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JOURNAL OF VETERINARY INTERNAL MEDICINE

In this issue:

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The Official Journal of the American College of Veterinary Internal Medicine, the European College of Veterinary Internal Medicine, the European College of Veterinary Neurology, and the European College of Equine Internal Medicine

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ACVIM FORUM
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Research Abstract Program of the 2011 ACVIM Forum

Denver, Colorado,
June 15–18, 2011
Index of Abstracts

ORAL PRESENTATIONS – Thursday, June 16

Time	#	Presenting Author	Abstract Title
SMALL ANIMAL – CARDIOLOGY**			
9:00 am	C-1	Sabine Riesen	Comparison of Short-Term Effects of Ivabradine and Atenolol on Heart Rate and Echocardiographic Variables of Left Heart Function in Healthy Cats
9:15 am	C-2	Gareth Buckley	Randomized, Blinded Comparison of Epinephrine and Vasopressin for Treatment of Naturally Occuring Cardiopulmonary Arrest (CPA) in Dogs
9:30 am	**C-5**	**Eryn Shipley**	**Effect of Pimobendan on Platelet Aggregation in Dogs**
9:45 am	C-4	Rachael Wood	Adiponectin: A Protective Role in Dogs with Congestive Heart Failure?
BREAK			
10:30 am	**C-3**	**Stacey Leach**	**Single-dose and Apparent Steady State Pharmacokinetics and Pharmacodynamics of an Extended Release Diltiazem Formulation in the Dog-A Pilot Study**
10:45 am	**C-6**	**Justin Thomason**	**The Influence of Chronic Combined Enalapril and Spironolactone Administration on Serum Electrolyte Concentrations in Doberman Pinschers with Occult Dilated Cardiomyopathy**
11:00 am	**C-7**	**Rita Singh**	**Occlusion Devices and Approach in Patent Ductus Arteriosus: Comparison of Outcomes**
11:15 am	**C-8**	**Brian Maran**	**Identification of Two Deletion Polymorphisms within the Canine Beta-1 Adrenoceptor Gene**
11:30 am	**C-9**	**Joshua Stern**	**Genome Wide Association Analysis Identifies Location of Interest on Chromosome 21 in Golden Retrievers and Rottweilers with Familial Subvalvular Aortic Stenosis**
11:45 am	**C-10**	**Holly MacLea**	**Canine and Human Degenerative Mitral Valve Disease Mimics Chondrogenesis**
12:00 pm	C-11	Kathryn Meurs	Characteristics of ARVC Boxers with Sudden Death
12:15 pm	**C-12**	**Rita Singh**	**Bronchomalacia in Dogs with Myxomatous Mitral Valve Degeneration**
** *Also see Cardiology abstracts C-13 – C-26 (Thursday, June 16, 2:15 pm – 6:15 pm)*			
SMALL ANIMAL – HEMATOLOGY**			
9:00 am	**HM-1**	**Marc Dhumeaux**	**Comparison of Bone Marrow Sampling in Cats Using Two Different Techniques: Manual and Power Driver-Assisted**
9:15 am	**HM-2**	**Marc Dhumeaux**	**Effects of a Standardized Anesthetic Protocol on Hematologic Parameters in Healthy Cats**
9:30 am	HM-3	Benjamin Brainard	In Vitro Effects of Rivaroxaban on Feline Coagulation Indices
9:45 am	**HM-4**	**Eryn Shipley**	**Comparison of Citrated and Hirudinated Blood on Whole Blood Platelet Aggregation Using the Chrono-Log Impedance Aggregometer**
BREAK			
10:30 am	HM-5	Carolyn Gara-Boivin	Use of Calibrated Automated Thrombogram (CAT) For Monitoring Low Molecular Weight Heparin in Healthy Dogs

Boldface type indicates ACVIM Resident Research Award eligibility.

ID-25	Melissa Beall	Canine Granulocytic Anaplasmosis and Granulocytic Ehrlichiosis - A Field-Based Comparison
ID-26	**Jeanne Ficociello**	**Comparison of Commercially Available Assays for the Amplification of *Ehrlichia canis* and *Anaplasma phagocytophilum* DNA from the Blood of Naturally Infected Dogs**
ID-27	Pedro Diniz	Prevalence of Tick-Borne Diseases in the Highlands of Peru
ID-28	Michael Lappin	Prevalence of *Bartonella* Spp. DNA in Blood of Naturally Exposed Cats with and without Imidocloprid Treatment
ID-29	Maria Dolores Tabar	Severity of Clinical Signs and Outcome of Dogs Infected by *Wolbachia*, Microfilaria and *Leishmania*
ID-30	Mary Marcondes	Feline Leishmaniasis in the Municipality of Araçatuba, São Pulo, Brazil
ID-31	Mary Marcondes	*Leishmania chagasi* Infection in Cats with Dermatologic Lesions from an Endemic Area of Visceral Leishmaniasis in Brazil
ID-32	**Gavin Olsen**	**Comparison of Radiographic and Urine Antigen Resolution of Clinical Blastomycosis**
ID-33	Valeria Scorza	Prevalence of *Giardia* Spp. and *Cryptosporidium* Spp. in Dogs of the United States
ID-34	Sahatchai Tangtrongsup	Intestinal Parasites of Dogs in Chiang Mai, Thailand
ID-35	Donald Martin	Comparison of 2 Methods of Parasite Recovery from Fecal Specimens of Veterinary Patients: Sedimentation/Concentration vs. Fecalyzer

SMALL ANIMAL – NEPHROLOGY / UROLOGY

N/U-20	Javier Del Angel-Caraza	Canine Urolithiasis in Mexico
N/U-21	**Dinaz Naigamwalla**	**The Use of a Medetomidine-Based Sedation Protocol to Perform Urohydropropulsion and Cystoscopy in the Dog**
N/U-22	**Nicole Smee**	**Effect of Storage, Time, and Temperature on Canine Urine Enzymes**
N/U-23	**Sara Irom**	**Interim Evaluation of the Efficacy and Safety of a High Dose Short Duration Enrofloxacin Treatment Regimen for Urinary Tract Infection in Dogs**
N/U-24	Thomas Daste	Renal Doppler Resistive Index in Dogs with Degenerative Mitral Valve Disease (DMVD)
N/U-25	Chelsea Sonius	Association between Feline Antibody Responses to Alpha-Enolase and Azotemia in Privately-Owned Cats
N/U-26	**Emily Harison**	**Acute Kidney Injury (AKI) as a Predictor of Mortality in Dogs and Cats**
N/U-27	**Jonathan Dear**	**Feline Urate Urolithiasis: 143 Cases (2000-2008)**
N/U-28	Bernard Schmidt	Evaluation of Normal Serum Concentrations of the Putative Uremic Toxins, Indoxyl and p-Cresyl Sulfate, in Healthy Adult Cats
N/U-29	John Kruger	Expression of 15-Hydroxyprostaglandin Dehydrogenase (PGDH) in Urothelium of Cats with Chronic Idiopathic Cystitis
N/U-30	Katherine Hamon	Variation In Kidney Size in a Population of Cats

SMALL ANIMAL – NUTRITION / METABOLISM

NM-8	**Valerie Parker**	**Association Between Body Condition and Survival in Dogs with Acquired Chronic Kidney Disease**
NM-9	Shiguang Yu	Dietary Crude Protein of 28.5% Maintains Long-Term Lean Body Mass in Cats with Impaired Kidney Function
NM-10	Shiguang Yu	Dietary Supplementation of Vitamin B12 Improves Vitamin B12 Status in Geriatric Cats
NM-11	John Bauer	Changes in Serum Essential Fatty Acid Profiles in Dog and Cat Diseases
NM-12	Sungjun Noh	Effect of L-Alanyl-L-Glutamine Supplementation in the Treatment of Canine Parvoviral Enteritis
NM-13	Laura Tonkin	In Vitro Effects of Lipid Emulsion on Platelet Function and Thromboelastography in Healthy Dogs

SMALL ANIMAL - OTHER

OT-4	Marina Leis	Comparison of a New Intraosseous Catheter Insertion Technique Using the EZ-IO G3 Power Driver to a Standard Manual Technique for Intraosseous Catheter Insertion in a Feline Cadaver Model
OT-5	Youngjae Lee	Assessment of Feline Bone Mineral Density: Quantitative Computed Tomography
OT-6	Donghoon Lee	Quantitative Assessment of Aging Effects on Cerebral Blood Flow in Normal Dogs: A Perfusion CT Study
OT-7	Archivaldo Reche, Jr.	Inappropriate Urination in Multi-Cat Households: Are They Really Just Behaving Badly?
OT-8	Archivaldo Reche, Jr.	Living Style, Personality, Owner Subjective Life Quality: What Factors Affect Stress Levels in Domestic Cats (*Felis catus*)?

SMALL ANIMAL - PHARMACOLOGY

P-7	**Kristin Lewis**	**Pharmacokinetics of Diminazene Diaceturate in Healthy Cats**
P-8	Laura Johnston	Determination of Meloxicam Concentration in Synovial Fluid of Inflammed and Non-Inflammed Joints in Dogs
P-9	Kamoltip Thungrat	Trends of Small Animal *Escherichia coli* Antimicrobial Resistance in the United States
P-10	Xiaoqiang Liu	Comparative In Vitro Activities of Fluoroquinolone Antimicrobials Against *Escheria coli* Uropathogens

modified diets, traditional Chinese and Western herbs have been recommended, although only one, chorieto, has published data. We evaluated 3 commonly used herbal treatments recommended for use in cats with LUTD including (1) San Ren Tang, (2) Wei Ling Tang, and (3) Alisma. We hypothesized that these 3 Chinese herbal preparations would induce increased urine volume and decreased urine saturation for calcium oxalate and struvite.

Six healthy, spayed female, adult cats were evaluated in a placebo-controlled, randomized, cross-over design study. Cats were randomized to 1 of 4 treatments including placebo (P), San Ren Tang (SRT), Wei Ling Tang (WLT), or Alisma (A). Treatment was for 2 weeks each with a 1 week washout period between treatments. At end of each treatment period, a 24-hour urine sample was collected using modified litter boxes. Urine volume and biochemistries were measured, and urine saturation for struvite and calcium oxalate was estimated using EQUIL 1.5b. Analysis of Variance (ANOVA) was used to analyze data statistically if distributed normally and Kruskal-Wallis was used to analyze data statistically if data were not distributed normally. A $p < 0.05$ was considered significant.

Body weights were not different between treatments. No differences were found in 24-hour urinary analyte excretions, 24-hour urine volume, urine pH, or 24-hour urinary saturation for calcium oxalate or struvite between treatments (Table).

Table [Abstract N/U-19]: Twenty-four hour urine volume and relative supersaturation (RSS) for struvite and calcium oxalate (caox) for 6 adult spayed female domestic short-haired cats receiving placebo (P), alisma (A), Sun Ren Tang (SRT), or Wei Ling Tang (WLT). Data are means ± SD if distributed normally or median (minimum, maximum) if not distributed normally.

Parameter	Units	A	P	SRT	WLT	*p*-value
Volume	ml/kg/d	11.0 ± 4.97	11.5 ± 3.49	14.0 ± 9.16	9.30 ± 3.23	0.7
RSS		0.030	0.022	0.038	0.029	0.8
struvite		(0.007, 0.148)	(0.006, 0.074)	(0.007, 0.921)	(0.005, 0.058)	
RSS caox		4.89	3.62	3.95	5.50	0.8
		(2.41, 9.09)	(2.83, 6.75)	(2.41, 5.73)	(2.48, 10.05)	

Results of this study do not support the hypothesis that these 3 Traditional Chinese herbal preparations increase urine volume or decrease urinary saturation for calcium oxalate and struvite.

ABSTRACT N/U-20

CANINE UROLITHIASIS IN MEXICO. J Del Angel Caraza [1], CC Pérez-García[2], I Diez-Prieto[2], MB García-Rodríguez[2], IA Quijano Hernández[1]. [1]Hospital Veterinario para Pequeñas Especies FMVZ-Universidad Autónoma del Estado de México. Toluca, México. [2]Laboratorio de Investigación en Urolitiasis. Universidad de León, España.

Urolithiasis is a multifactorial disease, frequent and recurrent in dogs in the worldwide, in which breed, sex, age, diet, some anatomical abnormalities, urinary tract infection, urine pH and some geographical and hereditary features in the populations studied have been implicated as risk factors. The effective long-term management of urolithiasis depends on identification and control of the pathophysiological mechanisms involved, which, in turn, depend on accurate knowledge of the mineral composition of the uroliths.

The aim of this study was to determine for first occasion the main epidemiological data of canine urolithiasis in Mexico. This study was developed with 491 dogs with urolithiasis from 25 of the 33 states of the country.

Chemical composition of the uroliths was determined by stereoscopic microscopy, infrared spectroscopy, scanning electron microscopy and X-ray microanalysis.

Urolithiasis affected nearly the same number of males and females; with ages ranging from two months to 15 years with a median age of 5 years. Adult animals were the most affected. Breeds more affected were Schnauzer miniature, Poodle, Dalmatian, Yorkshire terrier, Scottish terrier, Chihuahua and Bichon friseé.

Uroliths were found in the lower urinary tract in 97.74% of the cases. Mineral composition of the uroliths was: Struvite 49.69%, followed by calcium oxalate 25.46%, purines 7.13%, silicate 6.72%, others 0.20%, mixed 8.15% and compound uroliths 2.44%. Struvite uroliths affected females in most cases, whereas calcium oxalate, purines and silicate uroliths, were mainly observed in males.

Our results are similar to studies developed in other countries and continents, though we found a higher frequency of uroliths containing silicate, either pure, mixed or compounds uroliths (10.79%); in Mexico City the frequency reached 15%. This high frequency may be due to high consumption of silicate in home-made food or in the groundwater derived from aquifers.

Acknowledgments: This work has been partially supported by a project of Waltham Foundation in Mexico and the Consejo Nacional de Ciencia y Tecnología (CONACyT) of Mexico.

ABSTRACT N/U-21

THE USE OF A MEDETOMIDINE-BASED SEDATION PROTOCOL TO PERFORM UROHYDROPROPULSION AND CYSTOSCOPY IN THE DOG. JA Webb[1], M Rosati[1], D Naigamwalla[1], A Defarges[2]. [1]Mississauga-Oakville Veterinary Emergency Hospital, Oakville, ON. [2]Clinical Studies, Ontario Veterinary College, Guelph, ON.

Voiding urohydropropulsion is a non-invasive method for removing small urocystoliths from the dog, most commonly used in females due to the relatively wider and shorter urethra. This procedure is typically performed under general anesthesia to allow complete relaxation of the urethra, however, anesthesia results in longer procedure times and difficult endotracheal tube stabilization due to the vertical positioning of animals, especially in larger dogs.

The aim of this study was to devise a novel injectable sedation protocol for urohydropropulsion when cystoscopy was not concurrently required. An intravenous catheter was placed, and a combination of medetomidine (10 to 15 µg/kg IV) and hydromorphone (0.025 to 0.05 mg/kg IV) was administered, with the addition of ketamine (2 mg/kg IV) in fractious animals; atipamezole (double volume of medetomidine, administered IM) was used as a reversal agent upon procedure completion. This protocol was considered in cardiovascularly healthy, non-diabetic dogs without evidence of urinary obstruction. Monitoring equipment included electrocardiography, blood pressure measurement, and pulse oximetry, and supplemental flowby oxygen was provided.

Two dogs received the proposed sedation protocol in order to perform urohydropropulsion. Dog one was a 3 year old female spayed Shih Tzu cross, and dog 2 was a 2 year old female spayed Standard Poodle. Ultrasonography revealed a moderate number of urocystoliths present in both dogs, measuring up to 1 mm in dog 1 and 2.3 mm in dog 2. Urohydropropulsion was performed and resulted in retrieval of 15 urocystoliths in dog 1, and approximately 20 urocystoliths in dog 2. Repeat ultrasonography revealed no uroliths present after urohydropropulsion in both dogs. The time from administration of sedation to administration of reversal agent was 6 minutes for dog 1, and 8.5 minutes for dog 2. Records were obtained from 3 dogs that had traditional general anesthetic protocols for urohydropropulsion with cystoscopy for confirmation of urocystolith removal, performed within the last 2 years, and the average anesthetic time was 64 minutes.

Subsequent to the use of medetomine-based sedation protocols for the above dogs, cystoscopy was performed in a 9 year old neutered male Golden Retriever with prostatomegaly. Medetomidine (15 ug/kg IV) and butorphanol (0.2 mg/kg IV) were administered; atipamezole (double volume of medetomidine, administered IM) was used as a reversal agent upon procedure completion. This sedation allowed adequate immobilization for cystoscopy of the urethra and urinary bladder, and endoscopic biopsying of the prostatic urethra and urinary bladder. The time from administration of sedation to administration of reversal agent was 15 minutes for this dog.

In conclusion, a novel sedative protocol for urohydropropulsion is proposed which allows for an appropriate level of sedation along with a short procedure time and rapid recovery. This sedation protocol may also be useful for certain cystoscopic procedures.

ABSTRACT N/U-22

EFFECT OF STORAGE TIME AND TEMPERATURE ON CANINE URINE ENZYMES. N Smee[1], L Pohlman[2], MW Sanderson[1], GF Grauer[1]. [1]Department of Clinical Sciences, [2]Department of Diagnostic Medicine/Pathobiology, Kansas State University, Manhattan, KS.

Increased activity of urinary N-acetyl-β-D-glucosaminidase (NAG) and γ-glutamyl transpeptidase (GGT) can be markers of early tubular cell damage. After acquisition of a urine sample,