The Modern Equine Vet
www.modernequinevet.com
Vol 11 Issue 2 2021

Horses Are Talking; Are You Listening?

Biomarkers for Predicting Lameness

Amy Grice: Challenges Facing the Equine Profession

Technician Update: Role in Biosecurity

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The Modern Equine Vet

SALES: Matthew Todd • Matthew Gerald
EDITOR: Marie Rosenthal
ART DIRECTOR: Jennifer Barlow
CONTRIBUTING WRITERS: Paul Basillo • Adam Marcus
COPY EDITOR: Patty Wall

Published by

PERCYBO media publishing

PO Box 935 • Morrisville, PA 19067
Marie Rosenthal and Jennifer Barlow, Publishers

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1 Data on file.

2 Adequan® i.m. Package Insert, Rev 1/19.

3 Burba DJ, Collier MA, DeBault LE, Hanson-Painton O, Thompson HC, Holder CL: In vivo kinetic study on uptake and distribution of intramuscular tritium-labeled polysulfated glycosaminoglycan in equine body fluid compartments and articular cartilage in an osteochondral defect model. *J Equine Vet Sci* 1993; 13: 696-703.

4 Kim DY, Taylor HW, Moore RM, Paulsen DB, Cho DY. Articular chondrocyte apoptosis in equine osteoarthritis. The Veterinary Journal 2003; 166: 52-57.

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PP-AI-US-0372 02/2020

Signs of a problem in medium level dressage horse in right canter: Ears back; intense stare; and the bit is pulled through to the right.

Hey, I'm Talkin' HERE!

By Marie Rosenthal, MS

Horses can't talk, but they do communicate, giving clues that they are experiencing musculoskeletal pain, according to **Sue Dyson,** MA, Vet MB, PhD, DEO, DECVSMR, FRCVS, an independent consultant.

"We have to recognize that lameness may manifest as a change in performance rather than overt lameness in the conventional sense, and I believe that recognition of aspects of behavior can highlight the likely presence of musculoskeletal pain," she said.

Dr. Dyson and her colleagues developed the Ridden Horse Pain Ethogram (RHpE) of observable behaviors that could signal a horse is experiencing pain.

"To find the clues requires more than just watching the animal on the lunge, but observing it being ridden," she said during a virtual presentation of the American Association of Equine Practitioners Annual Meeting.

"We were able to identify those features, which were most commonly associated with pain," she said. Of an original list of 117 behaviors, they narrowed it to 24 behaviors, most of which were at least 10 times more likely to be seen in lame horses than nonlame horses. These include facial markers, body markers and gait markers (see chart).

"We determined that there were significant differences in behavior scores in nonlame horses compared with lame horses," she said. When they used this ethogram on a series of horses, lame horses presented a maximum of 14 of the 24 behaviors with median and

Photos courtesy of Dr. Sue Dyson

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PRECAUTIONS: Corticosteroids, including BetaVet®, administered intra-articularly are systemically absorbed. Do not use in horses with acute infections. Acute moderate to severe exacerbation of pain, further loss of joint motion, fever, or malaise within several days following intra-articular injection may indicate a septic process. Because of the anti-inflammatory action of corticosteroids, signs of infection in the treated joint may be masked. Due to the potential for exacerbation of clinical signs of laminitis, glucocorticoids should be used with caution in horses with a history of laminitis, or horses otherwise at a higher risk for laminitis. Use with caution in horses with chronic nephritis, equine pituitary pars intermedia dysfunction (PPID), and congestive heart failure. Concurrent use of other anti-inflammatory drugs, such as NSAIDs or other corticosteroids, should be approached with caution. Due to the potential for systemic exposure, concomitant use of NSAIDs and corticosteroids may increase the risk of gastrointestinal, renal, and other toxicity. Consider appropriate wash out times prior to administering additional NSAIDs or corticosteroids.

ADVERSE REACTIONS: Adverse reactions reported during a field study of 239 horses of various breeds which had been administered either BetaVet® (n=119) or a saline control (n=120) at five percent (5%) and above were: acute joint effusion and/or local injection site swelling (within 2 days of injection), 15% BetaVet® and 13% saline control; increased lameness (within the first 5 days), 6.7% BetaVet® and 8.3% saline control; loose stool, 5.9% BetaVet® and 8.3% saline control; increased heat in joint, 2.5% BetaVet® and 5% saline control; and depression, 5.9% BetaVet® and 1.6% saline control.

DOSAGE AND ADMINISTRATION: Shake well immediately before use. Use immediately after opening, then discard any remaining contents.

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References: 1. Trotter GW. Intra-articular corticosteroids. In: McIlwraith CW, Trotter GW, eds. *Joint Disease in the Horse.* Philadelphia: W.B. Saunders; 1996; 237–256.

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DOSAGE AND ADMINISTRATION: Shake well immediately before use.

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CLINICAL PHARMACOLOGY: Betamethasone is a potent glucocorticoid steroid with anti-inflammatory and immunosuppressive properties. Depending upon their physico-chemical properties, drugs administered intra-articularly may enter the general circulation because the synovial joint cavity is in direct equilibrium with the surrounding blood supply. After the intra-articular administration of 9 mg BetaVet® in horses, there were quantifiable concentrations of betamethasone (above 1.0 ng/mL) in the plasma.

EFFECTIVENESS: A negative control, randomized, masked field study provided data to evaluate the effectiveness of BetaVet® administered at 1.5 mL (9 mg betamethasone) once intra-articularly for the control of pain and inflammation associated with osteoarthritis in horses. Clinical success was defined as improvement in one lameness grade according to the AAEP lameness scoring system on Day 5 following treatment. The success rate for horses in the BetaVet® group was statistically significantly different (p=0.0061) than that in the saline group, with success rates of 75.73% and 52.52%, respectively (back-transformed from the logistic regression).

ANIMAL SAFETY: A 3-week target animal safety (TAS) study was conducted to evaluate the safety of BetaVet® in mature, healthy horses. Treatment groups included a control (isotonic saline at a volume equivalent to the 4x group); 1X (0.0225 mg betamethasone per pound bodyweight; BetaVet®); 2X (0.045 mg betamethasone per pound bodyweight; BetaVet®) and 4X (0.09 mg betamethasone per pound bodyweight; BetaVet®). Treatments were administered by intra-articular injection into the left middle carpal joint once every 5-days for 3 treatments. Injection site reactions were the most common observations in all treatment groups. Injection site reactions were observed within 1 hour of dosing and included swelling at the injection site, lameness/stiffness of the left front limb, and flexing the left front knee at rest. The injection site reactions ranged from slight swelling (in many horses on multiple days in all treatment groups) to excessive fluid with swelling, pain, and lameness (4x group only). Injection site reactions were observed most commonly on treatment days, and generally decreased in number and severity over subsequent days. The incidence of injection site reactions increased after the second and third injection (number of abnormalities noted on day 10 > day 5 > day 0). In the BetaVet® treated groups the number and severity of the injection site reactions were dose dependent. The 4X BetaVet® group had the highest overall incidence of and severity of injection site reactions, which included heat, swelling, pain, bleeding, and holding the limb up at rest. The control group and 4X group (which received similar injection volumes) had a similar incidence of injection site reactions; however, the severity of reactions was greater in the 4X group. Absolute neutrophils were statistically significantly higher in the BetaVet® treated groups as compared to the control group. Trends toward a decrease in lymphocytes and eosinophils, and an increase in monocytes were identified in the BetaVet® treated groups after the initial dose of BetaVet®. Individual animal values for white blood cells generally remained within the reference range. BetaVet® treated horses also had a trend toward increased blood glucose after the initial dose. Some individual animals showed mild increases in blood glucose above the reference range.

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mean scores of 9 standard deviation, SD ±2 while nonlame horses presented a maximum score of 6 out of 24 with median and mean scores of 2 (SD ±1.4). To validate the results, they performed the test again on the lame horses after receiving a nerve block, with resolution of the lameness, and found a significant reduction in the RHpE scores ($P<0.001$). They concluded that a RHpE score ≥8 was highly likely to reflect the presence of musculoskeletal pain.

The assessment should be made while someone is riding the horse, she said, because some lameness may not be apparent in hand or on the lunge. In addition, observing the animal tacked up can be another clue to the presence of a problem. In a study led by Dr. Dyson, the gait of 57 dressage and show-jumping horses was assessed. They compared each horse's gait in hand, the response to flexion tests and how each horse moved on the lunge on soft and firm surfaces and when ridden. They found that 47% of the horses showed signs of lameness, but in 12% of the horses, lameness was only apparent when ridden.

Recognition of the behaviors of pain-free horses facilitates identification of abnormal behaviors, Dr. Dyson advised. Use a checklist in the beginning to keep track of the RHpE behaviors which are seen, and be familiar with the definition of each behavior. Watch the animal carefully while it works for 5 to 10 minutes, going through a full repertoire of movements, such as

Photos courtesy of Dr. Sue Dyson

Riding club level event horse trotting on a good surface: left hindlimb toe drag; head tilt; intense stare; and right ear back.

THE RIDDEN HORSE PAIN ETHOGRAM (RHPE)

There are 24 behaviors and a RHpE score of ≥8/24 is likely to signify the presence of musculoskeletal pain.

7 FACIAL MARKERS

1. Ears rotated back behind vertical or flat (both or only 1) ≥5 seconds; repeatedly lying flat
2. Eye lids closed or half closed for 2–5 seconds
3. Sclera exposed, repeatedly
4. Intense stare for ≥5 seconds
5. Mouth opening and shutting repeated with separation of teeth for ≥10 seconds
6. Tongue exposed, protruding or hanging out, and/or moving in and out
7. Bit pulled through the mouth to 1 side

7 BODY MARKERS

1. Repeated changes of head position up and down, which is not in rhythm with the trot
2. Head tilted, repeatedly
3. Head in front of vertical (>30°) for ≥10 seconds
4. Head behind vertical (>10°) for ≥10 seconds
5. Head position changes regularly, tossed or twisted from side to side, corrected constantly
6. Tail clamped tightly to middle or held to 1 side
7. Tail swishing in large movements: repeatedly up and down, side to side or circular; during transitions

10 GAIT MARKERS

1. A rushed gate (trot steps >40 in 15 seconds); irregular rhythm during trot or canter; repeated changes of speed in trot or canter
2. Gait too slow (trot steps <35/15 seconds); passage-like trot
3. Hindlimbs do not follow tracks of forelimbs but deviate left or right; on 3 tracks in trot or canter
4. At canter, repeated strike off wrong leg; change of leg in front and/or behind
5. Spontaneous changes of gait
6. Stumbles or trips repeatedly, or drags hindlimb toes repeatedly
7. Sudden change of direction, against rider's cues; spooking
8. Reluctant to move forward, or stops spontaneously
9. Rearing
10. Bucking or kicking backward

Riding club-level dressage horse: front of head in front of the vertical ≥30° for ≥10 seconds; exposure of the sclera of the left eye; and left ear behind a vertical position.

Upper level showjumper in left canter: ears back, intense stare and tail swishing.

Photos courtesy of Dr. Sue Dyson

trot, canter, moving in circles and transitions. Use a stopwatch to measure the duration of behaviors that have timed definitions.

"Before starting, check the arena surface because a loose or deep surface may result in most horses exhibiting a toe drag. Check the size of the iris in each eye and see if the sclera are evident at rest. If the sclera is visible in one or both eyes, then exposure of the sclera cannot be included as an abnormal behavior. Check the width of the bit; if it is too wide, then you will not be able to assess the bit being pulled through to one side of the horse's mouth," she said. "Assess the fit of the saddle. If the saddle does not fit for example, the tree points are too tight this can induce pain and influence the RHpE score."

"The horse should be seen working through its full range of skills, including collected movements and flying changes," she said. This is important because one horse may be very comfortable in trot, but not in canter, for example. "I routinely assess all horses in 10-meter diameter circles, in rising trot to the left and to the right as they make a figure 8. This is biomechanically more demanding than traveling around the periphery of the arena and may induce both gait and behavioral changes like closure of the eyes, or positioning of the head behind the vertical.

"Remember too, that some horses are very skilled at hiding or adapting to pain, so a minority of horses with musculoskeletal pain may have an RHpE score lower than 8. These horses may still require a full work up, so that clinical judgment that comes from experience in investigating lameness should not be ignored.

"Use of the RHpE, just as so many skills in veterinary medicine, requires training and practice," she said, "but it will eventually become second nature, and the ethogram can be a powerful tool to assess pain in a ridden horse.

"Horses are trying to communicate with us," she said, "we just have to learn how to listen." **MeV**

How It Works

The Ridden Horse Pain Ethogram (RHpE) takes a bit of practice, but Dr. Sue Dyson said it does become second nature. Watch the video below—narrated by Dr. Dyson—to get a flavor for the RHpE. Dr. Dyson offers a course on recognizing the behaviors. Go to http://www.equitopiacenter.com for more information. Tell them you read about it in *Modern Equine Vet* to receive a discount!

Watch the video with Dr. Sue Dyson

For more information:

Dyson S. Greve L. Subjective gait assessment of 57 sports horses in normal work: A comparison of the response to flexion tests, movement in hand, on the lunge and ridden. *J Equine Vet Sci.* 2016;38:1-7.
http://www.sciencedirect.com/science/article/abs/pii/S0737080615300137

Dyson S. How to determine the presence of musculoskeletal pain in ridden horses by application of the Ridden Horse Pain Ethogram. 2020 AAEP Proceedings Vol. 66, 334-342.

Could Genetic Markers Help Determine Injury Risk?

By Adam Marcus

Researchers have found a panel of markers of gene expression that might help predict racehorses at increased risk of suffering catastrophic injuries on the track.

For the study, they analyzed changes in messenger RNA (mRNA) in 686 blood samples, which included samples from 107 racehorses at 5 U.S. sites that had suffered catastrophic injuries—most of which involved the front limbs—during competitions, roughly half of which were claiming races.

They included samples taken before races from 374 uninjured animals and from 205 taken after a race. They also looked at pre- and post-race blood samples from a subset of 37 horses to determine if exercise altered the expression of genes. The researchers looked at the activity of 21 protein-encoding genes known to play a role in inflammation, the repair and remodeling of the skeleton, tissue repair and the response to injury. They excluded 12 after finding that expression of the genes changed after exercise, leaving 9 genes that appeared to have altered expression in injured horses. Of those, 3 showed statistically significant differences that could be used to predict the risk of injury.

Two of these, *IGF1* and *MMP2*, were markedly elevated in injured horses compared with uninjured animals (odds ratios (OR), 3.2 and 1.92, respectively). The link was particularly strong for fractures of the proximal sesamoid bones (PSB), the third metacarpal/metatarsal bones and in mixed fetlock breaks, and, for *IGF1*, carpal fractures. The third gene, *IL1RN*, seemed to work in the opposite direction, with injured animals showing reduced expression compared with uninjured horses, particularly those with PSB breaks (OR, 0.14).

"Decreased *IL1RN* expression in catastrophically injured horses would suggest the presence of a pro-inflammatory state given the potent anti-inflammatory properties of IL-1RA [the protein encoded by *IL1RN*].

"Furthermore, the finding that only PSB fracture cohorts had significantly lower expression of *IL1RN* when compared with noninjured controls suggests a possible use for this gene with respect to identifying those horses specifically at risk for a PSB fracture," the authors reported in the *Equine Veterinary Journal*.

"This testing is not something that all veterinary labs could run as it requires specialized equipment to support the initial sample processing and PCR analysis. However, larger veterinary laboratories could likely be upgraded to handle high-throughput processing and utilize their existing PCR capabilities," co-author **Allen Page**, DVM, PhD, of the University of Kentucky, in Lexington, told *Modern Equine Vet*.

"Regarding what could be done with the information, we foresee an opportunity for owners, trainers and regulatory agencies to monitor horses for changes in mRNA expression over time, where changes of significance would suggest that the horses should be examined thoroughly, which may include advanced imaging," Page said. "These horses would also be rested or backed off of high-intensity work until their markers returned to normal levels." **MeV**

For more information:

Page AE, et al. Expression of select mRNA in Thoroughbreds with catastrophic racing injuries. *Equine Vet J*. 2021 Jan. 12 [Epub ahead of print].

https://beva.onlinelibrary.wiley.com/doi/10.1111/evj.13423

CHALLENGES FACING THE PROFESSION

An Interview with Dr. Amy Grice

Amy Grice, VMD, MBA, is a veterinary consultant in Virginia City, Mont. At the 2020 virtual meeting of the American Association of Equine Practitioners (AAEP), Grice, who serves as AAEP treasurer, presented results from a recent survey of the group's members, which highlighted some of the challenges and opportunities facing the field. *Modern Equine Vet* spoke with her about the findings.

MeV: *The AAEP has experienced a sharp drop in membership renewals, while the number of new graduates from veterinary schools choosing careers in equine medicine has fallen to about 1.5, according to the most recent data. You have found evidence that financial pressures might be behind these concerning trends. How so?*

AG: Membership data from the AAEP show that over the last 20 years, nearly half of new graduates who entered equine practice has left the field by the fifth year after graduation. In addition, the number of new veterinary school graduates who chose careers in equine practice dropped from 5.7% in 2003 to 1.1% in 2017, then increased slightly to 1.5% in 2018 before dropping to 1% in 2019, according to data from the American Veterinary Medical Association (AVMA). In 2020, 1.4% of new graduates entered equine private practice.

Many equine vets expressed concerns that the profession was incompatible with a healthy work-life balance—that the lack of "hard stop" to the day made time spent away from the office unpredictable and scarce. What can be done to address these issues?

The AAEP appointed a task force to further study the reasons behind the difficulties in attracting and retaining equine veterinarians. This effort is one of the pillars of the organization's current strategic plan. Once data are collected, the AAEP will drive change through education, business management resources, and outreach to students and new graduates.

Veterinarians in equine practice need to understand their own vision for their career, feel comfortable having boundaries and choose their employment opportunities carefully. There are many more equine jobs than applicants right now, and this supply/demand mismatch should increase salaries and allow applicants to negotiate better work schedules. Those seeking jobs should be interviewing the practices to make sure they have shared values and a culture that will support their vision for their lives.

How are these issues particularly difficult for female equine veterinarians to navigate?

In our society, women still are responsible for most of the tasks within a family—arranging child-care, shopping, cooking, cleaning and the often-busy family calendar. The traditional long work hours and the need to provide emergency coverage 24/7/365 are most easily accommodated if a spouse or partner is responsible for the home and children. In the past, most equine veterinarians were men, and had this support at home. This

PRECARIOUS FUTURE FOR EQUINE PRACTICE

About **60 equine veterinarians** will retire per year, because 26.6% are >60 years. **This is expected to grow by 3% per year.**

Source: AVMA

Number of new veterinary school graduates who became equine practitioners **dropped from 5.7% in 2003 to 1.4% in 2020.**

Source: Membership data from the AAEP

Nearly **50% of new graduates leave equine practice** by 5 years after graduation.

Source: Membership data from the AAEP

situation has been changing steadily over the last several decades, and now women are 51% of AAEP members. While some female veterinarians have someone who is this helpmate within the household, it is not common.

Equine veterinarians need to shape new ways of working that allow for maternity leaves, "hard stops" to the day, shared emergency duty with other local practitioners, and personal time to recharge. Because 44% of AAEP membership is more than 50 years old, with 26.6% greater than 60 years, a significant number of equine doctors will retire in the next decade. The AVMA estimates about 60 equine DVM retirements per year, growing by 3% per year. Clearly the career must change to better accommodate the young women entering the field.

Although more equine veterinarians are graduating free of debt from graduate school, the ratio of the debt to their starting income has never been higher. You maintain that the level is unsustainable, but what can be done to restore a more healthy balance?

In 2018, about 30% of graduates who entered equine practice had no debt. Real mean debt of all 2018 graduates from U.S. veterinary colleges, including those without debt, was $143,111, an increase from $133,086 in 2017 and $138,151 in 2016. Results of the 2016 AVMA AAEP Equine Economic Survey indicated that equine practitioners must use much more of their annual compensation than (primarily companion animal) AVMA members, when considering all respondents, to service their debt. The mean percentage of compensation used to service educational debt for 2006–2016 graduates in equine practice was found to be 20%. A healthy debt-to-income ratio (DIR) for professionals is considered to be less than or equal to 1.4, and veterinarians in equine practice well exceed this measure. For graduates of 2001–2016, the average DIR of veterinarians who worked full time in equine medicine was 2.48 (median 2.04). The DIR for recent graduates entering full-time equine practice was 3.2 in 2017 and 4.7 in 2018. In order to decrease the DIR, compensation for equine veterinarians must rise. Undoubtedly this means that fees for services must rise as well.

A recurrent theme that emerged from your survey was sadness among respondents in their chosen profession—sadness that equine practitioners felt they were constantly sacrificing some aspect of their life, whether personal or professional. Do you think it's possible to restore a sense of optimism and joy in the profession?

When young equine practitioners think deeply about how they want their lives to unfold, often they decide to create the life they imagine by opening their own practices. While this has challenges, they find that they can make the rules, and set boundaries that allow them to have better lives. By forming collaborative relationships with other local practitioners, they can still gain professional support, share emergency duty, and open up space to be present for their lives in areas other than work. Optimism and joy are present here. These veterinarians are an inspiration, and are modeling the way. **MeV**

The Equine Technician's Role in BioSecurity

By Deborah B. Reeder, RVT, VTS-EVN AAEVT Executive Director

If the COVID-19 pandemic has taught us anything, it demonstrated how easily a pathogen can spread. It just doesn't pay to be cavalier about infectious diseases. Creating and implementing a biosecurity plan for the practice, as well as helping clients develop a plan for the farm is imperative to minimize or prevent the movement of diseases and to control pests. The equine technician can be instrumental in developing this plan and implementing it at your practice, for a client, or in preparation of an equine event.

The movement of horses and horse events may look a little different in 2021, and may not be as international as they were in the past. However, they still pose a potential threat, and it pays to be proactive.

The first role of the technician in charge of a biosecurity program is to become familiar with the basic principles and understand the basic biology of infectious diseases and their agents. How do these diseases spread? Which horses and areas are at the greatest risk for an outbreak? And how can you best protect your practice and its patients?

Breeding and show farms, stables, racetracks and horse events are at a high risk for outbreak because there is a high concentration of horses in one area, and there is a lot of movement on and off the premises from a variety of locations and protocols. Even if there is a vaccination protocol for those entering the farm, stable or event, it does not always apply to previous locations where the horse evented or was housed.

Some basic principles of biosecurity include:

- Understanding the disease process
- Understanding how to house horses based on risk of exposure
- Performing daily monitoring and taking of temperatures
- Implementing hand hygiene and clothing protocols
- Implementing cleaning, decontamination and disinfection controls
- Preparing a contingency plan
- Developing immunization protocols

A biosecurity plan is imperative to minimize or prevent the movement of diseases from one barn to another and to control pests.

Influenza, rhinopneumonitis, encephalitis, tetanus, equine infectious anemia, West Nile, rabies, equine herpes virus, *Rhodococcus*, strangles, pigeon fever—just an example of the infections that could occur—all have unique characteristics, severity, signs of onset, methods of transmission and duration of illness. It is why we have many different vaccines available to protect against some of them. The most successful program has a well-thought-out immunization program and follows it.

The prepared technician is knowledgeable about these diseases, and has resources available to keep up on any new medical updates as well as perceived outbreaks. Creating a chart of the various diseases and having it handy is helpful, as well as using websites that provide email updates such as the Department of Agriculture, and the Equine Disease Communication Center.

A good biosecurity plan enables horses to be housed based on their risk of exposure, along with the farm, stable and ranch needs. Horses should be housed in small groups and grouped by age, use and gestation time if at all possible. When there is an event, the stalls should be designed so there is little contact with the horse next door.

There should be protocol for daily monitoring and charting of temperatures. Movement among different stables or barns should be minimized, as well as new arrivals. Equipment that is used should be kept to a specific group of horses. As much as possible, minimize sharing equipment, including stall pickers, buckets, brushes, wheelbarrows, etc.

A daily physical examination should be a prima-

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The American Association of Equine Veterinary Technicians and Assistants (AAEVT) is a sister organization to the AAEP and is a separate professional nonprofit organization.

Membership in the AAEVT is open to all veterinary technicians, assistants, support staff and those employed in the veterinary health care industry worldwide. Student membership is available for those currently enrolled in an AVMA/CVMA accredited program of veterinary technology. The AAEVT offers equine oriented CE courses focusing on all aspects of equine practice.

Learn more and join today! **www.AAEVT.org**

Useful Links

www.equineguelph.ca/pdf/facts/EquineBiosecurityPoster_%200Oct2015.pdf

www.promedmail.org

www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/equine

aaep.org/guidelines/infectious-disease-control/biosecurity-guidelines-control-venereally-transmitted-diseases/recommendations-biosecurity-program

ry part of your biosecurity and overall equine care protocol, especially in the clinic. Checking attitude, appetite, temperature, appearance of nasal discharge, coughing, fecal character, and any onset of neurological signs should be noted daily and in good record format for each horse. Helping to create a system in the clinic, as well as helping clients or event managers to create systematic charts for these parameters will go a long way to protect the industry and build awareness. This is a crucial role your veterinary technician can take on.

Practicing good hand hygiene is an important step to prevent disease, which we are all too familiar with now! But it is a step we often forget when dealing with horses. Posting signs as a reminder and having a sink or clean-up area available is helpful. And if not a wash station, then there should at least be hand sanitizer present.

Cleanliness should also be applied to housing areas, traffic areas, equipment, grooming supplies and trailers. The protocol should include an overview of how each of these areas will be cleaned and disinfected routinely as well as before and after admittance of a patient or the arrival of a new horse.

It is also a good idea to get a history about where the horse originated. Was there a biosecurity protocol in place? Was there an immunization program? Was there a recent outbreak in the vicinity?

Technicians can take the reins and be invaluable in implementing a successful biosecurity program in the hospital or at the client's facility.

Even if you have prepared your practice or your client's farm, there is always the threat of an outbreak. Have a predetermined plan in place that addresses how and when to isolate a sick animal, what protective clothing is needed, and how you will implement nursing care precautions, barriers and providers.

Post signage or discuss in rounds to communicate the situation, and make sure any team member who would be directly involved is quickly informed.

An outline of how to take samples and where to submit them, as well as the required testing for each disease will be a great resource for your team.

Reassess your protocols regularly and making sure they are relevant and updated.

Technicians can take the reins and be invaluable in implementing a successful biosecurity program. It will not only communicate to your clients that you care, and that you are prepared, but it will also assure your clientele and your community that your team is resourceful, prepared and is looking out for the health and welfare of their horses and your patients. **MeV**

About the Author

Deborah B. Reeder, BA, AS, RVT, VTS-EVN, is the executive director of American Association of Equine Veterinary Technicians and Associates.

BUN May Be Good Biomarker for Severe IMHA/IMTP

Elevated blood urea nitrogen (BUN) may act as a marker of the extent of hypoxic damage and severity of the immune-mediated disease, according to a recent study that looked at hemolytic anemia and thrombocytopenia in horses to see how they fared with treatment.

The researchers found that primary immune-mediated hemolytic anemia (IMHA) and immunemediated thrombocytopenia (IMTP) cases have a reasonable prognosis and warrant treatment.

However, differentiating between primary and secondary etiologies can be challenging. Secondary cases have a poor prognosis and frequently are associated with a neoplastic process.

This retrospective case-control study aimed to characterize the clinical presentation, clinicopathologic data, underlying conditions, treatment and outcome of IMHA and IMTP in horses. Horses were classified as primary or secondary IMHA/IMTP cases based on whether they had evidence of underlying infections, neoplasia or drug administration prior to the onset of clinical signs.

Twenty-four horses and 1 donkey met the inclusion criteria for cases. Two horses were diagnosed with IMHA only. Both horses were positive for antired blood cell antibodies on Coombs test. Eight equids were diagnosed with IMTP only and 15 were diagnosed with IMHA and concurrent IMTP. Controls were equids presented for nonimmune-mediated disease immediately prior to and after study animals.

Neoplasia incidence was significantly higher in the study population (28%) versus controls (8%). Overall short-term survival to discharge was 60%. There was no difference in survival among horses with IMHA, IMTP or both. Equids with primary disease were 13 times more likely to survive to discharge than those with secondary disease (8/9 vs 7/16).

Treatment with corticosteroids, azathioprine or blood transfusions did not significantly affect outcome, although group numbers were small.

Survivors had a significantly lower blood urea nitrogen (BUN) than those that died or were subjected to euthanasia (survivors, 6.1 ± 2.5 mmol/L vs nonsurvivors, 9.9 ± 3.1 mmol/L). The odds of short-term mortality were also higher in horses presenting with increased BUN. Elevated BUN may act as a marker of the extent of hypoxic damage and severity of the immune-mediated disease. **MeV**

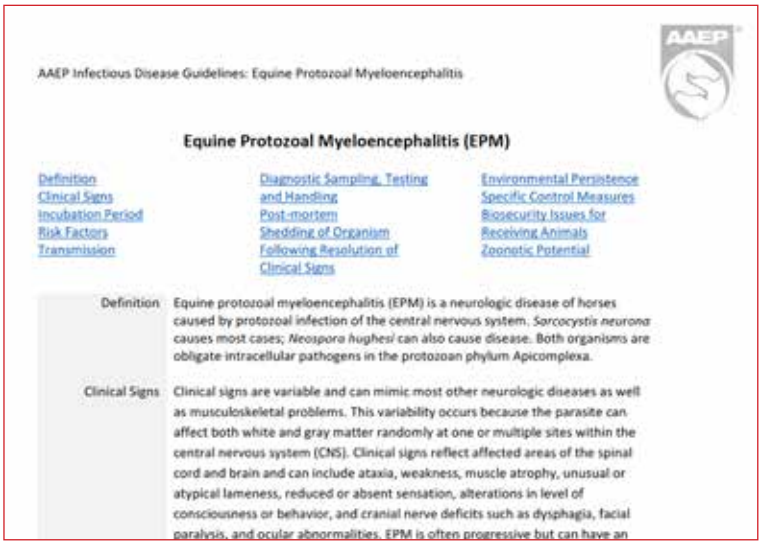
For more information:

Easton-Jones CA, Estell KE, Madesian G. Immune-mediated hemolytic anemia and thrombocytopenia in 25 adult equids: 1997-2016. *Equine Vet J.* 2020 Nov. 10 [Epub ahead of print]. **https://beva.onlinelibrary.wiley.com/doi/abs/10.1111/evj.13384**

AAEP Releases New Myeloencephalitis Guidelines

The American Association of Equine Practitioners developed comprehensive guidelines for the identification, diagnosis and control of Equine Protozoal Myeloencephalitis (EPM), a progressively debilitating disease of the central nervous system.

"EPM is widely considered the most important infectious neurologic disease of horses in North America," said guidelines author **Amy Johnson**, DVM, DACVIM. "The variable clinical signs and widespread seroprevalence pose challenges to diagnosis. These guidelines aim to summarize essential information regarding this disease process, as well as highlight the 3 criteria for highest diagnostic accuracy in potentially affected horses." **MeV**


AAEP Infectious Disease Guidelines: Equine Protozoal Myeloencephalitis

Equine Protozoal Myeloencephalitis (EPM)

Definition
Clinical Signs
Incubation Period
Risk Factors
Transmission
Diagnostic Sampling, Testing and Handling
Post-mortem
Shedding of Organism Following Resolution of Clinical Signs
Environmental Persistence
Specific Control Measures
Biosecurity Issues for Receiving Animals
Zoonotic Potential

Definition: Equine protozoal myeloencephalitis (EPM) is a neurologic disease of horses caused by protozoal infection of the central nervous system. *Sarcocystis neurona* causes most cases; *Neospora hughesi* can also cause disease. Both organisms are obligate intracellular pathogens in the protozoan phylum Apicomplexa.

Clinical Signs: Clinical signs are variable and can mimic most other neurologic diseases as well as musculoskeletal problems. This variability occurs because the parasite can affect both white and gray matter randomly at one or multiple sites within the central nervous system (CNS). Clinical signs reflect affected areas of the spinal cord and brain and can include ataxia, weakness, muscle atrophy, unusual or atypical lameness, reduced or absent sensation, alterations in level of consciousness or behavior, and cranial nerve deficits such as dysphagia, facial paralysis, and ocular abnormalities. EPM is often progressive but can have an

The guidelines can be downloaded to your mobile device for easy reference. **https://aaep.org/sites/default/files/Guidelines/EPM_Disease_Guidelines_2021.pdf**.

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