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Lewis, Lon D./Calf diarrhea : its causesLon D. Lewis^{1/}

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Quick Facts

Calf diarrhea may be caused by scours, enterotoxemia, salmonellosis and coccidiosis.

Scours, the most common cause of calf diarrhea, may be introduced by many different viruses or bacteria.

Scours may cause sudden death, septic arthritis or diarrhea; it generally occurs in calves less than a week old.

Enterotoxemia also causes sudden death in calves.

Enterotoxemia most often occurs in calves less than two weeks old or in nursing calves one to four months old.

Salmonellosis generally causes a prolonged wasting and intermittent diarrhea in confined calves two weeks to four months old.

Coccidiosis is seen most frequently two to three weeks after placing young cattle together under crowded conditions.

Diarrhea in the calf, regardless of its age, is second only to reproductive diseases as a cause of losses to the cattle industry. Diarrhea affects all breeds, killing 5 to 25 percent of all calves born in the United States.

There are four major causes: scours, enterotoxemia, salmonellosis and coccidiosis. Although some aspects in treatment and prevention are similar, there are differences which necessitate determining the disease involved.

Scours

Scours is by far the most common cause of diarrhea in calves. Although it may affect calves up to one month old, it is most common in calves two to seven days old. It may be caused by any of seven different viruses and numerous different bacteria. In addition, there are several different subtypes of each of these; e.g., three coronaviruses, eight enteroviruses and 300 serotypes of the bacteria *E. Coli*. Vaccination or immunity against one type has little effect against the others. However, there is a vaccine against all of the different types of *E. Coli* known to cause scours in calves. Many different stress factors may also predispose the calf to these organisms and, hence, disease.

There are two clinical forms of calf scours. One is sudden death, often without signs of sickness and before diarrhea has had a chance to develop. It occurs because the organisms, or toxins produced by them,

gain access to the blood. Although this most often results in death within four to 24 hours, occasionally death does not occur, and the organism localizes in one or more joints, especially the knees. This causes septic arthritis and swelling. The joint must be aseptically drained, flushed, the calf confined and antibiotics injected.

The second and most common clinical form of scours is diarrhea. Stools vary in consistency from watery to semisolid and are lighter in color than normal. This is in contrast to coccidiosis and enterotoxemia in which the feces are darker than normal and may contain visible blood. In the early stages, the calf continues to eat but later becomes dehydrated, weak and stops eating. The course of the disease generally is two to three days, but may vary from one to seven days.

Post-mortem examination reveals a reddened intestinal tract full of fluid, particularly the lower small intestine. The stomach generally is not affected, which helps differentiate this disease from enterotoxemia.

Enterotoxemia

Enterotoxemia is caused by the bacteria *Clostridium perfringens*, which is widely distributed in soil and manure. It is present in the intestinal tracts of most healthy cattle. Stress or a sudden change in the intestine is required for the organism to produce disease. Severe weather, large quantities of milk or other problems can cause these stresses. Enterotoxemia occurs most often in calves less than two weeks old, or in the biggest, best calves one to four months old that are nursing.

An outbreak generally begins with dead, rather than sick, calves. Affected calves show signs of abdominal pain and die within two to 24 hours. If diarrhea develops, it is profuse, dark and bloody. Many calves die before this occurs. A post-mortem examination reveals dark and bloody stomach and intestines and heart hemorrhages.

To confirm a diagnosis, a person should send a frozen tied-off portion of intestine from a calf that was not treated to a diagnostic laboratory for examination.

Treatment of enterotoxemia generally is futile. Prevention during an outbreak can be achieved by giving antitoxin to all calves. If enterotoxemia is or has been a problem, cows should be vaccinated at two to five months and again at two to four weeks before calving. Once-yearly vaccinations before calving are

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adequate after the first year. Calves then must obtain several quarts (liters) of colostrum from the vaccinated cows as soon as possible after birth.

Salmonellosis

Although salmonellosis may occur in mature cattle and calves on pasture, it most commonly affects confined calves two weeks to four months of age, causing any one of three clinical syndromes.

1) A sudden onset of weakness and depression in calves two to six weeks old. Occasionally, but uncommonly, it may occur in younger calves in which case death usually occurs within 12 to 48 hours, often before diarrhea develops.

2) A sudden onset of a profuse watery, dark-colored diarrhea, often with straining and colic. Death generally occurs in three to seven days.

3) Depression, fever and intermittent diarrhea with pasty, light-colored stools that may occasionally be blood-tinged. There is severe weight loss and wasting, although calves often continue to eat until near death. From onset to death may be several weeks to months. This is the most common syndrome occurring in cattle. Post-mortem examination reveals a reddened intestine and often a fibrinous pneumonia and fibrin in the joints. To confirm a diagnosis, a person should send a frozen, tied-off piece of intestine and gall bladder from a calf that was *not* treated to a diagnostic laboratory with a request to look for this organism.

Prevention can be accomplished by vaccinating cows with salmonella bacterins (Paratyphol—Cutter Labs) in the same manner as described for enterotoxemia.

Coccidiosis

Coccidiosis may occur in calves from three weeks to two years of age. The greatest incidence occurs beginning two to three weeks after putting a group of young cattle or sheep together under crowded conditions. Severe outbreaks may occur in young nursing calves when the cows are fed on the ground in the same location each day.

Older cattle are immune to the disease, but shed coccidia in their feces. Two to three weeks after ingesting the organism, non-immune cattle pass pasty stools that are darker in color and may contain blood. There may be straining resulting in rectal prolapse. Growth rate and feed efficiency are greatly reduced, which accounts for the greatest economic loss from this disease. If gut damage is severe, organisms and toxins may gain access to the blood, causing pneumonia or diseases affecting the brain.

Coccidiosis may be confirmed by a veterinarian through a microscopic examination of the feces.

Treatment may be accomplished by administering one of the following drugs. Best results are obtained by treating the entire herd as well as treating severely affected animals individually. Rumensin added to the ration to provide 200 milligrams per calf per day, will decrease the incidence and severity of coccidiosis as well as increasing by 10 to 15 percent feed efficiency in feedlot calves and rate of gain in pasture calves.

Table 1: Drugs for treatment of coccidiosis.

Drug	Individual treatment	Herd treatment
Sulfas; e.g., sulfaquandine	100 mg/lb* for 3-5 days, then 50 mg/lb for 3 more days.	1 lb/100 gal* of water for 3 days; then half of this amount for 3 more days.
Corid (Merk & Co.)		16 oz/100 gal* of water for 5 days. (For herd prevention, use half the treatment dose for 21 days.)
Amprovine (Merk & Co.)	0.2 lb feed/100 lb body weight/day for 5 days.	40 lb/ton of feed.

*To convert to metrics, use the following equivalents: 1 pound = .45 kilograms; 1 gallon = 3.8 liters; 1 ounce = 28 grams.

General aspects of treatment of calf diarrhea are discussed in Service in Action sheet 8.005, and prevention techniques are explained in Service in Action sheet 8.006.