HOARD'S DAIRYMAN

Diets can be a milk fever defense

Hidden from plain sight, subclinical milk fever's impact rivals that of the clinical disease, on a herd level. Dietary interventions can help us get ahead of the disease.

by Mary Beth de Ondarza

CLINICAL milk fever isn't nearly as prevalent on farms as it was 20 years ago, due primarily to improvements in dry cow nutrition and management. However, issues with subclinical milk fever still plague many dairies. Often, the dairy producer does not realize the costs associated with it.

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Cows with subclinical milk fever have no noticeable symptoms, but they eat less, have reduced rumen and intestinal movement, and have a greater susceptibility to metabolic and infectious disease. Of course, each secondary issue reduces milk production.

Milk fever, also known as periparturient hypocalcemia or periparturient paresis, is low blood calcium. On average, 5 percent of cows experience clinical milk fever (blood calcium less than 5 mg/dL). When blood calcium levels are low, nerve and muscle function is diminished, and the cow goes down and must be treated with intravenous calcium.

It has been estimated that, for every one cow with clinical milk fever, there are probably 10 cows with blood calcium between 5 and 8 mg/dL. A 2002 USDA NAHMS survey of 1,462 cows determined that 50 percent of the mature cows and 25 percent of first-calf heifers had subclinical milk fever within 48 hours of calving.

Subclinical milk fever often lasts for the first full week of a cow's lactation. Although a case of subclinical milk fever costs about 40 percent of a clinical case, University of Wisconsin researchers estimated that, on a herd basis, subclinical milk fever typically costs four times more than clinical milk fever.

Subclinical milk fever depresses intake and rumination, elevating subclinical ketosis. In the USDA NAHMS study, cows that experienced subclinical milk fever had higher serum NEFA (nonesterified fatty acids) showing that they were using more of their body fat reserves, probably due to lower intake. Weak muscle contractions in the rumen and abomasum combined with lower dry matter intake increase the incidence of displaced abomasum.

Subclinical milk fever can also boost metritis, retained placenta, dystocia and uterine prolapses, all of which negatively impact a cow's ability to become pregnant again. First, subclinical milk fever compromises smooth muscle function. These cows also released five to seven times more cortisol on the day of calving rather than the normal three- to fourfold increase.

This extra cortisol furthers immune suppression during the first few days of lactation. Furthermore, immune cells containing insufficient calcium are not activated either. A recent study at the University of Florida determined that, for every 1 mg/dL improvement in serum calcium, metritis risk decreased by 22 percent.

Mastitis is more prevalent in subclinical cows because of reduced immune function and, with low calcium levels reducing muscle function, teat sphincter muscles don't work as well, leaving the teat more open to infection. Cows with low blood calcium levels also tend to lie down more, possibly raising teat end exposure to bacteria.

Excessive Ca loss at root

At calving, cows have an elevated need for calcium to make colostrum and milk. Milk fever occurs when cows don't get enough calcium from their bones and diet to replace calcium lost in milk. Hormones normally work to mobilize calcium from the cow's bones and to improve the efficiency of dietary calcium absorption at calving time.

This keeps blood calcium at 9 to 10 mg/dL. Unfortunately, the actions of these hormones are inhibited when diets with more cations than anions are fed. This alkalinizes the blood, making its pH higher. Adding readily available anions to the diet can reduce blood pH (more acidic) and reverse this problem.

High potassium can reduce the cow's ability to absorb magnesium from the rumen. The normal blood magnesium level is 1.8 to 2.4 mg/dL in cows. Low blood magnesium (less than 1.5 mg/dL) will impair the cow's system from recognizing low blood calcium levels by reducing hormone secretion and sensitivity. This further decreases calcium mobilization and absorption.

Diet makes a difference

Even though you have probably worked on dry cow diet and management to control clinical milk fever, you may need to go a step further to successfully control subclinical milk fever. Good dry cow nutrition and care can reduce the incidence from 50 percent of mature cows down to 25 percent.

Precalving strategies for reducing subclinical milk fever are the same as for preventing clinical milk fever. These include: improving dry matter intake, improving cow comfort, reducing dietary potassium (less than 1.3 percent DM) and raising dietary magnesium (0.40 percent DM). The following should be maintained in the diet: calcium at 0.85 to 1.00 percent DM, phosphorus at 0.35 to 0.38 percent DM, sodium at 0.10 to 0.15 percent DM and sulfur at 0.25 to 0.35 percent DM. A palatable chloride source should also be included in the diet to achieve a urinary pH of 6.2 to 6.8 for Holsteins and 5.8 to 6.3 for Jerseys.

USDA researcher Jesse Goff recommends that dietary potassium be as low as possible, and dietary chloride should be 0.5 percentage point less than dietary potassium. So, if the dietary potassium level is at 1.3 percent DM, dietary chloride needs to be at about 0.80 percent DM. Urine pH should be assessed after two days on the diet to determine if dietary chloride needs to be upped more to adequately acidify urine pH.

Work hard to find low potassium forages to include in the diet and get dietary potassium to less than 1.3 percent DM. Reduce or eliminate hay crop silage in the dry cow diet due to its generally higher and fluctuating potassium content. If dietary potassium is 2 percent, dietary chloride may need to be 1.5 percent to achieve adequate acidification. But, this high chloride level is not desirable since it may reduce dry matter intake.

Cows that eat less before calving typically eat less after calving, reducing overall nutrient intake (including calcium) and compromising rumen function. So, promote dry matter intake with great dry cow management, cow comfort and a great diet. I have had a lot of success with dry cow diets containing corn silage (13 to 15 pounds DM), low potassium hay or straw (4 to 6 pounds DM) and 6 to 7 pounds of grain.

Facilities a priority

Consider recent recommendations from the University of Wisconsin. Avoid overcrowding by sizing the prefresh pen for 140 percent of the three-week average. For example, if cows spend three weeks in the prefresh pen and there are 20 calvings per week, the pen should have at least 84 stalls (60 cows times 140 percent).

Keep a minimum of 30 inches of feedbunk space per cow. Avoid moving a single cow at a time, but, rather, move three to five cows at a time to reduce social stress. In a bedded pack, maintain a minimum of 100 square feet of space per cow. Minimize the amount of time that the cow is in a separate calving pen.

It is typical for a nutritionist to get a phone call about milk fevers and other metabolic problems after more cows have calved than usual. Why? Often, it is because the cows were overcrowded in the prefresh pen so they didn't eat as well. Remember to take care of your prefresh cows even better than the lactating cows to ensure a great lactation.