Overweight Horses: Hypothyroidism or Metabolic Syndrome?

Amy Hilyer, DVM student (Class of 2005)

Is your overweight horse truly hypothyroid? Many of these horses formerly diagnosed as hypothyroid have problems such as abnormal estrous cycles and chronic laminitis. They typically have fat deposits at the crest of the neck, at the shoulders, near the rump, and around the sheath of geldings. "Easy keeper" is a term commonly used to refer to these horses. Pony breeds, Paso Fino, Peruvian Paso, European Warmblood, American Saddlebred, and Morgan horses seem to be predisposed to this condition. New research has revealed that many of these overweight horses are actually afflicted with a condition known as metabolic syndrome and are not hypothyroid. Metabolic syndrome, also referred to as peripheral Cushing's syndrome, is hypothesized to be caused by obesity. This obesity leads to a state of insulin resistance. Once a horse develops metabolic syndrome, they become even more overweight and thus a vicious cycle has developed. A diet too high in energy, too little exercise, genetic factors, and stress are all associated with the development of metabolic syndrome.

In the past, many diagnoses of hypothyroidism in horses had been made based on measuring blood levels of thyroid hormones, T3 and T4. Thyroid hormones are responsible for increasing the production of various enzymes involved in metabolism. However, various other conditions, including most types of illness, can cause a decrease in the production of thyroid hormones. Therefore, low T3/T4 measurements do not necessarily mean that a horse is hypothyroid. Better indicators of thyroid function are TRH and TSH stimulation tests. In normal horses, these tests cause an elevation of thyroid hormones; in hypothyroid horses, the thyroid hormones do not become elevated appropriately. Horses with metabolic syndrome have a normal response to these thyroid function tests, indicating that they are not hypothyroid. Further evidence to suggest that this condition is not hypothyroidism comes from experiments with horses that have had their thyroid glands surgically removed. True hypothyroidism is extremely rare in adult horses. When horses are inappropriately diagnosed with hypothyroidism and given thyroid hormone supplements as treatment, their weight often decreases. This is because the additional thyroid hormones are actually inducing a state of hyperthyroidism. Further adverse effects have been noted with the same situation in human medicine.
Purdue's Large Animal Isolation Unit Open for Business

Maggie Morris, Purdue News Service

Horses and cattle suspected of having contagious diseases now have a new safety zone at Purdue's School of Veterinary Medicine since the $2.2 million Large Animal Isolation Unit opened in December 2004.

"Whenever you have an infection within a hospital, you run the risk of infecting other patients," said Michel Levy, associate professor of large animal medicine at Purdue's School of Veterinary Medicine. "We are better equipped to avoid that with the new isolation facility."

The eight-stall, 5,740-square-foot building is entirely separate from the Veterinary Teaching Hospital. The primary patients of the isolation unit are horses; but one stall is equipped to treat cattle. Construction began in August 2003. "Because the two buildings are not physically connected, and there are no common entrances and exits, it will be possible to ensure that no infectious animals cross paths with non-infected hospital patients," said Mimi Arighi, director of the Veterinary Teaching Hospital. "The new isolation unit helps us be more competitive with schools around the country that are following the trend of providing separate housing for animals with infectious diseases."

In addition to the isolation stalls, the facility has a treatment room, a sterilization room, two small storage rooms and office space. The biggest room in the building is the mechanical room, which is necessary because it houses specialized air-handling equipment, Levy said.

"This isn't your average equine barn," he said. "Each stall has its own air conditioning and ventilation system to prevent cross-contamination between rooms or with the outside air."

Each stall, which is 12-by-12 feet, has a state-of-the-art monitoring system that the patients can be watched minute-by-minute from another room or from monitors in two other areas of the Veterinary Teaching Hospital. The screen is split into nine windows to give a quick overview of all eight stalls and the treatment room. The monitoring system also can focus on each room to determine if an animal is showing signs of pain, is acting abnormally or has pulled out the fluid-delivery tubes that are used for treatments.

The video monitoring setup puts us at the cutting edge of those hospitals with large animal isolation facilities," Arighi said.

Patients in the stalls also can be viewed through windows in the hallway.

The state-of-the-art equipment and accompanying protocols for dealing with infections that found in human hospitals.

"Facilities and protocol are changing now that we're learning more about how bacteria are passed around in both human and animal hospitals," Levy said.

Every door lists the proper protocol for entering any of the stalls and the treatment room. Each of the rooms includes a changing area. Entrants must first put on disposable gowns, gloves and plastic boots before entering the room where the animal is located. After exiting the animal room, each person must take off the disposable clothing and place it in a bag before leaving the changing area.

"Unlike surgery, where the doctors scrub before going in, in this facility there is more concern for what is brought out of the potentially contaminated area," Levy said.

Pathogens need to be strictly contained because they can persist in the environment and spread to other animals or humans. Some can also spread to humans, Levy said. For example, cryptosporidium, which is a parasite sometimes shed by calves with diarrhea, can spread to people. In an isolation unit, doctors can test and monitor the animals and take special precautions.

Doctors are constantly monitoring for salmonella, which affected several patients in the teaching hospital in 2000 when it had to close down for six weeks, Levy said.

"Approximately 10 percent to 20 percent of healthy horses shed salmonella in their manure but are not clinically affected," Levy said. "But if a horse is stressed, as it would be if it has to come to the hospital, that bacteria can multiply and eventually affect the horse. We need to keep these pathogens from spreading to other patients."

Other pathogens that need to be controlled are viruses, such as the sort that killed several horses at the University of Findlay in Ohio last year, Levy said. The facility also will help contain strangulates, a contagious respiratory disease that can spread through a horse population rapidly.

The average stay for a horse ranges from a few days to two weeks, Levy said. He suspects all eight stalls will be occupied in the spring, the time of year when contagious diseases are the most prevalent.

"We've had to turn away horses in the past because we didn't have room," Levy said. "Now we have more room and can take all the special precautions we need to keep every animal safe."

Equine Colic (continued from pg. 6)

Colic can be caused by a wide variety of problems and it is often impossible to determine the exact cause. There are several steps which horse owners can take to reduce the frequency of colic in their horses. Horses are animals which require a daily routine. Establishing and maintaining a daily routine of feeding and exercise allows owners to decrease the probability of colic in their horses. Changes to the routine should be done over several days to weeks. Concentrates and grain are often implicated in colics. It is beneficial to feed concentrates over multiple feedings (as opposed to one large feeding daily). It is also recommended to avoid excess grain and dietary supplements. Good quality free choice roughage (hay; pasture) can be a major step in increasing the health of a horses gastrointestinal tract. Horses should be on a regular parasite control schedule as some internal parasites are implicated in causing colic episodes. Sand is a common cause of colic in horses fed on the ground. Another very important cause of colic is stomach ulcers. These are commonly caused by over feeding, or inflammatory or pain medications. These drugs should not be given unless indicated by a veterinarian.
Colic is undoubtedly the most significant group of disorders facing horses of all breeds and ages. The term colic actually refers to any disease process that causes abdominal pain. Colics vary greatly from mild non-life threatening incidents caused by temporary gas accumulations, to severe and potentially fatal colics including torsions and impactions of the intestines. Early recognition is essential in the proper management and treatment of the colicking horse. Horses suffering from abdominal discomfort can exhibit a number of clinical signs which owners should be able to recognize. These include:

- The horse turning its head to look at its sides
- Paving, kicking and biting at abdomen
- Stretching out (if it can tolerate)
- Repeatedly lying down and getting up
- Lip curling
- Rolling, lying on back
- Lack of appetite, absence of GI sounds
- Lack of bowel movements (change in amount or consistency)
- Sweating, rapid breathing, flared nostrils
- Rapid pulse (greater than 60 beats/minute)
- Depression
- Cool extremities (legs, head)

Regardless of the type of colic there are several “first aid” steps which owners can do at the onset of clinical signs which can help make their horse more comfortable and will be beneficial in its treatment. First, remove all food and water from the stall and ensure the horse is in an area where it will not be likely to injure itself. Call your vet and inform them of how the horse is acting. The vet will use clinical signs to assess the situation. They will be interested in information about the horse’s behaviour, clinical signs, the progression of the discomfort, as well as other information about the horse such as breeding history, work history, pregnancy status, diet, insurance, etc. While waiting for the vet to arrive it is important to keep the horse as calm as possible. The horse can be walked slowly (this helps prevent rolling). Owners are encouraged by veterinarians NOT to give drugs unless they are indicated to do so. Although they may make the horse more comfortable, they may also mask important clinical signs or signs of a worsening condition.

There are a number of diagnostics which you can expect your veterinarian to perform on arrival in an attempt to determine the type of colic and the treatment that will be required for your horse. These will include a physical examination, placement of a nasogastric tube to see if there is excess gas or fluids in the stomach, and a rectal examination. A rectal examination can give important information if there is a blockage, distension of intestines or a displacement.

Blood tests and abdominoconcentus (using a needle to remove peritoneal fluid from the abdominal cavity) can also provide clues to the horse’s condition. Once the veterinarian has evaluated the horse they will formulate a plan to make the horse more comfortable. This is traditionally done with pain relievers and/or sedation (flumixin, xylazine) and/or laxatives such as mineral oil while continuing to observe the horse’s clinical signs. If indicated the horse may be referred to a facility where surgery or more intensive medical management could be performed.

A new drug has recently become approved for the medical management of colic in the United States. It has been widely used in other countries for many years with great success. The drug, known as Buscopan, is an injectable antispasmodic drug. It relieves gastrointestinal spasms and relaxes smooth muscle, which is often responsible for pain. The advantage of this drug is that it has only mild pain-relieving effect so it does not cloud the clinical picture. It works very well for colic caused by spasms, gas distension and simple impactions and provides relief within 5-10 minutes. Buscopan has a 30-minute duration before intestinal motility starts again so your horse may need to be redosed. Horses which do not respond to one (or even 2 doses) of Buscopan are highly likely to have a more serious problem and should be referred promptly for surgical (or intensive medical in some cases) treatment. Buscopan will not provide relief in horses with intestinal accidents such as displacements, torsions or hernias. These conditions generally require emergency surgery. However, these cases make up only 7% of colics occurring each year.

Buscopan gives veterinarians a valuable tool in determining which horses will require emergency surgery and which can be managed conservatively. The prognosis in surgical colics is greatly improved by prompt referral and surgery so determining this early can be very valuable. In clinical studies using Buscopan, 88% of colicky horses were successfully relieved within 30 minutes. As gas distension, impaction, and spasms are the cause of 90% of colics this is a very effective tool in their management. Another advantage of Buscopan is that in clinical trials and also after being in use in other countries for decades it has not been associated with side effects such as gastric ulcers or diarrhea (like other medications). Safety for use in pregnant or lactating mares, or nursing foals has not been determined yet.

New Faculty and Staff

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Education / Training
BS in biology, Worcester Polytechnic Institute, Worcester MA
DVM, Tufts University, North Grafton MA
Intern, Rochester Equine Clinic, Rochester NY
Research / Scholarly Interests
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Equine Infections Disease
Lameness in performance horses
Ultrasound Benefits Equine Reproduction
Valerie Curtis, DVM Student (Class of 2005)

The use of ultrasound in equine reproduction can be a very valuable part of a mare’s management plan for any breeding operation. It’s value lies in documenting uterine changes such as cysts, pregnancy detection as early as day 12-post-ovulation, diagnosing twins, identifying a viable fetus, and diagnosing pathologic conditions. It is important to scan a mare’s uterus that is not in foal to determine if there are any abnormalities present before breeding. It is common finding in many mares and usually are not clinically significant. However, if they were not previously recorded they can make diagnosis of a pregnancy more difficult. Ultrasound is a useful tool to map out the size and location of uterine cysts prior to breeding so that an accurate pregnancy diagnosis can be made. A pregnancy is usually visualized on ultrasound as a spherical embryonic vesicle about 15mm in size around day 14/15, whereas a uterine cyst can be any size and is usually more irregular in shape. If there is confusion between a pregnancy and a cyst the mare should be re-ultrasounded at a later date. This can determine if there has been a change in size and location of the vesicle that is consistent with a pregnancy. A day 14/15 ultrasound check is also a very important time to rule out twin pregnancies in the mare. Twinning in the mare usually occurs due to double ovulation and in the majority of cases results in late-term abortion. It is an undesirable condition and in the mare usually occurs due to double ovulation and in the majority of cases results in late-term abortion. It is an undesirable condition and

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indications to suspect a granulosa cell tumor that often affects a mare’s fertility or estrous cycle. The use of ultrasound in combination with rectal palpation is often a rewarding and time saving diagnostic tool in breeding management. Their combined use allows a practitioner to provide a better level of care and offer appropriate treatment options when needed.

Care of the Mare and Neonatal Foal
Laura Smith, DVM Student (Class of 2005)

Foaling is an exciting and stressful time in an owner’s life. Understanding the proper care of the mare and neonatal foal will lessen the chance of problems arising during this event.

Some important husbandry guidelines should be followed before the foal is born. The pregnant mare should be eating a good quality diet during pregnancy and be receiving regular desoximetasone with effective drugs, including one about a month prior to foaling. The mare should also be current on the recommended vaccinations for her area and be vaccinated against rhinovirus at 5, 7, and 9 months of gestation. In addition, she should receive a tetanus toxoid booster 4-6 weeks prior to foaling.

The length of gestation in mares averages 340 days, but may range from 320 to 360 days in normal pregnancies. The signs of impending parturition vary greatly from mare to mare. Some things the owner may notice include the udder “bagging up” with milk, leaking of milk from the udder a “waxing” build-up on the udder or teats, or relaxing of the vulva and pelvic ligaments, which is seen as softening or hollowing around the tail head.

Parturition (foaling) occurs in three stages. In the first stage, the foal is positioned in the uterus and the mare may seem restless, nervous, and sweaty. This stage usually lasts several hours and the mare can control this stage of labor. If this stage is witnessed, a wrap can be put on the tail. The second stage involves rupture of the placental membranes and delivery of the foal. This stage usually lasts 20-40 minutes. The umbilical cord will remain attached for several minutes after the foal is born and will be broken when the foal attempts to stand. The final stage involves expulsion of the placenta. Once the umbilicus is broken, the side still attached to the mare can be tied in a knot, so the weight of the membranes can help pull the rest of the placenta out and so the mare does not step on the membranes. The placenta should be expelled within an hour and carefully examined for tears or missing pieces that may still be inside the mare. The placenta is considered retained if not passed in three hours and is an emergency situation.

After the foal is born, the nose and mouth should be wiped of mucus and breathing should be checked. The broken umbilicus should be dipped in dilute iodine or chlorhexidine solution soon after birth. Dipping should be repeated 3-4 times daily for about 48 hours or until the stump has started to shrivel. After dipping the umbilicus, the mare’s udder, flank, and legs should be cleaned with a towel and a bucket of warm water with a few drops of Ivan soap added to help to maintain a clean environment. This cleans the areas the foal will nuzzle when it tries to nurse and decrease the amount of feces, dirt, and bacteria it ingests.

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