIDAPRIL ON THE GLOMERULAR FILTRATION RATE IN CATS SUFFERING FROM CHRONIC KIDNEY DISEASE. E. Grandemange, J. Blanc, A. Paulin, L. Lucats, F. Woehrlé. Vetoquinol SA, Lure, France

Feline Chronic Kidney Disease (CKD) is a common feature of ageing cats. Angiotensin-converting enzyme inhibitors (ACEi) are recommended to treat hypertension associated with CKD to limit target-organ damage and especially glomerular hypertension. In

addition, the International Renal Interest Society (IRIS) guidelines recommends the prescription of an ACEi in patients with CKD and proteinuria. To our knowledge no study has demonstrated the effects of long term administration of ACEi in a client owned population of cats suffering from CKD on glomerular filtration rate (GFR).

The aim of the study was to evaluate the effect of an ACEi (imidapril, Prilium®, Vetoquinol SA) on the GFR of cats suffering from naturally occurring chronic kidney disease (CKD) over 12 months.

Sixty-six cats presenting with clinical and biological signs of CKD were enrolled by 20 European investigators and followed up till 24 months in this randomized blinded study. Thirty-two cats provided suitable data for GFR analysis; 17 animals received imidapril at the dosage of 0.5 mg/kg/d and 15 received placebo. Animals with no available GFR value on Day 0 or with no data after Day 0 were excluded as well as animals for which the iohexol clearance could not be determined. Follow up was censored after 12 months due to small sample sizes for statistical comparisons. On Day 0, Month 3, Month 6 and Month 12, cats were sampled 30, 60 and 120 minutes after intravenous administration of 647 mg of iohexol. GFR was based on determination of the iohexol clearance which was calculated with the Phoenix® WinNonlin 6.3 software. Statistical analyses were performed with SAS/STAT 9.2 software. As GFR were not available on each time point for a given animal, the two treatment groups were compared on each GFR determination point using an ANCOVA (analysis of covariance) with the GFR determined on Day 0 as the covariate.

On D0, GFR were 1.53 ± 0.68 and 1.68 ± 0.60 mL/kg/min in the imidapril and placebo group, respectively. A significant statistical difference (1.62 ± 0.63 versus 1.24 ± 0.59 mL/kg/min in the imidapril and placebo group respectively, $P = 0.029$) was observed in favor of a higher GFR in the imidapril treated animals on Month 6. Higher GFR were also observed in the imidapril group on Month 3 and Month 12 but not significantly different from the placebo group.

Daily long term imidapril treatment compared to placebo, may be an effective treatment to slow the progression of renal failure in cats with naturally occurring chronic kidney disease.

Disclosures: Authors are employees of Vetoquinol.

ESVONC-P-1

EVALUATION OF ENVIRONMENTAL EXPOSURE TO VINCRISTINE AND CYCLOPHOSPHAMIDE IN VETERINARY MEDICINE. A. Baril¹, S. Ndaw², F. Denis², D. Rosenberg³, C. Maurey¹. ¹Ecole Nationale Veterinaire D'Alfort, Maisons Alfort, France, ²Institut National de Recherche et de Sécurité pour la Prévention des accidents d, Vandoeuvre, France, ³Micen Vet, Créteil, France

There is a concern over the potential of cytotoxic drugs which could harm exposed workers.

The speciality of Oncology of the ECVIM-CA published guidelines in order to prevent that risk.

However few data exist for evaluation of the real risk of occupational exposure. This concern was the aim of our study. Biomarkers used were vincristine and cyclophosphamide.

Surface samples were collected in the consultation room and ward dedicated for chemotherapy. Samples were collected with wet filter paper on 10×10 cm surfaces, or objects (computers for instance). Samples were analysed by liquid chromatography and mass spectrometric method. The limit of quantification was 0.2 ng/ 100 cm² (or 0.2 g/object) for vincristine and 0.02 ng/ 100 cm² (or 0.02 g/object) for cyclophosphamide.

Samples in consultation room were collected after treating 2 dogs with vincristine and after cleaning. Samples in dedicated ward were collected after cleaning and after 2-days stay of treated dogs. 18 aeras/objects were tested in consultation room; 15 in dedicated ward for vincristine; 9 in ward for cyclophosphamide.

After treatment of dogs in consultation room, traces of vincristine were detected on the floor and the laboratory bench top (0.47 – 0.50 ng/ 100 cm²). Moreover, the surface of auscultation table and extern side of gloves were contaminated after preparation and administration of vincristine (respectively 0.90 , 314 and 510 ng/object). After cleaning, 32% of samples in consultation

room were positive. Traces of vincristine were detected on the floor or objects (wall otoscope: 0.47–0.49 ng/100 cm²).

After cleaning, 40% of samples in ward were positive. Traces of vincristine were detected on the floor and objects (boxes, wastebin, bowls: 0.48–0.64 ng/objet) after cleaning and animals treatment. Cyclophosphamide were detected on all areas tested (0.04 à 2.23 ng/objet).

Despite protective guidelines to avoid spread of cytotoxic drug, environmental exposure was demonstrated. However contaminations were limited and show that handling procedures of cytotoxic drugs are well controlled.

Most-elevated contamination level for vincristin were noticed on extern side of gloves despite of using appropriate material. Workers should pay a particular attention for gloves withdrawal to limit exposure. Small amounts of vincristine were found in inappropriate places: computeur mouse. Even if there is few of those residues, we thought about people working on a regular basis in this room for other activities than chemotherapy, and we decided to adapt our clinical practices.

Evaluation of occupational exposure to cytotoxic drugs is an important step to prevent incidents and height awarness of nursing staff to apply those good clinical practices.

Disclosures: No disclosures to report.

ESVONC-P-2

INTRATUMORAL CD3+ T-LYMPHOCYTES IMMUNOEXPRESSION AND ITS ASSOCIATION WITH C-KIT AND ANGIOGENESIS IN MALIGNANT CANINE MAMMARY TUMORS: A MULTIVARIATE SURVIVAL ANALYSIS. M.I. Carvalho¹, M. Dias¹, I. Pires¹, J. Prada¹, L. Lobo², F.L. Queiruga¹. ¹University of Trás-os-Montes and Alto Douro, Vila real, Portugal, ²Hospital Veterinário do Porto, Porto, Portugal

The tumor-associated inflammatory response had the effect of enhancing mammary tumorigenesis, helping incipient neoplasias to acquire hallmark capabilities, both in human and dogs. T-cells migration to the tumor site and the following activation may be the essential requirement for their promoting effect on tumors. In human breast cancer the signaling pathways of c-kit have been described as possibly being involved in differentiation, migration, survival, and maturation of T-cells and other inflammatory cells into tumor sites. In order to clarify this subject in canine mammary tumors (CMT), 80 malignant neoplasms were studied by using immunohistochemistry comparing the intratumoral CD3+ T-lymphocytes and c-kit expression together with VEGF, microvessel density (MVD) and clinicopathological characteristics of tumor aggressiveness. CD3+ T cells and high c-kit immunoeexpression revealed a positive and statistically significant correlation with VEGF ($r = 0.503$, $P < 0.0001$; $r = 0.284$, $P = 0.023$ for CD3 and c-kit respectively) and CD31 ($r = 0.654$, $P < 0.0001$; $r = 0.365$, $P = 0.003$ for CD3 and c-kit respectively). A statistically significant association ($P = 0.039$) and a positive correlation ($r = 0.263$, $P = 0.039$) between CD3+ T-lymphocytes and c-kit was also observed. Tumors with high c-kit expression showed higher counts of CD3+ T-cells. The MVD of high CD3/VEGF tumors was significantly more elevated ($P < 0.0001$). A similar association was observed for high c-kit/VEGF tumors ($P < 0.001$). In this study high CD3/VEGF, high c-kit/VEGF and high CD3/c-kit tumors were statistically significantly associated with elevated grade of malignancy ($P < 0.0001$ for CD3/VEGF, c-kit/VEGF and CD3/c-kit), presence of neoplastic intravascular emboli ($P < 0.0001$ for CD3/VEGF and CD3/c-kit; $P = 0.002$ for c-kit/VEGF) and presence of lymph node metastasis ($P < 0.0001$ for CD3/VEGF, c-kit/VEGF and CD3/c-kit). Tumors with high CD3/VEGF ($P = 0.006$), high c-kit/VEGF ($P < 0.0001$) and high CD3/c-kit ($P = 0.002$) expression were associated with shorter OS time. Interestingly the group of tumors with high c-kit/VEGF retained their significance by multivariate analysis arising as independent predictor of OS. Results of this study suggest that T-lymphocytes may share common signaling pathways with c-kit and VEGF in CMT progression and may contribute to increased angiogenesis, aggression and shorter OS in these tumors.

Disclosures: No disclosures to report.

ESVONC-P-4

EPIDEMIOLOGICAL DATA OF FELINE LARGE GRANULAR LYMPHOCYTE LYMPHOMA: A CASE CONTROL STUDY IN 176 CATS. A. Zoia¹, M. Campigli¹, M. Drigo². ¹San Marco Veterinary Clinic, Padova, Italy, ²Sanità Pubblica Veterinaria, Padova, Italy

Few epidemiological data have been published on feline large granular lymphocyte (LGL) lymphoma. A recent study (Krick et al. 2008) described clinicopathologic features in cats with LGL lymphoma, but no comparisons were made with cats with other diseases or other forms of feline lymphoma. Therefore, the objective of this study was to assess differences in prevalence, signalment (breed, sex, and age), physical exam findings (body weight, body condition score, body temperature, heart rate, respiratory rate, and systolic blood pressure), and FeLV/ FIV status between cats with LGL lymphoma (group 1) and all other type of feline lymphoma (group 2).

The electronic data-base of the San Marco Veterinary Clinic was searched between January-2007 and December-2014 for cats with a cytological or histopathological diagnosis of lymphoma. Differences between groups were assessed by T-Test, Mann Whitney, Pearson-Chi square, Pearson Chi square Yates corrected, and Fisher's exact test.

During the study period 176 out of 3858 sick cats seen at the clinic were diagnosed with lymphoma (group 1: n = 32; group 2: n = 144). The prevalence of all type of feline lymphoma between 2007 and 2014 compared to sick cats did not change over time ranging from 3.7% to 6.5% per year ($P = 0.42$; overall prevalence 4.5%, 95% CI 3.8–5.1). The lymphoma LGL prevalence between 2007 and 2014 compared to all types of lymphoma did not change over time ranging from 11.1% to 30.0% per year ($P = 0.73$; overall prevalence 17.9%, 95% CI 12.2–23.6). Among the variables studied, only sex (group 1: 19 [59.4%] females, 13 [40.6%] males; group 2: 54 [37.5%] females, 90 [62.5%] males; $P = 0.023$) and age (group 1: 126 ± 34 months; group 2: 110 ± 57 months; $P = 0.037$) were significantly different between groups. Sixteen out of 32 cats with LGL lymphoma were tested for their FeLV/FIV status resulting all FeLV- and one (6.3%) FIV+. Seventy-four out of 144 cats with all other types of lymphoma were tested for their FeLV/FIV status resulting 28 (37.8%) FeLV+ and 13 (17.6%) FIV+. Five cats (6.6%) were both FeLV+/FIV+. Prevalence of FeLV infection was significantly lower ($P = 0.002$) in group 1 compared to group 2. There was no difference in prevalence of FIV infection between groups.

Lymphoma LGL affects more females and older cats compared to all other type of feline lymphoma. Opposite to all other type of lymphoma, and in accordance to previous litterature information, FeLV+ status does not play a role in the pathogenesis of feline LGL lymphoma.

Disclosures: No disclosures to report.

ESVONC-P-5

INTRATUMORAL FOXP3 EXPRESSION IN MALIGNANT CANINE MAMMARY TUMORS: ITS ASSOCIATION WITH CLINICOPATHOLOGICAL PARAMETERS, ANGIOGENESIS AND PROGNOSIS. M.I. Carvalho, I. Pires, J. Prada, F.L. Queiruga. University of Trás-os-Montes and Alto Douro, Vila real, Portugal

The activity of T regulatory cells (Tregs) is known to be closely associated with the expression of FoxP3 transcription factor. FoxP3 regulatory T cells (FoxP3Treg) are a distinct group of T lymphocytes that have immunosuppressive properties. Normally this cells work for prevention of harmful autoimmune responses, however can also interfere with beneficial immune responses such as anti-tumor immunity. In human breast cancer these cells play a crucial role in tumor progression. In canine mammary tumors (CMT) there are only a few studies and this topic are not well-documented. In this study we included 80 malignant CMT and studied, by immunohistochemistry, the intratumoral FoxP3 expression together with vascular endothelial growth factor (VEGF), microvessel density (MVD, by CD31 antibody) and several clinicopathological characteristics. Abundant FoxP3Treg cells was statistically associated with presence of tumor necrosis ($P = 0.004$),

nuclear grade ($P = 0.001$), poor differentiation of tumors ($P < 0.0001$), high mitotic grade ($P < 0.0001$), high histological grade of malignancy ($P < 0.0001$), presence of neoplastic intravascular emboli ($P < 0.0001$) and presence of lymph node metastasis ($P < 0.0001$). Intratumoral FoxP3 levels were correlated with the levels of VEGF ($r = 0.427$; $P < 0.0001$) and intratumoral MVD ($r = 0.520$; $P < 0.0001$). Additionally tumors with abundant FoxP3Treg cells were associated with shorter overall survival (OS) time ($P = 0.0001$). Results suggest that Treg cells play a role in CMT progression and may contribute to increased angiogenesis and aggression in these tumors. The association of intratumoral FoxP3 expression with shorter OS of animals suggests a utility of Treg cells activity as a prognostic marker.

Disclosures: No disclosures to report.

ISCAID-P-2

THE FIRST PREVALENCE STUDY OF HAEMOPLASMA SPECIES, LEISHMANIA SPP., BARTONELLA HENSELAE, EHRLICHIA/ANAPLASMA SPP., FELINE IMMUNODEFICIENCY VIRUS AND FELINE LEUKAEMIA VIRUS IN CATS FROM CYPRUS. C.H. Attipa. School of Veterinary Sciences, University of Bristol, Langford, UK

Cyprus is an island state in the eastern Mediterranean basin. No epidemiological studies have yet been performed on infectious agents in cats from Cyprus. The aim of this study was to determine the prevalence of several infectious agents, including some vector-borne infections, in cats from Cyprus.

Surplus EDTA-blood and serum samples were recruited from 176 Cypriot cats, from which signalment and lifestyle characteristics were recorded. DNA was extracted and real-time quantitative polymerase chain reaction (qPCR) assays were used to detect haemoplasmas (*Mycoplasma haemofelis*, “*Candidatus Mycoplasma haemominutum*” and “*Candidatus Mycoplasma turicensis*”), *Leishmania* spp. and *Bartonella henselae*. Conventional PCR assays were used to detect *Ehrlichia/Anaplasma* spp. Samples yielding positive results for *Leishmania* spp. or *Ehrlichia/Anaplasma* spp. underwent further characterisation (sequencing). ELISAs were performed for the detection of *L. infantum* antibodies, feline leukaemia virus (FeLV) antigen and feline immunodeficiency virus (FIV) antibodies. Statistical analysis was performed using SPSS for the assessment of any associations between variables and infectious agents.

Of the 176 samples extracted, 2 were excluded due to failure of \geq one internal control PCR. Of the remaining 174 samples, 46 (26.4%) were positive by PCR for haemoplasma including 13 (7.5%) for *M. haemofelis*, 36 (20.7%) for “*Ca. M. haemominutum*” and 12 (6.9%) for “*Ca. M. turicensis*”. Nineteen (10.9%) were positive for *B. henselae*. One cat (0.6%) was PCR positive for *Ehrlichia/Anaplasma* spp. and sequencing revealed identity with *Anaplasma platys*. *Leishmania* spp. DNA was detected in 6 of the 174 (3.4%) cats; sequencing revealed *L. infantum* in 4 of these cases. *L. infantum* serology was positive in 7 of the 162 cats tested (4.3%). Only one cat was positive for both *Leishmania* PCR and serology. Of the 166 cats that underwent retroviral serology, 11 (6.6%) were FeLV and 30 (18.4%) were FIV positive.

Statistical analysis identified several significant associations ($P < 0.05$) including the following; haemoplasma infection and both outdoor access and feral-shelter cat origin, FeLV or FIV infection and both anaemia and feral-shelter cat origin.

This study documents, for the first time, the presence of haemoplasmas, *L. infantum*, *B. henselae*, *A. platys*, FeLV and FIV in the feline population of Cyprus. The prevalence of haemoplasma, FIV and *B. henselae* infections were among the highest reported in cats from Mediterranean countries, while that of *Leishmania* spp. was similar. This is the second report of *A. platys* infection in a cat from a Mediterranean country.

Disclosures: No disclosures to report.

ISCAID-P-3

PREVALENCE OF BARTONELLA SPECIES INFECTIONS IN CATS IN SOUTHERN GERMANY. M. Bergmann¹, T. Englert¹, B. Stuetzer¹, S. Schwertler¹, U. Truyen², K. Hartmann¹. ¹Clinic of Small Animal Medicine, Munich, Germany, ²Institute of Animal Hygiene and Veterinary Public Health, Leipzig, Germany

Bartonella species (spp.) are zoonotic pathogens, and infections in cats are common. Prevalence in cats from Southern Germany is still unknown. The aim of this study was to determine the prevalence of *Bartonella* spp. DNA in blood of cats in Southern Germany and to evaluate associations between *Bartonella* bacteremia, housing conditions, feline immunodeficiency virus (FIV), and feline leukemia virus (FeLV) status, including progressive, regressive, and abortive FeLV infection.

Blood samples of 479 cats that were presented to different veterinary clinics in Southern Germany for various reasons were tested for *Bartonella* spp. DNA using a previously published conventional polymerase chain reaction (PCR) targeting a fragment of the 16S-23S rRNA intergenic spacer region. For statistical analysis, Fisher's exact test was used.

Prevalence rate of *Bartonella* spp. bacteremia was 2.5% (12/479; CI: 0.01%–0.04%). *B. henselae* was amplified in eleven of these cats. One cat was positive for *B. clarridgeiae* DNA. Most of the infected cats were clinically healthy, but half of the cats had thrombocytopenia, potentially caused by their *Bartonella* spp. infection. There was no significantly higher risk to be infected with *Bartonella* spp. when living mainly outdoors or being FIV- or FeLV-infected.

Prevalence of *Bartonella* spp. bacteremia is low in Southern German cats, but there is still a risk of human *Bartonella* infection associated with cat ownership. Most clinical changes of the *Bartonella* spp.-infected cats were related to other diseases. However, thrombocytopenia was common and further studies are required to define its potential clinical relevance.

Disclosures: No disclosures to report.

ISCAID-P-4

DETECTION OF FELINE CORONAVIRUS SPIKE GENE MUTATIONS AS A TOOL TO DIAGNOSE FELINE INFECTIOUS PERITONITIS. S. Felten¹, K. Weider², S. Doenges¹, S. Gruendl¹, K. Matiasek³, W. Hermanns³, E. Mueller², L. Matiasek¹, A. Fischer¹, K. Weber¹, J. Hirschberger¹, G. Wess¹, K. Hartmann¹. ¹Clinic of Small Animal Medicine, Ludwig-Maximilians-Universitaet Munich, Munich, Germany, ²Laboklin GmbH & Co.KG, Bad Kissingen, Germany, ³Institute of Veterinary Pathology, Ludwig-Maximilians-Universitaet Munich, Munich, Germany

Ante-mortem diagnosis of feline infectious peritonitis (FIP) is still challenging. The aim of this study was to evaluate sensitivity and specificity of a “combined reverse transcription nested polymerase chain reaction (RT-nPCR) and sequencing approach”, detecting mutations at two different nucleotide positions within the spike gene, that previously were shown to correlate with the FIP phenotype.

The study population consisted of 64 cats with confirmed FIP and a defined control group of 63 cats for which FIP was considered an important differential diagnosis, but that were definitively diagnosed with other diseases. Blood and/or effusion samples were examined for feline coronavirus (FCoV) RNA by RT-nPCR and, if positive, nucleotide positions 23531 and 23537 were sequenced for nucleotide transitions. Sensitivity, specificity, negative and positive predictive values were determined and 95% confidence intervals (95% CI) calculated.

RT-nPCR detected FCoV in 38 cats in blood ($n = 3$) and/or effusion ($n = 36$); all of them had FIP. One of the mutations of interest was found in 2/3 of the PCR-positive blood samples and in 32/36 of the PCR-positive effusion samples. Diagnostic specificity of the “combined RT-nPCR and sequencing approach” was 100% in blood (95% CI 83.9–100.0) and effusion (95% CI 93.0–100.0). Diagnostic sensitivity was 6.5% (95% CI 0.8–21.4) in blood and 65.3% (95% CI 50.4–78.3) in effusion.

A positive test result therefore confirms a suspicion of FIP. A negative result, however, cannot be used to rule out FIP, especially

if only blood is available. Therefore, if no effusion is present, diagnosis of FIP still remains challenging.

Disclosures: Dr. Elisabeth Mueller is the Managing Director of Laboklin GmbH & Co.KG. Dr. Karola Weider is employed at Laboklin GmbH & Co.KG. This laboratory offered the “combined RT-nPCR and sequencing approach” on a commercial basis and performed the testing in this study.

ISCAID-P-5
SEQUENCING OF 3C AND SPIKE GENES IN FELINE INFECTIOUS PERITONITIS: WHICH SAMPLES ARE THE MOST RELEVANT FOR ANALYSIS? A RETROSPECTIVE STUDY OF 33 CASES FROM 2008 TO 2014. G.M. Freiche¹, C.L. Guidez¹, M. Duarte², Y.B. Le Poder². ¹Université Paris-Est, Ecole Nationale Vétérinaire d'Alfort, Maisons alfort, France, ²UMR 1161 Virologie INRA-ENVA-ANSES, Université Paris-Est, Maisons-Alfort, France

Feline Infectious Peritonitis (FIP) is a viral disease caused by the virulent strain of Feline Coronavirus (FIPV). The disease can appear under two clinical forms, dry or effusive, both leading to a fatal outcome. Diagnosis was based on histopathologic lesions on necropsy until the recent discovery of mutations associated with the FIPV strain in the 3c and spike (S) genes. Our main goal was to detail the distribution of 3c or S gene mutations in different biological samples of cats suffering from FIP.

This was a retrospective, observational study of 33 cats showing clinical signs compatible with FIP. Ten out of 33 cats were of pure breed. 57.7% were males and 42.3% females. Median age was 36.5 months at presentation. The clinical presentation, pathologic findings and virologic data were reviewed. According to clinical signs, 11 cats were classified with a dry form and 22 with a wet form of FIP. The main clinical signs included dehydration, hyperthermia, icterus, abnormal abdominal palpation, neurological and ocular disorders.

When possible blood, fecal material, effusion, fine needle aspiration (FNA) from relevant organs or a combination of these, was recovered from each cat. Feline Coronavirus (FCoV) was first researched by RT-PCR, then the 3c and part of the S genes were sequenced to determine the eventual presence of mutations.

Among the 11 dry cases, FCoV was detected in 2/8 blood samples, 3/8 fecal samples and FNA (11/11). Among the 22 wet cases, 9/15 blood samples, 12/14 fecal samples and all effusion samples (21/21) were positive for the presence of FCoV. 3c mutations were never found in fecal samples but were found in 6/10 effusion samples and in 8/8 FNA. S mutations were detected in 4/9 fecal samples, 8/9 FNA and 14/15 effusion samples. For three cats, no mutation, neither in 3c or S genes was identified despite the confirmation of FIP by necropsy.

S gene mutation is more frequently observed than 3c gene despite in two cases where only 3c mutations were identified. Moreover the presence of strains harbouring S mutation in feces has never been described before and could suggest the possible diffusion of FIPV among feline population.

In conclusion, viral diagnosis of FIP based on RT-PCR sequencing in effusion and FNA samples is essential. RT-PCR resulting from blood samples should be carefully interpreted because of high risk of missing FIPV.

Finally, searching for mutations in both S and 3c genes is recommended.

Disclosures: No disclosures to report.

ISCAID-P-6
OCCURRENCE OF METHICILLINRESISTANT STAPHYLOCOCCUS AUREUS (MRSA) ISOLATES FROM CLINICAL SPECIMENS OF HOUSEHOLD DOGS. C. Giacopello, F. Lo Piccolo, M. Foti, E. Giudice, V. Fisichella. Department of Veterinary Sciences – University of Messina, Messina, Italy

Methicillin Resistant *Staphylococcus aureus* (MRSA) has recently become a great concern for pet animals' disease and zoonotic infection. MRSA strains transfer between pet animals and

humans could occur. The aim of the present study was to determine the occurrence of MRSA in 34 household dogs.

From January to June 2012, clinical samples were collected from 34 dogs, patients of the Veterinary Teaching Hospital of the Department of Veterinary Sciences of Messina (Italy), affected by several diseases of various origins. All samples were processed by bacteriological conventional methods for isolation and identification. All strains were tested for phenotypic susceptibility to oxacillin and were subjected to a PCR protocol for the detection of *mecA* gene. Strains carrying the gene were considered Methicillin Resistant (MRS). Lastly, on both MRS and Methicillin Sensitive (MSS) strains, Kirby-Bauer disk diffusion susceptibility testing were performed to highlight resistance profiles using 44 molecules belonging to the main classes of antimicrobials used in veterinary practice. Strains resistant to at least one molecule of three or more classes of antibiotics were considered multidrug-resistant (MDR). The statistical analysis of the results was made using the Z-test by a Primer[®] software.

Forty *Staphylococcus* spp. strains were isolated, belonging to 12 species. The most frequently isolated microorganisms were *Staphylococcus aureus* with 14 isolations (35%) and *Staphylococcus pseudintermedius* with 11 isolations (27.5%), followed by *Staphylococcus epidermidis* with 4 isolations (10%) and *Staphylococcus cohnii* and *Staphylococcus warneri*, both with 2 isolations (5%). A single isolation (2.5%) was obtained for each of the species *Staphylococcus chromogenes*, *Staphylococcus haemolyticus*, *Staphylococcus lentus*, *Staphylococcus lugdunensis*, *Staphylococcus saprophyticus*, *Staphylococcus simulans* and *Staphylococcus sciuri*. Thirteen (32.5%) strains of *Staphylococcus* spp. were phenotypically resistant to oxacillin and three *Staphylococcus aureus* (7.5%; n.2 from pyoderma, n.1 from exudative pleural effusion) were positive for the *mecA* gene. All 40 strains of *Staphylococcus* spp. were MDR. Our results showed the presence of MRSA and multidrug-resistant staphylococcal strains in household dogs. A lack of correspondence between antimicrobial susceptibility tests and molecular methods was found in the present study.

Disclosures: No disclosures to report.

ISCAID-P-8
MOLECULAR DETECTION OF HAEMOTROPIC MYCOPLASMAS INFECTING DOMESTIC CATS FROM SOUTHERN CHILE. A. Müller Pereira¹, R. Walker¹, F. Morera¹, N. Almosny², P. Biffencourt¹, M. Gomez¹. ¹Universidad Austral de Chile, Valdivia, Chile, ²Universidade Federal Fluminense, Niterói, Brazil

Haemotropic *Mycoplasmas* (haemoplasmas) are bacteria that infect domestic cats. Approximately 25% of ill cats have haemoplasma infection. Three main feline haemoplasma species have been detected worldwide; *Mycoplasma haemofelis* (Mhf), “*Candidatus M. haemominutum*” (CMhm) and “*Candidatus M. turicensis*” (CMT). A fourth haemoplasma called “*Candidatus M. haematoparvum-like*” (CMhp) was latter identified in cats. The only published study in Chile was carried out in 30 cats, with prevalences by PCR of 3.3% to Mhf, and 10% to CMhm. The aim of this study was to perform molecular detection of haemoplasmas in cats from Valdivia, southern Chile. Blood samples were taken from 384 cats and used for haemoplasmas DNA detection by Quantitative Real Time PCR (qPCR) at Universidad Austral de Chile. qPCR protocol was based on detection of feline DNA targeting 28S Housekeeping gene and *Mycoplasma* spp. 16S rRNA gene (universal primers, MY16SF forward, MY16SR1 y MY16SR2, both reverse) by SYBR Green method. The melting Temperature (Tm) analysis allowed identifying the infecting *Mycoplasma* species (Mhf, CMhm, CMT). It was not possible to identify haemoplasmas species on co infected cats, so a second qPCR specie specific protocol was applied on these samples. Second qPCR protocol was based on 16S rRNA gene, with specific primers to detect Mhf, CMhm, CMT and CMhp. All samples (384/384) were positive to 28S gene, proving presence of cat DNA. From the 384 cats, 15.1% (58/384) were positive to haemoplasmas, where 7.8% (30/384) corresponded to CMhm (Tm 73.5–75.0 °C), 4.4% (17/384) to Mhf (Tm 75.0–76.5 °C), 2% (4/384) to CMT (Tm 76.5–78.0 °C) and 1.8% (7/384) to co infections. Associations between CMhm+Mhf, CMhm+CMT, CMhm+CMhp and CMhm+Mhf+CMT were detected on co infected animals. These results agree with those found in previous

reports from Chile, Europe, EUA and Brazil, where CMhm is the most prevalent species and co infections are less frequent. Valdivia cats are infected by four different haemoplasma species and CMT and CMhp are reported for the first time in Chile. Founding: DID UACH, Project S-2014-25.

Disclosures: No disclosures to report.

ISCAID-P-9

MYOCARDIAL LESIONS IN DOGS WITH VISCERAL LEISHMANIASIS. A. Pacheco¹, H.F. Ferrari², K.Y. Hirata¹, F.A. Rosa³, T.Y. Tomokane⁴, M.D. Laurenti⁴, M. Marcondes¹. ¹UNESP – Araçatuba, Araçatuba, Brazil, ²Adamantinenses Integrated Schools, Adamantina, Brazil, ³UNESP – Jaboticabal, Jaboticabal, Brazil, ⁴Department of Pathology, University of São Paulo, São Paulo, Brazil

Clinical manifestations of canine visceral leishmaniasis (CanL) are non-specific and include progressive weight loss, anemia, lymphadenomegaly, hepatosplenomegaly, dermatological, renal and ocular alterations. Cardiac lesions resulting in clinical signs has been scarcely described in dogs with VL, and the presence of the parasite in the cardiac tissue has been involved in few reports. Accordingly, the present study aimed to evaluate histopathological abnormalities in cardiac tissue from dogs naturally infected by *Leishmania infantum chagasi*. A total of 20 dogs were evaluated. All dogs were symptomatic but no one presented clinical signs of cardiac involvement. In compliance with a federal law and under the owners' signed consent, all dogs were submitted to euthanasia and comprehensive post-mortem evaluation. Samples from right atrium free wall (RA), right ventricle free wall (RV), interventricular septum (IVS) and left ventricle free wall (LV) were collected and evaluated. Tissue samples were fixed in formalin, embedded in paraffin, sectioned at 5 mm, and stained with hematoxylin and eosin (HE) and Anti-*Leishmania* immunohistochemistry was also performed. The study was approved by the Ethics Committee in Animal Experimentation and Animal Welfare (protocol number 0463/2013). Histopathological changes were observed in at least one of the four evaluated cardiac regions in 75% (15/20) of the dogs. The most frequent cardiac injury was an inflammatory reaction, characterized by the presence of mononuclear cell infiltrate in different degrees. Of the evaluated regions, RA was the one with the highest incidence of histopathological changes, observed in 80% (12/15) of the animals, followed by RV, LV and SIV, affected in 73.3% (11/15), 66.7% (10/15) and 53.3% (8/15) of the dogs, respectively. Immunohistochemistry revealed amastigotes in the cardiac tissue in 70% (14/20) of the dogs. A positive correlation was found between cardiac lesions and the presence of amastigotes in the myocardium ($P < 0.05$).

Disclosures: No disclosures to report.

ISCAID-P-10

URINARY ADVERSE EFFECTS OF ALLOPURINOL TREATMENT IN DOGS WITH LEISHMANIOSIS: A PROSPECTIVE STUDY (PRELIMINARY DATA). M. Planellas¹, I. Espada¹, X. Roura², R. Altuzarra¹, J. Pastor¹, L. Solano-Gallego¹. ¹Faculty of Veterinary Medicine, Universitat Autònoma Barcelona, Cerdanyola, Spain, ²Hospital Clínic Veterinari, Internal Medicine Service, Barcelona, Spain

Canine leishmaniosis is a life threatening zoonotic disease. The combination of meglumine antimoniate and allopurinol is considered the most effective therapy for canine leishmaniosis and constitutes the first line protocol against this disease. Allopurinol is a parasitostatic drug used in long-term to maintain low parasite loads and to avoid clinical relapses. Traditionally, allopurinol is considered a very safe drug in the dog. However, some reports indicate that xanthinuria and xanthine urolithiasis is produced after prolonged therapy with allopurinol in the dog. The aim of this prospective study was to evaluate the prevalence of urinary adverse effects of allopurinol treatment (10 mg/kg/BID/PO) in dogs with leishmaniosis. Diagnosis was made by compatible clinical

copathological abnormalities with leishmaniosis and high *Leishmania infantum*-specific antibody levels assessed by quantitative ELISA. Once leishmaniosis was diagnosed, a close follow-up (day 0, 30, 90, 180 and 360 during treatment) including physical examination, baseline laboratory tests (CBC, biochemistry profile, serum electrophoresis, urinalysis, urinary protein/creatinine ratio) and abdominal ultrasound was performed. In our preliminary results, 13 dogs were included. Dogs did not present any urinary abnormalities based on biochemistry profile, urinalysis and abdominal ultrasound at the time of diagnosis. Four out of 13 presented xanthinuria (day-30 [n = 3], day-90 [n = 4], and day-180 [n = 4]). Two out of 13 dogs presented renal mineralization at day-90 of treatment. Two out of 13 dogs presented bladder urolithiasis since day-90 of treatment. Xanthinuria was presented initially in all dogs that developed renal mineralization or bladder urolithiasis. Dogs with renal mineralization and urolithiasis were treated with a restricted protein diet and, so far, they did not develop renal disease.

The present study describes early xanthinuria, renal mineralization and urolithiasis as adverse effects due to chronic allopurinol treatment in dogs with leishmaniosis. Neither mineral analysis nor renal biopsy was performed to confirm the origin of these lesions, but no urinary abnormality was present before allopurinol treatment was instituted. A thorough monitoring of dogs treated against leishmaniosis combined with urinalysis and abdominal ultrasound should be performed to evaluate urinary adverse effects and to help in the clinical management of these adverse effects.

Disclosures: No disclosures to report.

ISCAID-P-11

GIARDIA DUODENALIS IN DOGS AND CATS: AN EPIDEMIOLOGICAL STUDY. S. Rehbein¹, C. Klotz², E. Müller³, A. Aebischer², B. Kohn¹. ¹Freie Universität Berlin, Berlin, Germany, ²Robert Koch-Institut, Berlin, Germany, ³Laboklin, Berlin, Germany

Giardia duodenalis is one of the most important gastrointestinal parasites in dogs and cats with a zoonotic potential. In Germany the prevalence in dogs and cats reaches up to 29% and 24%, respectively. Genotypes of two genetic assemblages of the parasites infect humans (assemblages A and B) and other mammals including small animals. In contrast, parasites of the assemblages C and D are specific for dogs, assemblage F for cats.

Objectives of the study were to analyse the prevalence, potential epidemiological risk factors and symptoms of *G. duodenalis* infections in dogs and cats.

To detect *G. duodenalis*, feces from dogs and cats was analysed with an ELISA technique. After DNA extraction real time PCR as well as multi-locus sequence typing was performed for the following gene loci: triosephosphate isomerase-, glutamate dehydrogenase-, beta-giardin-gene, ssu rRNA. With a questionnaire possible epidemiological risk factors were evaluated. Statistical analyses were performed using SPSS 21 (Odds ratio, Kolmogorow-Smirnow test, Spearman correlation).

Fecal samples of 618 dogs and 156 cats were collected over a time period of 23 months. The ELISA test was positive in 101/618 dogs and 10/156 cats. Sixty-seven of 101 *Giardia* positive dogs and 9 of 10 positive cats had gastrointestinal signs. Genotyping was successful in 54 of 101 dog samples and were assigned to assemblages as follows: assemblage A (n = 12), A/C (n = 2), A/D (n = 4), B (n = 2), B/D (n = 1), C (n = 7), C/D (n = 2), D (n = 24). Only one of 10 positive cat samples could be genotyped and was atypically identified as assemblage D. Significant correlations between *Giardia* infection and age, clinical signs, deworming status and staying abroad were found.

In this monocenter study a prevalence rate of 16.3% in dogs and 6.4% in cats was detected, which is in good accordance with previous studies. The study further highlights a high rate (34%) of asymptotically *G. duodenalis* infected animals. As potential zoonotic assemblages were detected, transmission of *Giardia* from small animals to humans (and vice versa) cannot be excluded. Especially young and not dewormed animals had a higher prevalence.

Disclosures: No disclosures to report.

ISCAID-P-12

CANINE PARVOVIRAL ENTERITIS: A RETROSPECTIVE STUDY OF 147 CASES (2003–2013). M.L. Theron, A. Savary, D. Concordet, O. Dossin. National Veterinary School, Toulouse Cedex 3, France

Canine parvoviral enteritis remains a common cause of morbidity and mortality in young dogs. The goal of this study was to document a large cohort of affected dogs and analyze several factors as possible predictors of fatal outcome.

Medical records were retrospectively searched for dogs with parvoviral enteritis diagnosed with a positive fecal antigenic test or a fecal PCR. Dogs were included only if the medical records were complete. The population was compared to the reference population of the hospital on the same time period with Chi square tests and several factors were analyzed as possible predictors of death with a logistic regression.

One hundred and forty seven cases were included. Seventy percent of the dogs were non vaccinated puppies under the age of 6 months. Intact females and Rottweiler, American Staffordshire Terrier and French Beauce Shepherd dogs were over-represented. Clinical signs such as vomiting, diarrhea and dehydration were present in 92.7%, 86.4% and 70.1% of the dogs respectively. Hyperthermia, anemia and leucopenia were observed in 17.8%, 26.5% and 36.1% of dogs respectively. The majority of the affected dogs were hospitalized for 3–6 days and the mortality rate was 14.3% (21/147 dogs). Hypoglycemia at admission was observed in 11/81 (13.6%) dogs in which blood glucose was measured and was the only risk factor associated with death ($P < 0.05$).

In this study, a predisposition of Rottweiler, American Staffordshire Terrier and French Beauce Shepherd dogs was observed and hypoglycemia at admission was the only predictor of fatal outcome.

Disclosures: No disclosures to report.

ISCAID-P-13

EVALUATION OF THE IMPACT OF RESIDUAL MATERNALLY DERIVED ANTIBODIES AGAINST CANINE PARVOVIRUS ON THE EFFICACY OF A STANDARD PRIMARY VACCINATION PROTOCOL. J.C. Thibault, J. Bouvet, L. Cupillard, P.M. Guigal. MERIAL SAS, Lyon, France

Canine parvovirus (CPV) infections in dogs remain widespread around the world and still represent a major health threat in puppies. All vaccine manufacturers include this component in their core vaccination package, recommending two injections at 3–5 weeks interval from 7 to 8 weeks of age. Despite broad vaccination coverage, number of reports suggesting lack of efficacy in vaccinated dogs have been reported, which implicate vaccines belonging to all major manufacturers. These cases are usually considered as being linked to the interference with maternal antibodies (MatAb), able to persist beyond 12 weeks of age, which has led most expert groups to recommend a third vaccination around 16 weeks of age.

Persistence of MatAb actually represents a major issue when immunizing puppies against parvovirus. Indeed, MatAb titres higher than 1/40 in the haemagglutination inhibition (HI) test can still inhibit vaccine uptake whereas such titres do not prevent field virus infection. In contrast, HI titres higher than 1/80 to 1/120 are usually considered as protective against disease and virus excretion. This “immunity gap” is therefore a critical period for the puppy and the outcome of the vaccination.

In order to evaluate the impact of residual MDA on the efficacy of a standard primary vaccination protocol, we performed a vaccination field trial with serological follow-up.

Eighty-eight puppies from 7 to 24 weeks of age presented at veterinary practice received 2 injections at 4 weeks interval. Serology was performed by ELISA before (at D0/V1), during (at D28/V2) and after (D42) vaccination.

Average maternal antibodies titres were strongly correlated with the age of the puppy at primary vaccination, remaining at vaccine inhibiting level until ~10 week of age. Average titres increased significantly after 1st injection of primary vaccination in most groups and in all groups after the 2nd injection of primary vaccination.

Individual variability remained significant: vaccine uptake was inversely and strongly correlated to the pre-vaccinal MatAb titre at vaccination. Seven out of 88 puppies (8%) didn't seroconvert, despite vaccination complying to the recommended schedule. Vaccination was started in such dogs between 8.5 and 10.5 weeks and completed between 12.5 and 14.5 weeks and average initial MatAb titre was 2.4 log₁₀ compared to 1.6 for the general population.

In conclusion, this trial supports the recommendation of an additional injection of primary vaccination at 16 weeks, especially in areas of high parvovirus prevalence / pressure, where high levels of MatAb are likely to be transferred to puppies.

Disclosures: All authors are employees of Merial.

ISCAID-P-14

C-REACTIVE PROTEIN ELEVATION IN DOGS NATURALLY INFECTED WITH BACTERIUM ANAPLASMA PHAGOCYTOPHILUM. N. Tozon, Z. Rihar, U. Ravnik. Veterinary Faculty, UL, Ljubljana, Slovenia

Anaplasmosis, caused by bacterium *Anaplasma phagocytophilum* (*A. phagocytophilum*) is the second most important zoonosis and probably the most important tick-borne disease in dogs in Slovenia. In our retrospective study, we demonstrated 73.8% (553/754) seroprevalence of *A. phagocytophilum* infection in dogs in Slovenia (1999–2011). 5.3% of the dogs were PCR positive. The aim of our study was to evaluate the usefulness of determining serum level of C-reactive protein (CRP) in dogs naturally infected with bacterium *A. phagocytophilum* as a possible indicator of the clinical phase of the disease.

PCR and/or IFA positive dogs with clinical presentation and/or thrombocytopenia were included in the study. Based on the results, the dogs were divided into 4 groups: PCR positive dogs; IFA positive (subdivided according to titer level from 1:128 to >1:2048) and PCR negative dogs; positive control group – PCR and IFA negative dogs with clinical signs and/or thrombocytopenia; negative control group – clinically healthy, PCR and IFA negative dogs. Serum level of CRP was determined using LifeAssays® Canine CRP (LifeAssays, Lund, Sweden).

An elevated concentration of CRP (>35 mg/L) was determined in PCR positive and IFA positive dogs with an IFA titer $\geq 1:2048$ and coincides with the presence of clinical signs (most commonly general clinical signs, elevated body temperature, gastrointestinal problems) and/or mild (14.3%) or severe (71%) thrombocytopenia.

The assessment of CRP concentration, in correlation with certain clinical alterations and thrombocytopenia, suggests that CRP concentration is elevated in the acute phase of the disease and is in correlation with the aforementioned changes therefore can serve as an additional diagnostic parameter. The CRP concentration in IFA positive dogs, regardless of IFA titer levels, and with present clinical signs and thrombocytopenia is higher (above detectable level, >10 mg/L) than in dogs without clinical signs or laboratory alterations, which may speak in favor of reinfection or reactivation of a persistent infection at least in cases when no other cause of inflammation can be found. Specific treatment would therefore be reasonable in such cases, especially in cases of rising CRP concentration.

Disclosures: No disclosures to report.

SCH-P-1

GALLBLADDER AGENESIS IN 15 DOGS. K. Sato, M. Sakai, S. Hayakawa, K. Kutara, K. Asano, T. Watari. Nihon University, Fujisawa Kanagawa, Japan

Gallbladder agenesis is a very rare cause of elevated liver enzymes in dogs. In this study, we evaluated the features of 15 dogs [six males (three castrated) and nine females (two spayed)] with suspected gallbladder agenesis on ultrasonography.

Five different breeds were included: Chihuahua (n = 9), Toy poodle (3), German shepherd (1), Jack Russell terrier (1), and Shiba dog (1). The median age was 1.9 (0.7–7.4) years. Ten dogs

were asymptomatic, while the other five dogs showed decreased appetite (3), vomiting (3), ascites (2), seizure (1), and diarrhea (1). All dogs showed elevated liver enzymes, with high alanine aminotransferase levels (median, 306 U/L; 38–1374 U/L) in 13 dogs and high gamma-glutamyl transpeptidase levels (median, 12 U/L; 3–19 U/L) in 11. Gallbladder agenesis was confirmed using laparoscopy in 12 dogs and laparotomy in three. Liver biopsy samples were obtained from all dogs. Additional computed tomography cholangiography was performed for 12 dogs using a 16-slice multidetector computed tomography (MDCT) scanner following the intravenous administration of contrast medium (meglumine iotroxate). The obtained images were analyzed on a workstation, and they revealed an absent gallbladder in nine dogs and a vestigial gallbladder in three. The common bile duct was dilated in five dogs. For all dogs, laparotomy or laparoscopy was used to visualize the gallbladder and liver abnormalities, including malformed lobes and surface irregularities. Acquired portal systemic collaterals were visually confirmed in five dogs, who also exhibited hypoplasia of the portal vein on histological examination.

In conclusion, most animals with gallbladder agenesis were asymptomatic in our study, indicating a good long-term prognosis. However, symptoms associated with portal hypertension must be monitored in animals with primary portal vein hypoplasia.

Disclosures: No disclosures to report.

VBPS-P-1

COMPARISON OF MEASUREMENT OF SYSTOLIC ARTERIAL BLOOD PRESSURE BY DOPPLER METHOD IN DIFFERENT BODY POSITIONS IN CONSCIOUS DOGS. P.H. Itikawa, M.M. Mantovani, J.R. Castro, G.T. Goldfeder, D.S. Schwartz, M.H.M.A. Larsson. School of Veterinary Medicine and Animal Science – University of Sao Paulo (USP), São paulo, Brazil

Assessment of systolic arterial blood pressure (SAP) is an important tool in small animal internal medicine practice, especially with diseases or clinical conditions that can cause hypertension or hypotension. The Doppler method is noninvasive and has several advantages compared to oscillometric method. There are few studies about the effect of body position on SAP in conscious dogs. The hypothesis was that animal positioning during measurement alters SAP values. The study design was prospective and randomized regarding order of positioning measurements. One hundred and twenty client-owned, conscious, healthy or sick adult dogs, weighing up to 10 kg were included. SAP was recorded by Doppler ultrasonography following American College of Veterinary Internal Medicine consensus statement with animals positioned in sternal recumbency, right lateral recumbency and with the dog laying down on owner's lap. The order of body position was ruffled at the time of measurement. Five consecutive measurements on each body position were performed always on left forelimb and the average was calculated. SAP values were higher in sternal recumbency (153 mmHg, $P_{25\%-75\%} = 134-176.5$; $P < 0.0126$) compared to those obtained on the owner's lap (139 mmHg, $P_{25\%-75\%} = 125.5-159.8$), and both were similar to right lateral recumbency (141 mmHg, $P_{25\%-75\%} = 125-159$). These results suggest that SAP measurement obtained on owner's lap or

right lateral recumbency can be used on clinic routine, but SAP measurement obtained on sternal recumbency should be avoided, because such measures may be overestimated.

Disclosures: No disclosures to report.

VBPS-P-2

REPEATABILITY OF HYPERTENSION DIAGNOSIS BASED ON NONINVASIVE BLOOD PRESSURE ASSESSMENT IN CLINICAL CANINE PATIENTS. R.L. Stepien, E.M. Casper. University of Wisconsin School of Veterinary Medicine, Madison, USA

Canine patients may be presented for blood pressure (BP) assessment when clinical diseases associated with systemic hypertension (HT) are suspected but not confirmed; this population may encompass patients that have normal BP, true HT or situational HT. The clinician's aim is to identify animals with HT reliably, while minimizing false positives.

This prospective study investigated the repeatability of duplicate within-visit systolic BP assessments (SBP1 and SBP2) in consecutive canine patients presented for BP assessment in the small animal clinic (91 duplicate SBP recorded from 70 dogs) and in a control group of healthy dogs (37 duplicate SBP obtained from 19 control dogs), resulting in 128 duplicate measurements for analysis. Doppler methods were used for 16 duplicate assessments and oscillometric methods were used for 112 duplicate assessments; cuff size/location were consistent within any dog. SBP ≤ 160 mmHg was considered normal (NML); SBP >160 mmHg was considered abnormal (ABN). Median (range) elapsed time between duplicate readings was 30 (5–310) minutes; 75% of SBP2 were obtained within 80 minutes of SBP1. There was no correlation between elapsed time and change in SBP ($P = 0.40$). 70% of SBP2 were equal to or lower than SBP1; median decrease was 18 (0–78) mmHg. 30% SBP2 values increased; median increase was 14 (2–46) mmHg.

47/128 (37%) SBP1 readings were NML; median [range] SBP1 in this group (145[118–160] mmHg) did not differ from SBP2 (148 [118–172] mmHg, $P = 0.20$). SBP2 increased to ABN in 6/47 dogs (13%) with NML SBP1, but remained ≤ 172 mmHg in each case. 81/128 (63%) of dogs had ABN SBP1; median [range] SBP1 in this group (181[161–271] mmHg) was significantly higher than SBP2 (168[110–231] mmHg, $P < 0.0001$). 30/81 dogs (37%) with ABN SBP1 had NML SBP2; 51/81 (63%) maintained ABN SBP2. No dog with SBP1 >200 mmHg ($n = 15$) had NML SBP2. More dogs with ABN SBP1 were panting (26/71 scored, 37%) compared to the group with dogs with NML SBP1 (6/44 scored, 14%, $P = 0.02$). SBP2 of dogs that stopped panting (14/23, 61%) tended to decrease ($P = 0.16$).

Within-visit repeatability of BP diagnosis was good in dogs with NML SBP1, but apparent false positive diagnoses of HT occurred in 37% of dogs with ABN SBP1. SBP1 >200 mmHg was repeatable in all dogs. Panting may be associated with increased measured SBP by these methods. Duplicate within-day measurements may help identify false positive HT diagnoses in dogs with initial SBP measurements >160 mmHg.

Disclosures: No disclosures to report.