



## Horse Care

# Rotavirus Diarrhea In Foals

by HEATHER SMITH THOMAS

Rotavirus diarrhea in foals is a serious condition that has plagued horse breeders for many years. The rotavirus is an intestinal pathogen occurring in many environments; it can be found just about anywhere there are horses (especially foals). It is a tough and aggressive virus and can attack a foal's intestinal lining even without prior damage or irritation to the gut from bacteria or parasites. Some viruses are opportunistic invaders that attack only after an animal's resistance has been lowered by stress or the tissues weakened by prior infection from some other pathogen. But the rotavirus marches right in and starts the attack on its own.

The virus seems to persist on a farm almost indefinitely once it is established (usually brought in with a new animal or introduced by a person on the feet or clothing—someone who was recently on a farm already contaminated). The virus can lurk in barnyard and stalls to cause new infections, and may persist for years, infecting each new foal crop.

Rotavirus diarrhea can hit a foal anywhere from two days of age to five months old, with the majority of cases (according to a three year study in Kentucky) occurring at about 70 days of age, which corresponds to the period in which a foal's temporary immunities (from maternal antibodies absorbed through colostrum) are decreasing. This is the age when the foal's own immature immune system has not yet had a chance to develop strong defenses against the pathogens in his environment.

The cases in which diarrhea occurs at one month or less of age (especially if it occurs during the first two weeks of life) are usually more severe. After foals get to be a month old, most of them have stronger defenses (and their intestines are able to regenerate more quickly after an infection) and they are not as easily devastated by this type of diarrhea. Diarrhea is also more serious if complicated by other pathogens—such as an *E. coli* infection—at the same time.

The incubation period for rotavirus infection is 18 to 24 hours. When the foal becomes sick, they may have a fever

and seem dull and depressed for a few hours, then breaks with diarrhea. The runny bowel movements may be cow-pie consistency or more watery, and the feces are yellowish-green to gray. In the milder cases, the foal may just be off feed for a day or two, but in more severe cases, with explosive watery diarrhea the foal will dehydrate quickly and severely. He will need good supportive care and fluids (orally if the gut damage is not severe, intravenously if his gut cannot absorb fluids).

Rotavirus diarrhea is very contagious and can go through the entire foal crop unless precautions are taken to keep it from spreading. The virus is shed in feces and transmitted by fecal contamination of feed, bedding and water or by body contact (grooming tools, human hands, foals nursing mares with fecal contamination on the udder, etc.)

### Vaccination Is An Effective Tool

After ten years of research in Kentucky, a vaccine was created that can be given to pregnant mares (to produce high levels of antibodies in their colostrum at foaling time) to help protect their foals during the early weeks of life when this type of infection is most deadly. Some farms were having extensive outbreaks of diarrhea, and a three year study was done by Gluck Equine Research Center at the University of Kentucky to obtain blood and fecal samples during the foaling seasons of 1986, 1987 and 1988 to determine the primary causes. The study determined that the most common cause of diarrhea was rotavirus (90 percent of the diarrhea outbreaks).

Discussions were begun with vaccine companies about the possibilities of developing a product that could be given to mares in the last stage of pregnancy, to boost the antibodies in their colostrum and give foals protective immunity during the most critical period when they are most susceptible—the first 60 days of life. Fort Dodge finally agreed to work on a vaccine with help from the University of Kentucky, and began their testing of the vaccine on a university owned farm—on mares belonging to the university. The first tests were done in 1993.

## Conditional License Vaccines

Vaccines without full license are not available over the counter; they are only sold to veterinarians and must be approved by a state veterinarian in order to be sold in that state. A conditional license vaccine can only be dispensed by a veterinarian to a client if there is a valid veterinarian-client-patient relationship. As explained by Kevin Hankins, DVM (Fort Dodge Animal Health), to get a full license for a vaccine (so it can be marketed directly to horse owners), the company's researchers "must have a reliable clinical/research model in which we can consistently reproduce the disease itself, for full testing of the vaccine. But rotavirus is a disease that cannot be clinically reproduced. Through a number of trials and field studies, however, this vaccine (given to pregnant mares) was shown to help reduce incidence of rotavirus in the foals, so the vaccine continues to receive a conditional license," explains Hankins.

After these first trials were successful, nine Kentucky farms agreed to be included in the field trials for 1994, allowing their mares and foals to be used in the study. The farm veterinarians helped monitor and collect data. Mares on the nine farms were randomly assigned to the vaccinated group or the control group (which received a placebo resembling the vaccine). The farm managers, workers and veterinarians did not know which mares received the actual vaccine; all mares were treated the same and had blood samples taken at vaccination and at foaling. After foaling, the foals had blood samples taken (to check for antibodies for the rotavirus) at 12 to 18 hours of age, then were tested again every 30 days until they were four months old. Blood samples from the mares showed that titers rose in those who were vaccinated, and blood samples from their foals showed that they did receive rotavirus antibodies through the colostrum.

Any foals who developed diarrhea had more blood and fecal samples tested, and information was collected on the severity of the illness, condition of the foals and duration of the diarrhea. During the first year of this trial, a number of foals got sick, but there was a significant difference between the severity of illness in the foals from vaccinated mares and unvaccinated mares. The foals from unvaccinated mares had more severe diarrhea and were sick longer.

In 1995, the same nine farms participated in the continuing field trial. The mares who were vaccinated in 1994, got a booster shot 30 days before their expected foaling time. The control mares from 1994, and any new mares on the farms, were divided into two groups, half were vaccinated and the other half served as controls. On some of the farms, 70 percent of the mares were vaccinated or boosted for the 1995 foaling season. There was a low incidence of diarrhea during 1995, even in the control mares' foals, which led the researchers to feel that some herd immunity may have been gained. But the lack of difference between the vaccinated group and the control group meant that further studies were needed, and the USDA would not grant a full license to produce the vaccine.

But a conditional license was granted, allowing the vaccine to be produced and released on a state by state basis, needing approval by each state veterinarian (along with monitoring on how much vaccine is being used). By March 1996, the only state that had granted a conditional license for distribution of the rotavirus vaccine for that year was Kentucky. By early May 2006, however, 30 more states had authorized distribution of the new vaccine marketed by Fort Dodge. The drug company planned to continue more field trials and gain a full license for this vaccine, but found it difficult to create an adequate challenge model for proper testing. At this point in time, it's still being produced under a conditional license which means it can only be sold to veterinarians in states that have approved its use. Horse breeders in any state that does not yet allow use of the rotavirus vaccine can contact their state veterinarian to request release of the vaccine. 🐾

## Using The Vaccine

Bill Tracy, the Manager of Oak Tree Ranch in Bandera, Texas, says that he has used the vaccine for a number of years. The broodmares on the ranch each receive three injections of vaccine in late pregnancy, to build peak immune response and a high level of antibodies in their colostrum.

"I have a chart I make up every year, that includes all the mares. Based on the last breeding date of each mare, we project the anticipated foaling date. I use those foaling dates to determine when these vaccinations should be given. For instance, if a mare is due January 27, she needs her first shot on October 27, which is 90 days before she'd foal. She gets another shot 60 days before foaling, and the last one 30 days before foaling. Thus vaccinations are given to the mare in her eighth, ninth and tenth months of gestation. The vaccine is given intramuscularly," says Tracy.

Since Oak Tree Ranch began their program of using rotavirus vaccine (about eight years ago) they have not had any serious diarrhea outbreaks. The vaccine is expensive, but the value of one lost foal would more than pay for all the vaccine. If a farm gets diarrhea rampaging through a group of foals, it can be a nightmare trying to treat them. Tracy feels it is much more economical and less risky for the foals to buy the vaccine and spend the time and effort giving it to the pregnant mares.



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*A foal with some hair loss on his buttocks as an aftermath of diarrhea*