Facts About PPID & EMS

Exclusively Equine
VETERINARY SERVICES

Equine Endocrine Diseases

Pituitary pars intermedia dysfunction (PPID) is the most common endocrine disease in horses and ponies, with up to 21% of horses over 15 years old affected. Equine metabolic syndrome (EMS) is becoming more recognised in horses as it becomes more accurately defined. These two disorders present many challenges to horse owners and vets.

Pituitary Pars Intermedia Dysfunction

PPID, Equine Cushing's Disease
The horse's pituitary gland sits within the skull at the base of the brain, suspended from the hypothalamus by the infundibular sheath. Nerves travelling from the hypothalamus signal the release of various hormones from the pituitary. The release of hormone precursors is stimulated by thyrotropin-releasing hormone and inhibited by dopamine.

PPID was originally believed to be caused by benign neoplasia of the pituitary gland, however more recent studies have revealed that PPID is a neurodegenerative disease, in which the normal inhibition of the pituitary by dopaminergic neurons from the hypothalamus fails, resulting in the pituitary gland becoming hyperactive, producing an excess of hormones.

Age is the prominent risk factor for PPID, which most often affects older horses (teenage or older). Progression of clinical signs occurs slowly, making early diagnosis difficult.

Common clinical signs:

- A long, curly haircoat that fails to shed fully.
- Increased water intake and urination.
- Lethargy.
- Loss of muscle mass, most notable over the back and hindquarters, with a "pot-bellied" appearance.
- Excess or inappropriate sweating.
- Chronic infections due to elevation in cortisol levels.
- Repeated laminitis episodes, sometimes with chronic hoof abscesses, most often in horses with concurrent EMS.

Equine Endocrine Diseases

In the advanced stages of PPID, a resting (endogenous) ACTH concentration in the blood can be measured to diagnose PPID. ACTH concentrations in normal horses fluctuate throughout the year, so season-specific reference ranges have been established. Even for horses with obvious clinical signs, measurement of blood ACTH, glucose and insulin is still recommended to guide appropriate treatment. Early PPID can be more challenging to diagnose, as blood ACTH concentration will sometimes be normal in the early stages. The thyrotropin releasing hormone (TRH) stimulation test, which measures ACTH after administration of TRH, will likely become more commonly performed for this purpose as season-specific reference ranges are developed.

If PPID is diagnosed or suspected, there are some further diagnostic tests which are advised:

- Foot radiographs to detect changes associated with laminitis
- Complete blood count and biochemistry as PPID will sometimes elevated white cell counts
- Urinalysis, as excessive drinking will dilute urine
- Fasting insulin or insulin following oral or IV glucose challenge (see EMS below)

While PPID cannot be cured, clinical signs can be managed and progression of the disease can be slowed. The most widely used drug is Pergolide mesylate, a dopamine agonist which helps compensate for the loss of nerve inhibition. The drug is given orally once daily. Over time, the amount of drug needed to manage the condition may change due to progression of the disease, so repeated testing can help to determine the need for changing the drug dose. Another drug, cyproheptadine, is not as effective as pergolide when used alone, but may be added to the treatment protocol in horses that are no longer

Horses living with PPID benefit from some extra care:

- For stabled horses, change their bedding regularly to avoid wet footing.
- Body clipping as needed, especially in summer.
- Monitor for signs of infection.
- Regular dental care.
- Restriction of sugar in the diet.

Equine Metabolic Syndrome

EMS, Peripheral Cushing's Syndrome, Pre-laminitic Metabolic Syndrome

The term Equine Metabolic Syndrome (EMS) has recently been adopted by the equine veterinary community to describe the condition of obesity, insulin resistance and laminitis in horses and ponies. The exact nature of the syndrome and the features that define EMS are a subject of ongoing debate, however insulin resistance and/or hyperinsulinemia play an important role.

Signs of EMS include:

- Increased fat accumulation, either in specific locations ("cresty" neck, tail head, behind shoulder, prepuce/mammary gland region – termed regional adiposity) or generally (obesity).
- Insulin resistance, seen as hyperinsulinemia, a reduced ability of a given concentration of insulin to lower blood glucose levels.
- A predisposition towards laminitis.

Most horses begin to show signs of EMS between 5 and 15 years of age. EMS affected horses tend to have high metabolic efficiency, often referred to as "good doers" or "easy keepers". They require fewer calories for maintenance of body weight compared to unaffected horses. Breed predispositions have been identified, with Welsh and Dartmoor ponies, Morgans, Arabians and Tennessee Walking Horses more likely to be affected. It is likely that EMS has a genetic basis, with signs developing in young animals if obesity is allowed to develop, and/or later in life when PPID exacerbates the underlying condition.

A veterinarian will diagnose EMS through a horse's history, physical examination findings, radiography and laboratory tests. Obesity is not a necessary feature of the syndrome, although components of the disorder are exacerbated by obesity. Therefore, the presence or absence of obesity cannot be used as a diagnostic criterion, and whereas dietary restriction and weight loss cause important improvements in insulin sensitivity, it will not cure the underlying metabolic dysfunction.

Equine Metabolic Syndrome

Blood samples need to be collected after approximately 6 hours of feed withholding, for assessment of fasting glucose and insulin levels. Hyperglycaemia is rarely detected in horses with EMS because most horses effectively compensate through their insulin response. However, blood glucose concentrations are often towards the high end of the normal range. Hyperinsulinemia in the absence of other causes highly suggests insulin resistance. There is evidence in support of dynamic testing, which measures insulin response by inducing hyperglycaemia with oral or IV glucose. The combined glucose-insulin test uses injections of glucose and insulin to test tissue insulin resistance.

Most horses with EMS can be effectively managed by controlling their diet, instituting an exercise program and limiting access to pasture. Pharmaceutical products to treat insulin resistance, including levothyroxine to accelerate weight loss in horses on a controlled diet and metformin to limit postprandial hyperinsulinemia, have received attention but are not widely used.

Dietary management of EMS involves reducing the amount of energy provided in the diet to induce weight loss if the horse is obese and lowering the soluble carbohydrate content of the diet. Pasture access should be restricted as carbohydrates consumed in pasture can trigger laminitis.

If there is no foot pain or structural damage to the feet, exercise is recommended for horses with EMS to promote weight loss and insulin sensitivity. Some horses with EMS subsequently develop PPID, so both conditions can occur concurrently. In these cases, treatment of PPID is an important part of controlling EMS.