

EQUINE DISEASE QUARTERLY

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COMMENTARY

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Critical Reading, Careful Thought, and Common Sense

WITH THE ADVENT OF FAXES, THEN E-MAIL AND the World Wide Web, use of the above principles are more necessary now than ever before. Rumors and inaccurate, incomplete information can spread worldwide with the click of a mouse, causing concern, economic consequences, and even panic.

One recent mass e-mail from "Jane" screamed about massive numbers of horses dying of neurological disease in Virginia. The message stated that all horse shows were canceled, and owners were advised to stop all movement of horses. In fact, one farm and four horses were involved in the equine herpesvirus outbreak, which did not spread outside the farm.

Lesson: Beware of e-mail messages from unknown sources, and follow up (if necessary) by gaining information from reliable sources, such as the state veterinarian's office.

Lies and Statistics

Headline: "State X Reports a 200% Increase in Equine Rabies Cases in 2002."

Percentages, and even raw numbers, can be deceiving if not put into proper context. Two equine rabies cases in 2001 and four cases in 2002 would, in fact, be a 200% increase. But, how many horses are at risk in the defined (or undefined) area in each given year? Did the population of horses increase? Were all suspect cases necropsied and tested for rabies? How many horses were properly vaccinated for rabies each year (usually unknown, and rarely quantified)? Historically, what is the disease incidence? Perhaps two to four cases is actually low for State X, considering the previous 10-year average was much higher, and the "200% increase" is nothing more than an attention-grabber.

Lesson: Carefully read details in disease reports, not just headlines.

An Anecdote Is an Unpublished Narrative

During the 2001 outbreak in Kentucky of Mare Reproductive Loss Syndrome (MRLS), anecdotal reports were made of similar abortions occurring in a number of other states, causing significant concern. Upon further investigation, however, few aborted term fetuses in these other states were necropsied to rule out common causes of abortion, and few pastures were tested for endophyte-infected tall fescue. University of Kentucky pathologists and scientists were able to determine that this was a new syndrome, since all fetuses tested negative for known abortigenic pathogens, and pastures tested negative for endophytes and other toxic agents.

Another caution with anecdotes—who is the source? Is the information coming from a veterinarian with 25 years of practice experience, or a 16 year-old pony clubber who owns one horse? Take anecdotes from unknown sources with a grain of salt.

"Interesting" Advertising

In a recent equine publication, a breeding farm boasted in its advertisement "100% conception rate in 2002." To an unassuming consumer, that sounds quite impressive. However, a critical reader asks, "What is the live birth rate?" and "How many mares were bred?" Getting one mare bred and in foal equals a 100% conception rate.

Being critical, asking questions, clarifying the meaning of numbers—these are the keys to being an informed, knowledgeable person and consumer in today's fast-paced information world.

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LLOYD'S



INTERNATIONAL

First Quarter 2003

THE INTERNATIONAL COLLATING CENTRE, Newmarket, reported the following disease outbreaks:

Seven of 10 ponies and horses on two premises in Switzerland were euthanised, suspected of suffering from botulism after being fed silage/haylage. Treatment with hyperimmune serum (Types C and D) did not influence the outcome. A further case of Contagious Equine Metritis (CEM) was confirmed in the United Kingdom in a non-Thoroughbred mare known to have been covered by a non-Thoroughbred stallion in which the disease had been confirmed during October 2002. At the time of testing in March 2003, the mare was subject to movement and breeding restrictions, having been identified as an "at risk" animal.

Three cases on two premises of equine herpesvirus abortion (EHV-1) were reported from Germany and from Ireland on three premises plus one premise on which EHV-4 was diagnosed as the cause. On the island of Hokkaido, Japan, 12 mares on six premises aborted due to EHV-1 and less than 10 cases each were reported from Sweden and the United Kingdom. In Central Kentucky from November 2002 to the end of March 2003, 19 cases were diagnosed among Thoroughbred mares on 18 premises.

Since the middle of March to the end of April, the Animal Health Trust, Newmarket, England, has confirmed equine influenza in 20 racing stables in the Newmarket area. Clinical signs among these horses, most of which had received a booster vaccination in late December 2002, were mild, including coughing at exercise and a nasal discharge developed by some horses. Characterization of the isolates confirmed they are closely related to an American lineage H3N8 virus isolated in America during 2002 (A/eq/ Kentucky/5/02). Influenza infection has also been confirmed in non-racing stables containing vaccinated and non-vaccinated horses in several other areas of England. Clinical signs have been more severe in non-vaccinated horses, including fever, a harsh cough, and a purulent nasal discharge.

Turkey reported an extensive outbreak of leptospira infection among Thoroughbred horses on 10 premises based on serological diagnosis. Rotavirus infection was diagnosed among foals on one premise in Argentina and two premises in Ireland.

Outbreaks of strangles were reported from Ireland, Sweden, Switzerland, and the United Kingdom.

Equine Herpesvirus Neurological Disease in the USA and United Kingdom

BETWEEN JANUARY AND MARCH 2003, CASES OF the neurological form of equine herpesvirus type 1 (EHV-1) have been reported in four states within the USA and three counties in the south of England.

In the United States, the first cases occurred in January 2003 at a large equestrian facility housing 130 horses at the University of Findlay in northwest Ohio. Thirty horses developed signs associated with the neurological form of EHV-1, of which 12 were euthanised. EHV-1 was isolated from eight horses. Four severely affected cases were moved to The Ohio State University Veterinary Clinic in mid-January. In

February a number of horses, which had been hospitalized at the clinic during the same period, developed clinical signs after being discharged from the hospital and infected several horses on three farms. Since mid-February, no further cases related to this outbreak have been reported.

During February and March 2003, three Thoroughbred racehorses at Penn National Racetrack, Pennsylvania, developed neurological signs, of which two were euthanised. Samples from these animals were positive for EHV-1. The horses were stabled in two barns, and a restriction of movement of horses in those



Equine Disease Quarterly

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barns was applied. Four other horses at the racetrack tested positive for EHV-1 in late March but did not develop neurological signs.

In February, a horse on a farm in Virginia was euthanized after it became ataxic, and EHV-1 was isolated from this animal.

Most recently in March, two Thoroughbred horses stabled at Turfway Park racetrack in Northern Kentucky developed ataxia and were referred to an equine clinic in Central Kentucky. Samples from both these animals, which subsequently recovered, were positive for EHV-1. A mare at the clinic that displayed similar signs subsequently aborted, and the fetus was positive for EHV-1. A third racehorse at Turfway in the same barn as the other two horses developed a fever, and EHV-1 was isolated from this animal. Restrictions on the movement of all horses in this barn and daily recording of temperatures were initiated on March 17 and continued until April 5. No further cases were reported, and the restrictions were lifted. Four 2-year-old horses were shipped to a trainer at Turfway on March 28. When examined by the attending veterinarian within 24 hours of arrival, they exhibited elevated temperatures but no neurological signs. Equine herpesvirus type 4 (EHV-4) was isolated from nasopharyngeal swabs obtained from each animal.

Numerous state diagnostic and veterinary college laboratories, as well as the OIE International Reference Laboratory for Equine Herpesvirus Disease at the Maxwell H. Gluck Equine Research Center, have been involved in the examination of material from febrile and

ataxic horses. The samples included heparinized blood, nasopharyngeal swabs, and post-mortem tissue, which were examined utilizing virus isolation and PCR. Isolates of EHV-1 recovered by the Maxwell H. Gluck Equine Research Center laboratory from cases of neurological disease on eight affected premises are currently being analyzed at the genetic level in an attempt to establish specific epidemiological relationships among the different geographic foci of infection.

The pattern of cases of EHV-1 neurological disease in England reported by the Animal Health Trust (AHT), Newmarket, has been very similar. The diagnosis was confirmed at the AHT by virus isolation from blood and nasopharyngeal swabs plus serology, as well as detecting viral antigen by special staining in the brain and spinal cord of post-mortem cases.

Vaccination histories in both the United States and England confirmed that EHV-1 neurological disease occurred in both vaccinated horses and in horses with no known vaccination history. Important lessons to be learned from these outbreaks are that all sick and in-contact horses should not be moved once clinical signs are observed. Also, when multiple cases of febrile neurological disease are observed, laboratory confirmation of the infectious agent should be determined as soon as possible.

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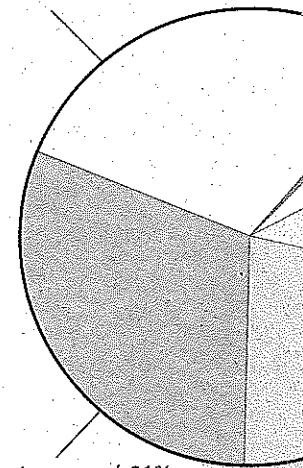
NATIONAL Fetal Sex Determination

FETAL SEX DETERMINATION IS A NEW MANAGEMENT tool being incorporated into many farm breeding programs. Depending on the sire and dam, the fetal gender may affect the value of the foal and the mare. If the value of the mare changes depending on the gender of the foal, then appraisals, sales reserves, insurance coverage, and collateral limits for loans could all be affected. Knowledge of the fetal gender could impact management decisions such as

where to foal the mare. If an owner wishes to race a colt bred in New York, it is impractical to send the mare carrying a filly to foal in New York. Other considerations include cash flow predictions in determining whether the offspring will be for sale (income) or racing (expense). An owner may want a foal of a particular sex from a particular cross. If the sex of the foal is what the owner desires, then it would be feasible the following year to breed the mare

Figure 1. Equine Nervous System

Infectious/inflammatory: 31%



Developmental: 31%

Source: Equine necropsies performed at the University of Kentucky Livestock Diagnostic Center, January 1993-October 1995.

to another stallion. If the foal is not the desired sex, then the owner would again breed the mare to the same stallion. If a mare is carrying a colt, the size of the fetus may be of some concern, requiring extra precautions at foaling. Each year as the demand for fetal sex determination increases, there are more reasons for mare owners to want to know the sex of the fetus.

Different techniques of ultrasound examination (scanning) are required for the varying stages of gestation. A technique using a rectal probe, performed at between 55 and 90 days of gestation, involves finding the genital tubercle, precursor to the penis in the male and the clitoris in the female, to determine its location relative to other fetal structures. The genital tubercle appears as a hyperechoic bilobulated equal sign 2 to 3 millimeters in length between the hind legs on the ventral midline of both sexes at 50 to 55 days. Migrations of the tubercle that indicate the sex of the fetus begin about day 54 to 55. A determination cannot be made before 55 days, because the migration toward the umbilical cord in the male or toward the anus in the female has not yet occurred. Using this technique, the veterinarian should be able to make a diagnosis 95% of the time on the first examination with 99% accuracy, which should take a few seconds to five minutes to perform.

A second technique, also using a rectal probe, is performed between 90 days and 150 days of gestation and involves finding the external genitalia of the fetus, the penis, glans penis, prepuce, and testes in the male and mammary gland, teats, clitoris, and ovaries in the female. At this stage the veterinarian should

be able to provide a diagnosis 90% of the time on one examination with 99% accuracy. It should take from a few seconds to 10 minutes to perform, depending on the experience of the practitioner.

At around 150 days of gestation, the fetus begins to assume an anterior presentation, at which stage the head is easily accessible but the pelvic area is out of reach. The fetus is much larger and does not change positions so often. Therefore, rectal scanning for the determination of the sex of the fetus after 150 days is very difficult. The percent of diagnosis by this method between 150 to 200 days is low—5% to 25% of attempts made.

The third technique involves performing a transabdominal scan and identifying the external genitalia after 150 days of gestation. In the author's experience, determining the sex of the fetus transabdominally has a very low percentage of diagnosis and is time consuming. Additionally, clipping of the abdomen is sometimes required and requires access to a more powerful ultrasound machine. It is therefore recommended that techniques one and two be used for determination of fetal sex in the equine.

Learning these techniques provides a worthwhile service to clients but requires many hours of actual sonographic visualization of the equine fetus between 55 to 150 days of gestation. Only when the sonographic cross-sectional anatomy of the fetus is learned will confidence of an accurate sexual determination be achieved.

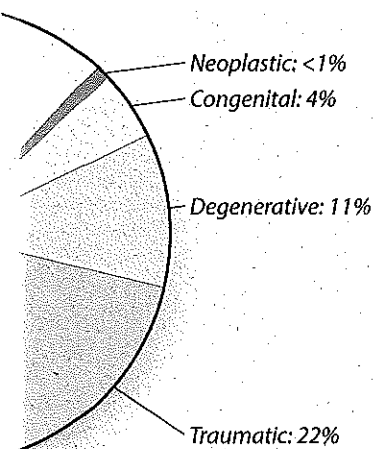
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Early West Nile Activity, 2003

AS OF JUNE 9, CASES OF WEST NILE HAVE BEEN reported among dead birds in Alabama, Florida, Georgia, Illinois, Iowa, Louisiana, Michigan, Mississippi, New Jersey, New York, Pennsylvania, South Carolina, Texas, and Wyoming. Positive mosquito pools have been identified in Georgia, Louisiana, New Jersey, and Pennsylvania and sentinel avian flocks in Florida

and North Carolina. Equine cases have been diagnosed in Alabama, Arkansas, Georgia, Kentucky, Minnesota, North Dakota, Texas, and Wisconsin. Outside of the United States, equine cases have been reported from El Salvador in Central America, the furthest point south the disease has been recognized, and a positive bird in Ontario, Canada.

Diseases by Type



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Equine Neurologic Disease

HORSES OF ALL AGES AND BREEDS CAN BE AFFECTED with disease involving the nervous system. Horses with neurologic disease may exhibit changes in behavior or mental status, seizures, inability to eat or drink normally, altered head position, changes in locomotion, weight loss, or other signs, including sudden death. These diseases may be acute or chronic, and can be the result of congenital, developmental, traumatic, degenerative, infectious/inflammatory, neoplastic, and other processes. When death ensues or the condition necessitates euthanasia, a necropsy examination is often sought to establish a diagnosis or confirm the clinical diagnosis.

Horses that undergo a neurological necropsy examination should be submitted to the laboratory as soon after death as possible, since post-mortem decomposition of the nerve tissue proceeds rapidly. A complete history is important, as well as a detailed clinical neurologic examination prior to death. This examination greatly assists the pathologist by localizing the lesion to an area of the nervous system, or by indicating diffuse or widespread involvement. Additionally, certain non-neurological diseases can appear clinically to be neurologic in origin, and a complete examination can help differentiate these. Rabies can cause a range of clinical signs in horses and must be considered a possibility in most cases of equine neurologic disease of less than 10 to 12 days' duration.

Neurologic necropsy examinations are difficult and time consuming. This is due to the difficulty of removal of the brain and spinal cord. Special training and equipment are required in order to perform central nervous system removal. Certain viral diseases are zoonotic, and proper procedures are required to minimize risk of transmission to necropsy room workers. Brain and spinal cord removal are usually accomplished by a combination of sawing and disarticulation of the skull and vertebrae. The vertebrae and skull must be handled in such a way that detailed examination of these bones can also be undertaken, since fractures or bone abnormalities can cause nervous system damage and signs of disease.

Once removed, the brain and spinal cord are examined and samples are taken for bacteriology, virology, or toxicology. The remainder is usually immersed in formalin for fixation prior to processing for microscopic examination. As part of a complete necropsy examination, the other body systems are also examined, and appropriate samples are retained.

A database search over a three-year period from 2000-2002 revealed that 8,833 equine necropsies were performed at the University of Kentucky Livestock Disease Diagnostic Center (LDDC). Of this total, 565, or 6.4%, had diagnoses referable to the nervous system. In a prior *Equine Disease Quarterly* report (Vol. 4, No. 2, 1996) encompassing 34 months (Jan. 1993 to Oct. 1995), 397 (8.7%) of a total of 4,559 equine necropsies had neurologic diagnoses. This comparison implies a constant occurrence of neurologic diseases on a percentage basis, even though the overall equine caseload has increased considerably since 1995.

The majority of equine neurologic cases examined at the LDDC could be classified as developmental or infectious/inflammatory diseases (**Figure 1**). All of the cases in the developmental classification were cervical stenotic myelopathy (cervical vertebral malformation-malarticulation) cases. There were 158 cases of cervical stenotic myelopathy over the three-year period, making it the most common neurologic disease, accounting for about one-third of all equine neurologic cases. Horses with cervical stenotic myelopathy ranged in age from less than 1 year to 8 years old, with 67% of the horses being yearlings. In keeping with the general population, 79% of the cases were Thoroughbreds; however, a total of six different breeds were represented.

The infectious/inflammatory disease group had 161 cases. Included in this group were 23 cases diagnosed as equine protozoal myeloencephalitis. With the spread of West Nile virus to Kentucky, 35 cases were diagnosed as West Nile virus infection in 2002. This category also included cases of encephalitis, myelitis, and meningitis in which conclusive causes were not found. These likely would include additional cases of viral encephalitis and equine

protozoal myeloencephalitis that could not be definitively diagnosed due to insufficient lesion development, condition of the tissue, or the lack of microbiological confirmation. During the three-year period, 191 horses were tested for rabies, and none of the horses were positive. Five cases of rabies were diagnosed in other species.

One hundred and fifteen cases were associated with trauma to the nervous system. These included cases of hemorrhage into the central nervous system (67 cases) and fractures (29 cases). Fractures of the skull accounted for 13 cases and vertebral fractures for 16 cases. All segments of the spinal column were involved, but fractures were most common in the cervical spine.

Degenerative diseases included 52 cases of non-specific encephalopathy and myelopathy,

four cases of leukoencephalomalacia associated with moldy corn ingestion, and one case of equine motor neuron disease. Congenital anomalies accounted for 24 cases of the neurologic diagnoses. Within this group were a variety of conditions including hydrocephalus, anencephaly, and encephalocele.

Tumors of the central nervous system were very rare, with only a cholesteatoma (actually a granuloma, not a tumor) and a single case of metastatic melanoma diagnosed during the three years. No primary tumors of the nervous system were diagnosed.

Cervical stenotic myelopathy is a major cause of neurologic disease losses in Kentucky and points to the need for better strategies to prevent and manage this disorder.

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MRLS Proceedings and Bibliography

THE PROCEEDINGS OF THE FIRST WORKSHOP ON Mare Reproductive Loss Syndrome, held in August of 2002, are now available in print and online. To access the proceedings on the Web, go to: <http://www.uky.edu/Agriculture/VetScience/mrls/index.htm> and follow the link for the online version. The online version of the proceedings is in PDF format. For a print copy of the proceedings contact: Gracie Hale,

ghale@uky.edu, Morris Library, Maxwell H. Gluck Equine Research Center, University of Kentucky, Lexington, Kentucky 40546.

A bibliography of resources related to Mare Reproductive Loss Syndrome is also available from the Morris Library. To request a copy of the bibliography, please use the above contact information.

Equine Disease Quarterly Newsletter

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