

BEEF ANIMAL HEALTH

Neonatal Calf Scours and Fluid Therapy

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The newborn calf has many challenges to face as it begins live on its own. The first of these challenges is a change in environment. If a calf can get beyond the challenge of finding its feet and finding mom's teat, there is a good chance it will be able to handle life. However, some challenges won't manifest themselves until later in the calf's life. The first of these is enteric disease (scours).

The cause of calf scours is usually fairly easy to diagnose. Most of it is based on calf age at onset, because a calf is exposed the day it is born, and different bugs have different incubation, or prepatent, periods. For instance, the incubation period for coccidia (protozoal parasite) is about 3 weeks, therefore, it is unlikely that a 1 week old calf will have scours due to coccidia infection. Therefore, how you treat scours should be based on calf age and the likelihood of the pathogen causing the disease. Oral antibiotics will only work with reasonable efficacy in cases of bacterial scours, usually caused by *E. coli*. In the case of coccidial scours, a coccidiostat, such as amprolium (Corid®) would be the appropriate anti-infective. In the case of cryptosporidium, there is no perfect anti-infective, however, sulfa drugs have had some positive therapeutic effects. It is very important to keep in mind that sulfa drugs are excreted from the body through the urine. If the calf is not properly hydrated, there is potential for accumulation of the sulfa drugs in the kidney and potentially kidney damage or failure.

ORGANISM AGE OF ONSET FREQUENCY

- *E. coli* 0-5 days Common
- *Clostridium* 0-21 days Rare
- Rotavirus 4-14 days Common
- Coronavirus 7-30 days Common
- *Salmonella* 7+ days Rare
- *Cryptosporidium* 8-16 days Common
- *Coccidia* 21+ days Common

As with most biological systems, there will be some variation in age of onset based on the pathogen load the calf is exposed to, as well as the innate capabilities of the calf's own immune system to fight infection. The exception to this is cryptosporidium. Calves will start to scour 8 to 16 days of age, and if the first calf starts to scour on day 11, all the sick calves will start to scour right around day 11.

Finding an effective anti-infective to treat calf scours isn't going to save calves, however. More often than not, it's not the infection that kills the calf, it is the acidosis and hypovolemia (low blood volume) from dehydration that results in calf mortality (death).

Dehydration is probably one of the two most important factors of calf morbidity and mortality related to calf scours. Most producers are not nearly aggressive enough with fluid therapy in scouring calves. Tube

feeding once or twice a day with an electrolyte solution isn't nearly sufficient. So, how much fluid should a scouring calf receive in 24 hours? Let's have a look.

Let's say you've got a 100 lb (50 kg) calf with coccidiosis. The calf is listless, depressed, its eyes are sunk in, and it has a skin tent, in other words, when the skin is pulled away from the neck, it does not snap down quickly, as it normally would. We would guess that this calf is about 10% dehydrated. At 50 kg of body weight, and 10% dehydration, this calf will require 5 liters of fluid just to replace its current deficit. The calf will also need about 2.5 to 5 liters of fluid a day for normal maintenance, and then there are the current losses (scours) that have to be accounted for. So, all told, a scouring calf that is 10% dehydrated will need approximately 8-11 liters of fluids in the first 24 hours of therapy! This calf should be tube fed 4-5 times, instead of the typical 2 times. It is important to remember that a calf stomach, on average, can hold up to 2.3 gallons, so if you are operating under a tight schedule, you may be able to tube the calf 3 times a day at 3 liters per feeding.

It is also important to note whether or not the calf is still nursing. A calf that is 10% dehydrated is not likely to be eating, but one that is eating will be meeting some of its fluid requirements through the cow's milk. Also, if you have to tube feed a calf milk replacer, because it's not eating, it is a good idea to wait 2 hours before you tube feed any electrolyte solution (the bicarb in the electrolyte solution will disrupt clotting and normal digestion of milk in the calf's stomach).

When a calf has scours, it is also losing its body's store of bicarbonate. Bicarbonate is the body's "buffer", in other words, bicarb is responsible for maintaining normal blood

pH. If a large enough quantity is lost, the calf's blood pH will drop (acidemia). There are several compensatory mechanisms built into the calf's body for dealing with a finite level of acidemia, but when the system is overwhelmed, the calf dies from heart failure. Therefore, when choosing an electrolyte product for treating a scouring calf, it is VERY important that there is bicarbonate in the electrolyte solution. Read the ingredients on the label, and look for some form of bicarbonate. You can also mix up your own electrolyte solution with baking soda and corn syrup. This solution won't have all of the other necessary electrolytes that a branded solution would have, but it works well in a pinch.

Another important electrolyte that is lost with scours is potassium. Loss of potassium occurs during compensation for acidemia, and low potassium levels (hypokalemia) is the cause of heart failure in scouring calves. Therefore, it is a good idea to supplement potassium, if possible, to scouring calves.

In summary: it is important to remember that you can't over-hydrate a scouring calf. Water and bicarbonate are the two most important components of fluid therapy, and an energy source will help get a sick calf back on its feet.