



## Woodside & Woodside North Equine Clinic Equine Health Times

### Quick Links

[WEC Website](#)

[AAEP Website](#)

### What to look out for when the weather changes!

As the weather starts to get colder, we need to start paying special attention to our equine friends and their health! Make sure that horses have access to water at all times, and that their water buckets aren't frozen. Horses that do not have access to water can be predisposed to impaction colic!

### Blog: Diaries of a Veterinary Intern

#### ***"EPM - Fad or Diagnostic Challenge?"***

***By: Kara Brown, VMD***

EPM, or Equine Protozoal Myeloencephalitis, is a neurologic disease caused by the protozoan parasite *Sarcocystis neurona*. Although this disease has gained widespread attention in recent years, it has actually been recognized as a disease in horses since 1964. It has been said that EPM occurs most commonly in Thoroughbreds, Standardbreds and Quarter Horses, and in horses aged 1-6, however, ANY breed of horse at ANY age can be diagnosed with EPM. The disease is also most common on the Eastern side of the United States, but can be found in horses on both coasts.

...To read more about EPM, please visit [Diaries of a Veterinary Intern](#) at Woodside Equine Clinic's website.

### Equine Endocrinology: Cresty Necks and Laminitis

By Nora Grenager, VMD, DACVIM



### **What has our staff been up to?**

Woodside Equine Clinic was on call for the 2014 Virginia State Fair from September 26-October 5. We had a wonderful time sampling the fair cuisine and checking out the equine events!

Dr. Anderson attended ISELP (International Society of Equine Locomotor Pathology) Module on the Equine Back and Neck at Virginia Equine Imaging.

Leslie, one of our licensed veterinary technicians, attended NEAEP (Northeast Association of Equine Practitioners) Symposium in Norfolk, Virginia, where she attended lectures on lameness and medicine including updates on parasitology and infectious diseases.

Read about the lives of our veterinary interns in their blog

### **Diaries of a Veterinary Intern**

by:  
[Dr. Megan Mathias](#)

The two main endocrinologic concerns in horses are equine Cushing's disease (also known as pituitary pars intermedia dysfunction) and equine metabolic syndrome (also known as "insulin dysregulation" or, formerly, "insulin resistance"). These disorders are increasing in prevalence as our equine population is better cared for and living longer, and improved diagnostics are available. There are two main similarities between these conditions: 1) insulin dysregulation 2) the potentially devastating possibility of laminitis. While it is an area of much research, there are numerous theories as to why these horses are predisposed to laminitis, and it is beyond the scope of this article to discuss them all. However, the laminitis is likely related to insulin dysregulation, which is a reduced ability of the body to respond appropriately to insulin released by the pancreas after eating a meal. It is important to understand the signs of insulin dysregulation and be able to effectively manage these horses to decrease the risk of laminitis.

### **Equine Cushing's Disease**

#### **Cause:**

The cause of equine Cushing's disease is a benign tumor, likely caused by oxidative stress, in a part of the horse's brain called the pituitary gland. It is not a typical neoplastic tumor, rather a lack of regulation of hormone secretion due to alterations in local factors in that region of the brain. This alteration (namely, a decrease in local dopamine production) leads to unregulated hormone secretion by the pituitary gland, enlarging this area such that it forms a tumor. This tumor secretes a variety of hormones, including one called adrenocorticotropic hormone (ACTH) that causes the adrenal gland (in the abdomen) to release increased amounts of steroid (cortisol). Other secreted hormones include  $\alpha$ -MSH, POMC, and b-endorphin.

#### **Clinical signs:**

The increased levels of these circulating hormones cause the typical clinical signs, including: a long, wavy hair coat that does not completely shed out; abnormal fat distribution, such as a cresty neck or fat pads above the tailhead; weight loss, especially over the ribs; muscle loss, along the top line or leading to a pot belly; recurrent laminitis; lethargy and exercise intolerance; increased sweating, increased water intake and urination; and immune system suppression or recurrent infections. Many horses with Cushing's disease also have chronic insulin dysregulation. The most common clinical signs are the abnormal, long hair coat (called "hirsutism") and chronic laminitis. However, it is important to remember that horses with milder disease can have milder signs, and a long haircoat may not be seen in all horses with Cushing's. Equine Cushing's disease is more common in older horses (in their late teens-20s), but can be seen in horses as young as 7 years old. There are some breeds that seem to be more predisposed, and ponies also seem to

and  
[Dr. Kara Brown](#)

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be predisposed to the condition.

### **Diagnosis:**

Definitive diagnosis of equine Cushing's disease can be challenging. It is relatively easy to diagnose in an older horse with more severe disease and typical clinical signs, such as a long hair coat and laminitis. In these cases, in which the horse has the typical clinical signs of equine Cushing's disease, diagnostic tests are sometimes skipped because the signs are so suggestive. Sometimes a "diagnostic therapeutic" challenge is used, in which we try treating a horse for 30-60 days and monitor the response; the treatment for Cushing's (pergolide) is so effective and safe that we have our answer if the horse improves on medication. However, in those horses that do not have the "typical" appearance of equine Cushing's disease, or if we want to have definitive test results to help us monitor the response to treatment, there are several tests available. The difficulty with all the available tests is that they can be negative in horses with early Cushing's disease; thus, if the index of suspicion is very high, we may still opt to treat the horse even if the test is negative.

The first recommended test is measurement of the resting levels of ACTH, one of the hormones that is overproduced by the tumor in the pituitary. This test requires one blood sample. While it is fairly accurate, it still can have false negatives (i.e., about 30% of the time horse with Cushing's disease has a negative test result).

If the resting ACTH levels are normal, the next recommended test is called the thyrotropin releasing hormone stimulation test (the TRH stim test). This test is slightly more sensitive (i.e., more likely to correctly diagnose the horse with Cushing's), but requires two blood samples, taken 10 minutes apart, and intravenous administration of TRH. The test is very safe but is obviously a bit more expensive than just measuring the resting ACTH once.

The dexamethasone suppression test is another test that is frequently used, though it is slowly falling out of favor as the ACTH testing has been shown to be more reliable. This test requires two veterinary visits: at the first visit, blood is drawn to measure the cortisol level and a dose of dexamethasone is given. At the second visit, about a day later, blood is drawn to again measure the cortisol level. The test relies on a normal endocrine negative feedback loop. In a normal horse, a dose of dexamethasone (steroid) suppresses the pituitary gland, telling the gland that it is unnecessary to make more cortisol (steroid made by the body) because some has just been given. Therefore the second sampled blood level of cortisol is very low in a normal horse. In a horse with Cushing's, the tumor in the pituitary gland results in production of cortisol no matter what levels of steroid are in the body, so it does not respond to the dexamethasone the veterinarian administers; therefore the second level of cortisol is not significantly different from the first, pre-dexamethasone, level.

This test can also have false positive or false negative results. There are two potential drawbacks: first, it necessitates two visits from your veterinarian, which increases cost. Second, it involves the

administration of steroid to a horse that is already possibly predisposed to laminitis. Therefore there is a very low risk of precipitating a bout of laminitis. Most practitioners feel, however, that the benefits of knowing the test results often outweigh the risks.

It has recently been shown that the tests for equine Cushing's disease are even more sensitive in the late summer/early fall (i.e., mid-August through mid-October); therefore, veterinarians may recommend testing at that time. A variety of other tests exist, and there is ongoing research to develop even more sensitive and specific ways to diagnose equine Cushing's disease in those horses in which the diagnosis is difficult. The astute reader may be asking why we do not just measure cortisol levels, since the overproduction of that hormone is a hallmark of the disease. Unfortunately, the daily variations in cortisol levels render this measurement useless.

Evaluation for insulin dysregulation should always be performed with tests for Cushing's disease since many horses with Cushing's have concurrent insulin dysregulation. Discussion on the diagnosis of insulin dysregulation is in the following section.

### **Treatment:**

Treatment is advocated because of the possibly devastating effects of laminitis and immune suppression. Fortunately, there is a highly effective specific treatment for equine Cushing's disease called "pergolide." Pergolide acts like dopamine and works on the pituitary gland to prevent the release of excess hormones from the tumor. It is given as a tablet once daily for the rest of the horse's life. Most of the time a beneficial response is seen in 4-6 weeks, but sometimes the dose needs to be increased or decreased. Pergolide has virtually no known side effects in horses at appropriate dosing levels; some horses will become mildly inappetent when the medication is first started. The appetite returns in these horses when they are started on a lower dose and it is gradually increased. Often bloodwork is repeated to help monitor response to treatment, and generally the response to treatment is easily seen. The trade name for pergolide is "Prascend®" - while there are compounded versions of pergolide that are less expensive, they are considerably less reliable and effective, so in the long run end up costing more for less effect.

Several other drugs (such as cyproheptadine and trilostane) have been used to treat equine Cushing's disease, but none have been shown to have the efficacy of pergolide. Occasionally one of those drugs is added to pergolide treatment in severe cases that need additional therapeutic help. Many nutritional or herbal supplements are also available (often including magnesium and chromium or chasteberry), and may have variable efficacy; however, none have been proven to be safe and effective. Often these horses also have insulin dysfunction, so treatment for that will be similar to what is described in the next section. The proper treatment of Cushing's disease with pergolide eventually alleviates many of the signs of insulin dysregulation since the underlying cause is being treated.

## **Feed and management:**

In addition to daily medication, some feed and management changes should be considered. These horses need regular farrier care, good dental care (immune suppression and older age make them prone to dental problems and secondary sinus infections), routine preventive veterinary care including fecal egg counts, and good quality feed. Some horses may need to be clipped to help prevent hyperthermia. High starch/sugar feeds should be avoided in the horses that have insulin dysregulation to help minimize fluctuations in glucose levels. More about nutrition for horses with insulin dysregulation is written in the following section on metabolic syndrome. Horses with Cushing's that do not have documented insulin dysregulation but suffer from weight loss will have different dietary needs.

## **Equine Metabolic Syndrome**

Equine Metabolic Syndrome is defined as chronic insulin dysregulation, obesity or abnormal fat distribution (e.g., a cresty neck; fat pads over the tailhead, eyes, and withers), and increased risk of laminitis in horses that do not have equine Cushing's disease. This is a relatively newly recognized condition, and there is a lot of ongoing research about this disorder and our understanding of it continues to grow. Horses with this condition tend to be younger than horses with Cushing's disease. These horses have documented insulin dysregulation and sometimes have increased circulating fat levels.

### **Cause:**

The cause of metabolic syndrome is not fully understood, but several theories are being closely considered. First, obesity leads to insulin dysregulation (much like people with Type II diabetes). Second, insulin dysregulation develops secondary to abnormal nutritional usage in genetically predisposed animals. Third, fat cells can be metabolically and hormonally active and alter insulin usage in a peripheral Cushinoid-type syndrome. It is logical to think that horses with metabolic syndrome will perhaps transition into equine Cushing's disease as they age; however, this has not been proven.

### **Diagnosis:**

There are several ways to test for insulin dysregulation associated with metabolic syndrome (and for horses with Cushing's disease). The most basic, first-line, test is to measure resting fasting glucose and insulin concentrations first thing in the morning before breakfast. Basically, a normal horse should have low insulin levels when glucose levels are normal. A horse with insulin dysregulation has increased levels of insulin (to try to make up for tissue resistance to it). The second, slightly more sensitive, test for insulin dysregulation involves administering a specific amount of light Karo syrup, then testing the blood a specific amount of time later (approximately 1 hour) to monitor the

response. A third, more involved, test is the combined glucose-insulin test (CGIT), which is used when insulin dysregulation is suspected but the first two test results are normal. The CGIT involves placing an intravenous catheter, administering glucose and insulin, and measuring the body's response to this at multiple time points.

### **Treatment:**

There is no one specific treatment available for equine metabolic syndrome regardless of whether it is definitively diagnosed or not. Treatment focuses on the management of the insulin dysregulation, including reducing the horse's weight, dietary management, and increasing exercise. The most important goal of dietary management is to restrict the amount of soluble carbohydrates (often called "nonstructural carbohydrates") in the feed, because they alter the insulin levels the most. Grazing should be discussed with your veterinarian and many owners use grazing muzzles or dry lots; however, it is not recommended to lock the horse in a stall. Hay can be analyzed (your vet can direct you to a company that will do this) for its soluble carbohydrate content; it is worth doing this if you purchase large amounts of hay at a time. Some types of grass hay have fairly low soluble carbohydrates, and should be fed at 1.5 to 2% of body weight, as directed by your veterinarian. Oat hay should be avoided. If the horse's hay intake is tapered down to 1% of its body weight and it is still having difficulty losing weight, soaking the hay is a way to further decrease the soluble carbohydrates. It should be soaked in warm water for 20 minutes, or cold water for 60 minutes, immediately prior to feeding. A vitamin/mineral supplement should be fed, and if additional calories are needed they should be provided by sources high in fat and protein, rather than carbohydrates, such as corn oil or rice bran. Sweet feeds, apples, carrots, and high sugar treats should be minimized or, more often, completely removed from the diet. Most feed companies also make low-carbohydrate feeds specifically designed for horses with insulin dysregulation.

Unless a horse is currently dealing with a bout of laminitis, increasing exercise is essential to reducing body fat. Some studies have shown that increased exercise also might help improve tissue insulin sensitivity.

If a horse is on a good exercise program with a proper diet and still not losing weight, or is in a current bout of laminitis, thyroid hormone supplementation may be recommended by your veterinarian to improve insulin sensitivity. Many horses with insulin dysregulation used to be incorrectly categorized as "hypothyroid." Further research has shown that very few horses are actually hypothyroid, however many horses with insulin resistance can have low measurable levels of thyroid hormone. However, their thyroid glands are working fine, and the insulin resistance is the main issue. In spite of this, supplementing with thyroid hormone can help boost the metabolism, improve insulin sensitivity, and get a horse to start losing weight. The thyroid hormone is typically given once daily for a couple of months and then tapered down and discontinued.

A drug used in humans to treat insulin resistance, called "metformin," shows promise in the treatment of equine insulin

dysregulation. It is typically given in conjunction with thyroid hormone. Other medications taken from the human medical field have also been evaluated and tried. Also, just as with equine Cushing's disease, there are many herbal supplements advocated to treat equine metabolic syndrome. Again, there is little proof of efficacy or safety of these treatments, though anecdotally there are some that are beneficial.

***If you are concerned that your horse has signs of either metabolic syndrome or equine Cushing's disease, set up an appointment with Woodside Equine Clinic at (804) 798-3281 or Woodside North Equine Clinic at (540) 423-3100 for an examination and discussion. It is not always easy to distinguish between these two conditions, and they can often be concurrent. Early recognition is critical to provide your horse with the best care and prevent the potentially devastating disease of laminitis. Ideally, endocrine testing would be part of the annual physical exam in all horses.***

Our practice devotes its charitable giving efforts to the AAEP foundation. The foundation is committed to supporting education, research and benevolent efforts for horses and their caretakers. If you'd like more information or to donate to the Foundation you can visit the website at [AAEP Foundation](#).



**Sincerely,**

Woodside & Woodside North Equine Clinic