

CALVING EASE

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Dehydration in Milk-fed Calves

Severe dehydration is not difficult to detect. Eyes are sunken, ears are cold, and calf is depressed and often unable to stand. Even if these calves do not die, they take a long time to recover.

However, we should think of mild dehydration as a silent enemy. Substantial body fluid losses (up to six percent of a calf's body weight in fluid) can occur before we see any "signs" of dehydration. We want to begin fluid therapy at this stage before the dehydration process gathers momentum.

Our diagnostic challenge, therefore, is to become proficient at picking out calves that are in the early stages of losing more fluids than they are consuming. Then, fluid therapy can begin early enough to prevent the problems caused by severe dehydration.

A Brief Review of Types of Water Loss

"In healthy calves, large amounts of water are regularly secreted into the small intestine to help digest and absorb nutrients. Most of this water is recovered as the nutrients are digested and absorbed. Nearly twice the total volume of water in an animal's body cycles into and out of its digestive tract each day." (Costello)

However, if this secretion-reabsorption process breaks down, the calf has a net loss of water through her feces. Rob Costello describes three major types of water losses. One type of breakdown is **increased permeability**. This is commonly caused by viruses (rotavirus, corononavirus) and protozoa (cryptosporidia, coccidia). These microbes cause inflammation and damage to the intestinal mucosa. That allows increased water leakage into the intestine.

Hypersecretion is a common type of water loss. Bacteria give off toxins. These toxins stimulate the release of substances that draw water into the intestine. Among young calves, the most common cause of this water loss is coliform bacteria, especially *E. coli* bacteria.

Malabsorption. Pathogens can damage the lining of both the small and large intestines. In the small intestine, normal amounts of water may be secreted to promote digestion and absorption of nutrients. However, tissue damage can cause poor nutrient and water absorption. This excessively sloppy mix with too many nutrients goes on to the large intestine. These extra nutrients cause additional fluid to be drawn from the body. Additional tissue damage reduces

fluid absorption making the feces even looser. It is common for calves to lose water by all three routes, (Malabsorption, Hypersecretion, Increased Permeability) at the same time.

Once the calf begins to draw down her plasma pool through these three mechanisms of fluid loss, her body adds water to the plasma. This water comes from inside cells. “In other words, plasma volume is maintained as the expense of cellular fluids.” (Costello) In very early stages of dehydration, we don’t see any changes. But, in more severe dehydration the tissues shrink, eyes become shrunken, and skin seems dry and wrinkled.

Practical Tips for Early Detection

The single most important predictor of a dehydration problem is scours or hyperfluidity of feces. All calf raisers learn about degrees of diarrhea. How fluid are the feces? If you can see feces, the “Poop patrol” criteria are straightforward.

1. Pile = not likely to be a problem
2. Puddle = need to watch closely, mild dehydration likely
3. Fluid = dehydration almost certain

A second predictor of dehydration is a change in eating behavior. The calf that normally cleans up her milk with enthusiasm changes. Now, she is fussy and fails to drink all of her milk. These signs tell us to check her out very carefully for diarrhea – a slightly soiled tail and/or very fluid feces easily escape detection.

A third dehydration predictor is a change in overall behavior. Normally, the calf may charge the milk pail at feeding time. In addition, she is alert, bounces around, and runs. Today, she is a bit slow in getting up. She is less than enthusiastic about drinking milk. Or, she looks “off.” That is, she lacks brightness of eye, ears are not forward and up, she has a “slouch” posture.

Water – The Key to Hydration

Free choice water should always be offered to calves. Especially among calves with limited water losses, having water constantly available may be our least expensive therapy. Just replacing a milk feeding with the same volume of an electrolyte solution does nothing to restore a calf’s fluid balance.

Choosing the most effective electrolyte solution is properly the subject of another newsletter. You may wish to go to <http://www.calfnotes.com> and read Calf Note #23 Feeding Scouring Calves and Calf Note #43 Electrolytes for Scouring Calves.

Reference: Costello, Rob (Technical Specialist for Merrick’s) “Electrolyte and Water Balance.” Constable, Peter “Diagnosis and Treatment of Neonatal Calf Diarrhea” Proceeding of Dairy Certificate Program, Univ. Guelph, 2004 “Clinical and laboratory assessment of hydration status of neonatal calves with diarrhea” JAVMA Vol.12, No.7,1998.

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