The Colostrum Counsel

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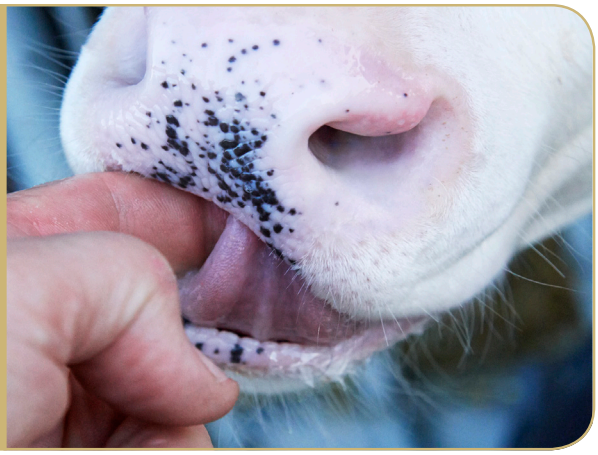
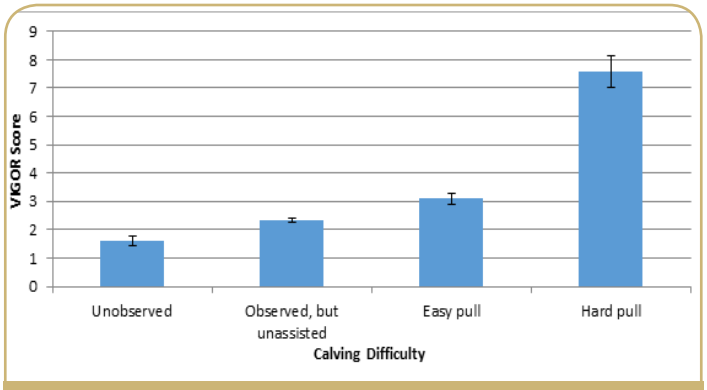
EFFECTS OF CALVING DIFFICULTY ON NEWBORN CALF VIGOR

Following a difficult birth calves have reduced vigor and motivation to consume colostrum, having long-term consequences for calf health. Studies show that administering a non-steroidal anti-inflammatory drug following birth shows considerable promise for the improvement of calf vigor and health.



Newborn calves suffer from pain and trauma following a difficult birth, which may have long-term consequences for health and productivity. University of Guelph researchers, Drs. Christine Murray and Ken Leslie, have developed an on-farm tool to assess birth trauma in the newborn calf. Similar to the Apgar score for newborn human babies, the calf VIGOR score uses easily observable and measureable signs that can indicate distress in the newborn calf. These signs include: **V**isual appearance of the calf, notably, swollen head or tongue and the degree of meconium staining; **I**nitiation of movement after birth; **G**eneral responsiveness to stimuli including straw in the nasal cavity; **O**xygenation of the calf by noting the colour of the mucous membranes; as well as heart and respiration **R**ates. Note that the first letters of these signs make up the word VIGOR.

Calves may suffer from a wide range of problems following a difficult calving, including injury and pain from rib fractures and compression of the skull in the birth canal, acidosis from an inability to regulate respiration, and a reduced ability to maintain a normal body temperature. The signs included in the VIGOR score have been chosen to help producers identify calves that may be suffering from these issues. The results of this research suggest that the VIGOR score is an excellent indicator of the degree of trauma experienced at birth, and is associated with the future health and growth of the calf. As such, this tool can help producers figure out if a calf needs extra assistance following birth to improve health and performance.



This graph shows the effect of calving difficulty on newborn vigor (higher VIGOR score indicates a lower state of vitality)

When calves are suffering from trauma and pain after a difficult calving, they are less motivated to stand and suckle. In one of our recent studies, we found that calves born following calving difficulty were more acidotic and took longer to attain sternal recumbency and stand, compared to calves born unassisted. If the calf is not able to get up in a timely manner following birth, this may lead to a delay in colostrum intake. Thus, calving difficulty is a major cause of failure of transfer of maternal immunity. Furthermore, the effects of calving difficulty on blood pH have been shown to impair immunoglobulin absorption. Calves suffering from acidosis following birth may not absorb immunoglobulins as efficiently as calves with a normal blood pH.

There are many standard interventions, such as

artificial respiration, that have been developed to help producers improve the vitality and reduce the risk of failure of passive transfer, morbidity and mortality in calves. A more novel method that has been tested in this research is therapy for pain and inflammation from non-steroidal anti-inflammatory drugs (NSAIDs), such as meloxicam. Through this research, giving meloxicam to calves at birth has proven to have many benefits including improved calf vigor, suckle reflex, milk intakes and overall pre-weaning health. Furthermore, meloxicam treatment to calves born from assisted births had a 1 KG advantage in weight gain in their first week of life. Since NSAID treatment to newborn calves is currently off-label, producers should talk to their veterinarian before administering the drug.

Supervisors for this research include Drs. Todd Duffield, Derek Haley, David Pearl, Doug Veira and Ms. Kathleen Shore. This research is supported by the Agricultural Adaption Council through the Ontario Veal Association, Boehringer Ingelheim Canada and the Dairy Farmers of Ontario.

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Christine graduated with a Bachelor of Science in Agriculture from the University of Guelph in 2010. Following graduation, she went on to pursue a PhD in Epidemiology at the Ontario Veterinary College, Department of Population Medicine, where newborn calf vigor was her focus. Upon completion of her PhD in early 2014, she moved on to the University of Calgary, Faculty of Veterinary Medicine for a Post-Doctoral Fellowship. Here, she investigated management practices associated with the health and vitality of beef calves. Christine is now working full time with Nutreco Canada as a Ruminant Nutrition Research Scientist with a focus on improving calf health through nutritional strategies.

ASK THE EXPERT:

Be Aware of the Limitations of Total Serum Protein

Brix Assessment For Evaluation of Passive Transfer In Individual Calves

The evaluation of serum total protein (STP) and serum total solid values (%Brix) by optical and digital Brix refractometers at 24 hours of life is widely used to determine the presence of failure of passive transfer in calves (FPT, serum IgG at 24h < 10 g/L). A recent study [Deelen SM et.al J. Dairy Sci 2014; 97(6):3838] using 400 calf serum samples demonstrated a high correlation between digital Brix refractometer (% Brix), STP, and serum IgG values, suggesting either method could be used to monitor calves.

It is important to understand that while there is sufficient correlation among the measurements to be useful on a herd basis there are limitations such that both serum protein and %Brix should be used with caution for interpretation of individual calf passive transfer status.

We evaluated 157 serum samples randomly collected from calves that received maternal colostrum and analyzed at Saskatoon Colostrum Company Ltd. (SCCL) for STP, %Brix, and IgG concentration by radial immunodiffusion (RID). As in previous reports, there was a linear correlation between STP, %Brix, and serum IgG (r2 = 0.88 and 0.82, respectively).

Often STP values of 5.5 g/dL and Brix of 8.4% are used as "cut-offs" for predicting adequate passive transfer. Using these criteria most calves are correctly categorized but this was not true for all calves. In the following table are presented some individual values of %Brix, STP, and IgG in serum to illustrate this. Among the data from the 10 calves shown here all have adequate passive transfer (>10 g/L serum IgG) yet all have %Brix less than 8.4% and only one calf serum protein levels of 5.5 g/dL or greater.

%Brix	STP (g/dL)	IgG g/L
8.3	5.2	10.2
8.1	5.2	12.8
8.1	5.1	14.7
8.3	5.1	15.7
8	5	16.6
8.3	5.5	16.7
8.2	5.4	20.6
8.3	5.2	14.5
8	4.7	10.1
8.3	5.3	16.7

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