newsletter

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BLENDING NATURE AND TECHNOLOGY

EQUUS
BLENDING NATURE AND TECHNOLOGY
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in this month's issue

EQUINE METABOLIC SYNDROME

Equine metabolic syndrome (EMS) has not yet been thoroughly defined and many scientists suggest that more research should be carried out before we can fully appreciate how to define this disorder. Currently, however, EMS describes a series of clinical signs that may increase the risk of the horse developing laminitis.

EMS can be defined as both a metabolic and hormonal disorder. It is primarily a metabolic disorder as affected animals are metabolically efficient. They are what we commonly refer to as "good doers". These are horses or ponies that become obese on even a minimal diet.

EMS, however, is also an hormonal disorder as a result of insulin deviations, causing the condition Insulin Resistance. Insulin Resistance (IR) is a reduction of the horse's ability to respond appropriately to the hormone insulin. Insulin is involved in the uptake of glucose from the bloodstream after eating as well as the storage thereof in cells. In cases of IR, this system no longer functions properly. (Dickvetequine 2011). Over time, the pancreas starts to compensate for this by secreting more and more insulin to control rising blood sugar, causing blood insulin concentrations to rise above normal range in horses with EMS, leading to its diagnosis.

While IR is associated with laminitis, it is still unknown what the actual causative factor is. It is thought that IR may cause inflammatory responses resulting in full laminitis.

Signs of EMS

- Obesity- not all horses are obese but it is generally the most common sign of EMS.
- Regional fat deposits- a big "cresty neck," fat pads near the tail, fat accumulation in the sheath/near the mammary gland
- Insulin resistance
- Laminitis

Which horses get EMS?

While any breed can be affected by EMS, it is most commonly seen in ponies and breeds that tend to be "good doers" such as Welsh ponies and Boerperde. This disorder is often observed in horses that are between 5 and 15 years old. It is now thought that there may even be a genetic link with EMS.

Diagnosing EMS

EMS is typically suggested when the horse or pony shows one or more of the above signs. Horses can be screened for insulin resistance by collecting blood samples after the horse has fasted for approximately six hours and then measuring the glucose and insulin concentrations. If the horse or pony has an abnormally high insulin concentration with a glucose concentration that is still within reference range, insulin resistance can be confirmed, and no further testing is required. In more complex cases more detailed tests may need to be carried out.

Managing EMS

The principle starting point in the management of EMS is weight loss in those horses that are obese. Most of these horses are good doers and can become fat on even poor grass and hays, therefore weight loss must be achieved through diet reduction and exercise together. However, exercise should only be initiated if no laminitic signs are seen. Horses with EMS should be put on a diet low in Non Structural Carbohydrates (NSC). NSC are absorbed into the blood as glucose. Glucose stimulates the production of insulin and thus further exacerbates conditions such as EMS.

NSC are present in large quantities in cereal grains like oats, maize, barley, sorghum, molasses and in by-products such as rice bran, wheat bran and pollard. These products should thus be avoided.

NSC may also be present in large amounts in some pastures and hays, especially rye grass and oat hay. Weather damaged lucerne hay and stemmy, mature pasture hay are most likely to contain suitably low levels of non-structural carbohydrates

Soaking hay can reduce the amount of simple sugars in this roughage and it is therefore the ideal forage for most metabolic ponies. Soaking should take place for 45mins-1 hour to ensure the maximum amount of simple sugar is removed from the hay. It is advised that most horses should be fed between 1% and 2% of bodyweight daily. The lower end of the range should be used if weight loss is desirable.

Soaking hay is an excellent way of removing sugars but it also removes essential vitamins and minerals. These must thus be replaced in the diet to ensure good health. The simplest way to achieve this is to feed a balancer pellet, such as Equus' All Time Balancer . Balancers are low in energy (and thus low in calories), but are packed full of essential vitamins and minerals, thus giving the horse the maximum nutrients without unnecessary calories. Pasture access should be limited to a couple of hours a day and, in addition, all treats such as commercial treats, apples and carrots which can all be high in sugars, should be eliminated.

TESTIMONIALS

Dear Equus

When I bought my youngster, Juliet, a year ago she had a terrible runny tummy and was in poor condition. We tried numerous things but nothing seemed to help. After speaking with Hannah, we started feeding her on ***Equus Safe 'n Lite*** and ***Equus All Time Balancer*** along with good quality ad lib hay.

The mare is now rising 5 and is looking magnificent, she still has stomach problems every now and again but they certainly aren't as bad as before. Equus has made such a difference to her that now I am feeding all my youngsters Equus and am very happy.

Kindest Regards

Tracey Bent & Juliet

Although the majority of EMS horses are overweight, this is not always the case. If extra energy is needed, then using a feed such as Equus' Safe 'n Lite, which is low in NSC and contains high levels of fibre and oils, allows the underweight, or working, EMS horse to be fed safely. Oil must be metabolised by the liver before being used as energy and does not stimulate insulin production. As with any new feed, it should be introduced to the diet slowly over several weeks.

www.ed.ac.uk/.../dvepfactsheet-cushingsdiseaseandequinemetabolics...
www.ker.com/library/equinews/v9n2/v9n214.pdf
www.lloydinc.com/media/.../n_frankequinemetabolicsyndrome.pdf

DOES EQUINE METABOLIC SYNDROME AFFECT GUT MICROBES?

The horse's digestive tract houses a unique and diverse microbial population, each species in careful balance with the others to serve specific purposes.

Diet, age, and disease status, however, can all negatively affect the microbiota (the microbial population residing in the digestive tract). In humans, researchers know that metabolic syndrome can be associated with changes in the intestinal microbiota. So what happens in the gut when horses have equine metabolic syndrome (EMS)?

Sarah Elzinga, a graduate student working under Amanda Adams, PhD, at the University of Kentucky's Gluck Equine Research Center, in Lexington, set out to answer this question.

Her team studied 20 horses of varying breeds and genders consuming free-choice mixed-grass hay for at least two months prior to sampling. They classified the horses based on the presence or absence of insulin dysregulation, regional or general adiposity (body fat), previous history of or predisposition for the hoof disease laminitis as EMS or as control (not affected) horses.

After grouping the horses, the team extracted DNA from fecal samples for examination and microbial classification.

As expected, EMS-affected horses had greater insulin concentrations, both while fasting and 60 minutes after oral sugar administration (a standard protocol used to diagnose insulin dysregulation), than control horses. They also had higher body condition and cresty neck scores than controls.

Regarding fecal microbiota, while the EMS group did not have different quantities of bacteria in the intestinal tract, they did have less microbial diversity. Other disparities between the two groups' bacteria populations included:

- An abundance of phylum Verrucomicrobia in EMS-affected horses. In humans, abundance of this phylum has been described as a potential marker of glucose intolerance, and researchers found increased numbers of Verrucomicrobia in obese mini-pigs compared to lean ones;
- Control Horses had More Fibrobacter than EMS horses—an integral part of the horse's microbiota contributing to the breakdown of fiber. Both Fibrobacter and Ruminococcaceae tend to be intolerant of acidic conditions in the hindgut and decrease in number as lactic acid bacteria increase, usually due to large quantities of starch spilling over into the hindgut or to intestinal disease;
- Greater Lactobacillus concentrations in EMS-affected horses, which Elzinga said could be a representation of the lower Fibrobacter numbers; and
- Greater Ruminococcaceae (which produce the volatile fatty acid butyrate) concentrations in control horses.

The researchers noted that lower microbial diversity seen in EMS-affected horses has also been seen in horses receiving antibiotics or in response to dietary change.

Take-Home Message
Horses with EMS appear to have different microbiota numbers and diversity than healthy horses, potentially impairing gut health and affecting metabolism. Adams added, "The future goals are to develop therapeutic tools that target the gut microbiota that have the potential to modulate disease states, including insulin resistance in EMS horses."

http://www.thehorse.com/articles/39221/does-equine-metabolic-syndrome-affect-gut-microbes?utm_source=Newsletter&utm_medium=health-news&utm_campaign=05-23-2017