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NebGuide

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Calf Scours — Causes and Treatment

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Calf scours or calf diarrhea cause significant financial loss to cow-calf producers. This NebGuide discusses causes, treatment, supportive therapy, and herd management.

Calf scours or calf diarrhea cause significant financial loss to cow-calf producers. Scours or diarrhea is a clinical sign of a disease which can have many causes.

When diarrheas occur, the intestine fails to absorb fluids and/or secretion into the intestine is increased. A calf is approximately 70 percent water at birth. Loss of body fluids through diarrhea can produce rapid dehydration. Dehydration and the loss of certain body salts (electrolytes) produce a change in body chemistry and severe depression in the calf. Although infectious agents may be the cause of primary damage to the intestine, death from scours is usually due to loss of electrolytes, changes in body chemistry, dehydration, and change in acid-base balance. Invasion of body systems by infectious agents also is responsible for some deaths. Identifying the infectious agents that cause scours is important in designing prevention strategies.

The age of the calf when scours begin is an important consideration in its survival. The younger the calf, the greater the chance of death.

Management

Research indicates that many scour cases can be directly related to colostrum intake by the newborn calf. A calf that is well mothered and consumes one to two quarts of colostrum in the first few hours after birth absorbs a higher level of antibodies. This calf is far less susceptible to scours and other calfhood diseases.

The nutritional status of the cow herd is important to produce healthy calves. Cows in good body condition have calves that rise and nurse more rapidly than calves from thin cows, and are more resistant to chilling. These more vigorous calves have higher levels of colostral immunity and are more resistant to scours and other health problems.

Herd management to reduce calf scours incidence is very important. Practices such as overcrowding and confinement increase disease exposure to newborn calves. Herd introductions during calving, such as grafting calves, increases risk for calf scours. Attention to cleanliness and sanitation is essential. Wet, sloppy conditions increase stress and disease exposure.

Viral Scours

Rotavirus Scours

Rotavirus can cause scours in calves early in life. 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 drooling of saliva and profuse watery diarrhea. The feces vary in color from yellow to green. Calves lose their appetite and the death rate may be as high as 50 percent, depending on colostral antibody level and/or the secondary pathogens present.

Diagnosis depends on an accurate history, clinical signs, and proper specimen collection and submission to a laboratory. The rotavirus 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.

Coronavirus Scours

Scours caused by coronavirus occur 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. As scouring continues for several hours, the fecal material may contain clear mucus that resembles the white of an egg. Diarrhea may continue for several days. Mortality from coronavirus scours ranges from 1 to 25 percent.

Gross lesions are not significant. The intestine is often full of liquid feces. If lesions are observed in the intestine, they are the result of secondary bacterial infection.

Treatment for coronavirus scours is the same as that for rotavirus scours. Herds throughout Nebraska have been found

to be infected with both the rotaviruses and coronaviruses.

A vaccine that is specific for rotavirus and coronavirus is available. It can be administered in one of two ways: vaccinating the pregnant cow, which is more effective, and orally to the calf soon after birth. The first year that a vaccination program is started in the beef cow herd, the cow receives two vaccinations — the first at six 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 six to eight 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 calves receive a high level of rotavirus and coronavirus antibodies in the colostrum. However, the calves must receive adequate colostrum, preferably within the first few 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 buildup in the herd.

Diagnosis of Rotavirus and Coronavirus Scours

Accurate diagnosis of viral scours can be made only by laboratory tests. Your veterinarian knows what material to submit for examination.

Bacterial Scours

Escherichia coli (Colibacillosis)

Escherichia coli (E. coli) has been incriminated as a major cause of scours. Many times this is the only organism identified following routine bacteriologic culturing. Certain strains of the *E. coli* species can cause diarrhea. Many different serotypes (kinds) of *E. coli* have been identified; some cause scours while other do not. The K99 serotype is known to cause severe diarrhea in calves and is commonly the major cause of this problem. *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; however, death may occur in a few hours before diarrhea develops in extreme cases. The color and consistency of the feces are of little value in making a diagnosis of any type of diarrhea. The course varies from two to four days and severity depends on age of the calf when scours starts, the particular serotype of *E. coli* and antibody level due to passive transfer.

Upon postmortem examination, lesions are nonspecific. However, the small intestine may be filled with fluid and the large intestine may contain yellowish feces. Diagnosis depends on an accurate history, clinical signs, and culture of intestinal contents and internal organs for bacteria along with serotyping the suspected pathogen. The anatomic location at which the culture from the intestine was taken is also important.

Controlling *E. coli* scours 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* and other pathogenic infections. Early isolation and treatment of scours helps to prevent new cases.

E. coli cow vaccines are available. These vaccines contain the K99 antigen. The vaccine is administered six weeks and three weeks prior to calving. *E. coli* vaccine is also available in combination with the rotavirus and coronavirus vaccine. This vaccination builds high antibody levels in the colostrum, but the calf must get quality colostrum in the first few hours of life for proper transfer of passive immunity to be effective in disease prevention.

Salmonella (Salmonellosis)

There are more than 1,000 types of salmonella, all of which are potential disease producers. Salmonella produces a potent endotoxin (poison) within its own cells, causing depression and severe clinical signs. Calves are usually affected at 6 days of age or older. Sources of salmonella infection in a herd can be from filthy environment, other cattle, birds, cats, rodents, the water supply, human carriers, and/or others.

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 on the inner surface of the small and/or large intestine at necropsy is strong presumptive evidence that salmonella might be involved. Salmonella isolates should be checked by a bacteriologic sensitivity test to determine the antibiotics of choice. Salmonella bacterins (vaccine) are available and are being used in some problem herds.

Enterotoxemia

Enterotoxemia can be fatal to young calves. It is caused by toxins produced by *Clostridium perfringens* organisms. There are six types of *Clostridium perfringens* that can produce toxins, of which types A, B, C, and D appear to be the most important in calves.

The disease has a sudden onset. Affected calves become listless, display uneasiness, become bloated and strain or kick at their abdomen. Bloody diarrhea may or may not occur. 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 establishes a medium in the gut that is conducive to bacterial growth and production of toxins by the clostridial organisms. In many cases, calves may die 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 looks dead. This is usually attributed to type C. Types B and D may produce diarrhea without the

usual postmortem lesions. Diagnosis of these toxins is by finding the toxin in the small intestine by laboratory methods. This toxin breaks 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 is suggestive but should be confirmed by veterinary laboratory diagnosis.

This disease is best 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 is diagnosed in calves from nonimmunized cows, antitoxin can be given to the calf. Administration of antitoxin and oral antibiotics is a treatment that can be effective.

Protozoal Scours

Coccidiosis

Coccidiosis is caused by one-celled parasites that invade the intestinal tract of animals. There are many species of coccidia. Two, *Eimeria zurnii* and *Eimeria bovis*, are usually associated with clinical infections in cattle. Coccidiosis has been observed in calves three weeks of age and older, usually following stress, poor sanitation, overcrowding or sudden changes of feed. It often occurs in calves seven to 14 days after movement from the calving lots to pasture as the matured oocyst has developed to the infective stage.

Clinical coccidiosis is diagnosed by finding significant numbers of parasites in the feces. The results of the fecal examination should be related to the clinical signs and intestinal lesions. Occasionally, clinical coccidiosis will 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 is bloody diarrhea with fecal material smeared over the rump as far around as the tail will reach. Death may occur during the acute period or later from secondary complications.

Proper use of amprolium, ionophores, decoquinate, and sulfonamides is an aid in prevention and/or treatment programs. Good feeding practices, management, and sanitation are the control methods of choice.

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. As a rule, cryptosporidium is detected in combination with coronavirus, rotavirus, and/or *E. coli*. However, research indicates cryptosporidium infections alone cause scours.

Presently, there are no known specific treatments. Supportive treatment for calf scours is recommended.

Treatment of Calf Scours

Treatment for scours is very similar regardless of the cause. It should be directed toward correcting dehydration, acidosis, and electrolyte loss. Antibiotic treatment can be given simultaneously with the treatment for dehydration. Dehydration can be overcome with administration of electrolytes and fluids given orally and properly timed early in the course of the disease. If dehydration is prolonged, intravenous fluid treatment becomes necessary.

The clinical signs of dehydration first occur when the fluid loss reaches 5 to 6 percent of the body weight. Ten percent loss of fluid results in depression, sunken eyes, dry skin, and inability to stand. A 15 percent loss of fluids usually results in death. Oral fluids used early in the scouring process have been quite successful. Consult your veterinarian for electrolytes to be given orally and do not overload. Follow instructions and consider calf size to determine volume as directed by the veterinarian. There are electrolyte powders available that can be mixed with water for oral administration.

If electrolyte powders are not available, there are three solutions for oral administration that can be prepared at the ranch:

1. Combine 1 can beef consomme, 1 package fruit pectin (Sure Jell or Pen Jel), 2 teaspoons low sodium salt (Morton Lite Salt), 2 teaspoons baking soda, and add enough warm water to total 2 quarts.

2. Combine 1 can beef consomme, 3 cans warm water, and 1 heaping tablespoon baking soda.

3. Combine 1 tablespoon baking soda, 1 teaspoon salt, and 250cc (8 ounces) 50 percent dextrose or 8 ounces light Karo syrup, and add enough warm water to total 1 gallon.

Do not overfeed! Administer up to 1 quart of any of these three solutions every three to four hours, depending on the degree of dehydration and fluid loss. These solutions can be used as the only source of nutrient for 24 to 48 hours.

Esophageal feeders and nipple feeders are available which work very well for administering oral fluids to calves. These devices, or a stomach tube, should be used when giving calves oral fluids.

Antibiotics should be used by injection whenever treating calves for diarrhea. In acute salmonellosis outbreaks, antibiotics may cause the release of excess endotoxins; therefore, consideration should be given to using fluid therapy only. Consult your veterinarian to evaluate these cases and recommend the proper antibiotic.

Ear tag treated calves for identification and keep a daily record of the treatment administered. This aids in evaluating the treatment and utilizing follow-up treatments as necessary. Valuable information can be obtained by having the

cows identified and identifying each calf at birth. If an outbreak of scours occurs, persistent treatment and records are essential for doing a good job.

Summary

Scour problems are an ever-existing threat to baby calves. A good program requires proper nutrition, management for a clean, dry, comfortable environment, and an ongoing preventive herd health program to minimize disease incidence and losses. Prevention, early diagnosis, and treatment of sick animals will reduce the threat of a herd outbreak. Use this important information when considering vaccinations and other procedures for the cow herd the next calving season. Work closely with your veterinarian to design effective prevention and treatment programs.

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