Age of Calf is CRITICAL in Dealing With Scours

BY HEATHER SMITH THOMAS

Gut infections in calves are often a rancher's biggest headache. Each ranch seems to have its own set of problems. And some years are worse for infection than others, depending on weather and levels of calf stress and scour contamination. Some problems can kill a calf even before it has a chance to scour. Some are problem only to newborns; others affect older calves.

Each rancher must learn how to deal with problems unique to that ranch and must become a good judge of calfhood illness to prevent losing calves. Management to reduce contamination can help prevent cases of scours, and learning how to diagnose causes of scours and how to properly treat them can reduce risk of loss.

Age is critical

Many types of scours are most deadly in very young calves. Young calves dehydrate more readily and more rapidly than older calves, and their gut linings are slower to heal. (However, a few kinds of gut infections can be just as deadly to older calves.)

By the time a calf is 17 days old, its gut lining is more able to regenerate itself after a bout of damaging diarrhea, and it takes less time to heal, says Terrebonne, Ore., veterinarian Heidi Smith. Also, by the time a calf is that old, it's more able to handle several types of scours that can be deadly to a very young calf. The same diarrhea that would be an emergency in a 2- or 3-day-old calf is usually not so serious in a 3-week-old calf. It may still need doctoring, but it should be better able to fight off infection without as much gut damage or risk of serious dehydration.

If pastures are contaminated, many calves will start to scour at about 3 weeks of age. At this time, temporary immunity gained from the colostrum is wearing off, so the antibodies from colostrum are no longer protecting the calf.

This temporary immunity may wear off sooner if the calf didn't nurse the cow soon enough or if it didn't get enough colostrum when it first nursed. Temporary immunity can also wear off sooner if the cow's colostrum was not very rich in antibodies, as is sometimes the case if the cow had poor immunity, was underfed or was a first-calf heifer (a heifer's colostrum is generally not as rich in antibodies as that from a cow).

Once the temporary (passive) immunity from colostrum is gone, the calf must build its own immunity as it comes into contact with various pathogens.

Importance of colostral antibodies

The best weapon against scours is prevention. We can minimize calf risk by maintaining a good health program for the cows, says Salmon, Idaho, veterinarian Robert Cope. "A cow in poor health or nutritional state will never furnish her calf good colostrum, its first line of defense against disease.

"Stockmen can also vaccinate the cow with Scourguard," he says, so she can give her calf antibodies against rotavirus and coronaviruses, two of the most common causes of calf scours.

Cope says these two viruses "do not stimulate a pronounced immune response from the cow naturally or by vaccination. This is why cows carry these viruses in their bodies year after year. It also explains why vaccination doesn't always produce an extremely protective response.

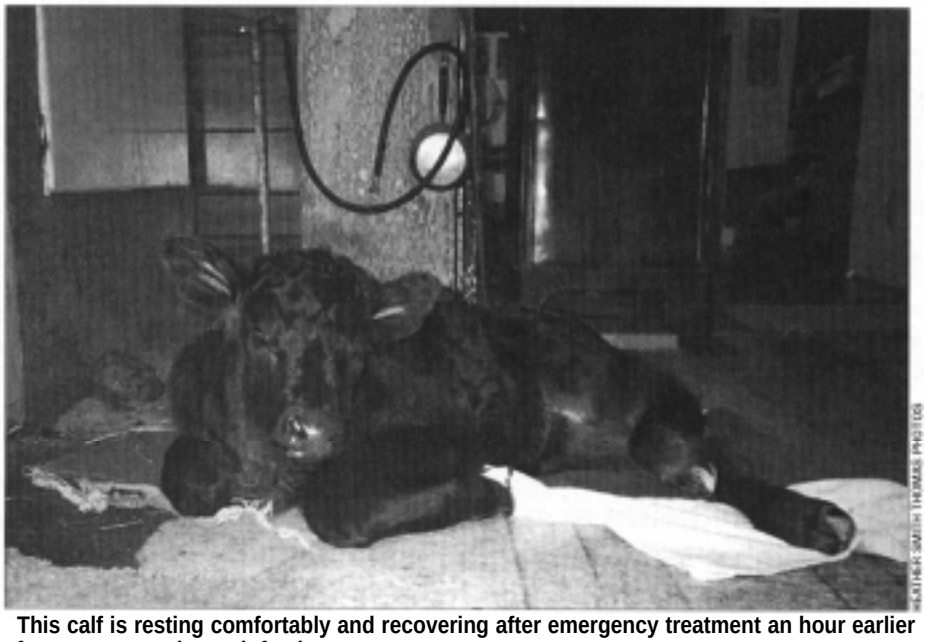
"Anything that may interfere with the cow's immune system will keep her from making a protective level of antibodies in colostrum," Cope continues, adding that in his region, the two biggest hurdles to good colostrum production are bovine viral diarrhea (BVD) and nutritional deficiencies.

"Low levels of energy, protein or trace minerals in the diet will suppress the immune system and result in low antibody levels in colostrum," he says.

Even if a cow has good colostrum, if the calf doesn't nurse soon enough, it doesn't get the benefit of those antibodies, since they can't be absorbed once the pores in the intestinal lining start to close (see "Beef Logic," page 104). A calf that nurses several hours after birth may get only a fraction of the protection it needs.

This pore-closing process "occurs much more rapidly in calves that are chilled," says Cope. "Calves born outside on a cold night need their colostrum almost immediately."

To protect against viral infection, "it's



This calf is resting comfortably and recovering after emergency treatment an hour earlier for an acute toxic gut infection.

essential every calf gets good colostrum. The levels of antiviral antibodies produced in response to Scourguard are protective only against the viruses that are ordinarily shed by mature cows," he says. If a calf gets sick with rotavirus or coronavirus, "it will shed millions of viral particles in every squirt of diarrhea. Immunity conferred by use of Scourguard will be utterly overwhelmed in the face of exposure of this magnitude.

"Vaccination in the face of an outbreak will have no effect if the calves remain in a pasture where calves have been scouring," says Cope. "Thus it is vital that every calf get a sufficient amount of colostrum to prevent the outbreak from getting started."

Bacterial scours, often caused by various types of *E. coli,* he says, are much harder to prevent by vaccination. *E. coli* of the K99 subtype (for which vaccine can protect against only four) are the most common, "but they are not the only *E. coli* capable of infecting baby calves. There are literally thousands of different types of these bacteria that can cause disease," says Cope. Sanitation is the best means of prevention.

A mixture of castor oil and neomycin is administered through the nostril using a tube to prevent this calf from going into shock due to an acute gut infection.

Treating a problem

Any calf scouring under 2 weeks of age should be a high priority for quick doctoring. They have the most trouble fighting off infection and are hardest to save if neglected until the situation is critical.

By contrast, a 3-week-old calf may not even need doctoring, depending on how it feels and whether it keeps nursing. If it's strong, hard to catch and continues to nurse, it may bounce back on its own. But if a calf is dull, not nursing and not feeling good, it needs supportive treatment (fluids, electrolytes and medications to soothe and slow the gut) to enable it to recover more quickly, advises Smith.

The "feel good" test is often a good clue as to whether an older calf actually needs doctoring or not. The "udder check" is a clue as to whether younger calves are about to break with scours, she says. Many times a calf will go off feed before it shows signs of diarrhea. If you start doctoring it early, it will scour less severely and for less time.

Diarrhea in young calves can be caused by viruses, bacteria or protozoa. Proper antibiotics can help a calf fight bacterial scours, but are of little value in viral diarrhea, coccidiosis or cryptosporidiosis.

The most important treatment for any type of scours is to replenish the fluids and body salts the calf is losing. If given soon enough and often enough (before the gut is severely damaged or the calf dehydrates), oral fluids will be adequate — 1-2 quarts (qt.) given by stomach tube or esophageal feeder every 2-6 hours. The younger the calf, the more rapidly it can dehydrate, so the more often it needs fluids.

If the calf is already severely dehydrated or the gut is too damaged to absorb fluids, administer fluids by different route, such as intravenously (IV) or even by injecting sterile fluid under the skin (where it is absorbed nearly as fast as an IV).

Some of the best drugs for treating scours have been taken off the market, "but we still have some effective weapons against scours," says Cope. "The two most used antibiotics in our area are neomycin and Tribrissen."

Liquid neomycin is easy to add to oral fluids and gets to the site of the problem faster than pills, he explains. "Also, it's not absorbed from the intestinal tract, so it stays in the gut where it can do the most good.

"Tribrissen contains a sulfa, and when using any sulfa you must maintain good hydration," warns Cope. "Sulfas in high concentration in the bloodstream can cause irreversible kidney damage."

If treatment with Biosol (neomycin) or Tribrissen is not effective, Cope recommends culturing a sample of feces from a calf that has not yet been treated. "Then we can hopefully find an antibiotic that will be effective," he adds.

Treatments for scours will vary from ranch to ranch, says Cope. "It is important to find an antibiotic that works, either by culture sensitivity or trial-and-error, and stick with it."

He cautions against overusing and mixing antibiotics. While some drugs work well in combination, such as sulfa and trimethoprim, it doesn't always work to "throw the whole drugstore" at a scouring calf. Some antibiotics counteract the effect of others, and some don't work well for intestinal infections.

Cope reminds stockmen that after any aggressive antibacterial therapy, probiotics are useful to repopulate the normal intestinal bacteria essential to proper digestion.

Different bug for different age group

Most types of scours become less serious the older the calf because they are better able to fight them off and to recover more quickly. There are several exceptions, Smith says.

Coccidiosis, caused by a protozoa, can be very debilitating in older calves. The protozoa's incubation period in the gut is 16-30 days, so symptoms don't appear in very young calves. Therefore, you won't see evidence of coccidiosis until calves are several weeks old.

If calves are in a contaminated environment — such as small pastures or

CONTINUED ON NEXT PAGE

feeding grounds where there is a lot of manure, with wet weather giving ideal conditions for spread of coccidiosis -you may have an outbreak of watery brown diarrhea in calves, with some blood in the feces. Cattle develop immunity after being infected, says Smith, "but calves exposed for the first time may develop severe infection and diarrhea."

Antibiotic treatment is no help, since the life cycle of the protozoa has already run its course by the time diarrhea begins. But supportive treatment, such as fluids, can help if diarrhea is severe. Other calves in the group can be protected by medicating before they show symptoms. The best preventive is a clean environment.

Acute toxic gut infections

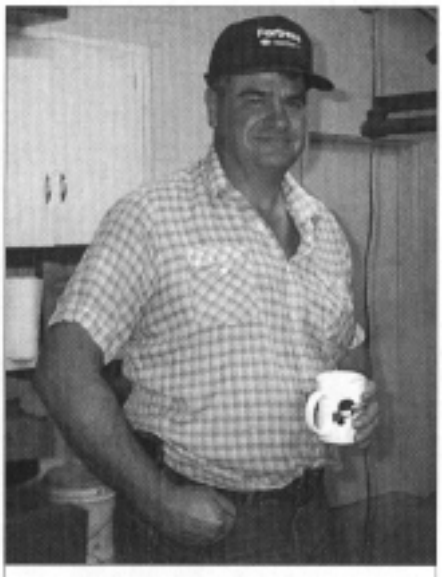
Several types of acute bacterial gut infections can be just as deadly in a 2-month-old calf as in a 2-week-old calf. Examples include enterotoxemia caused by clostridial bacteria and certain acute infections caused by various strains of *E. coli* or other bacteria. The problem with these acute infections is that the bacteria produce deadly toxins.

Cope explains that "like other gram-negative bacteria, *E. coli* can contain poisons within the cell wall. When the bacteria die and decompose, these endotoxins are released." Once the toxins get into the bloodstream, which they do as soon as they damage the gut lining, they cause poisoning throughout the calf's body. The result is general toxemia and damage to vital organs; the calf goes into shock and can be dead in a few hours, or the toxins may create a sudden and severe general weakness, similar to food poisoning in humans. The calf becomes wobbly and is soon too weak to stand, even though it is not yet dehydrated.

If you experience acute and deadly gut infections in calves 3 weeks to 3 months old (this is the usual time — after protection from colostrum has worn off), you must try to determine the cause, Clostridial infection with *Colostridium perfringens* (traditionally called enterotoxemia by stockmen) can be prevented with vaccination or treated with antitoxin.

"This type of bacteria produces potent exotoxins while the bacteria is still alive," says Cope. Calves are affected so quickly they usually die before diarrhea occurs. Thus, most stockmen who experience this problem choose to vaccinate against it.

There are no preventive vaccines for acute and toxic *E. coli* infections, since there are so many different strains. *E. coli*



"It is important to find an antibiotic that works, either by culture sensitivity or trial-and-error, and stick with it."
— Robert Cope, DVM

antitoxin or antiserum may be of some help in treating an acute case since these products are less strain-specific than the vaccines, according to Smith.

For acute gut infections that cause colic and/or bloat in calves 3 weeks to 3 months old, Smith suggests treating immediately with a liquid neomycin-sulfate solution, given orally in conjunction with 4-8 ounces (oz.) of castor oil. The neomycin combats the acute infection and the castor oil stimulates the shut-down gut to start working again and also tends to bind with (and neutralize) some of the toxins.

"Without the castor oil, these calves would soon go into toxic shock because the gut has quit working and the toxins damage the gut lining and get into the blood stream," she says. Once a calf is in shock, the only way you can save it is with large amounts of IV fluids and medications, such as Dexamethasone, to help reverse shock. If kidneys and other internal organs are not yet damaged by the toxins, you may save the calf.

Problems to young calves

The protozoa cryptosporidia can cause diarrhea in baby calves. The oocysts are shed in the feces of infected animals. Outside the host, they lie dormant until ingested by an animal eating contaminated feed or suckling a dirty udder, says Smith. In the intestine, the oocysts release sporozoites that attach between the cells of the lining and begin to multiply.

"As they disrupt the cell wall, damage to the intestine interferes with absorption of nutrients and fluid, and the calf exhibits severe diarrhea," she says.

Calves 5-20 days old are most susceptible to cryptosporidiosis. They may resist infection if their immunities are strong; develop mild infection that is self-limiting (with the calf recovering in a few days); or die soon after infection, says Smith. The calf's fate seems to depend on its age and immunity level. The older the calf, the more resistance it has because of its more mature immune system.

Cope says cryptosporidiosis can be difficult to tell from other types of scours because "it almost always causes disease in the first weeks of life." He adds there is some evidence that if this type of scours is severe, it is usually secondary to another disease — such as BVD infection — in the cow herd that lowers immunity and causes poor antibody levels in colostrum.

Deadly bacterial scours in newborns

Some bacterial infections can strike within 24 hours of birth (sometimes in the first 2-3 hours) and can be very devastating. There are no vaccines against some of these pathogens, and some can create scours before the calf has a chance to benefit from colostrum. In a herd with this problem, cases can often be prevented by giving every calf an oral antibiotic (such as trimethoprim-sulfa) within I-2 hours of birth, says Smith. Furazolidone (originally a preparation for treating scours in newborn pigs) was very effective for this, but was taken off the market a few years ago, so stockmen now use other products.

Veterinarians at the Caine Veterinary Teaching and Research center, University of Idaho, explain that most commonly used antibiotic liquids and scour pills will not work on this particular type of scour; tetracyclines, neomycin and the sulfas in pills and liquids will not halt this infection. If your favorite antibiotic is not working, they recommend asking your veterinarian to do a culture and antibiotic-resistance test to find a drug that would be helpful.

Editor's note: Product recommendations in this article are those of the veterinarians used as sources. Other products (antibiotics and vaccines) are also available. Please consult your local veterinarian for product recommendations specific to your locale and "bug(s)."