

"Impressive" Syndrome

by Jessica Young, DVM - Abraham's Equine Clinic

What is HYPP?

If you are a horse owner or horse enthusiast, you have most likely heard the term "HYPP" used at least one time or another in the horse world. What exactly does HYPP mean, and why does it scare horse owners so much?

HYPP stands for *hyperkalemic periodic paralysis* and is an inheritable disease that leads to elevated levels of potassium in the blood stream and uncontrolled muscle twitching or muscle weakness. It has been reported in Quarter Horses, Paints, and Appaloosas. It is a genetic disease and occurs in horses that trace their lineage back to the Quarter Horse stallion "Impressive," thus earning the title of "Impressive Syndrome."

HYPP is a genetic mutation of sodium channels on muscle cells that leads to an imbalance between sodium and potassium levels in the horse's bloodstream. This ion imbalance leaves the muscle cells more excitable and ready to contract uncontrollably, leading to muscle tremors, muscle contractions, or extreme muscle weakness.

HYPP is genetically inherited as a dominant trait and can be identified from a DNA test obtained from whole blood. DNA results are reported as homozygous (H/H) or heterozygous (N/H). Horses that are H/H have the mutation on both copies of the affected gene and can suffer very severe attacks, while horses that are N/H only have the mutation on one gene and are considered to be carriers for the disease. Carrier horses, however, can still have signs of HYPP and suffer attacks even though they are usually less severe than horses that are H/H.

What does this mean for the breeding world?

It means that the breeding of an affected mare or stallion to a normal horse will result in 50% chance of the offspring carrying the trait. If two horses that carry the mutation are bred, then 75% of the foals will be affected. The rare H/H horse bred to an N/N mare will pass the gene to its offspring 100% of the time and always produce carrier horses. This dominant mode of inheritance for the disease, and the popularity of Impressive as a breeding stallion before the disease was truly understood, is what allowed it to spread so rapidly throughout the horse world.

Due to the devastating nature of the disease and the fact that it is spread

so easily to offspring of affected horses, the American Quarter Horse Association lists HYPP as a genetic defect in the Rule Book. According to the AQHA, foals born in 1998 and later, and tracing to the sire Impressive, will have a statement placed on their Certificates of Registration that recommends testing for the condition, unless test results indicating the foal is negative (N/N) are on file with the AQHA. To help eradicate the disease from the horse population, the AQHA has made a new rule effective January 1, 2007, stating that foals tested and found positive (H/H) will be ineligible for registration.



HYPP attacks are characterized by sporadic attacks of muscle tremors (shaking, trembling), muscle weakness, and/or collapse. Paralysis of the muscles of the upper airway may result in loud, snoring-like breathing noises. Horses suffering extremely severe attacks may be unable to get up, and sudden death can occur due to heart failure or respiratory paralysis.

Often, mild HYPP attacks are confused with colic, seizures, and "tying-up." A distinguishing feature between HYPP and "tying-up" is that horses that recover from an HYPP attack appear completely normal, while horses that recover from an episode of "tying-up" commonly have a stiff gait and sore muscles. "Tying-up" is usually associated with periods of exercise, while HYPP attacks generally occur when the horses are at rest, at feeding time, or following a stressful event such as transport, feed changes, or

concurrent illness. Horses suffering a seizure are usually unaware of their environment, while horses that are experiencing an HYPP attack are bright and alert and aware of what is going on around them.

What can you do if your horse is suffering an attack and how do you prevent them from occurring?

Potassium is a very important electrolyte and is necessary for the function of muscles and nerves. Normal body regulation of potassium and sodium is interfered with in horses affected with HYPP. During severe attacks, treatment by a veterinarian is necessary. The veterinarian must administer specialized fluids and drugs to help bring the elevated blood potassium under control. Mild attacks, however, can often be managed by the owner with exercise (hand-walking) and the administration of high-sugar supplements like light Karo® syrup (avoid molasses as it contains high levels of potassium). The high level of sugar stimulates an insulin release that drives potassium back into cells.

Regular exercise and access to a large paddock or pasture is preferred over stall confinement. The most important part to maintaining a horse with HYPP is controlling the potassium content of their diet. Maintain a regular feeding schedule, and if possible, feed frequent small meals. Avoid high potassium content feeds such as alfalfa hay, brome hay, canola oil, and sugar or beet molasses. Feed timothy or Bermuda grass hays and feed grains such as oats and corn. Affected horses do very well on grass pastures due to the high water content of the grass. It is recommended that the total potassium concentration of the diet be between 0.6 and 1.0%. Due to a wide variety of potassium concentration in feeds and forages, feed analysis is often necessary to ensure low enough levels for safety. Complete feeds formulated for HYPP horses are also available.

There are myths about HYPP and some people have felt like they can "dilute" out the disease and not carry it on to further generations, but this is false because of the dominant mode of inheritance and the fact that each horse affected with HYPP stands the same chance of spreading it to their offspring. Horses also do not "grow out of" the condition and are affected for life. If you are concerned about your horse or have questions about DNA testing, contact your local veterinarian or the AQHA for more information.