Kentucky Equine Research

Diagnosing Equine Metabolic Syndrome

Most horses affected with equine metabolic syndrome (EMS) are overweight and have abnormal fat deposits that include a cresty neck, fat around the tailhead that makes the tail look inset into the body, and fat pads around the shoulder, sheath, or udder. Horses with EMS almost always can be described as easy keepers that gain or maintain weight with little feed. Breeds most commonly affected with EMS include the Morgan, Paso Fino, Arabian, American Saddlebred, and Spanish Mustang as well as pony and various warmblood breeds. Most horses with EMS are fairly young, between 5 and 15 years of age.

EMS is believed to be an anomaly in the way body fat is stored in preparation for times when food will be scarce. Perhaps the most serious and potentially fatal clinical sign of EMS is laminitis that occurs spontaneously without any of the other conditions that can normally result in laminitis. Laminitis often occurs with lush pasture growth during late spring and early summer, when pastures have high sugar content (nonstructural carbohydrates). Affected mares may also have irregular heat cycles.

Diagnosis of EMS can be difficult and usually begins with ruling out equine Cushing's disease. Occasionally, horses can be affected with both conditions, and some researchers speculate that EMS may predispose some horses to develop equine Cushing's disease at an earlier age.

Blood insulin and glucose concentrations: Affected horses have insulin resistance (similar to type II diabetes mellitus in humans). Bloodwork may show elevated insulin and blood glucose concentrations. Horses with EMS may have both high blood insulin and glucose concentrations, but usually blood glucose is normal and toward the higher end of normal ranges. The most reliable tests to accurately determine glucose and insulin responses involve intravenous infusion of glucose and insulin followed by measurement of concentrations over time. However, these tests are complicated and not commonly performed, even in hospital settings.

Insulin results are most reliable if the horse has not eaten any concentrate (grain or sweet feed) for at least 4 hours before drawing blood. The higher the fasting insulin level, the more likely the horse has EMS. A glucose-to-insulin ratio of less than 10:1 is considered abnormal. In cases of EMS, a low glucose-to-insulin ratio is usually due to increased insulin concentration and not elevated blood glucose concentration.

Thyroid hormones: Horses with EMS can have normal to low thyroid hormone concentrations. Thyroid hormone levels alone are of little benefit to diagnose EMS.

The most important warning that a veterinarian can give the horse owner is to be prepared for some abnormal results, even in normal horses, when performing endocrine testing. The concentration of one or more hormones likely will be out of the normal range. The difficulty in interpreting endocrine tests lies in determining what abnormalities are significant and if some other factor is influencing the hormone. The "big picture" of the horse's laboratory results, clinical signs, history, and other coexisting conditions determines which, if any, endocrine abnormalities need to be addressed.--*Dr. Bryan Waldridge* KER.