VIRGINIA COOPERATIVE EXTENSION SERVICE
EXTENSION DIVISION - VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY - BLACKSBURG, VIRGINIA 24061

VIRGINIA-MARYLAND
REGIONAL COLLEGE
OF
VETERINARY MEDICINE

# VIRGINIA VETERINARY NOTES



July-August, 1986

No. 22

WHAT'S INSIDE!



Kent C. Roberts, DVM
Extension Veterinarian

## CANINE CORONAVIRUS INFECTIONS

Canine coronavirus (CCV) is just one of at least nine viruses known to be associated with infectious canine enteritis. The virus was first reported in the early 1970's as being reported or serologically detected in severe outbreaks of diarrhea and vomiting in "high risk" dogs, i.e. those dogs in research facilities, kennels, humane facilities, etc. Concurrent with CCV infections was the discovery of a new enteric virus of dogs in 1977-78, now commonly referred to as canine parvovirus (CPV). It was observed in 1980 that dogs infected with both CCV and CPV had a higher fatality rate than those dogs just infected with either virus alone.

CCV is highly contagious and spreads rapidly through kennels and groups of susceptible dogs primarily by fecal-oral transmission. The incubation period is considerably shorter than CPV, 1 to 4 days and is shed for up to 2 weeks after infection. The pathogenesis of CCV is very similar to TGE in pigs, i.e., oral infection leads to viral replication in the epithelial cells of the villi throughout the small intestine resulting in the shortening of the villi and decreased capacity for nutrient absorption.

It is difficult to differentiate CCV from other causes of diarrhea although it is generally believed that CCV is less severe than CPV and could be better described as a chronic/re-current or intermittent type of diarrhea. Dogs are usually presented with a sudden onset of diarrhea preceded in some cases by vomiting. Loss of appetite and lethargy are common signs. Fever is not constant and leukopenia is not a recognized feature of CCV. The majority of dogs affected recover spontaneously after 8-10 days. However, when secondary complicating factors are present (parasites, bacteria or other viruses), the clinical course can be significantly prolonged.

Clinical signs, demonstration of CCV in feces by electron microscopy, isolation of virus from feces in cell culture, serologic tests and histopathology on sections of the small intestine can be used to confirm a diagnosis of CCV. Coronaviral enteritis should be suspected whenever there is a rapid spread of gastrointestinal disease from dog to dog. It is also important to consider bacterial and parasitic infections, intoxications, acute pancreatitis, renal or hepatic failure and other causes of vomiting and diarrhea in the differential diagnosis.

Immunity to CCV appears to differ from CVP in that CCV is a <u>localized infection</u> of the gastrointestinal tract and relies upon <u>localized immunity</u> for infection control and prevention of disease. Immunity of CPV occurs not only locally in the GI tract, but also at the systemic level, since it is capable of spreading in the blood and disseminating to body organs.

Following natural infection with CCV, dogs become immune to disease for a period of months as long as localized antibody is present. When the local antibody declines, the dog is again susceptible to re-infection and disease. This time course would explain the apparent recurrent nature of CCV infection-disease, especially in "high risk" dogs that are in continual contact with other dogs. Maternal antibodies to CCV are usually low and only present 4 to 5 weeks. A loose stool or diarrhea can occur in pups at 4 to 6 weeks concurrent with a decline in maternal antibody protection.

In the summer of 1985 a killed CCV vaccine was released for the prevention of infections due to CCV. The vaccine is administered twice at 2 to 3 week intervals. The measures of efficacy of the vaccine were seroconversion of pups to the vaccine and demonstration of intestinal tract protection from a virulent CCV challenge given orally and intranasally. The results indicated that the vaccine was effective in protecting the small intestine from CCV infection in a high percentage of the vaccinated pups. Although it would be assumed that since the vaccine reduced the level of CCV intestinal infection that it would also protect against the disease, field studies documenting the reduction in canine enteritis-diarrhea have not yet been reported. The use of CCV vaccine should be approached conservatively until its true efficacy can be determined. Two groups of dogs which would benefit from adequate CCV immunity would be "high risk" dogs, pregnant dogs where maternal antibodies in colostrum would be important in protecting the pup for periods longer than 4 to 5 weeks.**--Dr. Jim Evermann, College of Veterinary Medicine, WSU, as reported in Animal Health Notes, Washington State University Cooperative Extension, Vol. 7, No. 10, October 1985, and Veterinary Newsletter, University of Florida, Nov/Dec, 1985.**

## OVERFEEDING ENERGY TO HORSES

Many joint problems appear in weanling and yearling horses cannot be related to any injury or infection. These problems include swollen knees and fetlocks (epiphysitis), and dying and breaking off of thickened joint cartilage, usually in the stifle (osteochondrosis). The swollen appearance is the result of thickening of growth plate cartilage adjacent to the joint, while the changes in the joint cartilage directly result from overgrowth (hypertrophy) of the cartilage.

Because these disorders are frequently noticed in horses that appear "tall for their age," a number of veterinarians have claimed that this results from the horses being forced to grow "too rapidly." They have concluded that either bone is produced so quickly that it is not reinforced and remains weaker than normal, sagging under the animal's weight, or else mineral deficiencies in the feed are exaggerated by the excessive feeding of energy and protein.

However, several experiments testing these theories have failed to reveal any connections between feed mineral deficiency and either swollen bones or overgrowth of cartilage. In addition, young horses fed correct amounts of energy and protein, but insufficient amounts of minerals suffer from stunted growth and weakened, soft bones, but not from enlarged cartilage.

Researchers, stymied by their failure to produce joint disorders under controlled conditions, noticed similarities between epiphysitis, osteochondrosis and the skeletal problems that accompany thyroid deficiency in horses. At about the same time, it was discovered that rations adequate in all minerals, including iodine, calcium and phosphorus, but excessive in energy content, altered the actions of thyroid hormone in weanling horses. This effect involves newly-discovered interactions of the thyroid gland with enzymes in the pancreas and liver.

It is becoming more and more clear that the skeletal problems associated with rapid growth in young horses result from interference with normal hormonal functions. This interference is caused by overfeeding energy, and not by mineral deficiency.**--(M.J. Glade, Ph.D., Equine Veterinary Science VS #2, 1985 Utah Veterinary Newsletter, from Veterinary News, Clemson University, March 1986), Animal Health Beat, University of Nevada-Reno, April 1986.**

## NEW RESEARCH ON THE EFFECTIVENESS OF CASTRATING HORSES TO CONTROL BEHAVIOR

Common wisdom has some very opinionated things to say about the subject of castrating horses. But as is often the case with common wisdom, the accepted answers aren't always 100 percent accurate. A new study published in the Journal of the American Veterinary Medical Association by Scott W. Line, CVM, Benjamin L. Hart, DVM, and Linda Sanders addresses the effectiveness of castration as a behavior-modifying technique. To begin with, although much is believed about the effectiveness of castration, little is really known about how successful it is in preventing objectionable sexual or aggressive behavior.

Dr. Line's findings are that about 20 to 30 percent of horses castrated before two years of age can be expected to display stallion-like interest in mares and aggression toward other horses. About 5 percent are aggressive toward people. Previously, the unexpected behavior was attributed to improper castration technique that does not remove all the androgen-producing tissue. But that's not the case, says this study. The aggressive geldings had no more of the "male" hormone in their blood than the nonaggressive geldings. In reality, there is a "normal" percentage of stallion-like behavior always possible among any given number of geldings, which can't be blamed on faulty gelding procedure.

If it's any consolation, dog and cat owners have the same problem with their castrated pets. Dogs castrated before puberty have been known to exhibit such "male" behavior as mounting. Dr. Line also calls readers' attention to studies that indicate the same rate of urine spraying and aggression in male cats castrated before or after puberty.

Where horses are concerned, castration does largely eliminate objectionable sexual behavior and aggression toward people. The effectiveness is between 60 and 70 percent, which is excellent if not perfect. That percentage is fairly close to that observed in dogs and cats. Dr. Line points out that in adult male cats, castration will reduce spraying, roaming, or fighting behavior from 80 to 90 percent of the time; in dogs, castration will reduce mounting, aggression toward other dogs, and urine marking in the house from 50 to 60 percent of the time.**--Animal Health Newsletter, Cornell University College of Veterinary Medicine, Volume 3, Number 6, August 1985.**

## NEW HEAD OF SMALL ANIMAL SURGERY

Peter Shires, B.V.Sc., M.S. has joined the faculty at the Virginia-Maryland Regional College of Veterinary Medicine. He will serve as Section Chief, Small Animal Surgery on the staff of the College's Teaching Hospital in Blacksburg. He is a Diplomate, American College of Veterinary Surgeons.

A graduate of the University of Pretoria, South Africa, Dr. Shires operated his own practice in that country before doing a surgery residency at Auburn University. He comes to Virginia Tech after seven years on the staff at Louisiana State University School of Veterinary Medicine. His special interest is in orthopedic and spinal surgery.

Peter and Jeannette Shires have three children. The family is involved in soccer, scouting, camping, and swimming.

## TOXOPLASMOSIS AND SEROLOGICAL RESULTS IN CATS

A positive serological result in cats simply means the cat has been previously infected with the agent Toxoplasma gondii. In the absence of clinical manifestations suggestive of toxoplasmosis, it has little significance. Although there is a relatively high prevalence rate of this infection in cat populations, overt clinical disease is uncommon. The parasite is well adapted to its host and can remain viable in host tissues for years without causing clinical signs.

Indoor cats are generally serologically negative, unless they are habitually fed raw meat products. Outdoor cats, including those allowed outside for brief intervals, have the highest prevalence of toxoplasmosis. Several days following ingestion of an infectious meal, oocyst production begins and continues for 14-21 days, with millions of oocysts being shed in the feces. After the appearance of serum antibody, oocyst shedding usually ceases. Therefore, even though a cat may be serologically positive for extended periods, it generally will not be shedding oocysts.

Recrudescence of oocyst shedding is relatively uncommon. It has been experimentally induced, although at substantially reduced levels and for abbreviated intervals, following immunosuppressive therapy or subsequent to immunosuppressive infections. A serologically positive cat rarely would be a source of infection to humans. If a serologically positive cat ingests another infectious meal, oocyst shedding is generally not observed. If in the rare event it does occur, only a few oocysts are shed for a short time. Therefore, we recommend that pregnant women take precautions when handling cat litter pans, even though transmission is remote.

Usually, T. gondii is not pathogenic in cats. It is prevalent in some cat populations, and may have been present in the cat fora long time prior to the current condition. Elevated antibody levels in chronically infected cats are usually persistent. When the differential diagnosis for a clinically ill cat includes toxoplasmosis and the cat is serologically positive for toxoplasmosis, clinicians often think that toxo is the problem. However, the toxo titer may be only incidental to the clinical observations.

Alternatively, a positive toxo titer may support the clinical findings, particularly when the titer is very high. This is suggestive of increased stimulation of the immune system, either by a recently acquired infection of by the persistent release of zoites from the pseudocysts in tissues harboring large numbers of organisms. Periodically, however, we see high titered cats which are clinically normal. Therefore, the level of anti-toxo antibody in cats is not necessarily directly related to disease.

Recently, test kits for detecting serum antibody to T. gondii have become available. Generally, these only indicate whether the cat is serologically positive or negative (qualitative result) and do not provide a titer (quantitative result). If one is screening cats for the presence of anti-toxo antibody to assess the infection status, the tests can provide useful information. These same results can be misleading when confirming a clinical diagnosis of toxoplasmosis. With the current increase in serological testing systems, it is essential that clinicians demand an interpretation of serological results for a given system This is especially important because there are no officially accepted standards for test validation. Only when interpretative information includes the aforementioned factors can informed decisions be made in support of the differential diagnosis.

Quantitative results are the most useful in assessing the significance of serology for toxoplasmosis. Although some useful information can be obtained from qualitative tests, their usefulness in understanding the role of T. gondii in a differential diagnosis is reduced due to the relatively high prevalence of the infection in certain cat populations.--**Veterinary Information, North Carolina State University, Volume VII - No. 1, Notes from Extension Veterinarians, Kansas State University, May 1986.**

## SMALL ANIMAL DERMATOLOGY NOTES

*Contact dermatitis is commonly over diagnosed.

*Behavioral skin problems in cats are commonly underdiagnosed.

*Cats rarely work on skin problems in the owner's presence.

*A good dermatological history will point to a diagnosis in approximately 70% of all skin cases.

*Approximately 40% of all dogs and 80% of atopic dogs react positively to the flea antigen test.

*Approximately 20-25% of those dogs positive to the flea antigen test only have a delayed reaction 12-72 hours after the test.

*Chronically pruritic patients seldom have only one skin problem; concurrent and secondary complicating problems are common.

*An effective rinse should follow any skin shampoo.

*Pruritus in warmer climates is often due to a combination of atopy, flea bite allergic dermatitis and superficial pyoderma.

*Superficial pyodermas and secondary seborrheas are common pruritic disease complications.

*Determine which came first; the skin lesions or the licking/biting by the patient.

*A diagnosis of food allergy should be considered in any young animal suffering from intense pruritus.

**Dr. John R. August, VA-MD Regional College of Veterinary Medicine, SA Medicine Update, April 1986.**

## COMMON CAUSES OF EQUINE ABORTION

Aborted equine fetuses often present a diagnostic challenge to the practitioner. Many go undiagnosed. Some of the more common causes of abortion in the mare and their diagnostic lesions are described.

Twinning - This diagnosis is obvious. There are 2 fetuses and 2 placentas, usually aborted during the 2nd or 3rd trimester. The underlying cause of abortion in these cases is assumed to be insufficient placentation. Because the two placentas abut against each other, rather than making contact with the maternal attachment sites, the nutrient blood supply to the fetus is inadequate and abortion occurs. The fetuses may or may not appear emaciated. A gross necropsy examination is the definitive diagnostic test.

Umbilical twisting and strangulation - Caution must be used in attributing the cause of an abortion to umbilical twisting and/or strangulation. It is common and normal for the long umbilical stalk to be twisted upon itself 7 or 8 times. The key lesion here is to document vascular compromise due to the twisting. The definitive diagnostic test is a careful gross necropsy. Diagnostic lesions include edema of the umbilical cord and/or placenta often with a sharp line of demarcation. If the vascular insufficiency has been prolonged the fetus may be emaciated. It is possible, but rare, for the umbilicus to become twisted around one of the foal's legs or head. However, vascular impairment in these cases must also be documented.

Equine viral rhinopneumonitis - The foal is usually aborted during the 3rd trimester or at term. The fetus is usually fresh, not autolyzed, when aborted. The lesions at gross necropsy are subtle and may be overlooked. The lungs are firm and may appear larger than normal, having rib impressions on the surface. Multifocal yellow white areas (1-4 mm) of necrosis are scattered throughout the lung. Occasionally a plug of fibrin or meconium is found in the trachea. Often there is subpleural and mediastinal edema. Multifocal areas of necrosis, similar to those in the lung, are usually found in the liver. Small samples of liver, lung, and adrenal gland (especially) should be immersed in 10% neutral buffered formalin for histopathologic examination. Fresh samples of liver, lung, and adrenal gland should be submitted for virologic examination. It is best to refrigerate these samples and send them to the lab packed in ice.

Mycotic - Although more common in cattle, mycotic abortions occur in horses. The major lesion is a thickened, dry, granular, leathery placenta. Earliest lesions are usually in the region of the cervical star. Occasionally, there may be small, irregularly shaped dull, white to tan, dry plaques on the skin of the foal. There are usually no internal lesions. Placenta, lung, liver, and adrenal should be submitted, in formalin, for histopathologic examination. Fresh (refrigerated) samples of placenta and stomach contents should be submitted for microbiology.--**Lois Roth, DVM, PhD, DACVP, VA-MD Regional College of Veterinary Medicine, Blacksburg, VA.**

## THOUGHT FOR THE MONTH

When you lose confidence in yourself -- you make it unanimous.

## CONTINUING EDUCATION OPPORTUNITIES

| | |
|---|---|
| June 20-22, 1986 | Virginia Veterinary Medical Association<br>Summer Sojourn - Wintergreen, VA |
| September 24-25, 1986 | Small Animal Medicine Update<br>Tidewater and Charlottesville, VA |
| September 28, 1986 | Charleston, WV |
| October 17-18, 1986 | Small Animal Fracture Repair<br>Lecture/Wet Lab - Blacksburg, VA |
| November 21-22, 1986 | Practical Eye Surgery<br>Lecture/Wet Lab - Blacksburg, VA |

Virginia-Maryland Regional College of Veterinary Medicine Extension Staff:

Dr. J. M. Bowen - Extension Specialist - Equine
Dr. C. T. Larsen - Extension Specialist - Avians
Dr. K. C. Roberts - Extension Specialist - Companion Animals
Dr. H. F. Troutt - Extension Specialist - Swine
Dr. W. Dee Whittier - Extension Specialist - Cattle

K. C. Roberts, Editor
Barbara B. Jones, Managing Editor of VIRGINIA VETERINARY NOTES

COOPERATIVE EXTENSION SERVICE
U. S. DEPARTMENT OF AGRICULTURE
VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY
BLACKSBURG, VIRGINIA 24061