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Cushing's Disease

Equine Cushing's Disease (ECD), also known as Pars Pituitary Intermedia Dysfunction (PPID), hyperadrenocorticism is a disorder of the endocrine system. Cushing's disease is a slowly progressive disease which commonly affects pony breeds, but other breeds can also be affected. It is primarily seen in older horses above 15 years of age and in both male and female horses.

Equine Metabolic Syndrome, also known as Peripheral Cushing's Syndrome is a different ailment that has many of the same symptoms of Cushing's disease and will be discussed later.

Cushing's disease is caused by enlargement (benign tumour or hyperplasia) of the pars intermedia (middle section) of the pituitary gland. The pituitary gland is located at the base of the brain and produces a variety of different hormones. This gland is like a dispatch centre, where hormones and other chemical mediators called "proopiomelanocortin peptides" (POMC) are produced and then released into the body to control body functions. Dysfunction of the pars intermedia results in increased levels of some hormones, such as ACTH (adrenocorticotrophic hormone). As ACTH levels are increased this causes the adrenal glands to increase production of a steroid called cortisol and explains many of the clinical signs of Cushing's.

Clinical signs of Cushing's disease

- **Long, curly coat** - some variation in length and density may occur from normal. Natural spring moulting may not take place.
- **Sweating** - is common and the coat often feels damp. Sweating is a result of the thick coat, hormonal changes and the brain's thermoregulatory centres not working correctly.
- **Laminitis** - the most common and potentially serious condition which may appear mild in the first instance and may occur without other symptoms present. (see our information sheet on laminitis)

- **Excessive drinking** (polydipsia) **and urine production** (polyuria) usually associated with a diabetic state where blood sugar levels are elevated. This may result in the bed being wetter.
- **Immune system suppression** - predisposes the horse to skin and other infections.
- Occasionally a mare's **oestrus cycle** may be abnormal or not occur at all.
- **Foot abscesses** develop from laminitic changes and poor hoof quality.
- **Lethargic and lacks energy.**
- **Sinus and dental problems.**
- **Poor wound healing** - small ulcers in the mouth can be present for months and often enlarge.
- **Weight loss** - Weakened abdominal muscles become stretched but often with a pot bellied appearance. Fat redistribution possibly causing bulging of the hollow above the eyes and a thick crest.
- **Blindness** and **seizures** can occur but are a rare complication.

Testing for Cushing's disease

Blood tests can reveal high sugar levels, high blood fats, anaemia, and electrolyte imbalances. High blood sugar levels are often present in Cushing's horses due to insulin resistance. Urinalysis can detect high glucose and ketone levels in the urine.

Dexamethasone suppression test- a blood sample is taken to establish baseline cortisol levels. Then, dexamethasone is administered and another blood test is taken 19-24hrs later. Cortisol levels are normally elevated in horses with Cushing's disease.

The ACTH stimulation test is another way of measuring cortisol levels in the blood. A baseline blood sample is taken followed by injection of 1 unit of ACTH per kg bodyweight. Cortisol levels are then measured 4-8hrs later. A diseased horse will show a 4 fold rise in cortisol, whereas a normal horse will only show a 2-3 fold increase.

However, recent research has cast a shadow of doubt on the accuracy of these tests.

Other tests have been developed. One test combines dexamethasone suppression test with a thyrotropin releasing hormone (TRH) stimulation test. Measuring blood cortisol levels 3 hours after injecting dexamethasone and immediately following it with an injection of TRH, allows measurement of elevated cortisol levels in just 45 minutes.

Because blood glucose is elevated in a high proportion of cases, and because there is glucose in the urine, a combined urine analysis and blood sugar estimation can be as helpful as many of the more sophisticated tests.

At Avondale Vets the testing regime we use is to measure blood levels of ACTH, cortisol, insulin and glucose from venous blood samples at 9am before morning feeds and in a quiet environment. This is a simple test but involves separation of blood cells from the plasma and freezing the sample before testing at a specialised laboratory.

Cushing's Treatment

There are NO cures for Cushing's in horses, there are however useful drugs and some management procedures that could help.

Pergolide mesylate is the best drug option at present. Pergolide is a dopamine agonist originally used to treat Parkinson's disease in humans.

A second drug sometimes used is Cyproheptadine. Cyproheptadine is a serotonin blocker which is administered at a lower dose initially and gradually increases until symptoms improve.

Trilostane is another drug used in the medication of horse and ponies. Licensed in dogs. The drug acts by inhibiting cortisol and is required to be given twice daily.

In addition to medication, horses with Cushing's disease need careful management of their health. A proper diet, vaccinations, deworming and dental care are important.

Prevention

No preventive measures can be implemented. Most aged horses will develop Cushing's disease if they live long enough.

Long Term Prognosis

If caught early, Cushing's disease is very controllable. Given a good response to drugs and good management, many horses live with Cushing's for many years. In severe cases where there are secondary complications such as laminitis or sinus infections the prognosis is poor.

EQUINE METABOLIC SYNDROME

Equine metabolic syndrome (EMS) is a term used to describe horses with obesity, insulin resistance and recurrent laminitis. EMS usually affects young to middle aged horses and is more common in native pony-type breeds. These ponies have evolved to thrive in harsh conditions, storing fat during spring and summer so that they can draw on their resources during the winter months. However, modern diets and management practices provide many more calories than these ponies need.

Large regional fat deposits can be seen most commonly in the crest of the neck but also around the shoulders, at the base of the tail, in and around the mammary glands in mares and in and around the sheath in geldings. The association of EMS and laminitis is not fully understood but it is believed that there is a link between insulin resistance and predisposition for laminitis.

Diagnosis of Equine Metabolic Syndrome

No definitive test is available and diagnosis is often based on clinical symptoms. Elevated glucose and insulin concentration are the most reliable indicators. Confusion is common amongst vets in distinguishing between Equine metabolic syndrome and Cushing's disease.

Insulin resistance

Insulin is involved in the uptake of glucose from the blood stream after eating. This glucose uptake into tissues no longer works in EMS. The body responds by producing more and more insulin and this elevated blood insulin level is characteristic of equine metabolic syndrome.

Treatment

This involves management more than drugs. Weight loss and exercise are the key areas. Obese horses should be put on hay and nothing else plus a vitamin and mineral supplement with no access to pasture. Alfalfa hay should be avoided as it contains more energy but if that is all you have then soak hay in water for at least 30mins to wash out the soluble sugars.

How much hay do you feed?

Feed 1.5% of the ideal body weight, *not the current body weight*. **DO NOT** feed less than 1% ideal body weight as this could induce hyperlipaemia.

For example, a 480kg pony that should be 400kg should get 6kg dry weight of hay per day. If no weight loss has occurred within 30-40 days then reduce to a minimum of 1% dry weight hay per kg of pony (Remember, ideal weight!!)

Exercise increases insulin sensitivity even without weight loss and the pony should be started on 20-30 minutes exercise 2-3 times a week. In laminitics this is obviously difficult but should be encouraged once laminitic feet are sound.