

Calf Scours: Definition and causes

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Abstract: Calf scours is a broad, descriptive term referring to diarrhea in calves. It is not a specific disease with a specific cause, but it is actually a clinical sign of a disease complex with many possible causes. The present literature is review of the causes, symptoms, diagnosis, treatment, control and vaccination of calf scours. Scours occur within the first several days of life are the most important cause of calf sickness and death. Almost no herd goes through a calving season without some scours. In severe outbreaks, the effects of scours in an individual herd can be overwhelming. Morbidity may occur in 70 % of calves born and mortality may occur in 50 %. The present study was concluded that the causes of calf scours divided to noninfectious scours (nutritional) and infectious scours (Viral, bacterial and protozoal agents).

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1. Introduction

One of the major economic losses problems is scour in young calves. This problem usually occurs when the calves are less than one month of age. The primary harm full effect from scours is loss of water and electrolytes (body salts) in the diarrhea. This loss of water and salts creates dehydration and alteration of the acid-base balance of the bodily fluids. Inflammation of the intestinal lining impaired the calf's ability to digest nutrients, creating weight loss and the potential for hypoglycemia (low blood sugar). If untreated, these changes can be severe enough to result in death. In addition, certain bacteria (certain strains of *Salmonella* and *Clostridium perfringens*) can release toxins that cause harm to multiple vital organs in the calf.

Many factors influence the occurrence of diarrheal disease.

Factors that predispose calves to scours include: Dystocia, poor health of dam, less mothering ability of dam, etc. These factors may be difficult to control. When they occur, they lower the calf's ability to resist infectious diseases, and extra care of the calf is required to decrease the risk of scours. When the calf's resistance was lowered, exposure and invasion by infectious agents could occurred which played an important role in producing diarrhea.

Causes of Scours

1) - Noninfectious Scours (Nutritional Scours)

Calves do best under consistent circumstances. Sudden changes, especially to the feeding program, Overfeeding, switching milk replacer brands or changing from a high to a low

quality milk replacer formulation could 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 **Walter Baumgartner. 2012.**

2) - Infectious Scours

A- Viral Scours

1-Rota virus Scours.

A reo-like virus can cause scours in calves within 24 hours of birth. However, when the infection- is first introduced into the herd, it can affect calves up to 30 days of age or older. Infected calves are severely depressed. There may be a drooling of saliva and profuse watery diarrhea. The feces will vary in color from yellow to green. Calves lose their appetite and the death rate may be as high as 50 percent, depending on the secondary bacteria present **Haschek et al., 2006.**

Diagnosis of rota virus

The diagnosis depends on an accurate history, clinical signs, and proper specimen collection and submission to a laboratory. The reo-like virus infection alone causes no diagnostic gross lesions in the intestine, but there is an increased volume of fluid in both the small and large intestine.

2-Corona virus Scours.

Scours caused by corona virus occurs in calves that are over 5 days of age. When the infection first starts in a herd, calves up to 6 weeks of age may scour. These calves are not as depressed as those infected with rotavirus. Initially, the fecal material may have the same appearance as that caused by rotavirus. As the calf continues to scour for several hours, however, the fecal material may contain clear mucus that resembles the white of an egg. Diarrhea may continue for several days. Mortality from corona virus scours ranges from 1 to 25 percent **Heinrichs and Radostits .2001.**

Control of Corona virus

Scours of *corona* virus is the same as that for rotavirus scours. Many herds have been found to be infected with both the *rota*- and *corona* viruses. A vaccine that is specific for the *rota*- and *corona* viruses is available. It can be administered in one of two ways:

Orally to the calf soon after birth; or as a vaccination to the pregnant cow. The first year that a vaccination program is started in the beef cow herd, the cow receives two vaccinations-the first at 6 to 12 weeks before calving, and the second as close to calving as possible. The next year, the cows are given a booster vaccination just before calving. In herds where the calving period extends over more than 6 to 8 weeks, cows that have not calved at the end of a 6-week period should receive a second booster vaccination. Following this procedure insures that the calf receives a high level of *rota*- and *corona* virus antibodies in the colostrum. However, the calf must receive adequate colostrum, preferably within the first 4 hours after birth as the antibodies cannot be absorbed later than 24 hours after birth. This cow vaccination program fits well into a beef cow herd health program and helps prevent virus build-up in the herd.

Diagnosis of *Rota*- and *Corona virus* Scours. Accurate diagnosis of viral scours can be made only by laboratory tests.

3-Bovine Virus Diarrhea.

The virus of bovine virus diarrhea can cause diarrhea and death in young calves. Diarrhea begins 2 to 3 days after exposure and may persist for quite a long time. Ulcers on the tongue, lips, and in the mouth are the usual lesions that can be found in the live calf. These lesions are similar to those found in yearlings and adult animals affected with bovine virus diarrhea. Diagnosis is by history, lesions, and diagnostic laboratory assistance.

Treatment and control

Similar to that used for other viral scours. Bovine virus diarrhea is controlled by vaccinating all replacement heifers 1 to 2 months before breeding.

B) - Bacterial Scours

1- *Escherichia coli* (Colibacillosis).

Escherichia coli (*E. coli*) have been incriminated as a major cause of scours **Yamamoto and Nakazawa, 1997.** Many times this is the only organism identified following routine bacteriologic culturing. Many different serotypes of *E. coli* have been identified; some cause scours while others do not.

E. coli is always present in the intestinal tract and is usually the agent that causes a secondary infection following viral agents or other intestinal irritants. *E. coli* scours is characterized by diarrhea and progressive dehydration. Death may occur in a few hours before diarrhea develops. The color and consistency of the feces are of little value in making a diagnosis of any type of diarrhea **Khan et al., 2002; Chattopadhyay et al., 2003; Wani et al., 2004.**

The course varies from 2 to 4 days, and severity depends on age of the calf when scours starts and on the particular serotype of *E. coli*.

Upon postmortem examination, lesions are nonspecific. However, the small intestine may be filled with fluid and the large intestine may contain yellowish feces.

Diagnosis of Colibacillosis

It depends on an accurate history, clinical signs, and culture of internal organs for bacteria and serotyping of the organism. The location at which the culture from the intestine was taken is also important.

Control of *E. coli* scours

It can be difficult in a severe herd outbreak. All calves should receive colostrum as soon after birth as possible. This helps the calf resist *E. coli* infection. Early isolation and treatment of scours help to prevent new cases. There are new *E. coli* cow vaccines now on the market. These vaccines contain K99 antigen which should give immunity to many types of *E. coli*. The vaccine is administered 6 weeks and 3 weeks prior to calving. The new *E. coli* vaccine is also available in combination with the *rota*- and *corona* virus vaccine. This vaccination builds high antibody levels in the colostrum, but the calf must get colostrum in the first few hours of life for the vaccine to be effective.

2- Salmonella.

There are more than 1000 types of *salmonella*, all of which are potential disease producers. In Egypt, a varying prevalence of *Salmonella* infections in calves was recorded with predominance of *Salmonella enteric* serovar Typhimurium (ST) and *Salmonella enterica* serovar Enteritidis (SE) **Seleim et al 2004; Younis et al 2009; Moussa et al 2010 and 2012.**

Calves are usually affected at 6 days of age or older. This age corresponds very closely to the age of the *Corona* virus infection. The source of

salmonella infection in a herd can be from cattle, birds, cats, rodents, the water supply, or a human carrier **Islam et al., 2004.**

Clinical signs associated with *salmonella* infection include diarrhea, blood and fibrin in the feces, depression, and elevated temperature.

The disease is more severe in young or debilitated calves. Finding a membrane like coating in the intestine on necropsy is strong presumptive evidence that *salmonella* might be involved.

3- *Clostridium perfringens*

Usually a harmless member of the normal microflora, under certain conditions it can multiply rapidly and secrete toxins and degradative enzymes that are associated with serious enteric disease **Songer.1996.**

There are 6 types of *Clostridium perfringens* that can produce toxins, of which types B, C, and D appeared to be the most important in calves **McDonel.1980**. The disease has a sudden onset. Affected calves became listless, display uneasiness, and strain or kick at their abdomen. Bloody diarrhea may occur or not. It is usually associated with a change in weather, a change in feed of the cows, or management practices that cause the calf to not nurse for a longer period of time than usual. The hungry calf may over-consume milk which established a media in the gut that was conducive to the growth and production of toxins by the clostridial organisms. In many cases, calves died without clinical signs being observed. Postmortem lesions may be a hemorrhagic intestinal tract; thus, the common name, "purple gut." In the small intestine, there may be large hemorrhagic or bloody, purplish areas where the tissue looked dead. This was usually attributed to type C. Types B and D produced diarrhea without the usual postmortem lesions. Diagnosis of these toxins was done by finding the toxin in the small intestine by laboratory methods. This toxin broke down rather rapidly so the contents of the intestinal tract must be collected very soon after death and preserved by freezing. Finding lesions of hemorrhagic enteritis at postmortem in a calf that has died suddenly was basis for a tentative diagnosis **Trotz-Williams et al., 2005.**

Vaccination programs

This disease controlled by vaccinating the cows with *Clostridium perfringens* toxoid 60 and 30 days before calving. A single booster dose of toxoid should be given annually thereafter before calving. If this problem diagnosed in calves from non immunized cows, antitoxin can be given to the calf. Administration of antitoxin and oral antibiotics were the only effective treatment.

C) - Protozoal scour

1-Coccidiosis.

It caused by one-celled parasites that invade the intestinal tract of animals. There were many species of coccidia. Two, *Eimeria zurnii* and *Eimeria bovis*, were usually associated with clinical infections in cattle. Coccidiosis has been observed in calves 3 weeks of age and older, usually following stress, poor sanitation, overcrowding or sudden changes of feed. It often occurred in calves 7 to 14 days after they moved from the calving lots onto pasture. Clinical coccidiosis was diagnosed by finding significant numbers of parasites in the feces. The results of the fecal examination must be related to the clinical signs and intestinal lesions. Occasionally, clinical coccidiosis would be present with bleeding and very few parasites in the fecal material. Laboratory examination of sections of the intestine may be required for diagnosis. A typical sign of coccidiosis in young calves was diarrhea with fecal material smeared over the rump as far around as the tail will reach. This may contain blood or not. Death may occur during the acute period or later from secondary complications **Rob Costello .2005 .**

Sulfonamides have been the treatment of choice for coccidiosis for many years. If treatment was given before signs appeared, the disease can largely be prevented. Amprolium has been cleared for use in calves as a preventative; this should be supplied at the rate of 5 mg/kg of body weight for a period of 21 days to cover the time period during which this disease anticipated. Good feeding practices, management, and sanitation were the control methods of choice.

2- *Cryptosporidium*.

Cryptosporidium is a protozoan parasite that is much smaller than coccidia. It has the ability to adhere to the cells that line the small intestine and to damage the microvilli. Several reports from researchers and diagnosticians have associated *cryptosporidium* with outbreaks of calf scours **Björkmann et al.,2003.** As a rule, *cryptosporidium* is detected in combination with corona virus, rotavirus, and/or *E. coli*. Calves infected by *cryptosporidium* have ranged from 1 to 3 weeks in age **Steiner et al., 1997.**

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