



LIPHOOK
EQUINE HOSPITAL

Equine Metabolic Syndrome

The term equine metabolic syndrome (EMS) has only been in use for the last 10 years and replaces previous terms such as peripheral Cushing's syndrome, Cushings X and pre-laminitic metabolic syndrome. The term describes a common syndrome of obesity and predisposition to laminitis that affects horses and in particular ponies. The condition has similarities with human metabolic syndrome and Type II Diabetes.



The Liphook Equine Hospital , Forest Mere, Liphook, Hampshire, GU30 7JG
Practice Office: 01428 723594 / Hospital Office: 01428 727200
Email: post@theleh.co.uk Website www.theleh.co.uk

Equine Metabolic Syndrome

What causes EMS?

A reduction in the normal response to insulin (insulin resistance) is central to EMS. Insulin's most important function is the control of glucose levels in the blood and when insulin resistance occurs the normal relationship between insulin and glucose levels becomes disrupted. In addition to insulin resistance the syndrome also encompasses a number of other potential metabolic derangements including altered energy metabolism, changes in fat composition, clotting disorders, inflammation and damage to blood vessels. In horses the blood vessels in the feet are thought to be especially susceptible to these metabolic changes as a result of their unique anatomy - potentially giving rise to **laminitis**.

The precise mechanisms by which insulin resistance and other metabolic changes result in disease in the feet are complex and not fully understood; however possibilities include dysfunction of the cells lining the blood vessels of the foot, constriction of the blood vessels, reduced glucose uptake in the foot, altered function of the cells that produce hoof horn, and increased activity of potentially damaging enzymes called matrix metalloproteinases.

Certain breeds have been recognised to be at greater risk of EMS including Welsh, Dartmoor and Shetland ponies and Morgan, Arabian and Warmblood horses. Any breed can be affected if management and particularly diet are inappropriate. Furthermore, this is a disease induced by diet and management factors and can be prevented in all breeds with appropriate dietary restriction.

Clinical signs

Obesity is the classical sign of EMS and may be generalised or localised – commonly seen surrounding the nuchal ligament in the neck or “cresty neck” (Figure 2a), around the tail head, behind the shoulder, around the eyes (Figure 2b) and in the prepuce or mammary gland region. However, the absence of obesity does not rule out the presence of the condition.

Lameness and evidence of current or previous **laminitis** may be present. Indicators of laminitis include poor horn quality, uneven or divergent growth rings on the hooves, flat or convex soles, divergent white lines, bruising of the white line and chronic foot infections.

The differences between EMS and equine Cushing's disease:

Equine metabolic syndrome is often confused with equine Cushing's Disease or more correctly, Pituitary Pars Intermedia Dysfunction (PPID). Although these two diseases have different causes they may both result in insulin resistance and laminitis.



Equine Metabolic Syndrome

There are however important differences:

- EMS horses are typically young or middle aged, while horses with PPID are older.
- Horses with PPID may demonstrate several signs not seen with EMS *e.g.* delayed or failed shedding of the winter coat, excessive sweating, increased thirst, increased urination, and muscle wasting.
- Horses with PPID have abnormal pituitary gland function which can be assessed by measuring a hormone (ACTH) level in a blood sample; horses with EMS do not have this dysfunction.

Diagnosis

A presumptive diagnosis can often be made from the appearance of an overweight horse and a history of laminitis. In order to confirm the presence of EMS **insulin resistance** has to be identified. For all testing methods it is important that the horse is fasted prior to testing and is not painful (*e.g.* during a laminitis episode) or stressed at the time of testing.

Testing methods include:

- **A single blood sample** can be taken to assess **insulin and glucose concentrations** and to estimate the risk of laminitis developing. Unfortunately some horses with EMS will also have normal levels of insulin making the single blood tests slightly unreliable and prompting the use of more accurate tests of insulin function in these cases.
- **An Oral Glucose Challenge Test** assesses the insulin response to a meal of glucose and is therefore more accurate than a single blood test. A blood test is performed (usually 2 hours) after the horse is fed glucose and the resulting insulin concentration is measured.
- **Other laboratory tests** from a blood sample may also be useful in identifying increased levels of fat and hormones other than insulin that are also characteristic of EMS. Diagnosis of EMS is often dependent upon specific tests to rule-out PPID as a cause of insulin resistance.
- **Radiographs** may be taken to confirm the presence of laminitis and to determine the severity of any structural changes that may have occurred in the feet.



The Liphook Equine Hospital, Forest Mere, Liphook, Hampshire, GU30 7JG

Practice Office: 01428 723594 / Hospital Office: 01428 727200

Email: post@theleh.co.uk Website www.theleh.co.uk

Equine Metabolic Syndrome

Prevention and Treatment

The principles of prevention and treatment are very straightforward; **dietary restriction and exercise**. Not only do these measures result in weight loss but also increased fitness which improves the way the body responds to insulin. Horses have evolved to lose weight annually through the winter and preventing this from happening is damaging to the metabolism and results in EMS. Horses with, or at risk of, EMS should be fed a diet that is low in soluble sugars and starches. In many cases this means feeding forage with a high fibre and low sugar level only; most native breeds do not require hard feed to maintain their condition. Access to pasture should also be limited especially when grass is lush and growing. Sugars will accumulate in grass when the days are sunny and the nights are cold in the winter - so these periods are also to be avoided. Some horses with established EMS may not be able to tolerate any access to pasture.

Horses that have EMS and need to lose weight should be restricted to a diet of grass hay at 1-2% of their body weight with all treats eliminated from the diet.

More radical dietary restriction is often necessary but should be done under veterinary guidance as excessive weight loss over too short a period of time may result in other metabolic disorders. Provision of a vitamin and mineral balancer is advisable.

If laminitis develops exercise may not be possible (see laminitis leaflet for specific treatment) and this presents major difficulties in management. It is therefore worth being proactive and tackling the condition before laminitis occurs.

In humans with metabolic syndrome there are a number of drugs that are used to increase insulin sensitivity. These have been tried in horses but results are mixed. Metformin is one such drug that is popular in the UK but there are concerns over whether it is absorbed from the intestine and whether it is effective.

A number of supplements have been suggested to be of benefit in horses with EMS including chromium, magnesium, cinnamon, and chasteberry (Vitex agnus-castus) extract. There is no evidence that they are beneficial and indeed there is some evidence that they are ineffective and so currently their use cannot be recommended.

EMS is a disease induced by diet and management factors and can be prevented in all breeds with appropriate dietary restriction.

Reproduced with the kind permission of the

National Animal Disease Information Service - www.NADIS.org.uk

Written by Dave Rendle BVSc Cert EM (Int Med) DipECEIM MRCVS, Medical Specialist from

Liphook Equine Hospital.

Copyright The Liphook Equine Hospital - May 2015



The Liphook Equine Hospital , Forest Mere, Liphook, Hampshire, GU30 7JG
Practice Office: 01428 723594 / Hospital Office: 01428 727200
Email: post@theleh.co.uk Website www.theleh.co.uk