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The Use of Oral Electrolytes for Calves

Scouring calves can be a significant challenge on many farms. Not only can this be a cause of pre-weaning mortality, but sick calves that scour are also costly in terms of treatments and valuable time spent tending to them.

It is imperative that all farms have procedures and protocols to try and minimize stressors that cause diarrhea like bacteria, viruses, parasites, and nutritional inconsistencies. However, it is just as important for protocols to be put in place to identify and treat calves with scours and to know when to intervene with oral electrolytes. The sooner sick calves can be identified and treated, the more likely it is for the calf to have a quick recovery.

Calves with diarrhea lose hydration quickly, which consequently causes the loss of important electrolytes. This affects the calf's health as common side effects of diarrhea include metabolic acidosis and hyperkalemia. Metabolic acidosis is the scientific term for an imbalance in the acid-base equilibrium of the calf causing a drop in blood pH (due to loss of sodium). Common symptoms we see associated with metabolic acidosis include loss of suckle reflex, weakness, and the inability to stand. Hyperkalemia is the scientific term for elevated potassium levels in the blood. This often occurs in conjunction with low blood pH (acidemia). Abnormally high potassium levels in the blood can lead to depression, weakness, and heart arrhythmias. Both acidemia and hyperkalemia are common reasons for death in scouring calves, but with the use of oral electrolytes we can help minimize the impact of these metabolic complications.

When to use oral electrolytes?

The first sign of a calf getting sick before exhibiting symptoms, will be a reduced drinking speed. Robot feeders will have settings to identify calves that have lower than normal drinking speeds, but physical signs include calves chewing on the nipple of the bottle or calves sticking their noses in the bucket of milk but not drinking aggressively. If you identify calves at this early stage of sickness, then start supplementing with oral electrolytes. Early identification and treatment can help reduce the severity of the clinical illness. However, if early signs are missed and you identify a calf that is now sick and scouring, you must do a quick assessment to determine the best course of action. Calves that are greater than 8% dehydrated or those that cannot stand likely need more intensive treatment with intravenous fluid therapy. At this point, oral electrolytes could not be sufficient due to the amount of fluid loss the calf has experienced.

If we can identify that the calf is less than 8% dehydrated, we can still use oral fluids as part of our treatment plan. The guide below can be used to help determine the level of dehydration a calf is experiencing.

Level of Dehydration	Attitude	Skin Tent (sec)	Eye Recession
<5%	Normal, bright, alert	<1	None
6-8% (Mild)	Slightly depressed, reluctant to stand	1-2	Slight
8-10% (Moderate)	Depressed, inability to rise	2-5	Obvious
>10% (Severe)	Comatose	5-10	Very recessed

To evaluate hydration using skin tenting, pinch a fold of skin along the neck and count the seconds it takes to flatten. Flattening of skin in less than 2 seconds indicates normal hydration. If the skin takes 2 to 5 seconds to flatten, the calf is about 8% dehydrated. Over 5 seconds indicates severe dehydration. Gums can be evaluated by looking at their colour and feeling them for moisture. Normal gums should be pink and damp but if gums are white and dry this indicates 8 to 10% dehydration.

When reaching for oral electrolytes it is very important to know that not all electrolytes are the same. Calves have very specific requirements that differ from those of an adult ruminant.

What makes a good electrolyte for calves?

Here is a guide to the important properties in oral electrolytes for calves:

- 1) **Sodium** – is an electrolyte. It must be used to replace the sodium lost when calves scour. Too little sodium is ineffective but too much and the calves can become even more dehydrated. Ideal levels of sodium should be included at 80-130 mEq/L.
- 2) **Dextrose** – is an energy source. It is absorbed on a one to one ratio with sodium and therefore can help with sodium reabsorption. However, too much dextrose can actually draw water out of the calf, making dehydration worse. Dextrose should not be included at any more than 200mmol/L. Note that high energy electrolyte formulations often have more than 400mmol/L of dextrose, which is not good for scouring calves.
- 3) **Glycine** – is a non-essential amino acid that helps facilitate intestinal absorption of sodium, dextrose and water. If glycine is not present in the electrolytes you use, then it is not likely meant for calves and it will not be as easy for calves to reabsorb essential metabolites like sodium and dextrose. Usually glycine is incorporated at around 45mmol/L.
- 4) **Acetate** – is essential to help decrease metabolic acidosis and can also provide energy to the calf. Bicarbonate is also another common alkalinizing agent but is not as good as acetate as it is not utilized as an energy source and it can interfere with milk digestion. Acetate should be included at 50-80 mmol/L.

I would recommend that you look at the label of the electrolytes you use for calves to see if these components are included at appropriate rates. Not all electrolytes serve the purpose of correcting calf specific metabolic imbalances.

Recap!

When is the best time to give oral fluids?

As soon as the calf's drinking speed is slower than normal and/or if the calf does not finish its entire milk feeding.

Why should you give oral electrolytes?

- a. To replace lost fluid in ill or scouring calves
- b. To correct acid-base and electrolyte abnormalities.
- c. To prevent calves from becoming even more severely ill or needing IV fluid therapy

What should be in electrolytes that we feed to calves?

- a. Sodium – 80-130 mEq/L
- b. Dextrose – no greater than 200 mmol/L
- c. Glycine – ~45mmol/L
- d. Acetate – 50-80 mmol/L

Our main goal should be to try to prevent scouring in calves through best management practices. However, it is inevitable that some calves will get sick. When this happens, it is important to use the correct tools for effective and fast treatment. Knowing when to use oral electrolytes and picking the correct one can make a significant difference to the recovery of scouring calves.

Chelsea Allen DVM

New Vet Announcements!

Dr. Niki Alsop

Niki is a 2020 Ontario Veterinary College graduate. Becoming a Large Animal Veterinarian has always been a goal of hers. Niki grew up on a dairy farm outside of Feversham, *Glenwin Holsteins*. She has always been active on the farm, from helping with chores, to milking, and managing the calves. Through her work on the farm, and at school, she has grown a keen interest in dairy production, genetics, and calf management. Niki is looking forward to being able to help and learn more with our clients in those areas. Though she needed to leave her old 4-H cows, and pet cows at home, she is excited to be moving to the Listowel area!



Dr. Paige Gamester

Paige hails from beautiful Prince Edward Island and is a 2018 Atlantic Veterinary College graduate. She has practised as a large animal ambulatory veterinarian since graduation and has a particular passion for dairy herd health management! She also has special interests in small ruminant and camelid herd health, and small flock poultry medicine. Paige is an avid outdoors, yoga, and food (especially seafood!) lover! Paige is excited to meet everyone!



Please help us make Niki and Paige feel welcome!

Veterinary Services During the COVID-19 Pandemic

Much has changed with the alarming presence of the COVID-19 virus in Ontario. During this time, it is important that we maintain a safe food supply. Our veterinarians will continue to play a role in animal health, welfare, and food safety. At the time of this writing, we are still providing herd health and emergency service. In response to the pandemic, our clinic is taking many precautions to ensure everyone's safety. We care very much about the health and wellbeing of our clients, staff, families and community. Below are some of the changes we have implemented. Please be aware that as this pandemic develops, we may have to adjust our procedures in response.

Veterinary farm visits

- Vets will be contacting farmers before our arrival to the farm to assess the level of risk, the comfort of both parties and to clarify our expectations for social distancing
- Once on farm, we will be wearing gloves during the visit and try to maintain a distance from people of at least six feet wherever practically possible
- Care will be taken to wash and disinfect hands and contacted tools and equipment before re-entering our vehicle

Technician farm visits

- Techs will continue to assist veterinarians as necessary. The same precautions as above will apply
- Technicians will continue to provide services, such as dehorning, but we ask that no farm personnel are in the immediate vicinity during their visit

Clinic procedures

- Our clinic will remain open, but business hours may be subject to change
- Clients will be met at the door by one of our customer care representatives
- Purchases will be set out at the door
- Laboratory samples will be received at the door

We thank you for assistance in helping us continue to provide veterinary care while considering the health of yourselves and our staff.

Stay healthy!