Texas Dairy Matters

Higher Education Supporting the Industry

Preventing Metritis in Lactating Dairy Cows. Part 3

Juan M. Piñeiro, DVM, MSc, Ph.D.
Extension Dairy Specialist, Department of Animal Science
Texas A&M AgriLife Extension Service, The Texas A&M University System

Guest Author: Gustavo M. Schuenemann, DVM, MSc, Ph.D.
Professor and Dairy Extension Veterinarian
Department of Veterinary Preventive Medicine, The Ohio State University

The cost of a case of metritis in the U.S. is roughly $500 and is mostly explained by the decrease in milk yield and increased treatment and replacement costs[1]. In Part 1 and Part 2 of this article we discussed risk factors predisposing cows to metritis and how to optimize cow comfort, nutrition and feeding management strategies, and employee calving management training to prevent it (Figure 1). Dystocia and twinning increase the risk for metritis and can be controlled through genetic selection and reproductive management. This article will focus on genetic selection and reproductive strategies to prevent metritis.

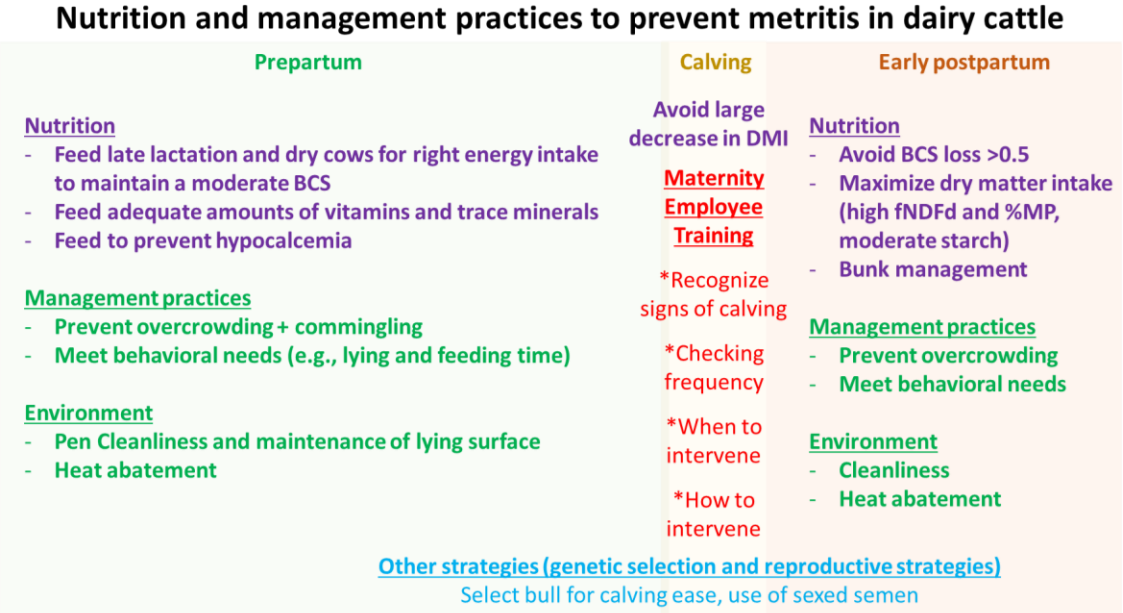

Figure 1. Nutrition and management practices to control risk factors and prevent metritis in dairy cattle.

Genetic selection and use of sexed semen for calving ease

Calf birth weight is the most important predictor for difficult calving with a 13% increase in the odds of dystocia for every 2.2 pounds increase in birth weight. Birth weights above 92 pounds exponentially increase the probability of dystocia and stillbirth[2]. A birth weight of 110 pounds doubles the probability of stillbirth (8%) compared to a birth weight of 87 pounds (4%)[3]. Therefore, to prevent dystocia, calves born from your first-calf Holstein heifers should weigh less than 90 pounds. A study of over 4,500 births showed that the ideal calf's birth weight to dam's weight ratio to prevent stillbirth in Holstein cattle is 7.2%, which would correspond to a calf birth weight of 83 pounds for a 1,150-pound first-calf heifer[3].

When selecting your bulls, consider calving ease traits such as sire calving ease and birth weight if breeding with beef semen. Also, include daughter calving ease if breeding with conventional or sexed dairy semen for replacement heifers. When assessing the Expected Progeny Differences (EPDs) of these traits in beef bulls (or Predicted Transmitting Ability in dairy bulls), also consider the accuracy of these predictions. With the increased use of beef semen in dairies, some young bulls nowadays do not have enough progeny for a reliable prediction. Avoid using bulls that have not been proven and have low reliability for these traits, especially if breeding dairy heifers with pure or crossbred continental breeds.

Most dairy heifers are bred with female sexed semen which reduces substantially the risk for difficult calving since bull calves have a higher risk of dystocia compared to heifer calves (birth weight of male calves is 2 to 7 pounds heavier than heifer calves).

Managing twinning rate in dairy cows

In dairy cattle, successful pregnancy generally results in the birth of one calf. However, birth of two or more calves could occur at a rate of 3% to 5%. Birth of twin calves has been associated with genetic, season, parity (1.2% in primiparous and 5.8% in multiparous), and high milk yield. It has been shown that high milk producing cows have reduced blood concentration of progesterone due to increased metabolism (liver) to support milk yield. Increased milk yield with reduced blood progesterone occurs at 40-60 DIM during selection of the dominant preovulatory follicle. Therefore, cycling dairy cows with reduced blood progesterone at the onset of the breeding program are more likely to experience double ovulations resulting in dizygous twins[4]. In dairy cattle, birth of twins is associated with increased spontaneous abortion, difficulty at caving, hypocalcemia, retained placenta, metritis and culling early in lactation. Therefore, twinning has a negative economic impact in dairy farms that ranges from roughly $60 to $160[5].

Case study of a herd with high twinning rate

A high milk producing Holstein dairy herd (92 pounds per day with 3.5% milk protein, 3.8% milk fat) with an annual 30% 21-day pregnancy rate experienced an increased annual twining rate of 9% for over three years. The reproductive program consisted of a 14-day Presynch starting at 26 days in milk (DIM) followed by Ovsynch 12 days after the second prostaglandin of Presynch with a voluntary waiting period of 55 DIM. About 70% of cows were bred on standing estrus and the remaining 30% of cows were submitted to timed-AI. The following changes were implemented to reduce twining rate from 9% to 4.5% as well as to manage pregnant cows with twins during the transition period:

1) Increase the proportion of cows bred on timed-AI by eliminating heat detection. This reproductive strategy allows most high milk producing cows to develop the pre-ovulatory follicle under the influence of higher concentration blood progesterone; thus, increasing the likelihood of single ovulation.

2) Extend the voluntary waiting period from 55 to 70 DIM to allow cows more time to recover their uterine environment and start breeding cows after the peak milk yield.

3) Cows confirmed pregnant with twins were moved into the prepartum pen with an anionic diet 10 days earlier than the rest of the cows (at 245±3 days prior to calving). Because cows pregnant with twins had reduced gestation length, this management strategy allows on average 10 days of additional exposure to the anionic diet to prevent hypocalcemia.

Acknowledgments

This work was supported by the Agriculture and Food Research Initiative Grant no. 2016-68003-24607 from the USDA National Institute of Food and Agriculture (NIFA-AFRI). Any opinions, findings, conclusions, or recommendations expressed in this presentation are those of the authors and do not necessarily the view of the U.S. Department of Agriculture.

References

[1]Pérez-Báez, J., Silva, T.V., Risco, C.A., Chebel, R.C., Cunha, F., De Vries, A., Santos, J.E.P., Lima, F.S., Pinedo, P., Schuenemann, G.M. and Bicalho, R.C., 2021. The economic cost of metritis in dairy herds. J. Dairy Sci. 104:3158-3168.

[2]Mee, J.F., 2008. Prevalence and risk factors for dystocia in dairy cattle: A review. The Veterinary Journal, 176:93-101.

[3]Johanson, J.M. and Berger, P.J., 2003. Birth weight as a predictor of calving ease and perinatal mortality in Holstein cattle. Journal of dairy science, 86:3745-3755.

[4]Stevenson, J.S., Portaluppi, M.A., Tenhouse, D.E. 2007. Factors influencing upfront single- and multiple-ovulation incidence, progesterone, and luteolysis before a timed insemination resynchronization protocol. J. Dairy Sci. 90:5542–5551.

[5]Cabrera, V.E. and Fricke, P.M., 2021. Economics of twin pregnancies in dairy cattle. Animals, 11:552.