

Fat Horses Face Health Problems

Source: The Virginia-Maryland Regional College of Veterinary Medicine (VMRCVM) and the College of Agriculture and Life Sciences (CALs) at Virginia Tech

America's growing obesity problem has alarmed physicians and public health officials, and veterinarians have recently focused their attention on fat dogs and cats. Now, a team of researchers in the Virginia-Maryland Regional College of Veterinary Medicine (VMRCVM) and the College of Agriculture and Life Sciences (CALs) at Virginia Tech has determined that horses are also facing serious health risks because of obesity.

Fifty-one percent of the horses evaluated during the pioneering research were determined to be overweight or obese -- and may be subject to serious health problems like laminitis and hyperinsulinemia. And just like people, it appears as though the culprits are over-eating and lack of exercise.

"This study documented that this is an extremely important problem in horses that has been under-reported," said Dr. Craig Thatcher, a professor in the VMRCVM's Department of Large Animal Clinical Sciences (DLACS) and diplomate in the American College of Veterinary Nutrition. Thatcher and his colleagues believe the study results suggest that horse-owners should change some of the ways in which they care for their horses -- and hinted that horses could emerge as an important model for studying the health implications of human obesity.

"Obesity, over the past decade, has become a major health concern in horses," said Dr. Scott Pleasant, an associate professor in DLACS and diplomate in the American College of Veterinary Surgeons. "This is primarily because of its association with problems such as insulin resistance and laminitis."

In fact, it was a spike in pasture-associated laminitis cases that led Dr. Pleasant to grow curious and seek the collaboration of Dr. Thatcher, an internationally renowned veterinary nutritionist, on the innovative research project. Dr. Ray Geor, the Paul Mellon Distinguished Professor of Agriculture in the College of Agriculture and Life Sciences and director of the Middleburg Agricultural Research and Extension Center in Middleburg, Va., and Dr. Francois Elvinger, an epidemiologist and associate professor in DLACS, are co-investigators.

"Laminitis is a failure of the connective tissue bond between the horse's hoof and the bone within the hoof," explains Dr. Pleasant, noting the highly publicized struggle that the racehorse Barbaro had with the disorder as a result of his catastrophic injury at the 2006 Preakness. "When that bond fails, and the hoof and bone start to fall apart, it is extremely painful to the horse," he continued. "Laminitis is one of the most devastating and debilitating problems that we see with the horse."

Funded in part by the Virginia Horse Industry Board, the study hypothesized that overweight horses may suffer from insulin and sugar imbalances, chronic inflammation, and oxidative stress, a malady that occurs as a result of changes to metabolic processes that alter the delicate balances between the destruction and creation of new cells in the body.

"Oxidative stress is an imbalance between the production of free radicals and reactive oxygen species and the body's anti-oxidant defense mechanisms, and that imbalance is in favor of the oxidants," said Thatcher. "Those free radicals and reactive oxidant species can affect macromolecules in the body such as lipids, DNA and proteins, ultimately causing cell death or changing the functionality of these macro-molecules."

Other problems caused by equine obesity are heat stress, increased bone, tendon, and joint injuries, and reduced performance levels.

After surveying the academic literature, the researchers discovered that only one documented study on equine obesity existed prior to this research, according to Thatcher. It was an owner-reported survey done in 1998 by the National Animal Health Monitoring System (NAHMS) through the United States Department of Agriculture. This study reported the prevalence of overweight or obese horses to be 5 percent.

However, based on the horses seen routinely in clinical practice at VMRCVM, the research team hypothesized the prevalence of overweight and obese horses was much higher than the reported 5 percent. "We thought it was at a level of at least 15 percent," said Dr. Thatcher.

The research team designed a prospective study and conducted it over the course of 60 days from June 19, 2006 through August 17, 2006. They studied 300 horses, ranging from 4 to 20 years old from 114 farms, chosen randomly from over 1,000 animals in the VMRCVM's field service horse population.

The horses were studied between 6 a.m. and 12 noon, prior to any grain or concentrate consumption, which can alter glucose and insulin levels.

Two independent body-conditioning scores (BCS), which assess the amount of fat cover of the horses, were assigned to each animal. The scores range from 1 to 9 and a score of 8 or 9 signifies obesity. Morphometric measurements were also taken to allow the research team to calculate body weight and body mass index (BMI). These measurements include girth circumference, neck circumference, body length, and height.

Each horse was checked for signs of laminitis and blood was drawn to assess glucose and insulin levels as well as other hormones, cytokines, and oxidative biomarkers. A questionnaire was also completed by each horse's owner to gather background information on breed, gender, health history, feed, and exercise. Ponies, minis, donkeys, draft breeds, and their crosses were excluded from the study, as were pregnant and lactating mares, and horses undergoing treatment for medical problems.

While laboratory testing and data analysis are still underway, the research team has already made some alarming discoveries.

Fifty-one percent of the horses in the study were found to have a BCS greater than 6. Thirty-two percent of the horses in the study were found to have a BCS of greater than 6 but less than 8 and 19 percent of the horses were found to have a BCS of 8 to 9. Ten percent of the horses that had a BCS greater than 6 but less than 8 and 32 percent of the horses that had a BCS of 8 to 9 were hyperinsulinemic. These findings support the researchers' hypothesis that the rate of overweight and obese horses is greater than the five percent figure reported in the 1998 NAHMS study.

The study suggests that equine obesity may result from natural grazing behavior instead of the overfeeding of grains and other feed supplements, which defies conventional thinking on equine weight matters. The majority of horses examined in the study were fed primarily pasture and hay with very little grain and concentrate.

Instead of overfeeding of grain and concentrates, the evidence indicates that improved forage and lack of exercise are the two most common contributing factors in equine obesity. Thatcher believes this may result from the fact that many pasture forages have been fortified with the goal of improving weight gain and productivity of cattle and other food animals, with little

thought given to how these forages might affect horses, which often share the same types of pastures. In addition, the majority of the horses studied were under-exercised. They were left on pastures to eat, but did not have an actual exercise regimen.

Horses today are managed much differently from their evolutionary roots, indicated Dr. Pleasant. "The horse evolved as a free-roaming grazer on sparse pasture types," he said. Later the horse served primarily as a work animal, serving as a source of transportation and draft power. Today, most horses serve as companions and light performance animals, he said.

"We can see with increased nutrition and lack of exercise how these animals could drift toward being overweight," he said.

This research project remains underway, and has laid the groundwork for a series of provocative new studies. The researchers are now focusing more specifically on the role of hormone levels, oxidative stress, inflammatory biomarkers, and antioxidant mechanisms. However, the preliminary data clearly demonstrates that this research has important implications for both equine and human health.

For example, the knowledge gained concerning the correlation between fortified forage and lack of exercise and obesity in the horse can be immediately utilized by veterinary clinicians and owners who can now consider altering their existing feeding and management programs.

Human health may also substantially benefit from this study, according to Dr. Thatcher, because humans suffering from obesity experience chronic inflammation. If obese horses are also found to suffer from chronic inflammation, the possibility would then exist for the horse to serve as an animal model for the study of obesity in people for the very first time.

Note: This story has been adapted from material provided by Virginia Tech.