

Calf Diarrhea (aka Scours)

Charlie Stoltenow, D.V.M., D.A.C.V.P.M.,
Extension Veterinarian
Animal Sciences Department

Neil Dyer, D.V.M., M.S., D.A.C.V.P.,
Veterinary Diagnostic Laboratory Director
Animal Sciences Department

Gerald Stokka, D.V.M., M.S., Extension
Livestock Stewardship Specialist
Animal Sciences Department

Calf diarrhea, more often referred to as “scours,” is a big topic with a basic problem: the loss of fluids and electrolytes from the body of the calf.

The majority of these cases occur between 3 and 16 days of life. While a variety of conditions may result from scours or diarrhea, such as the loss of fluids leading to hypovolemia or low blood volume, electrolyte imbalance and acidosis, the animal essentially dies of shock.

Infectious calf scours is found in two forms: those involving excess secretion of fluids and electrolytes from the intestine (such as *E. coli* K99), and those that have reduced absorption from the intestine into the body (other types of *E. coli*, *Salmonella*, rotavirus, coronavirus, etc.).

Identifying Scours

The challenge is in identifying and successfully treating a dehydrated animal early. Calves that have lost significant amounts of fluid will have skin that “tents” (stays up for more than three seconds when you pull it away from the body), a dry mouth, cold ears and sunken eyeballs. They often have low blood sugar, a body temperature of less than 100 F, low urine output and decreased blood electrolyte (sodium, potassium, bicarbonate, chloride) levels that adversely affect organ function, particularly the heart. These animals are visibly depressed.

Treatment Options

In treating cases of calf scours, correcting **dehydration and electrolyte loss** first is critical; antibiotics can come later if appropriate.

The following are treatments for three stages of calf scours:

- If the scours problem is detected early, when the calf still is standing and relatively bright, you can replace fluids orally with a bottle. In these situations, the best treatment is to leave the calf on milk and add several 2-quart electrolyte feedings a day to replace the fluid that is being lost through diarrhea. By leaving the calf on milk, it still can get some nutrients.
- Calves that are down but alert probably need to have fluids administered with a stomach tube.

They will need 2 quarts of a high-energy (containing glucose) electrolyte solution several times a day. You will need to provide a heat source as well.

- Calves that are comatose or recumbent must have intravenous fluids. Neither subcutaneous nor oral fluids will be absorbed in these animals because the scouring animal’s peripheral circulation is very poor.

Being thorough when replacing fluids in a scouring animal is vital.

- The amount of fluid lost (percent of dehydration) must be replaced.
- The fluid maintenance requirements (50 milliliters per kilogram of body weight per day) of the animal must be met.
- Replacement must include the ongoing diarrhea loss (1 to 4 liter day).

A common mistake is giving the animal too little fluids. A 100-pound calf that is 10 percent dehydrated will need about 10 liters of fluid a day to maintain adequate volume.

Infectious Causes of Scours

The most common infectious causes of calf scours are *Escherichia coli* (septicemic strains, enterotoxigenic and enteropathogenic strains), *Salmonella* spp., *Clostridium perfringens*, rotavirus, coronavirus, bovine viral diarrhea virus, *Cryptosporidium* and coccidia (*Eimeria*) parasites.

- *E. coli* that gains access to the bloodstream (bacteremia/septicemia) can cause inflammation in any body location, but it does the most damage in the meninges/brain, kidneys and joints. Animals with this type of scours do not respond to treatment and will not survive.

- Enterotoxigenic *E. coli* such as strain K99 attaches to cells that line the interior of the intestine and causes a hypersecretory diarrhea. This type of diarrhea occurs in neonatal animals (1 to 3 days of age) and can be prevented by ensuring the calf ingests colostrum from cows that have been vaccinated with a K99 product. No vaccines are available for other types of *E. coli* that create hypersecretory and malabsorptive diarrhea.

- *Salmonella* spp. causes diarrhea that results in significant tissue damage, which can lead to problems with absorption and septicemia (bacteria in the blood). Infected animals shed the bacteria from all body orifices and can be a source of infection for humans (this is a zoonotic disease) and other animals. The bacteria are resilient in the environment (can survive for several weeks), and antibiotic-resistant strains are common. Animals that recover from salmonellosis often become "carriers" that shed the bacteria when stressed. *Salmonella* bacterins are available; however, their effect is not always consistent. Consult with your veterinarian about their use.

- *Clostridium perfringens* infections commonly are referred to as enterotoxemic. Enterotoxemia (toxins in the gut) is typically fatal and is caused by toxins that various types of *C. perfringens* release. The disease has a sudden onset. Affected calves become listless and strain or kick at their abdomen. Bloody diarrhea may or may not occur. Infection usually is associated with changing weather conditions, changes in the feed or

feeding of the cows, or management practices that cause the calf nursing interval to be longer than usual. The hungry calf may overconsume milk, which establishes an environment in the gut favorable to clostridial organism growth and production of toxins. In many cases, calves may die without any clinical signs being observed.

- Viral diarrheas such as rotavirus and coronavirus cause damage to the cells that line the intestine, and lead to problems with fluid and nutrient absorption. Virus is shed into the environment by cows (low amounts of virus) and infected calves (high amounts of virus). The virus remains infective in the environment for several days. Vaccines are available for these two viruses but have variable success in preventing disease. Consult your veterinarian about their use. Antibiotics may help with bacterial infections secondary to the viral infection and damage in the intestine, but antibiotics will have no effect on the virus itself.

- The bovine viral diarrhea virus (BVDV), although not a common cause of scours, can cause sporadic diarrhea and death in young calves. Diarrhea begins about 24 hours to three days after exposure and may persist for days or weeks (if the animal survives that long). Erosions and ulcers on the tongue and lips, and in the mouth, are the usual lesions found in the live calf.

- *Cryptosporidium* spp. is a protozoal parasite that is found in immune-suppressed animals or as a co-infection with other bacteria or viruses. The parasite occupies the surface of the cells that line the intestine and cause problems with fluid and nutrient absorption. No vaccine or licensed therapeutic agent is available. Diagnosis is made through the examination of a fecal sample. Most animals recover from *Cryptosporidium* infections with supportive care.

- Coccidiosis usually occurs in calves that are 3 weeks to 6 months of age. Diarrhea can vary from watery to bloody and the calf often has tissue damage in the intestine. Fatalities can occur. This disease is best diagnosed with a fecal test or post-mortem exam. Drugs are available for coccidiosis prevention and treatment; therefore, the incidence of the disease can be reduced with the right management and therapeutic agents. Carrier animals can shed the infective oocyst in their fecal matter and be a source of infection for others. Infection is through ingestion of the parasite.

Noninfectious Causes of Scours

Noninfectious causes of calf scours are best defined as flaws or gaps in management. Inadequate nutrition, exposure to severe environment, insufficient attention to the newborn calf or a combination of these often are involved in scours outbreaks. The most commonly encountered noninfectious problems include:

- **Inadequate nutrition of the pregnant dam, particularly during the last third of gestation** – The quality and quantity of colostrum are adversely affected if the energy and protein requirements of the pregnant dam are not met. Deficiencies in vitamins A and E, and trace minerals have been associated with greater incidence of calf scours. For more detailed information, see NDSU Extension publication AS1207, "Preparing for a Successful Calving Season," at www.ag.ndsu.edu/pubs/ansci/beef/as1207.pdf.

- **Exposure to severe environment for the newborn calf** – Mud, overcrowding, contaminated lots, calving heifers and cows together, wintering and calving in the same area, storms, heavy snow, cold temperatures

and rainfall are all stressful to the newborn calf and increase its exposure to infectious agents. The wet and chilled (hypothermic) newborn calf experiences a loss of body heat, becomes severely stressed, and lacks the vigor to nurse aggressively and receive adequate colostrum early in life.

Attention to the newborn calf is essential, particularly during difficult births or adverse weather conditions. The calf is born without most antibodies, including those that fight the infectious agents that cause scours. The calf will acquire these antibodies only from colostrum. Because of this, any effort to prevent scours by vaccinating cows is wasted unless the calf actually receives colostrum, preferably before it is 2 to 4 hours old.

As the calf grows older, it rapidly loses its ability to absorb colostrum antibodies. Colostrum given to calves that are more than 24 hours old is practically useless; antibodies seldom are absorbed this late in life.

Nutritional Scours

Under range conditions, a calf adapts a pattern of nursing that fills its needs. Nutritional scours can be caused by anything that disrupts this normal habit. A storm, strong wind or the dam going off in search of new grass disrupts the normal nursing pattern. When the calf eventually nurses, it is overly hungry and the cow has more milk than normal. Consequently, the calf may overconsume milk, resulting in nutritional scours.

The diarrhea is usually white and caused by undigested milk passing through the intestinal tract. This type of scours usually presents little problem. Many of these calves, if they still are active and alert, do not require treatment. If the calf becomes depressed or quits nursing, treatment should be initiated.

Diagnosing Scours

If a scours problem develops, do not wait to send samples to the laboratory. Indiscriminately treating a scouring calf with any available antibiotic can make finding the real cause difficult to do. Send in samples early.

Here is how to collect samples:

- Consult your veterinarian about collecting appropriate samples.
- If your veterinarian is not available, collect a fresh fecal sample from an untreated calf. Place this sample in a sterile plastic container, chill it and submit it to the lab for analysis.
- If you have a dead animal, submit it to the lab within 24 hours of death.

The laboratory will look for bacteria, viruses and parasites in its routine testing.

Preventing Scours

Here is what you can do to prevent scours in your calves:

- Maximize ingestion of colostrum immediately after birth (antibody from cow's milk passes through the calves' gut in the first few hours of life; after 24 hours, the gut closes completely).
- Maintain proper nutrition and body condition of the cow.
- Minimize the dose of an infectious agent to which the calf is exposed; keep the environment clean.
- A healthy calf normally will encounter most of these agents and develop an active immunity.
- Minimize the density of susceptible calves.
- Overcrowding causes the number of infectious agents in the environment to increase dramatically.
- Keep the calving premises as dry as possible.
- Isolate sick animals; no comingling.
- Clean and sanitize equipment after every use.

Factors Affecting Scours' Appearance Rate

Several factors can affect the appearance rate of scours:

- Some herds are genetically stronger; high herd immunity.
- Some herds have a better nutritional status.
- Calves born to heifers are more likely to develop scours problems because heifer colostrum is lower in antibodies than cow colostrum.
- An increased fecal load on a piece of ground will increase the amount of infectious agent present.
- Poor environmental conditions contribute to scours incidence.
- The vaccination status of the cow herd can have an impact.
- The number of scouring calves that are contaminating the environment may affect the rate.
- Which infectious agents are involved can affect the rate.

Treatment Principles

Natural suckling is preferred in beef cattle, but that means each calf's colostrum intake will be variable. The time and amount of colostrum intake may be delayed and insufficient; therefore, passive immunity will be ineffective. Giving colostrum with a stomach tube ensures that each calf receives an adequate amount of good-quality colostrum. Bottle feeding may be done as well.

Most veterinarians will recommend that a gallon of colostrum be given within two hours of birth. This could be split into two doses of 2 quarts at two to four hours after birth and another 2 quarts four to six hours after birth. If you use a colostrometer, use colostrums that contain a concentration of at least 50 milligrams per milliliter.

Do not feed pooled colostrum. Once colostrum is harvested, place it in a sanitary container and freeze it for later use. When you thaw colostrum for use, do not boil it or you will destroy the antibody.

The following are other treatment principles:

- Newborn calves will benefit from a vitamin A injection. Vitamin A deficiency is associated with scours. The calf should be given 500,000 International Units (usually 1 cc) of vitamin A early in life.
- Intestinal protectants such as Kaopectate or Pepto-Bismol may give some relief. Probiotics may be appropriate as well. Consult your veterinarian on their use.
- If electrolyte powders are not available, a solution for oral administration can be prepared on the ranch by using 1 tablespoon of baking soda, 1 teaspoon of salt and 250 cc (8 ounces) of 50 percent dextrose. **Do not use table sugar!** Add enough warm water to make 1 gallon and administer up to 1 quart of this material every three to four hours, depending upon the degree of dehydration and fluid loss. This solution can be used as the only source of nutrients for 24 to 48 hours. Another formula often used: one package (1 ounce) of fruit pectin, 1 teaspoon of Lite salt, 2 teaspoons of baking soda and one can of beef consommé, plus enough warm water to make 2 quarts. Give 1 warm quart orally at four- to six-hour intervals.

NOTE: Homemade formulas are not a replacement for commercially balanced preparations and are for oral use only.

- ✓ Remember that many infectious agents that cause calf scours **can cause disease in people as well.**
- ✓ Wear gloves and wash your hands.
- ✓ When working with sick animals, treat them last, and wear dedicated coveralls and boots that can be washed.
- ✓ Children, individuals with any immune system disorder and pregnant women are more susceptible to zoonotic disease and should not work with sick calves in any way.

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