



VIRGINIA-MARYLAND VETERINARY NOTES

Veterinary Teaching Hospital, Virginia-Maryland Regional College of Veterinary Medicine

January – March 2007

No. 121

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Thought For the Month

A conservative is a liberal who has been mugged

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Witonsky Exploring EPM

Equine researchers continue to make progress in unravelling mysteries surrounding Equine Protozoal Myelitis (EPM), a parasitic infection of horses that causes major neurological problems.

Sharon Witonsky, associate professor, Department of Large Animal Clinical Sciences (DLACS), was recently honored with the college's 2006 Pfizer Award for Research Excellence for the research she is conducting in this area.

EPM is caused by an infectious protozoal parasite known as *Sarcocystis neurona*. Opossums are the known carriers of this organism and horses are believed to contract the disease by grazing on forage contaminated with the opossum feces. The parasite then breeches the blood/brain barrier through unknown mechanisms.

The blood/brain barrier is composed of the blood vessels of the brain. It protects the tissues of the brain from being exposed to anything that might cause harm.

While over 50% of all horses in the United States are believed to be exposed to this disease, only 0.5-1% actually develop clinical signs, and the reason for this selective infection remains unclear, according to Witonsky.

However, the effect of the disease on horses that are afflicted can be devastating. Equine patients can suffer a range of neurologic problems including behavioral changes, ataxia or clumsiness, muscle atrophy, and death. According to Witonsky, part of the current problem is that it can be difficult to determine whether a horse has the disease. In some cases, a horse may not be diagnosed until the disease has entered more severe stages. This late diagnosis may make a 100% recovery much more difficult for the patient.

Luckily, over the past several years, diagnostic tests, treatments and vaccinations for EPM have been developed and Witonsky is attempting to improve upon those.

Witonsky hopes to achieve three main goals with her research. First, she seeks to discover the mechanism by which *Sarcocystis neurona* is able to travel to the brain and affect the horse. Second, she wants to broaden scientific understanding of the disease process so that more sensitive and more accurate diagnostic tests can be developed. Finally, Witonsky hopes to develop a more effective vaccine to help protect horses from this debilitating disease.

Witonsky and her collaborators are using both equine and murine models to address these issues. Their work with these models has led her and fellow researchers to hypothesize that *Sarcocystis neurona* crosses the blood brain barrier via infecting leukocytes in the periphery. *S. neurona* then leaves the leukocytes and infects the brain tissue. However, the mechanism of this transfer is, as of yet, unclear.

Witonsky works both as a clinician in the hospital's equine field service unit and as a research scientist pursuing EPM and other infectious disease research. Witonsky's research is a good example of the VMRCVM's goal of increasing the amount of translational research underway in the college.

Translational research involves strong collaborations between basic and clinical scientists and seeks to rapidly develop solutions for pressing animal and human disease problems. The discoveries which are being made in Witonsky's laboratory are easily transferable to the examining room. Veterinarians are able to take the knowledge gained from Witonsky's research and use it to diagnose and treat horses that are afflicted with EPM.

All of this work has been made possible by a large collaboration with colleagues in a variety of areas. Current collaborators include Dr. David Lindsay, professor, parasitology, Department of Biomedical Sciences and Pathobiology; Dr. Robert Gogal Jr., associate professor, immunology, Edward Via Virginia College of Osteopathic Medicine; Dr. Robert Duncan Jr., associate professor, pathology, Department of Biomedical Sciences and Pathobiology; Dr. Yasuhiro Suzuki, associate professor, molecular immunology, Department of Biomedical Sciences and Pathobiology; Dr. Virginia Buechner-Maxwell, associate professor, Clinical Services / Medicine / Equine and Production Management Medicine, Department of Large Animal Clinical Sciences; Mr. Dan Ward, laboratory supervisor, Laboratory for Study Design and Statistical Sciences; Dr. Frank Andrews, professor, large animal internal medicine, University of Tennessee College of Veterinary Medicine; and Dr. Siobhan Ellison, private practitioner specializing in pathogens.

This article was reported in the November issue of Vital Signs newsletter.

<http://www.vetmed.vt.edu/Publications/VitalSigns/index.asp>

Radiographic Cardiac Size in Cats and Dogs with Heartworm Disease Compared with Reference Values Using the Vertebral Heart Scale Method: 53 Cases

Objectives - To measure the size of the heart, caudal vena cava and right pulmonary artery (cats) or right caudal lobar artery (dogs) using the vertebral scale method in heartworm-infected cats and dogs and compare the results with reference values.

Background - The vertebral heart scale (VHS) method is an objective measure of heart size relative to body size.

Animals - Thoracic radiographs from heartworm-infected cats (n = 28) and dogs (n = 25).

Materials and methods - Standardized measurements using a previously published method were made using lateral, dorsoventral and/or ventrodorsal thoracic radiographs.

Results - On lateral radiographs, the mean VHS for the heartworm-infected group was significantly larger than the reference value for both cats and dogs (cats $p = 0.009$, dogs $p < 0.001$). On lateral radiographs of both infected cats and dogs, there was a significant correlation between mean diameter of the caudal vena cava and VHS (cats $p = 0.002$, $r = 0.59$; dogs $p = 0.012$, $r = 0.53$). The mean ratio of the width of the right pulmonary artery (cats) or right caudal lobar artery (dogs) to the width of rib 9 was higher than reference values for each species.

Conclusions - Heartworm-infected cats and dogs often have an enlarged cardiac silhouette on thoracic radiographs. The VHS method, measurement of the caudal vena cava expressed in vertebral lengths, and the calculation of the ratio of the right pulmonary or caudal lobar artery width to rib 9 width are all useful tools to monitor the natural history of the disease and aid in staging for therapy of heartworm disease.

A. Litster, Rick Atwell, School of Vet. Sci., Univ. of Queensland, Australia, C. Atkins, College of Vet. Med., NC State Univ., James Buchanan. Section of Cardiology, School of Vet. Med., Univ. of Penn. Journal of Veterinary Cardiology Volume 7, Issue 1, May 2005, Pages 33-40, as reported in Veterinay News, October 2005, Penn State, University Park, PA

Would You Believe?

Because of recent commodity price increases, the zinc in a US penny now costs .83 of a cent. There is almost no copper in our penny today – too expensive. When production and distribution costs are added we end up paying 1.3 cents to make a penny today.

The Mint made 8 billion new pennies in 2005 – far more than any other US coin. These new pennies cost roughly \$100 million to produce and distribute.

There are organized movements both to save and eliminate our penny from circulation, including a bill in Congress known as the Legal Tender Modernization Act. The pro penny group, Americans for Common Cents, are funded by the zinc industry and penny distributors. This group claims the penny is a “psychological hedge against inflation”.

Incidentally, the US nickel also costs more than it’s worth. They are mostly made of copper.

Serologic Responses of Dogs Given a Commercial Vaccine Against *Leptospira*

Objective - To evaluate serum titers obtained by use of the microscopic agglutination test (ie, MAT titers) to *Leptospira interrogans* serovar pomona and autumnalis and *Leptospira kirschneri* serovar grippotyphosa in dogs given a commercial vaccine against serovars pomona and grippotyphosa.

Animals - Forty 12-week-old puppies and 20 mature Beagles.

Procedure - Puppies received a commercial vaccine against serovars pomona and grippotyphosa at 12 weeks of age, then received a booster vaccine and 3 weeks later; mature dogs received the vaccine once. Serum MAT titers to serovars pomona, autumnalis, and grippotyphosa were measured before vaccination and at 2, 4, 6, 10, and 16 weeks after the first or only vaccination.

Results - Of the 40 puppies vaccinated, 40, 0, and 40 developed MAT titers of > 100 after vaccination to serovars pomona, grippotyphosa, and autumnalis, respectively. Microscopic agglutination test titers to serovar autumnalis were higher than MAT titers to serovars pomona and grippotyphosa and persisted in some dogs for 16 weeks (6 weeks longer than for titers to serovar pomona). Of the 20 mature dogs, 13, 5, and 20 developed MAT titers of > 100 at 2 weeks to serovars pomona, grippotyphosa, and autumnalis, respectively. Titers to serovar pomona were higher and persisted in some dogs beyond 16 weeks after vaccination, compared with titers to serovars pomona and grippotyphosa, which persisted for 10 and 6 weeks, respectively.

Conclusions and Clinical Relevance - Subunit vaccines against serovars pomona and grippotyphosa induce MAT titers not only to homologous antigens but also to serovar autumnalis, which could lead to a misdiagnosis of leptospirosis caused by serovar autumnalis.

S. Barr, Depts. of Clin. Sci., P. McDonough, J. Starr R., Pop. Med. & Diag. Sci., College of Vet. Med., Cornell Univ., R. Scipioni-Ball, Marshall Farms Inc, NY, Am J Vet Res 2005;66:1780-1784, as reported in Veterinary News, October 2005, Penn State, University Park, PA

Relationship Between Total Transit Time -- and Faecal Quality in Adult Dogs Differing in Body Size

Fed the same diet, large and giant-breed dogs have higher faecal moisture and increased frequency of soft stools than small ones. This could be the result of physiological differences, such as a different gastrointestinal transit time. In this study, we have correlated mean total transit time (MTT) with body size and faecal consistency in dogs varying in body size. Fifty dogs from 13 different breeds were used, from a Dachshund to a Great Dane. The MTT was determined using coloured plastic beads [Cummings and Wiggins, Gut, Vol. 17 (1976), p. 219], and faecal consistency was scored daily during the study. We confirmed the strong correlation between height at the shoulder (body size) and faecal score ($r = 0.76$; $p < 0.0001$). The MTT increased with body size, from 22 h for a Miniature Poodle to 59 h for a Giant Schnauzer. We found significant positive correlations ($p < 0.0001$) between MTT and body size as well as faecal scores ($r = 0.71$ and 0.70 respectively). In the present study, we observed an effect of body size on MTT. In our 50 healthy dogs a longer MTT was related to a poorer faecal quality. Previous studies reported no relationship between body size and the upper gastrointestinal transit time in healthy dogs. So, we hypothesized that body size would mainly affect colonic transit time and that a longer colonic residence time would be related to a poorer faecal quality by promoting fermentation activity.

D.C. Herno, L.J. Martin, H.J. Dumon, P.G. Nguyen Nutrition and Endocrinology Unit, National Veterinary School of Nantes, France, V.C. Biourge, Royal Canine Research Center, Aimargues, France, Journal of Animal Physiology and Animal Nutrition Volume 89 Issue 3-6 Page 189 - April/June 2005, as reported in Veterinary News, April 2005, Penn State, University Park, PA

Insulin Resistance and Compensation in Thoroughbred Weanlings Adapted to High-Glycemic Meals

Insulin resistance has been suggested to increase the risk of certain diseases, including osteochondrosis and laminitis. Our objective was to evaluate the effect of adaptation to high-glycemic meals on glucose-insulin regulation in healthy Thoroughbred weanlings. Twelve Thoroughbred foals were raised on pasture and supplemented twice daily with a feed high in either sugar and starch (SS; 49% nonstructural carbohydrates, 21% NDF, 3% crude fat on a DM basis) or fat and fiber (FF; 12% nonstructural carbohydrates, 44% NDF, 10% crude fat on a DM basis). As weanlings (age 199 - 5 d; BW 274 - 5 kg) the subjects underwent a modified frequently sampled i.v. glucose tolerance test. A series of 39 blood samples was collected from -60 to 360 min, with a glucose bolus of 300 mg/kg BW injected at 0 min and an insulin bolus of 1.5 mIU/kg BW at 20 min. All samples were analyzed for glucose and insulin, and basal samples also were analyzed for plasma cortisol, triglyceride, and IGF-I. The minimal model of glucose and insulin dynamics was used to determine insulin sensitivity (SI), glucose effectiveness, acute insulin response to glucose (AIRg), and disposition index (DI). Insulin sensitivity was 37% less ($P = 0.007$) in weanlings fed SS than in those fed FF; however, DI did not differ ($P = 0.65$) between diets because AIRg tended to be negatively correlated with SI ($r = -0.55$; $P = 0.067$). This finding indicates that the SI decrease was compensated by AIRg in the weanlings adapted to SS. This compensation was further demonstrated by greater insulin concentrations in SS-adapted weanlings compared with FF-adapted weanlings at 11 of 36 sample points ($P < 0.055$) and greater ($P = 0.040$) total area under the insulin curve in SS than in FF weanlings. Plasma cortisol and triglycerides did not differ between dietary groups, but IGF-I was greater ($P = 0.001$) in SS weanlings. Despite appearing healthy, horses adapted to high-glycemic feeds may exhibit changes in altered insulin sensitivity and compensation that increase the risk of diseases involving insulin resistance. These changes seem to be partially amenable to dietary management.

K.H. Treiber, D.S. Kronfeld, W.B. Staniar, Dept. of An. & Poultry Sci., Va. Polytech. Inst. & State Univ., R.C. Boston, Dept. of Clin. Studies, New Bolton Center, Univ. of Pa. P.A. Harris, Equine Studies Gp., Waltham Ctr. for Pet Nutrition, Melton Mowbray, U.K., J. Anim. Sci. 2005. 83:2357-2364, as reported in Veterinary News, October 2005, Penn State, University Park, PA

Website Will Educate Veterinarians about Compounding

As part of a continuing effort to educate the veterinary profession about compounding, the AVMA has launched a series of Web pages that will serve as a comprehensive educational resource on the issue. Dr. Elizabeth Curry-Galvin, assistant director of the AVMA Scientific Activities Division, says that for a drug to be compounded legally, a number of requirements must be met. Compounding may be necessary if a veterinarian diagnoses a condition in an animal for which no FDA-approved animal or human drug, in its available dosage form and concentration, will appropriately treat the patient. Veterinarians may compound for their patients, or pharmacists may compound upon a veterinarian's prescription. Compounded drugs, with their possible flaws, may be better than no drug at all and may be suitable for a limited patient population. Compounding shifts the assurance for safety and efficacy from the manufacturer to the veterinarian. The new compounding area on the AVMA Web site provides information on pharmacology basics, regulations, and issues on the horizon; answers to frequently asked questions; and definitions of compounding terms. It also provides links to the new compounding brochure, AVMA's position on compounding, and related news articles in the JAVMA.

Individuals can access these pages by visiting www.avma.org/compounding. Dr. Curry-Galvin points out that practitioners also need to be aware of state regulations. States require that prescriptions for compounded drugs be specific to a patient, but some states have a provision for in-office use of compounded products. These states allow pharmacists, under limited conditions, to fill a veterinarian's request for a drug that is not commercially available and must be compounded if the product is to be administered by the veterinarian in their office. The same states often prohibit a veterinarian from dispensing such drugs or selling the product to other veterinarians. Other states, however, have no provision for in-office use, or ban the preparation of products for office use. Veterinarians should contact their state board of pharmacy and state board of veterinary medicine to determine state requirements. **AVMA News Bulletin; March 9, 2005, as reported in Animal Health Spectrum, Summer 2005, Mississippi State University, Mississippi, MS**

Is Computed Tomography More Sensitive Than Radiography For Diagnosing Middle Ear Disease In Dogs?

Middle ear disease (otitis media) is a common complication of chronic external ear disease (otitis externa) in dogs. When middle ear disease is diagnosed, bulla osteotomy and curettage are indicated. Radiography is currently the standard imaging modality for evaluating dogs with suspected middle ear disease. A positive radiographic diagnosis is based on presence of thickening or irregular margination of the tympanic bulla, or increased soft tissue opacity within the lumen of the bulla.

However, radiography has been found in a previous study to have low sensitivity for detection of middle ear disease in dogs. Computed tomography (CT) is a noninvasive technique that uses x-rays and computers to obtain slice images of structures. Advantages of CT versus radiography include elimination of superimposition, ability to display images in multiple planes, shorter imaging time, and higher contrast resolution. Disadvantages of CT versus radiography include higher cost and lower availability.

In a recently conducted prospective study, we compared findings from CT, radiography, surgery, and histopathology in thirty-one dogs with chronic otitis externa. All dogs were referred to the VTH for total ear canal ablation and bulla osteotomy. Three normal dogs served as controls. A total of 47 ears were examined surgically. A positive surgical diagnosis of middle ear disease was made in 29 ears and a negative diagnosis in 18 ears. Histopathologic severity of disease in right ears was significantly lower than left ears.

Both CT and radiography underestimated the presence of mild middle ear disease. For moderate to severe middle ear disease, observer performance was more consistent with CT than with radiography. Using surgery as the gold standard, the overall diagnostic sensitivity, specificity, positive predictive, and negative predictive values were greater for CT versus radiography.

These findings indicated that CT is more sensitive and reliable than radiography for detecting middle ear disease in dogs with chronic otitis externa, but only when the severity of middle ear disease is moderate to high. When severity of middle ear disease is low, diagnostic certainty for both modalities becomes more variable.

Jeryl C. Jones, DVM, PhD, Dipl. ACVR Associate Professor, SACS, VMRCVM, as reported in Vital Signs, VMRCVM, May 2006

Evaluation Of Cats Fed Vegetarian Diets And Attitudes Of Their Caregivers

Objective – To determine motivation and feeding practices of people who feed their cats vegetarian diets as well as taurine and cobalamin status of cats consuming vegetarian diets.

Design – Cross-sectional study.

Animals – 34 cats that had been exclusively fed a commercial or homemade vegetarian diet and 52 cats that had been fed a conventional diet for 1 year.

Procedures – Participants were recruited through a Web site from attendees of a national animal welfare conference. Caregivers of cats in both groups answered a telephone questionnaire regarding feeding practices for their cats. Blood was obtained from a subset of cats that had been fed vegetarian diets. Blood and plasma taurine and serum cobalamin concentrations were measured.

Results – People who fed vegetarian diets to their cats did so largely for ethical considerations and were more likely than people who fed conventional diets to believe that there are health benefits associated with a vegetarian diet and that conventional commercial cat foods are unwholesome. Both groups were aware of the potential health problems that could arise from improperly formulated vegetarian diets. All cats evaluated had serum cobalamin concentrations within reference range, and 14 of 17 had blood taurine concentrations within reference range.

Conclusions and Clinical Relevance – Vegetarian diets are fed to cats primarily for ethical considerations. Results of this study should aid practitioners in communicating with and providing advice to such clients.

L.A. Wakefield, F.S. Shofer, & K. E. Michel, Depts of Clinical Studies, Univ. of Penn., PA, Journal of the American Veterinary Medical Association, July 1, 2006, Vol. 229, No. 1, Pages 70-73, as reported in Veterinary News, July-August 2006, Penn State, University Park, PA

A Comparison of Behaviour in Test and in Everyday Life: Evidence of Three Consistent Boldness – Related Personality Traits in Dogs

Six specific personality traits - playfulness, chase-proneness, curiosity/fearlessness, sociability, aggressiveness, and distance-playfulness - and a broad boldness dimension have been suggested for dogs in previous studies based on data collected in a standardized behavioural test ("dog mentality assessment", DMA). In the present study I investigated the validity of the specific traits for predicting typical behaviour in everyday life. A questionnaire with items describing the dog's typical behaviour in a range of situations was sent to owners of dogs that had carried out the DMA behavioural test 1-2 years earlier. Of the questionnaires that were sent out 697 were returned, corresponding to a response rate of 73.3%. Based on factor analyses on the questionnaire data, behavioural factors in everyday life were suggested to correspond to the specific personality traits from the DMA. Correlation analyses suggested construct validity for the traits playfulness, curiosity/fearlessness, sociability, and distance-playfulness. Chase-proneness, which I expected to be related to predatory behaviour in everyday life, was instead related to human-directed play interest and nonsocial fear. Aggressiveness was the only trait from the DMA with low association to all of the behavioural factors from the questionnaire. The results suggest that three components of dog personality are measured in the DMA: (1) interest in playing with humans; (2) attitude towards strangers (interest in, fear of, and aggression towards); and (3) non-social fearfulness. These three components correspond to the traits playfulness, sociability, and curiosity/fearlessness, respectively, all of which were found to be related to a higher-order shyness-boldness dimension. Chase-proneness and distance playfulness seem to be mixed measures of these personality components, and are not related to any additional components. Since the time between the behavioural test and the questionnaire was 1-2 years, the results indicate long-term consistency of the personality components. Based on these results, the DMA seems to be useful in predicting behavioural problems that are related to social and non-social fear, but not in predicting other potential behavioural problems. However, considering this limitation, the test seems to validly assess important aspects of dog personality, which supports the use of the test as an instrument in dog breeding and in selection of individual dogs for different purposes.

K. Svartberg, Dept. of Zoology, Stockholm Univ., Sweden, Applied Animal Behaviour Science Volume 91. Issues 1-2, May 2005, Pages 103-128, as reported in Veterinary News, April 2005, Penn State, University Park, PA

Continuing Education Opportunities

Date	Topic	Location	Contact Hours
TBA	Applied Ultrasonography	Blacksburg	10
TBA	Introductory Echocardiography	Blacksburg	10
TBA	Advanced Echocardiography	Blacksburg	21
January 13, 27 and February 10, 2007	Urinalysis & Hematology for Technicians	Blacksburg	6
Spring 2007	3 – Day Gastrointestinal Endoscopy	Blacksburg	24
April 14, 2007	Radiology for Technicians	Blacksburg	6

Please note:

The courses listed above are limited enrollment and feature a hands-on laboratory experience under the guidance of clinical faculty members. Program brochures provide course details. For more information, please contact Anne Cinsavich, aclapsad@vt.edu (540) 231-5261; or to register for a program, please contact Conference Registration, Continuing Education Center, (540) 231-5182.

Virginia-Maryland Regional College of Veterinary Medicine Extension Staff:

Dr. W. Dee Whittier	Extension Specialist – Beef Cattle
Dr. Scott Pleasant	Extension Specialist – Equine
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