Calf Diarrhea (aka Scours)

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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 Escherichia 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.

- 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, enterotoxicogenic 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 infection 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 are commonly 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](http://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 diffi
cult births or adverse weather conditions.
The calf is born without most
antibodies, including those that fi ght
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 colostral
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 fi lls 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 ac-
tive 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 diffi cult
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 fi rst 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 environent 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 insuffi cient;
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 consomme, 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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