Foal Diarrhea - Avoiding it Altogether

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Posted by Dr. Robert Franklin in Foal and Neonate Care

A newborn foal's biggest adversary is infection from pathogens such as Rotavirus, E. coli and Salmonella bacteria. In fact, diarrhea or sepsis (generalized body infection) is the leading cause of neonatal intensive care in foals. The illness starts out as invasion by one of many viruses or bacteria. Rotavirus is highly contagious and happens when foals ingest focally contaminated material or lick surfaces contaminated with manure. One teaspoon of Rotavirus-infected feces from a foal can contain more than 10 million virus particles – enough to infect whole herds of foals. Unfortunately, too, the virus is so hardy that it can survive more than nine months at room temperature and over winter on farms.

A study in the late 1980s revealed that more than 90 percent of diarrhea outbreaks were caused by Rotavirus. But there are bacterial causes, also, too numerous to count. Other bacterial culprits include Salmonella, Clostridium difficile and Clostridium perfringens. Gram-negative bacteria such as E. coli cause most cases of sepsis, but a recent Equine Veterinary Journal study showed that the incidences of Gram-positive bacteria such as Enterococcus are also on the rise in foals.

There's nothing more tragic than watching a foal collapse with dehydration, fighting for its life after a bout with Clostridium or some other infectious agent. But now, veterinarians are taking new approaches to help prevent life-threatening diarrhea.

Why Foals Are So Defenseless

The two-fold reason that foals are so susceptible to pathogens starts with the biology of the mare's womb.

Foals are born with what's commonly called a 'naïve' immune system, which means they have no infection-fighting antibodies. That's common with farm animals of all species. While human fetuses get antibodies from the mother while in the womb, immune proteins cannot cross the placental barrier in horses.

Instead, foals are designed to ingest their first antibodies from the mare's first milk – colostrum. Colostrum contains immune proteins and antibodies that protect the foal until his own immune system develops over the first few weeks of life.

A foal's intestinal tract is completely empty at birth but is designed to absorb antibodies from colostrum during the

first 12 to 18 hours of life. Following that short window, the intestinal tract closes down, so to speak, after which the bloodstream can no longer absorb the immune proteins and antibodies supposedly ingested in colostrum. Unfortunately, that's also the window of time during which pathogens can be absorbed into the bloodstream.

A normal foal may not get up and nurse until two hours following birth – and if it never does get the opportunity to nurse or the mare's milk doesn't have what it needs, it will soon be under-gunned against infectious agents.

The other reason that today's foals are so at risk for infection is simple geography.

In nature, calves and foals would be born away from the herd, which allows a clean place isolated from areas contaminated by feces, where there are lots of bacteria. One of the reasons diarrhea and joint infections can be so common in neonatal foals on large breeding farms is that those properties typically use common foaling areas. Unfortunately, these areas often become environments laden with pathogens that cause diarrhea and sepsis. And when those pathogens are absorbed by a foal's bloodstream that first day, it can lead to joint infections that cause long-term arthritis and performance issues, if not death.

Mares will seek a clean place to foal on most ranches. But unless the property is enormous, the mare is likely to foal down in a dirty environment. Even the finest farms in the country that lay down new bedding and are extremely vigilant are likely still contaminated, because pathogens live in very dark corners, where they can wreak havoc on foals.

Former Treatment Protocol and New Thinking

Week-old foals that arrive at the ICU commonly present bloody diarrhea and shock or infected joints; referred to sometimes as "joint ill." Both problems can be life-threatening and/or athletically compromising with long-term effects including arthritis developing in joints such as the hock.

Veterinarians try to avoid that by making sure a foal gets plenty of potent colostrum in a timely manner, and checking on that by measuring its IgG levels at 18 to 24 hours of age. Preventative measures should have included ensuring the mare foaled in a clean area and the mare's udder was cleaned of feces. Also, the umbilical cord can be treated with dilute (1:4) chlorhexidine to prevent infection that way.

Formerly, veterinarians thought it was a foal's umbilical cord that allowed disease, but now it's proven that most disease stems from the open, naïve intestinal tract. Many times, however, a day has passed before it's determined that a foal may not have received adequate colostrum. If the foal missed out, its IgG levels will check low. In that case, the footrace has already begun and the foal is way behind. The pathogens are already at play and starting the disease process. Neonatal veterinarians then play catch-up by administering intravenous plasma or tubing the foal with colostrum if the foal is fewer than 18 hours old. But it can be very hard to get ahead of the process by that point.

Prevention is a much better idea.

Remember, when a foal hits the ground it has nothing at all in its intestinal tract. That means the tract is basically "equal opportunity," so it could fill with healthy microbes or with pathogens. Have you ever seen a foal in its first month eating the mare's manure? In doing that, it's trying to take in healthy microbes to make it naturally resistant

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to infection and to help it digest nutrients.

The foal goes from having nothing at all in its intestinal tract the first day to having trillions and trillions of healthy microbes at 2 months. The most important protocol, then, is to fill the foal's intestinal tract up with healthy microbes – also called probiotics – which can compete with the pathogens from the very beginning.

These probiotics start the competition in the foal's favor from the word "go" and interrupt the pathogens before they cause disease. Probiotics and antibodies are not a substitute for colostrum, but they can go a long way toward protecting the foal against invaders like Salmonella and E. coli.

New Weapons Helping Prevent Infection

To help kick-start a foal's immune system and ward off viruses and bacteria, owners can now administer a high dose of antibodies that come from eggs produced by hyper-immunized chickens. Those immune proteins are pasted right into the foal as it hits the ground and again six hours later.

These antibodies help stop the disease process during those two hours after birth when the foal has no immune system. Then after the intestinal tract has closed down, pasting the foal with probiotics daily through its first week of life will help the foal maintain a healthy microbe balance until its own immune system recognizes invaders and makes its own antibodies.

As a foal ages, it spends less time on the stall floor near pathogens, and at the same time, its systems all begin to work normally until the foal has passed out of that delicate stage of life at one and two days old.

For foal health, probiotics are most important in the first week but also are indicated in some foals up to a month of age. In nature, a mare's antibodies are gone by the time the foal is 4 months old, having tapered from their peak when the foal was a day or two old. By 10 weeks, the foal's immune system should be up to speed. But have you ever noticed more disease in foals at the weaner stage? It's because their immune system wasn't quite in gear as the foals' maternal antibodies were waning.

A new, unprecedented first-week foal kit spearheaded by an equine internal medicine specialist from Texas is specially designed for large breeding farms. The kit contains paste filled with antibodies from hyper-immunized eggs to be given at birth and six hours later, while the remainder of the kit contains paste tubes filled with healthy microbes – or probiotics – to help the foal stay ahead of pathogens. Those tubes are administered daily starting the day after birth through the seventh day. After that point, foals spend less time on the ground and their immune systems have typically begun working normally. The challenge lies in getting them through contagious outbreaks during their neonatal period.

In the wild, if a foal's mother died or the foal received no colostrum for some other reason, it would surely die. Now, with modern ICU facilities, foals can be saved with the administration of antibiotics and plasma as needed. But a foal is so challenged at that point by pathogens that the pathogens have an unfair advantage. In fact, viruses and bacteria already have the advantage when you consider that a foal was never intended to be born in a 12x12 stall and kept there.

Large breeding farms have all the important tools to help a mare or foal in trouble, but the downside is a larger incidence of contamination. For horses, the first days of life are a little like taking your children to kindergarten the

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first time – lots of foreign pathogens and very little defense against them. Now there's a defense; a way to prevent the heartbreak of watching a newborn foal fight for its life.

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