



Equine Metabolic Syndrome

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Equine metabolic syndrome is a health problem that affects many horses that are considered “easy keepers”. The disease consists of large regional fat deposits, obesity, insulin resistance or high fasting insulin concentrations and if not controlled, recurrent episodes of laminitis. In this age, obese horses are more the rule rather than the exception. Despite education by veterinarians and nutritionists to keep horses in moderate body weight, good willing horse owners continue to feed high-calorie concentrates and hay. More often than not, the result is a plump middle-aged horse that is anything but healthy or athletic. He gasps for breath when subjected to mild exercise, and his limbs bear the brunt of unnecessary pounds. Now, researchers have uncovered yet another reason to keep mature horses slim and conditioned: equine metabolic syndrome. Because it is a relatively recent discovery, veterinarians are just beginning to learn the intricacies of this disorder.

If this disease is not controlled it can be debilitating for the horse, emotional for the owner and may eventually lead to euthanasia if meticulous diet and exercise management is not initiated. My goal in this article is to provide the facts that are presently known about this disease and help owners use preventative medicine to keep their horses as healthy as possible.

Along with obesity, equine metabolic syndrome (EMS) is characterized by insulin resistance (IR) or high fasting insulin concentrations. The physiology of insulin starts with the body’s response to eating foods that are broken down through the gastrointestinal system to glucose or other sugar molecules. Abundant in certain feedstuffs commonly fed to horses, glucose is absorbed from the intestine and results in elevated blood sugar. High blood sugar leads to the release of insulin from the pancreas, which encourages the removal of glucose from the bloodstream by fat or skeletal muscle cells in normal animals. Once in the cells, glucose can be put to work immediately to fuel exercise or growth or stored as glycogen or fat for later use. Insulin resistance implies that either the central tissue (liver) or the peripheral tissues (the skeletal muscle or the fat cells) are insensitive to the action of insulin or that the quantity of insulin released by the pancreas in response to hyperglycemia declines. This leaves glucose circulating in

the blood. Because glucose levels do not drop, the pancreas continues to discharge insulin, leading to elevated concentrations of insulin in the bloodstream, a condition known as hyperinsulinemia.

Little is known about what predisposes a horse to this disease, however the responsibility might rest on genetic and environmental factors. In humans, causative factors are well documented: aging, pregnancy, smoking, reduced physical activity, and obesity. In humans, glucose intolerance can lead to noninsulin-dependent diabetes mellitus (type 2 diabetes).

In the horse, obesity appears to be related to the onset of metabolic syndrome. Age and diet may also be directly related to the development of equine metabolic syndrome. Age is thought to decrease the horse's sensitivity to insulin. Diets high in starch and sugar cause significant spikes in blood glucose and insulin.

An important fact to note is that not all fat horses are insulin resistant, or hyperinsulinemic. Current postulation is that horses whose fat cells produce high levels of leptin (hormone) are the ones prone to insulin resistance. Leptin is not believed to cause insulin resistance but is found to be higher in horses that are insulin resistant.

An unwelcome clinical sign of EMS is laminitis. The laminitis exhibited by these obese, middle-aged horses tends to be mild, in contrast to the laminitis seen with other diseases. Recurrent bouts of lameness that are mild in nature may be observed during the beginning stage. Most of the time, these horses have such mild clinical signs of pain that knowledgeable, attentive horse owners cannot definitively say there is lameness present. If the disease is not meticulously controlled, the chronic form of recurrent laminitis can be identified by abnormal hoof growth, unusual growth lines, prolapsed soles and separation of the white line. End stage laminitis may be obvious on radiographs. This is where the term "founder" comes into play. Founder is the shifting of the coffin bone within the hoof capsule, which is obvious upon radiography.

Regardless of the cause, laminitis is the result of alterations in structure of the laminae, the interconnected layers of tissue that secures the integrity of the foot. Laminae in easy to understand terms can be explained as "Velcro". They are what hold the coffin bone in the appropriate position. When this "Velcro" is disrupted it will not hold as well and this is when rotation or sinking occurs (aka founder). In obese horses, researchers believe that insulin insensitivity and vascular spasms may incite changes within the laminae. Regardless of the current theories, a definitive cause for obesity-associated laminitis remains an uncertainty.

Currently the diagnosis of equine metabolic syndrome is based on clinical signs and physical traits, along with measuring fasting blood glucose and hormone concentrations, including insulin and leptin. Measuring glucose and insulin after a glucose challenge test can be helpful for diagnosis in clinically suspect horses that have normal fasting glucose and insulin. Affected horses usually range between the ages of eight and eighteen. Horses and ponies of nearly all breeds have been diagnosed. The most apparent physical characteristic that all EMS patients share is the distribution of body fat. Regional areas of unusual fat accumulation include the top of the neck (cresty neck) and over the shoulders, croup, and tail head. Significant fat sometimes settles in the sheaths of geldings and mammary glands of mares, so much so that they may appear swollen. Some of the physical traits are similar to horses with PPID or Cushing's disease and to confuse the issue even more, some horses can be affected by both diseases simultaneously. In fact, in the past, EMS was falsely diagnosed as Cushing's disease because of the parallel relationship with some of the common physical traits. The treatment for Cushing's (PPID) and EMS do not correlate and need to be managed differently.

Once EMS is the official diagnosis from your veterinarian, diet and exercise are two of the most important aspects to prevent this disease from progressing. The goal of equine diets should be straightforward: provide enough feed to satisfy nutrient requirements for growth, maintenance, or work while maintaining ideal body condition.

It's simple, horses become overweight because they consume too many calories in relation to the work asked of them, just like humans or any other living creature. Mature horses diagnosed with metabolic syndrome should not be given grain, feed mixed with molasses, or unlimited access to pasture. A balanced feed (concentrated protein, minerals, and vitamins) can be given to provide essential nutrients without carbohydrates. It is recommended to soak hay for at least 30

minutes before giving it to try to reduce the amount of sugar within the hay. If the horse needs to lose weight, placing the hay in a nibble net will allow them to eat small amounts throughout the day instead of consuming large amounts in one sitting. One of the hardest things owners have to contend with once their horses are diagnosed with EMS is not allowing them on pasture. It seems most of the horses I have diagnosed with this disease have access to the most beautiful lush pastures, and it is heart breaking for the owners to not allow them on their “normal territory”. One of the ways around this is to place a grazing or regular muzzle to help restrict the grass intake. I find that the theories based on how much sugar is found in the grass during specific hours of the day can be too confusing and even risky if one is to try to be strategic about allowing their horse to graze.

In addition to changes in diet, exercise should be implemented to slim down overweight horses or prevent them from becoming too heavy provided the horse is sound enough. Exercise programs must be designed with the individual horse in mind. If a horse has suffered from laminitis, consultation with your veterinarian and farrier is warranted before any exercise is started.

If the horse needs to lose weight, sometimes they are prescribed levothyroxine (thyro-L), this is used to increase metabolism which facilitates weight loss but also can help reverse insulin resistance. If they are going through a laminitis episode, these horses are sometimes placed on NSAIDS to help counteract the inflammatory process and provide pain relief. With that said, there is no magic pill currently recommended that can stop the debilitating path of EMS. A diet and daily exercise program that emphasizes optimal body condition may be just enough to dodge the effects of this precarious disease.

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