

Is My Horse Just Fat or Does He Have a Metabolic Disease?

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Obesity is becoming a more well-recognized disease in all of our domestic animal species. It can be either a cause or effect of other disease conditions or problems. Obesity can worsen orthopedic conditions such as arthritis and may predispose horses to laminitis. It may be due to simple overfeeding for the amount of exercise being performed, or it may be due to an actual disease condition. The two diseases that can cause abnormal weight gain or distribution in horses are Equine Metabolic Syndrome (EMS, also referred to as insulin resistance) and Equine Cushing's Disease (also known as pituitary pars intermedia dysfunction, PPID).

Cushing's disease is due to dysfunction at the level of the brain. There is damage to the hypothalamus, an area of the brain that produces a hormone called dopamine which is supposed to suppress the pituitary gland. When this suppressive factor is no longer present, the pituitary gland (specifically the pars intermedia portion of the pituitary) begins to secrete increased amounts of several hormones (eg: ACTH, MSH, B-endorphin) that cause some of the clinical signs directly as well as an increase in cortisol release from the adrenal glands. The pituitary gland continues to enlarge with functional adenomas (small tumors). These can become large enough to compress other areas of the pituitary gland and hypothalamus resulting in some loss of their function as well. The Cushing's disease that we see in horses is different than that seen in dogs or people, so PPID is the preferred term for the disease in horses.

PPID is generally seen in older horses. The average age is 19-21, but it has been diagnosed in horses as young as 7. The prevalence increases drastically after 30 years. It is more common in ponies than horses. PPID causes changes in the fat and muscle distribution in affected horses. Fat accumulates in the crest of the neck, tailhead, over the eyes, and in the sheath. At first, horses may have more overall weight gain but over time, they lose the muscle along their topline leaving more of a potbellied appearance. One of the most telltale signs of PPID is called hirsutism which is an excessively long hair coat that does not shed out normally. Laminitis or founder can affect up to 80% of horses with PPID. The mechanism is unclear, but this painful condition may be the ultimate cause of death in PPID affected horses. Other signs that you may notice in a horse with PPID are increased thirst, increased urination, lethargy, increased appetite, change in temperament, recurrent infections, infertility, increased sweating, and/or persistent lactation in mares.

Testing for PPID is a common source of confusion and debate. The baseline ACTH is the most common screening test. This test involves just taking a blood sample, so there is no risk to the horse. The main problem with the test is that there is known seasonal variation in ACTH in horses with levels being higher in the fall. The “gold standard” test for PPID is the dexamethasone suppression test. This test involves drawing a baseline blood sample, administering dexamethasone, and then repeating a blood draw at 15 and 19 hours. There is some risk to this test as the administration of dexamethasone has been linked to the occurrence of laminitis in some horses. Other tests include a thyrotropin-releasing hormone stimulation test, combined dexamethasone-thyrotropin-releasing hormone stimulation test, and domperidone challenge test. Resting cortisol levels are not a good test as there is a lot of normal variation in all horses.

Treatment of horses with PPID involves both management and drug therapy. Regular deworming, dental, and foot care is necessary due to some of the clinical signs seen with the disease. Body clipping is also very useful for horses that do not shed out normally. Good quality hay and feed with high nutrient density should be fed. Equine Senior is a good option for many of these horses if they require a concentrate to maintain adequate body condition. The primary drug currently used in the treatment of PPID is pergolide. This is an oral drug with minimal side effects, but it must be handled and stored carefully. Other drugs that have been used include cyproheptadine, bromocriptine, and trilostane. Herbal treatments such as chaste berry have been advocated, but there is no scientific proof that they are effective in horses with PPID.

Equine Metabolic Syndrome should be suspected in any overweight horse described as an “easy keeper.” EMS is seen in horses over 5 years of age and is most common in ponies, Morgans, Arabians, and Fjords but can be seen in any breed. There is current research looking for a genetic marker, but this appears to be a disease with a genetic predisposition that is brought on by management factors. Most horses with EMS are obese with a body condition score of >7/9. They will also have regional fat distribution like horses with PPID but will not have the muscle loss. Horses with EMS often present for spontaneously occurring laminitis that may occur in association with pasture or feed changes.

Diagnosis of EMS is dependent on the measurement of serum insulin, as insulin resistance is part of the syndrome similar to Type II diabetes in people. A resting serum insulin concentration can be performed as a screening test, but the horse must be fasted overnight prior to the blood sampling. Blood glucose is checked at the same time, but most horses maintain a normal blood glucose even with insulin resistance. If this test is equivocal, a combined glucose-insulin rest can be performed. An oral sugar test using Karo syrup has also been developed.

Horses with EMS may develop PPID as they get older. In other species, obesity has been associated with a chronic inflammatory state which may cause PPID at a younger age. Horses with EMS should be monitored carefully for muscle atrophy, hair coat abnormalities, alterations

in metabolism, and exacerbation of hyperinsulinemia or laminitis. If these develop, testing for PPID should be performed, as horses can have both diseases.

Unlike PPID, there is no direct pharmacologic treatment for EMS. The bulk of treatment is dietary and management. Horses with EMS should go on a weight reduction diet. This includes no grain and a dry lot or small paddock. For the first 2 weeks, they should receive 1.5% of their current body weight per day in hay. Weeks 2-6, they should be fed 1.5% of their *ideal* body weight per day in hay. After that, they should receive 1% of their body weight per day. The hay should be low in non-structural carbohydrates. This can be confirmed via forage analysis or by soaking hay for at least 30 minutes prior to feeding it. A vitamin and mineral supplement should also be considered. Exercise is very important for the horse not undergoing an active laminitic bout, and should consist of 30 minutes of trot and canter 4-7 times per week. Most EMS horses can return to some degree of pasture once they have lost weight, however horses with recurrent severe laminitis may be safest in a dry lot. Grazing muzzles can also be very useful. Turnout should occur in the early morning or late at night when grass sugar content is the lowest.

Historically, many horses with EMS have been treated with levothyroxine (Thryo-L) a thyroid supplement. While these horses do not have actual thyroid dysfunction, short term supplemental thyroid hormone will increase insulin sensitivity and weight loss. Weight loss will only occur, however, if calories are also restricted, so levothyroxine may be prescribed for 3-6 months to accelerate weight loss while other management changes are instituted. Metformin is another drug used in people with insulin insensitivity that has been looked at for the treatment of horses with EMS. So far, the studies that have been performed have conflicting results. Herbal supplements such as magnesium, chromium, and cinnamon have not been shown to alter insulin sensitivity in horses.

While horses with EMS are often treated with thyroid hormones, the existence of true hypothyroidism in the horse is controversial. Historically, hypothyroidism has been linked to obesity, laminitis, anhidrosis (non-sweating), recurrent tying up, and decreased fertility. In all of those cases, however, actual hypothyroidism could be not documented, and most of these horses more likely suffered from PPID or EMS. To truly diagnose thyroid dysfunction, a thyroid stimulation test would have to be performed.

Equine Metabolic Syndrome and PPID remain a source of confusion and frustration for many owners and veterinarians. Differentiating between the two diseases can be difficult. The age of onset, appearance of the haircoat, and presence of muscle loss may all help in addition to blood tests. Management is a significant part of both diseases, with the main goal being to prevent secondary complications such as laminitis.