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VIRGINIA-MARYLAND VETERINARY NOTES

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

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THOUGHT FOR THE MONTH

The secret is not to do things for people but to do things with them.

Anton Raport, South African Entrepreneur

Kent C. Roberts, DVM
Extension Veterinarian



VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

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Serum Alkaline Phosphatase and Canine Osteosarcoma

The prognostic significance of serum total alkaline phosphatase (TALP) activity for human beings with osteosarcoma has been recognized for over 30 years. An assay is now available for the measurement of bone ALP (BALP) activity in canine serum. The assay uses wheat germ lectin to selectively precipitate constituent bone BALP. Corticosteroid-induced (CALP) isoenzyme activity is determined by the automated levamisole inhibition assay. Liver (LALP) activity is then determined in the supernatant fluid. BALP activity is finally determined by subtraction of CALP and LALP from the known TALP activity determined by use of a standardized assay.

Sixty-one dogs with appendicular osteosarcoma were treated with amputation and chemotherapy of cisplatin and doxorubicin. Serum samples were obtained before and after treatment for determination of TALP activity as well as the activities of the BALP, LALP, and CALP. The relationship between alkaline phosphatase activities and survival was examined by Cox proportional hazards regression analysis and Kaplan-Meier log rank analysis. Mean activity of TALP, BALP, and LALP decreased significantly after treatment ($P < 0.001$). TALP and LALP activities before treatment were significantly correlated with survival ($P = 0.006$ and 0.001 , respectively). The correlation between BALP activity before treatment and survival approached significance ($P = 0.054$). CALP activity and TALP, BALP, and LALP activities after treatment were not significantly correlated with survival. Dogs with normal pretreatment TALP and BALP activities survived longer than dogs with increased pretreatment activities ($P = 0.001$ and 0.003 , respectively). Median survival times for dogs with normal or increased TALP activities before treatment were 12.5 and 5.5 months, respectively; and median survival times for dogs with normal or increased BALP activities before treatment were 16.6 and 9.5 months, respectively. In the design of future clinical trials involving dogs with osteosarcoma, consideration should be given to stratifying the randomization according to alkaline phosphatase activity. In addition, alkaline phosphatase activity should be a factor considered by clinicians attempting to tailor the aggressiveness of adjuvant chemotherapy to the needs of individual patients or owners.

Pretreatment activity of TALP and BALP are important prognostic factors for dogs with osteosarcoma. An indication of the strength of the correlation between pretreatment alkaline phosphatase activities and survival is provided by the results of relative risk analysis, which indicated that for each 160 U/L increase in TALP or BALP activity, the risk of death in any given time interval increased by approximately 25%. Similarly, log rank testing revealed that median survival times for dogs with normal pretreatment TALP and BALP activities were approximately 50% longer than for dogs with increased activities. We did not find a significant correlation between post-treatment activities of TALP or its isoenzymes and survival. **Taken from: Garzotto, CK, et al. J Vet Intern Med 14:587-592, 2000. as reported in Vet Med, Jan. 2001, Iowa State University, Ames, IA.**

Would You Believe?

In the past five years, commercial air traffic in the US has increased 27% to 660 million passenger trips annually. More than 70% of this commercial traffic is concentrated at the 28 largest airports. All of these facilities need more runways to help relieve the over-scheduling too prevalent at most major airports. At New York's LaGuardia Airport, for example, 75 flights per hour is the most that facility can handle, but the airlines often schedule more than 100 flights for the same hour. Other major problems include "general aviation", which uses more than half airport tower services; 20% of traffic control activity but pays just 3% of the costs; safety standards set 45 years ago that badly need updating; and the unreasonably long time it takes to approve and build airport expansions.

On a typical afternoon in 2001 more than 5000 planes move across the skies of this country. Airline labor problems, over-scheduling, and an outmoded air traffic control system that is 60 years old, all contribute to a major problem in air travel. Are we just a thunderstorm away from a gridlock? Time, Jan. 22, 2001.

Ulcerative Keratitis Caused By *Streptococcus Equi*

Infectious keratitis of the horse is very serious and challenging, with many associated problems. The equine cornea tends to scar as it heals, whether surgery is performed or not. It often vascularizes poorly or excessively. Although Gram-positive bacteria predominate in the normal conjunctival microflora of horses throughout the world, Gram-negative bacteria and fungi are more often isolated from equine ulcers. Beta-hemolytic *Streptococcus* spp. are associated with a very aggressive ulcerative keratitis with the capability to digest conjunctival graft tissue. Clinical signs are pronounced. Killing bacteria and fungi in the cornea is not a major problem as several drugs appear to be effective, but excessive tear protease activity and severe uveitis induced by microbial death can be difficult to control. Aggressive surgical and intensive medical therapy with topical antibiotics and protease inhibitors is indicated.

A retrospective clinical study (1996-99) of ulcerative keratitis associated with beta-hemolytic *Streptococcus equi* was done using Florida horses. Beta-hemolytic *Streptococcus equi* was cultured from 11 horses with deep ulcers, descemetocoeles or iris prolapse (n=8), a suture abscess found with a penetrating keratoplasty for a stromal abscess (n=1), and ulceration that developed following keratectomy/irradiation for corneal squamous cell carcinoma (n=2). Beta-hemolytic *Streptococcus equi* subspecies *zooepidemicus* was found in 10 eyes and subspecies *equi* in one. Marked signs of uveitis including miosis and hypopyon were present in 8/11 (72.7%) eyes. Keratomalacia was severe in all eyes. The mean diameter of the ulcers associated with beta-hemolytic *Streptococcus* was 10.2 ± 6.1 mm. Eight of the eyes required conjunctival flap surgery (four grafts dehisced) and one eye corneal transplantation. Two eyes were treated with medication only. Isolate sensitivity to antibiotics included ampicillin (6/11), bacitracin (11/11), cephalothin (11/11) chloramphenicol (11/11), gentamicin (5/11), polymyxin B (2/11), and tobramycin (1/11). All isolates were resistant to neomycin. The average healing time was 44.7 ± 26.7 days. The visual outcome was positive in 8/11 eyes, and the globe retained in 9/11 eyes.

In most forms of infectious keratitis, the infection is characterized by an initial bacterial or fungal colonization of the corneal surface followed by invasion into deeper tissues, which then elicits an influx of inflammatory cells. Toxins produced by some organisms facilitate infection through cytotoxic destruction of the cell membrane or by inhibiting cellular protein synthesis. Once bacteria have attached to the ulcer site and invaded the corneal stroma, the host response is mediated by leukocytes. The microbes induce leukocytes in the tear film to release proteases that elicit inflammatory and degradative processes. The enzymes produced by the leukocytes help destroy the invading microbes. Excessive levels of certain proteases in the tear film of horses can lead to rapid degeneration of corneal stromal collagen, potentially inducing keratomalacia or corneal melting, and corneal perforation. The proteases and other metabolites associated with beta-hemolytic *Streptococcus* spp. in the horse appear to be very powerful. **Taken from: Brooks, D. E., et al Vet Ophthal 3:121-125, 2000; as reported in VetMed , Vol. 7 Issue 1, Jan. 2001, Iowa State University, Ames, IA**

The Albatross

"A bird of unsurpassed grace and beauty" are the words the Prince of Wales uses to describe this endangered sea bird. With a wingspan of 11 feet the albatross is capable of flying across the Atlantic Ocean in six days. There are 24 species of albatross, of which 16 are considered in danger of extinction. Studies indicate that albatrosses are being killed by fishing methods which put out 60 miles of fishing line with up to 50,000 fishhooks. When the birds try to grab the hooked bait they are dragged to their deaths.

The Amsterdam albatross with an estimated world population of 90 birds has been reduced to 20 breeding pairs. Other species of this sea bird are also under the threat of extinction as their numbers are rapidly being depleted. The International Union for the Conservation of Nature is compiling data on the albatross. KC Roberts, Feb, 2001.

Ferret Cardiopulmonary Diseases

Heartworm Disease: Symptoms of heartworm disease may vary from a mild cough early in the course of the disease to severe pulmonary congestion, ascites, pleural effusion, severe heart murmurs and sudden death. Heartworm treatment is difficult at best. The author has treated about 30 ferrets with caparsolate or Immiticide and has had about a 60% survival rate overall. It is possible that ferrets should be treated similarly to cats, that is, using oral prednisone, heartworm preventive, and symptomatic treatment. At this time it is not known what the survival rate of ferrets not treated with adulticides might be. If a ferret lives in a heartworm-endemic area, it should be on heartworm prevention. This is true even for "indoor-only" ferrets. The author recommends one of two methods for heartworm prevention. First, the feline Heartguard chewable tablet is a good option, palatable to many ferrets and in a small enough tablet that the ferret will ingest the whole thing. The tablet for cats who weigh less than five pounds is ideal. Second, if the ferret will not ingest the tablet, an oral Ivermectin in oil suspension can be used. We mix 0.3 cc of the 1% injectable Ivomec in one ounce of Ferretone or propylene glycol (Ivomec is not water-soluble). This makes a 100-microgram/ml suspension. This should be dosed at 0.1 ml per pound of bodyweight once monthly. An oil-based suspension should have a shelf life of about two years if kept refrigerated and out of sunlight.

Thymic Lymphoma: Thymic lymphoma often presents as dyspnea or coughing. There will often be large amounts of serosanguinous or milky thoracic exudate. On radiographs, a mass will be seen anterior to the heart, sometimes pushing the trachea dorsally. The first order of business is often to do a needle aspirate thoracocentesis, both to assist in diagnosis and to buy some time for the ferret in emergency situations. Some ferrets will present with severe dyspnea and cyanosis, and removing large amounts of thoracic fluid will make the ferret comfortable while options are discussed.

Influenza and Canine Distemper: These two viruses are easily confused clinically in the first week or so of disease. Influenza can cause coughing, sneezing, and mucopurulent ocular or nasal discharge, but these will begin to resolve after about a week. In canine distemper, clinical signs will continue to worsen, with seizures beginning at about day 12 after onset of clinical signs. We treat influenza with OTC children's diphenhydramine syrup at about 1 mg per pound two or three times daily. The author does not recommend routine use of aspirin, and Tylenol should never be used in the ferret. Antibiotics may be warranted in some instances to treat secondary infections, but caution about over-use of antibiotics should be observed.

Bacterial Pneumonia: Bacterial pneumonias independent of underlying disease do occur. Antibiotic selection should be based on nasal or tracheal cultures when possible. Since most ferrets have white blood cell counts in the 4,000-8,000 range, concern is warranted when a ferret has respiratory symptoms and a WBC greater than 10,000. This situation warrants cultures and antibiotics. **Kemmerer, DW. Proc. Natl. SCAVMA, May, 1998 in ISU Vet Med, July 1999; as reported in Veterinary News, Aug. 1999, Penn State University, University Park, PA.**

Would You Believe?

Cornell University neurobiologists working with song birds have found that the females of certain avian species choose suitors with the most elaborate courtship songs. According to research these fancy male singers have more elaborate brain structures to learn singing and other life skills. The females hope their offspring will inherit these bigger brains. KC Roberts, Nov, 2000.

Pet Treats Can Make You Ill

Dogs love them. They're blissfully chewy and delightfully smelly to your pet--but treats made from the leftover parts of food-producing animals can make you and your family very sick.

Pet treats made from the dried ears, hooves, lungs, and bones of pigs and cows have been implicated in Salmonella poisoning in humans. In late 1999, Canadian health officials alerted the Food and Drug Administration to more than 35 human cases of Salmonella poisoning that occurred in Canada over the past year and were linked to contact with pig ears produced in that country. Some of these illnesses required children to be hospitalized.

"It's alarming to find that number of serious illnesses," says Gloria Dunnavan, the director of the Division of Compliance in FDA's Center for Veterinary Medicine. "We want to make sure there is no Salmonella in dried animal parts being sold as pet treats in the United States."

Earlier this year, FDA alerted U.S. distributors of both the suspect Canadian products and U.S.-manufactured dried animal parts. After U.S. retail store Costco tested and found Salmonella in samples of Medalist brand pig ears produced in this country, manufacturer Treat Makers L.L.C. recalled the products in May.

The recall covers treats sold at Costco stores in 11 states: Washington, Oregon, California, Arizona, New Mexico, Nevada, Utah, Colorado, Idaho, Montana, and Hawaii. The products are packaged in 25 count plastic bags and stamped with lot numbers **07600EXU3** or **08300EX01** on a white sticker on the back of the bag.

In June, another U.S. manufacturer, Products Carousel, Inc., recalled its Pets Carousel 100% Choo-Hooves Pressed Sticks-Item **#90010-S** because of possible contamination with Salmonella. The Pets Carousel products were sold by Petsmart in Ohio and Arizona.

Although no illnesses from these products have been reported in the United States, consumers should handle dried animal parts like they would handle raw meat, according to Dunnavan. In other words, wash your hands with soap and hot water after handling, avoid putting the treats on food contact surfaces (such as kitchen countertops), and don't allow children to touch their mouths after handling until they've washed their hands. Dunnavan also advises consumers not to purchase unpackaged dried treats, which are more likely to be contaminated by Salmonella.

While healthy pets rarely become ill from the bacteria, they can become carriers of Salmonella and infect humans or other animals. This means that you could become infected if Fido licks your face after chewing a contaminated product.

Salmonella can cause vomiting, diarrhea, fever and stomach cramps in otherwise healthy individuals and can be fatal in young children, the elderly, or people with weakened immune systems.

Consumers may return the recalled Medalist and Pets Carousel products to the store where they purchased them for a full refund. Customers with questions about the recall should call Treat Makers at 1-888-250-7369 or Products Carousel at 1800-231-3572. FDA continues to work with pet treat manufacturers to investigate the cause of the problem and ways to prevent it in the future. **Linda Bren, FDA Veterinarian Sept/Oct 2000 ; as reported in Veterinary News, Dec. 2000, Penn State University, University Park, PA.**

Did You Know?

The exodus of the Boomers, those people born between 1946 and 1964, starts this year from the workforce. Three million Boomers will turn 55 in 2001 which is the age people typically become eligible for early retirement under many retirement plans. There are approximately 76 million Boomers in the US looking to retire or at least semi-retire over the next 20 years. KC Roberts, Feb, 2001.

Potomac Horse Fever Transmission By Infected Aquatic Insects

Since the first report of Potomac horse fever (PHF), *E. risticii* has continued to be a cause of illness and death in horses within the USA. Despite intensive research efforts for over 20 years, the epidemiology and mode of transmission of *E. risticii* has remained a mystery. This study provides evidence that horses can acquire the infectious agent by the oral route through the ingestion of trematode stages in intermediate hosts such as aquatic insects infected with *E. risticii*.

Ehrlichia risticii, the agent of Potomac horse fever (PHF), has been recently detected in trematode stages found in snail secretions and aquatic insects. Based on these findings, horses could conceivably be exposed to *E. risticii* by skin penetration with infected cercariae, by ingestion of infected cercariae in water or via metacercariae in a second intermediate host, such as an aquatic insect. In order to test this hypothesis, horses were challenged with infectious snail secretions and aquatic insects collected from a PHF endemic region in northern California. Two horses stood with their front feet in water harboring *E. risticii*-infected cercariae, 2 horses drank water harboring *E. risticii*-infected cercariae, and 6 horses were fed pools of different aquatic insects harboring *E. risticii*-infected metacercariae.

The only horse successfully infected in this study was fed mature caddisflies. The clinical signs and hematological changes were consistent with PHE. This study demonstrates that oral infection with caddisflies is not only possible, but also that the clinical disease produced is similar to that seen in naturally and experimentally infected horses. The laminitis which developed in this horse is a severe sign of PHF occurring in up to 40% of naturally affected horses. The fact that laminitis has only been reported in natural cases reinforces our conclusion that natural transmission probably occurs by the oral route through ingestion of trematode stages in insect intermediate hosts.

E. risticii is maintained in nature in a complex aquatic ecosystem and transmission to horses can occur through accidental ingestion of insects such as caddisflies containing infected metacercariae. The *Dicosmoecus gilvipes* caddisflies are widespread in the western montane of North America and are very abundant in the Shasta River. Mature caddisflies have been recorded from July to November, which coincides with the seasonal occurrence of PHF. We believe that caddisflies represent a probable source of infection due to their abundance in the natural environment, the high prevalence rate determined by PCR, and the mass hatches regularly observed during summer-fall. Under natural conditions, horses consume mature insects along with grass near rivers (as the insects live near water and therefore are likely to die there) or drink mature insects trapped on the water surface, or ingest recently dead insects that are attracted to stable lights and accumulate in feed and water. Other insects and free trematode stages have not been excluded as potential sources of infection. **Taken from: Meteghan, J. E., et al Equine Vet J 32:275-279, 2000; as reported in VetMed, Jan. 2001, Iowa State University, Ames, IA.**

Would You Believe?

There are more than 1.5 million vending machines in the U.S. with collected sales of over \$23 billion a year

What I've Learned

I've learned that whenever I decide something with kindness, I usually make the right decision.

Age 66

Mad Cow Disease & People

Bovine spongiform encephalopathy (BSE), better known as Mad Cow Disease, was identified in cattle in Great Britain in 1986. Necropsies of affected cattle showed that their brain tissue was pitted with holes, much like sponges. Hence the term "spongiform."

Researchers suspect that cattle got this disease from sheep, which have had a similar disease, called scrapie, for many years. Current reasoning is that proteins in sheep brains mutated to form infectious agents named prions which eat away brain tissue. The practice of feeding ground-up sheep tissue in cattle feed is believed to be the method of transfer of these prions.

As for human involvement, there was no obvious evidence linking the disease in cattle to illness in people. That is until the late 1990's, when a few young adults in Britain began showing signs of an intractable neurological disease. This turned out to be a variant of a rare disease in humans called Creutzfeldt-Jakob disease (CJD). This disease normally affects adults 50 years or older, causing muscle spasms, uncoordinated movements, dementia, and death within a few weeks. The variant form strikes young adults, often in their 20's, with similar signs which result in death at an average of 14 months after onset.

Research indicates that the disease is more transmissible from one species to another than was originally believed, but it has not been proven for certain that people can get the disease by eating meat from infected cattle.

Much remains to be discovered regarding this strange disease affecting a variety of species. The lack of an effective treatment is especially frightening, but focused research holds the promise of new and helpful information. **K.C. Roberts Feb. 2001**

Opportunities in Continuing Education

Spring 2001

<u>Date</u>	<u>Topic</u>	<u>Location</u>	<u>Contact Hours</u>
April 13 & 14	Applied Ultrasonography	Blacksburg	10
April 20 & 21	Gastrointestinal Endoscopy I	Blacksburg	10
May 25 & 26	Diagnostic Ultrasonography	Blacksburg	10
June 1 & 2	Introductory Echocardiography	Blacksburg	10
August 10 & 11	Introductory Echocardiography	Blacksburg	10
Sept. 7 & 8	Applied Ultrasonography	Blacksburg	10
November 8-10	Advanced Echocardiography	Blacksburg	21
December 7 & 8	Applied Ultrasonography	Blacksburg	10

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 registration or more information, please contact **Anne Clapsaddle**, VMRCVM – Virginia Tech, Blacksburg, VA 24061, (540) 231-5261; or **Conference Registration**, Continuing Education Center, (540) 231-5182.

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