Pituitary Pars Intermedia Dysfunction (Cushing's)

TVMDL Texas A&M Veterinary Medical Diagnostic Laboratory

Pituitary Pars Intermedia Dysfunction (PPID), also known as equine Cushing's disease, is one the most common endocrine disorders in equine. This condition generally occurs in older horses; most horses experiencing PPID are in excess of 15 years of age. It has been estimated that as much as 21% of the horses and ponies over the age of 15 may be affected by this condition. Though it affects many horses, the condition can go undetected. The Texas A&M Veterinary Medical Diagnostic Laboratory (TVMDL) offers guidance for veterinarians looking to diagnose PPID.

Clinical suspicion of the disease relies primarily on observed clinical signs such as a horse deemed an "easy keeper," long shaggy hair coat (hirsutism), excessive water consumption and urination (polydipsia/polyuria), pot belly, hyperhidrosis (excessive sweating) and clinical or subclinical laminitis. These signs are typically seen in more advanced cases. PPID appears to be more common in ponies than in other breeds of equine. PPID is typically the result of a pituitary adenoma specifically of the pars intermedia.

The mechanism for disease involves enlargement of the pars intermedia of the pituitary resulting in an increase in adreno-corticotropic hormone (ACTH) being released into circulation. The role of dopamine and the degeneration of the dopamine secreting neurons in the pars intermedia are important to the development of PPID. This dopaminergic neuron degeneration results in loss of control of the pars intermedia and, therefore, increased secretion of hormones. The adrenal gland responds to this ACTH by increasing cortisol production. The "negative-feedback" system is lost due to the fact that the pituitary adenoma does not respond to the increased concentrations of cortisol. Excessive levels of cortisol eventually result in development of the clinical signs of PPID.

Confirmation of PPID and monitoring response to treatment using laboratory diagnostics can be useful if appropriate testing is requested. TVMDL does not recommend using resting cortisol concentrations as direction to aid in confirmation of PPID because cortisol fluctuates day to day along with individual variation and can be influenced by many variables. Resting ACTH (endogenous ACTH) appears to be a better test for confirming PPID than single cortisol (increased over normal) due to less variation.

Sample handling is very important and should be adhered to because the ACTH molecule is fragile and mishandling can lead to decreased concentrations (into normal range), which can lead to a missed confirmation of diagnosis. Measurement for ACTH requires an EDTA plasma sample that is handled appropriately. Once a blood sample is taken and placed into an EDTA tube (purple/lavender top), the sample should be thoroughly mixed by gentle inversion for complete mixing. Place the sample tube in a centrifuge and centrifuge for at least 10 minutes. Harvest the plasma and place into a plastic tube (ACTH adheres to glass) of some type and freeze. In most cases, freezing plasma sample in a specimen jar with water will ensure a block of ice around the sample which when shipped overnight with cold packs will remain frozen. If one is out in the field, then placing EDTA tube into ice is a good way to preserve sample integrity until sample can be centrifuged and plasma harvested.

An alternative to the ACTH measurement is to use a dexamethasone suppression test. One drawback to this test is the need for multiple measurements at 15 and 19 hours post injection of dexamethasone. Although this test appears to be a viable alternative, the increased farm visits may make this test less desirable. Response to treatment can be monitored through improvement in clinical signs and also through periodic monitoring of ACTH levels.