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# HYPP Survival Guide

*How to be prepared for and deal  
with a horse affected by HYPP.*

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**By Andrea Caudill**

# WHAT IS HYPP?

Hyperkalemic periodic paralysis is a sodium channel deficiency in the muscle. The defect wreaks havoc on the sodium channels that serve as the gateways to the cells. During an attack, the defect causes the channels to leak excessive sodium into the cells and potassium into the blood, disrupting the voltage current of muscle cells and causing the disease's characteristic muscle twitching and weakness.

It is a dominant genetic disease, and there are three designations.

- **HYPP H/H: Homozygous positive.** This horse is most severely affected and, if bred, will pass the defect on to all its foals no matter the status of the horse it is bred to.
- **HYPP N/H: Heterozygous positive.** Bred to an unaffected (N/N) horse, it will produce 50 percent normal offspring and 50 percent affected offspring.
- **HYPP N/N: Negative, or unaffected.** This horse is normal and will never be affected by HYPP. It cannot pass the defect on to its offspring.

In the early 1990s, the mutation was linked to the popular stallion Impressive, foaled in 1969. As of late October 2006, there are 361,609 registered Quarter Horses with Impressive in their pedigree. Researchers estimate 4 percent of the breed is affected by HYPP. It should be emphasized that not all Impressive-bred horses are affected. Many are normal and healthy, and their unaffected status can be clarified through a genetic test.

The simple test, available through the Veterinary Genetic Laboratory at the University of California-Davis, can diagnose a horse's status. However, despite the test's availability for nearly 15 years, the gene frequency of the disease has not decreased.



PHHA PHOTO

Foaled in 1969, champion Impressive sired many great horses that went on to earn more than 24,000 AQHA points, including 29 world champions and money- and point-earners in the National Cutting Horse Association, National Snaffle Bit Association and the Palomino and Buckskin associations.

In 1996, AQHA designated HYPP a genetic defect and undesirable trait. Two years later, the Association added that all Impressive-descendent foals born after January 1, 1998, were required to be tested for the disease, with results placed on the registration certificate. Beginning with foals of 2007, any horse tested as H/H will not be accepted for registration with AQHA.

IT WAS TO BE, SAID COURTNEY KACZKA OF FELTON, DELAWARE, her daughter's first horse.

"The horse bug had bitten the family, so we decided to buy a horse," she said.

With names from their riding instructor and ads in the paper, their search turned up a mare named Ms Awesome Pine or "Lilly." Kaczka let the seller know the family's inexperience with horse owning and asked about the mare's health, training and safety. He assured her of the horse's suitability and gave them a money-back guarantee.

"The seller told us the horse had HYPP," she said, "to which I replied 'What is that?' It was explained that it was just a difference in how the horse's muscles looked and that some horsemen didn't like the look of it. Lilly looked beautiful to us. No strange lumps, no odd formations. We didn't know why HYPP would be a concern and bought the horse anyway. She enjoyed sweet feed along with all the other (horses), and we didn't treat the condition as a disease."

Three weeks after they bought Lilly, she was found dead in her stall.

"We, in essence, helped kill our first horse," Kaczka said.

Now, six years later, the family owns and shows two American Quarter Horses.

"Our family learned many hard lessons with this purchase," Kaczka said. "Any HYPP horse owner must know the signs of an attack, feed the horse differently, have medicine ready for a possible attack and be willing to risk possible death of the animal."

Halter competitor Sheila Orms of Gilmer, Texas, agrees with that sentiment.

She purchased Jazzi Champagne, an affected horse, as a long yearling in December 2006. Before buying the filly, Orms read up on the disease, including symptoms, medications and feeding, and talked with the horse's owners before buying her.

## SYMPTOMS

The most common symptoms of HYPP include: muscle tremors, weakness, muscle cramping, yawning, depression, an inability to relax the muscles, sweating, prolapse of the third eyelid (the membrane in the corner of the eye flicking over the eyeball), noisy breathing and/or abnormal sounds or whinnies.

Cases usually start with muscle weakness and prolapse of the third eyelid, sweating and minor tremors most commonly in the flank, neck and shoulders.

More severe attacks can involve severe weakness, high heart and respiratory rate, staggering, dog sitting and collapse. In its most extreme form, HYPP can lead to collapse and death, usually from a heart attack or respiratory failure.

The time of attacks vary from a few minutes to a few hours but typically last 15 to 60 minutes.

Symptoms can vary among horses. Some horses show extreme signs, and some may show few or no signs. Generally, homozygous horses are more severely affected than heterozygous horses. In the majority of horses, intermittent clinical signs begin by 2 to 3 years of age. A horse cannot be "cured" of the disease, but symptoms can often be managed by proper diet and maintenance.

“Needless to say, I was ready when I went to pick her up in Illinois and (bring) her back to Texas,” Orms said.

The filly is on preventive medications and so far has shown no symptoms. Orms says “she is a super jam-up filly, and I thank the lucky stars I own her!”

However, after another of her horses was euthanized after suffering a severe HYPP attack, Orms said she needed to take a long look at owning another positive horse.

“I need to sit back and rethink (it),” she said. “Just like I did when I bred overos – (which are associated with Overo Lethal White Syndrome) – Do I really want to chance something like this happening again?”

“Am I done with halter?” she continued. “No, not by a long shot. Am I done with taking a chance on N/H’ers? Probably so.”

The disease HYPP, or hyperkalemic periodic paralysis, first became known among breeders and veterinarians in the early ’80s. Sharon J. Spier, D.V.M., Ph.D., Diplomate ACVIM, of the University of California-Davis School of Veterinary Medicine, Department of Medicine and Epidemiology, is the foremost expert on the condition.

“They don’t have normal muscle function,” Spier said of

## IN THE EVENT OF AN ATTACK

The goal of treating an attack is to decrease the amount of potassium in a horse’s bloodstream. If you have any doubts or are unfamiliar with treating the symptoms, contact a veterinarian immediately.

For a **mild** attack, defined as when the horse has muscle tremors but does not fall down:

- Exercise the horse by walking or gentle longeing, which stimulates the release of adrenalin and which helps replace potassium inside the cells. Use extreme care while doing so, as the horse could stumble or fall and cause injury to itself and its handlers.
- Feed grain, such as oats, corn or barley, and/or a full 60cc syringe of light Karo syrup. Feeding carbohydrates supplies glucose, which stimulates insulin release and thus promotes potassium uptake by the cells.
- Feed acetazolamide tablets, as directed by your veterinarian. These tablets increase potassium excretion from the kidneys.
- Administer an intramuscular shot of epinephrine as directed by your veterinarian

For a **severe** attack, defined as a horse that is down:

- Immediate veterinary attention is required.
- Be extremely careful around a horse that is showing signs of extreme weakness, as it can collapse or thrash and cause injury to itself or you.
- The vet should first draw a blood sample to be used for later testing (to ensure the horse was suffering an HYPP attack).
- Treatment typically involves inserting an intravenous catheter and administering medications to stabilize the muscle membrane and lower the potassium in the blood.
- If a horse suffers severe respiratory obstruction, a veterinarian may find it necessary to perform a tracheostomy (an emergency procedure to open an airway through the trachea).

## FIRST AID KIT

Here are items you should keep on hand at all times in case of an attack:

- Veterinarian’s contact information and a way to call him or her, such as an emergency cell phone number.
- Grain feedings, such as dry corn, oats or barley
- Karo syrup
- 60cc dosing syringe
- Acetazolamide
- Optional – Epinephrine injection to be used intramuscularly **ONLY**. Consult with your veterinarian on its proper usage.

affected horses. “I get frustrated hearing that it’s not a big deal – it is a big deal for the horse experiencing an episode of paralysis. It’s a serious condition. It can be managed, but steps should be taken to reduce the frequency of the gene for the long-term health of the breed.”

## PREVENTION

- Discuss drug options with your veterinarian. Some owners keep their horse on a regular amount of acetazolamide. This drug is regulated for horses competing in AQHA shows. It is allowed only in horses that have been documented through DNA testing to be HYPP-positive. An average daily dose is 1 milligram per pound, or approximately 1 gram for a 1,000-pound horse. Another drug, hydrochlorothiazide (typically administered as 227-450 milligrams for a 1,000-pound horse every 12 hours), may also be helpful.
- Make sure anyone caring for the horse is aware of the horse’s condition and understands how to administer proper treatment.
- Inform your veterinarian of the horse’s HYPP-positive condition before he or she administers general anesthesia, as it might precipitate an episode. In addition, if the horse is suffering from another illness, such as an episode of colic or diarrhea, etc., be sure to mention HYPP as it can cause an attack or change a treatment plan.
- Be careful when exposing a horse to stressful situations, as these can often cause an attack. When hauling, stop frequently to water the horse and check on it.
- Other factors associated with attacks are exposure to cold, pregnancy and rest after exercise.
- For more information, see [www.vgl.ucdavis.edu/~lvmillion/hypp/treatment.html](http://www.vgl.ucdavis.edu/~lvmillion/hypp/treatment.html).



PHOTO CREDIT

Experts recommend HYPP-positive horses are turned out as much as possible.

# FEEDING

The feeding program for HYPP-positive horses should include food that is low in potassium. It is ideal to feed a balanced ration containing less than 1 percent potassium.

Forages, such as grass and hay, can vary significantly in their potassium concentrations, and can vary by cutting. Have your hay and pasture analyzed for nutrient requirements to find out whether it is too high in potassium. Commercially produced feeds do not typically show the potassium content on the feed label, but the information can be obtained by calling the company and asking.

Foods generally recommended as low in potassium are: beet pulp, grains such as oats, wheat, barley or corn, pasture grass, wheat bran and soybean hulls.

Most hay is medium or high in potassium levels, but some choices are better than others.

"The main thing to remember with forages is to stay away from legumes," said Joe Pagan, Ph.D., president of Kentucky Equine Research in Versailles, Kentucky. "Stay away from alfalfa. That's a big thing. When you get into the grass, it becomes a little grayer, because the amount of potassium is going to vary depending on maturity, on environment, weather, a lot of things."

Medium-potassium hay includes most grasses, such as brome, fescue, timothy, coastal Bermuda, Kentucky bluegrass and oat hay.

Avoid feeding high-potassium foods, such as alfalfa (hay or cubes), molasses (which is often top-dressed on grain to make sweet feed), electrolyte supplements, kelp supplements, soybean meal, canary grass, orchard grass or canola oil. If alfalfa must be fed to balance a ration, mix it with grass or oat hay to decrease the potassium content.



Feed low potassium feeds as much as possible. Oats are one of the recommended grains for an affected horse.



Experts recommend feeding only white salt blocks or loose salt. Red mineral blocks can contain extra potassium, which can be problematic for an HYPP-positive horse.

In addition:

- Feed frequent, small meals on a regular basis. At minimum, the horse should be fed three small grain meals per day.
- It is always a good idea to change a horse's feed slowly but is very important for an HYPP-positive horse. Changes in diet – and thus changes in potassium levels – can cause an attack.
- Avoid fasting and water deprivation, as these can trigger attacks. Make sure the horse has access to a white salt block or is fed loose salt and has water at all times. Do not feed the red-colored mineral blocks as these often contain added potassium.
- Turn the horse out as much as possible. Pasture grass is an excellent source of nutrition for an affected horse. Care should be taken with pasture grass, and it should be tested just like hay. The presence of large amounts of legumes – such as clover – can increase the amount of potassium in a horse's diet significantly.
- Some horses may be asymptomatic on diets that are relatively high in potassium. If a horse is not suffering from attacks, do not change its feeding regimen. Studies have proven that affected horses have more attacks on high-potassium diets, but Spier says horses can adapt to their diet.

"They actually up-regulate other pumps (specifically the sodium-potassium pump) that help control potassium influx into the muscles," she said. "So they adapt over time to the feed that they're consuming. If a horse is having a problem with repeated episodes, however, the feed is the first place to look."



Experts recommend HYPP-positive horses are turned out as much as possible.

# GETTING TESTED

If your horse has not been tested for HYPP, a test can be obtained through AQHA. Call (806) 376-4811, or go to [www.aqha.com/forms/pdf/hyppptest.pdf](http://www.aqha.com/forms/pdf/hyppptest.pdf) to get a request form. Once filled out, mail it to AQHA to get the test.

Horses can also be tested directly through a licensed laboratory such as the Veterinary Genetics Lab at University of California-Davis. They can be contacted at (530) 752-2211 or [www.vgl.ucdavis.edu/service/horse/index.html](http://www.vgl.ucdavis.edu/service/horse/index.html).