



Calf Scours

Causative Agents of Calfhood Diarrhea

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Scours -- What is it? Calf scours is a broad, descriptive term referring to diarrhea in calves. Calf scours is not a specific disease with a specific cause, but is actually a clinical sign of a disease complex with many possible causes.

Scours occur when normal movement of water into and out of the digestive tract is disrupted, resulting in water loss and dehydration. Loss of body fluids through diarrhea is accompanied by loss of body salts. This fluid and electrolyte loss produces a change in body chemistry that can lead to severe depression in the calf and eventual death. Rehydration therapy of scouring calves with water and supplemental electrolytes can help alleviate effects of dehydration and help restore a normal electrolyte balance.

Noninfectious scours (nutritional scours) are usually caused by changes to the feeding program. While usually not severe enough to cause death, non-infection scours can weaken the calf and make it more susceptible to infectious scours. Infectious scours are the biggest problem and are caused primarily by viruses, bacteria and protozoa. Identifying the infectious agent causing scours is an important part of developing a sound prevention program.

Noninfectious Scours

Calves do best under consistent circumstances. Sudden changes, especially to the feeding program, test their ability to cope. Overfeeding, switching milk replacer brands or changing from a high to a low quality milk replacer formulation can adversely affect digestion. Ingredient differences, taste, nutrient and product density (how much fits in an 8 oz cup) can affect a calf's willingness to drink as well as its performance. Changes like these should be evaluated and made gradually.

When waste milk is fed, nutrient quality and quantity vary depending upon the condition and health status of cows contributing to the waste milk supply. Calves may scour in response to these changes. Pasteurization does not affect this characteristic of waste milk.

Infectious Scours -- Bacterial Agents

These bacterial agents produce toxins that degrade the intestinal lining. The calf responds to these toxins by pumping large amounts of water into the intestinal tract as if trying to flush out the toxin.

E. coli organisms are part of the normal flora of the intestinal tract. Many strains are harmless to the calf, but certain strains can cause moderate to severe scours and even death. *E. coli* typically produces a secretory diarrhea resulting from the intestinal epithelial cells being switched from an absorption mode to a secretion mode. *E. coli* is often referred to as “white” scours and is the most common cause of calf scours.

3 Types: Enteric. This is the most common type. The main clinical sign is severe diarrhea. The calf rapidly becomes weak and dehydrated with an initial fever that rapidly returns to normal (or subnormal). Dehydration can lead to death.

Enterotoxigenic. (K-99 strain) This infection runs a rapid, fatal course. Toxins cause so much fluid to be pumped into the intestine that the calf usually dies before external signs of diarrhea are present. This type of scours is one of the few that occur within the first 3 days of life.

Septicemic. This type acts like *Salmonella* by invading the blood stream and penetrating body tissues causing a general infection. Gross lesions are usually minimal. This is a rapid form of *E. coli*, often with no evidence of diarrhea. Colostrum deprived calves usually die of this form of *E. coli*.

Occurrence: *E. coli* affects calves within the first 10-14 days of age, usually within the first week. *E. coli* is commonly found in conjunction with rota- and coronavirus.

Other: Since only about 60% of the electrolyte solution is absorbed by the scouring calf, effective treatment requires increased frequency of treatment to replenish fluids and electrolytes lost during diarrhea. With as much as 40% of the electrolyte solution passing through the calf, diarrhea may appear to be worsening even though treatment is effective.

Salmonella invades the mucosa of the small intestine causing inflammation and erosion of the intestinal lining. The bacteria may invade the blood stream, infecting joints, brain, lungs and liver. Infected calves can shed the organism in feces, urine, saliva, and nasal secretions, which can survive in the environment for months. The sources of *Salmonella* infection in calves include cattle, birds, rodents, water, humans and milk from infected cows. The most common *Salmonella* serotype is Group B, typically *Salmonella typhimurium*. Many isolates have a very resistant antimicrobial susceptibility pattern, making antimicrobial sensitivity results critical for successful treatment.

Symptoms: Calves are usually severely affected, do not drink milk/milk replacer, become severely dehydrated and have a high fever. Feces are watery and often tinged with blood. There is a high mortality rate among infected calves, with death occurring within 12-48 hours after the first signs appear.

Occurrence: Can affect calves of any age, but usually affect calves that are over 10 days old

***Clostridium perfringens* Types C & D** cause enterotoxemia, an acute intestinal infection, and kill through the production of a systemic toxin. *Clostridium perfringens* is normally found in the intestine of cattle and can survive for months in the soil. Overeating or abrupt diet changes tend to produce indigestion, which slows gut movement, providing the sugars, proteins and lack of oxygen for rapid growth of clostridium. Wet conditions also seem to favor this organism.

Symptoms: Affected calves show uneasiness and strain or kick at their abdomen. Calves are often found dead without having shown any symptoms.

Occurrence: Usually affects calves less than 10 -14 days of age.

Other: Clostridial infections of the intestines are fairly uncommon in young calves. There are many more cases of clostridial infection that involve the abomasum, usually in calves between two and five weeks of age. Acute death with moderate bloating is often found. *Clostridium perfringens* type A may be found in association with bloat.

Infectious Scours -- Viral Agents

Viruses attack the villi cells lining the small intestine leading to malabsorption. The virus enters the cell and utilizes the cell's own material to reproduce themselves. When the cell is full of newly formed virus, it ruptures and releases the new viruses to attack more cells. Viral infections make the calf more susceptible to secondary bacterial infections.

Rotavirus and Coronavirus have similar modes of action and are the most common viruses associated with calf scours. Both organisms are widespread in cattle and exposure of young calves is common.

Symptoms: profuse watery scours, near normal body temperature, depression and dehydration. There may be drooling of saliva; calves may appear to be constantly straining to pass feces.

Occurrence: usually within the first 10-14 days of life -- typically within the first 10 days

Other: often complicated by secondary bacterial infection such as *E. coli*. Antibiotics are ineffective against viruses, but may offer some protection against secondary bacterial infections.

Bovine Virus Diarrhea (BVD) is another viral agent that can cause scours, although it is not real common in very young calves. Antibodies from the dam's colostrum protect most calves if dams were vaccinated for BVD. Calves infected after birth may possess a high fever, accelerated breathing and severe diarrhea. BVD is usually found in combination with other infectious agents.

Infectious Scours -- Protozoal Agents

Coccidia & Cryptosporidia are common throughout the United States and are found in nearly all cattle populations. These organisms enter the body through contaminated feed and water and can lay dormant in manure and soil for up to one year. Once in the intestine, the oocysts (eggs) release protozoa that multiply, attach to and enter the cells of the intestinal lining decreasing digestion and absorption of feed ingredients

Symptoms: Subclinical (chronic) infections show few outward signs, but animals suffer reduced feed consumption, feed conversion and growth.

Acute infections result in diarrhea (often with blood), depression, weight loss, dehydration, but calves will often continue to eat.

Occurrence: Coccidia have a 21-day life cycle, so it is unlikely that calves will scour before 18-19 days of age.

Cryptosporidia are typically found in calves from 7 - 21 days of age.

Other: Cryptosporidia are often detected in combination with rotavirus, coronavirus and E. coli.

Giardia was fairly rare unto a few years ago. Incidence has been increasing, especially in three to five week old calves. These are usually poor doing calves with a chronic malabsorption diarrhea.

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