Implementing selective dry cow therapy

Michael Capel, DVM
Perry Veterinary Clinic,
Perry, NY 14530

Abstract

Veterinarians play a critical role in the judicious use of antimicrobials on farms. The treatment and control of mastitis accounts for approximately two-thirds of all antimicrobial use on the dairy farm. Cow, management and farm level factors can be used to identify the risk of subclinical infection at dry off or the likelihood of subclinical or clinical infection during the dry period and can thus be helpful in determining when antimicrobial use is appropriate and when it is of lesser importance. There is an opportunity for veterinarians to make a major impact on antimicrobial use by adopting a selective approach to their inclusion in dry-off protocols.

Introduction

Blanket dry cow therapy has been shown to decrease intramammary infections (IMI) during the dry and early fresh period as well as decreasing somatic cell count (SCC) at dry off. The National Mastitis Council five-point plan, developed in the 1960's, cited blanket dry therapy as a critical component of achieving excellent milk quality.[1] Since that time, blanket dry cow therapy has been one of the most widely adopted veterinary recommendations on the dairy farm. In the 2014 National Animal Health Monitoring Service Health and Management Practices survey, it was found that 80% of dairy operations in the U.S. employ the use of blanket dry cow therapy and blanket dry cow therapy is used on 93% of U.S. cattle.[2]

Selective dry cow therapy (SDCT) is the targeted use of antimicrobials at dry off on dairy cows that are at higher risk for subclinical or clinical IMI infection, while minimizing their use in cows that are at a low risk for IMI infection. The overall udder health of the U.S. dairy herd has improved dramatically since the time when blanket dry cow therapy was advocated as a routine procedure. The percentage of negative quarter level cultures at dry off has increased from 44% in 1985 to between 73 and 95% in the last decade and there has been a decrease in the prevalence of contagious mastitis pathogens as well as a reduction in bulk tank SCC.[3] Blanket dry cow therapy as a herd level management tool becomes less important as udder health continuous to improve, thus increasing the opportunities for successful adoption of SDCT.

Establishing risk of subclinical or clinical IMI infection

Accurately identifying cows that are at risk for subclinical or clinical IMI at dry off is a critical component in the successful adoption of SDCT. When using SDCT, cows that are at a high risk for IMI infection receive an intramammary internal teat sealant and antibiotic infusion at dry off while cows at low risk for IMI infection are only infused with an internal teat sealant. Methods for determining risk should be inexpensive, accurate and rapid to be practical for use on the dairy.

Early SDCT protocols determined IMI risk using cow-side tests that directly or indirectly evaluated SCC.[4,5,6] This approach achieved varying degrees of success with on-farm factors and limited cow level data leading to inadequate information to establish risk. Composite milk culture has been shown to be an effective method for identifying risk of IMI at dry off. Selective dry cow therapy protocols using culture to establish high and low risk have demonstrated significant reductions in antimicrobial use with no negative impact on IMI infections.[7,8] A culture-independent approach using on-farm cow level disease and DHIA data was developed as an alternative tool for assessing risk level.[3] Risk was determined by looking at lactation somatic cell and clinical mastitis history in addition to evaluating milk at the time of dry off for each cow. Using this approach to identify low risk cows suitable for infusion with only an internal teat sealant resulted in a 60% reduction in dry-cow antibiotic use with no adverse production or health outcomes. Additional work using an algorithm-based approach and a culture guided approach for SDCT, as compared to blanket dry cow therapy, demonstrated no negative impacts on dry period IMI cure risk, new dry period IMI and early lactation IMI cure risk in the subsequent lactation while decreasing antimicrobial use by 55%.9

While research has established that individual animal somatic cell, clinical mastitis history and culture data can be used to make cow level decisions of IMI risk when adopting SDCT, this information is not available for all farms. Additionally, specific cow-level risk factors may exist that increase IMI risk such as poor udder or teat confirmation and lameness. The herd veterinarian should work closely with the farm to develop easy to follow reliable methods of determining individual animal IMI risk to provide a consistent approach to adopting SDCT.

Herd level risk factors to consider when adopting SDCT

Herd level risk factors are important to consider when identifying farms that may be suitable for adoption of SDCT. Herds should have an excellent relationship with their herd veterinarian and should have the ability to implement new management protocols with good compliance. Contagious mastitis pathogens should be well controlled prior adoption of SDCT with no Streptococcus agalactia present in the herd and a low incidence of Staphylococcus aureus. Herd bulk tank somatic cell count should be consistently under 250,000. Careful attention to dry off procedure is critical to success as any introduction of bacteria during the infusion of a teat sealant will pose a significant risk for IMI. The dry off procedure should begin with proper handling of animals as they are sorted out of their pens for dry off. Minimizing stress and manure splatter during handling, sorting and movement to the area where animals will be dried off is important. The dry-off procedure should be performed in clean and dry conditions. Sterile infusion technique should be strictly adhered to and should be performed by trained personnel who understand the importance of proper technique. Farms should consider using a "far to near" approach to cleaning teats and then a "near to far" approach to infusing teat sealant. This will help minimize contamination of the "near" teats (the back teats in a parallel parlor or inside teats in a herringbone parlor) while infusing the "far teats" (the front teats in a parallel parlor or the outside teats in a herringbone parlor). Following

the dry-off procedure, cattle should be moved using low-stress techniques to the dry pen. Dry cow housing conditions should consist of well-designed freestalls, adequately sized for dry cows, with ample quantities of clean and dry bedding.

Summary

Improvements in udder health have created an opportunity were SDCT can successfully replace blanket therapy on many farms. The risk of IMI infection can be established using individual SCC and clinical mastitis history or quarter level culture information which can then be used to determine which animals should receive an intramammary antibiotic and an internal teat sealant at dry off or an internal teat sealant alone. Herd level risk factors should also be carefully evaluated to determine if the farm is a good candidate for SDCT.

References

1. Neave F.K., Dodd F.H., Kingwill R.G. 1966. A method of controlling udder disease. *Vet Rec* 78:521–523.

2. National Animal Health Monitoring System. Dairy 2014: Health and Management Practices on U.S. Dairy Operations. **https://www.aphis.usda.gov/animal_health/nahms/dairy/downloads/dairy14/Dairy14_dr_PartIII.pdf**

3. Vasquez A.K., Nydam D., Foditsch C., Wieland M., Lynch R., Eicker S., Virkler P.D. 2018. Use of a culture-independent on-farm algorithm to guide the use of selective dry-cow antibiotic therapy. *J Dairy Sci*. 101:5345-5361.

4. Poutrel B., Rainard P. 1981. California Mastitis Test guide of selective dry cow therapy. *J Dairy Sci*. 64:241–248

5. Hockett M., Payne M., Rodriguez R. 2014. Milk leucocyte differential diagnosis as a tool to guide quarter-level, selective dry cow therapy. Regional Meeting of National Mastitis Council, Ghent, Belgium. National Mastitis Council, Madison, WI.

6. Godden S.M., Royster E., Timmerman J., Rapnicki P., Green H. 2017. Evaluation of an automated milk leukocyte differential test and the California Mastitis Test for detecting intramammary infection in early- and late-lactation quarters and cows. *J Dairy Sci*. 100:6527–6544.

7. Cameron M., McKenna S.L., MacDonald K.A., Dohoo I.R., Roy J.P., Keefe G.P. 2014. Evaluation of selective dry cow treatment following on-farm culture: Risk of postcalving intramammary infection and clinical mastitis in the subsequent lactation. *J Dairy Sci*. 97:270–284.

8. Patel K., Godden S, Royster E., Timmerman J., Crooker B., McDonald N. 2017. Pilot study: Impact of using a culture-guided selective dry cow therapy program targeting quarter-level treatment on udder health and antibiotic use. *Bov Pract*. 51:48–57.

9. Rowe S. M., Godden S.M., Nydam D.V., Gorden P.J., Lago A., Vasquez A.K., Royster E., Timmerman J., Thomas M.J. 2018. Randomized controlled non-inferiority trial investigating the effect of 2 selective dry-cow therapy protocols on antibiotic use at dry-off and dry period intramammary infection dynamics. *J Dairy Sci*. 103:6473-6492.