Dry Cow Therapy for Mastitis Control

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Mastitis continues to be one of the most perplexing and costly diseases of dairy cattle. It is estimated producers lose approximately $200 per lactating cow annually to this disease as a result of lowered milk production, poor-quality milk, necessary culling of infected cows, and the added expense of drugs and veterinary bills. Despite continued losses and a lack of complete understanding of this disease, research has led to certain procedures proven effective in reducing the incidence of mastitis. Dry cow therapy, the intramammary infusion of antibiotics immediately after the last milking of lactation, is one such practice.

Role of Dry Cow Therapy

During the early dry period tremendous stress is exerted on the udder because the gland must break down and absorb retained milk as well as millions of dead milk secreting cells. It is during this time and two to three weeks prior to calving that approximately 40 to 50 percent of new udder infections occur. Research has shown dry cow therapy can reduce the number of new infections during this period by up to 30 percent.

Subclinical mastitis: In addition to reducing the high rate of new infections during the dry period, dry cow therapy is the best method to treat subclinical udder infections. Unless an operation is in danger of losing its milk market, research indicates treating cows based solely on somatic cell count is not cost effective. Additionally, treatment of subclinical infections caused by environmental streptococci and various staphylococci is not recommended because cure rates may be as low as 10 percent and will rarely exceed 40 to 50 percent. Again, such infections are best treated during the dry period when cure rates may be 60 percent or greater.

Clinical mastitis: While clinical mastitis cases must be dealt with as they arise, in many instances dry cow therapy has the following advantages over lactation therapy:

- The cure rate is higher than that achieved by treatment during lactation(80 to 90 percent vs. 30 to 40 percent).
- A much higher dose of antibiotic can be used safely.
- Retention time of antibiotic in the udder is longer.
- The risk of contaminating milk with drug residue is reduced.

These advantages should be considered carefully, especially if the cow is a candidate for early dry off or the bacterial culture tests indicate the infecting organism is not *Streptococcus agalactiae. Streptococcus agalactiae* is the only common mastitis-causing organism that can be treated readily during lactation. Cure rates are usually in the range of 90 to 95 percent.

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http://osufacts.okstate.edu

Drying Off and the Early Dry Period

Reducing the grain ration and sudden cessation of milking is the recommended practice for drying off cows. High producing cows should be taken off concentrates two weeks prior to dry off to help reduce production. Cows should be observed closely for two weeks after drying off to ensure udders are involuting (not swollen or inflamed) properly. Udders with swollen quarters should be examined for mastitis. Cows showing visible signs of illness should be provided supportive therapy; however, re-infusion of antibiotics into the mammary gland is not recommended. Supportive therapy may include intramuscular or intravenous administration of antibiotic and/or anti-inflammatory compounds. In severe cases electrolyte therapy may be warranted. Consult a veterinarian for advice on a proper treatment procedure. Be careful to follow drug withdrawal recommendations closely to avoid possible residue violations.

Infusion Procedures

Following proper infusion procedures is a key component of the dry cow therapy program. Teats must be cleaned and sanitized before infusing antibiotics into a quarter. Without proper preparation, organisms present on the teat end may be forced into the udder and result in an infection more severe than the one for which treatment was intended. The following steps should be adhered to closely anytime intramammary infusion products are administered.

1. Clean and dry teats with a single service paper towel or cloth.
2. Dip teats in an effective germicidal product. Allow 30 seconds of contact time before wiping teats with single service paper towel or cloth.
3. Thoroughly clean and disinfect each teat end by scrubbing with cotton soaked in 70 percent alcohol. Use a separate piece of cotton for each teat. Prepare teats on the far side of the udder first, followed by the teats on the near side.
4. Treat quarters in reverse order; near side first, far side last.
5. Insert only the tip of the cannula (or use a commercial product with a short cannula) into the teat end. Do not allow the sterile cannula to touch anything prior to infusion.

6. Dip teats in an effective germicidal product after treatment.
7. Identify treated cows and remove them from the milking herd to prevent antibiotics from entering the milk supply.

Dry Cow Infusion Products

Only FDA-approved single dose intramammary infusion antibiotic products formulated specifically for dry cow therapy should be used. These products contain high levels of antibiotics in a slow release base that will maintain therapeutic levels in the dry udder for longer periods of time than infusion products intended for use in lactating cows. *These preparations should never be used in lactating cows or in dry cows within a month of freshening.* Cows treated at drying off will have a high antibiotic residue in their bodies and cannot be slaughtered within one month of treatment. Refer to the label of the drug used for specific recommendations.

Most dry cow therapy products are designed to eliminate existing *Staphylococcus aureus and Streptococcus agalactiae* infections in the early dry period. In some herds, especially where confinement has become more intense, environmental bacteria cause a higher percentage of new infections during the dry period. Most dry cow therapy products are reasonably effective against environmental streptococci but are ineffective against coliform bacteria. Consult your veterinarian to determine which dry cow product to use in your herd.

Products used for dry cow therapy should be stored in accordance with the Pasteurized Milk Ordinance and discarded when the expiration date is reached. Outdated intramammary antibiotics may have little antibacterial activity.

General Considerations

Early dry off: As mentioned previously, in instances where a severe problem with mastitis threatens a producer's milk market, consideration should be given to using DHI somatic cell counts to aid in selecting cows for early dry off and dry cow therapy. This is particularly true if bacterial cultural tests indicate the infecting organism is not *Streptococcus agalactiae.* However, care should be taken so as not to provide cows with a dry period in excess of 100 days.

Number of infusions: To date, research indicates there is little, if any, value in treating cows at drying off and again two or three weeks later. Subsequent treatments may pose the additional risk of forcing bacteria into the gland and increasing the risk of antibiotic residues in milk after freshening.

Total vs. selective dry cow therapy: When subclinical mastitis in a herd has been reduced to a very low level (e.g. every cow in the herd has less than 100,000 somatic cells/milliliter of milk), some dairy producers and veterinarians have considered selective dry cow treatment. However, selective treatment may fail to reach 20 to 40 percent of subclinically infected quarters in the herd. Also, quarters not treated at drying off are more likely than treated quarters to become infected during the early dry period.

Treating every quarter of every cow at drying off will reach all infected quarters, is more effective than selective treatment in preventing new infections during the early dry period, and does not require screening of cows to determine those to treat. Additionally, studies indicate that if the decision is based on economics (i.e. the cost of dry cow therapy compared to the return to the producer), treating every quarter on every cow at dry off is preferable.

Teat dips: Dipping teats with a disinfectant is considered one of the most important steps in the prevention of new mastitis infections. When the practice of teat dipping is employed, the rate of new infections during lactation can be reduced approximately 50 percent within one year. After a two-year period, up to 75 percent of the infections can be prevented. If teat dipping is discontinued, the infection rate increases rapidly.

A wide variety of teat dips under various trade names are on the market. Use only products listed with the FDA which have been shown to effectively reduce infection rates in controlled research. Contact the state Extension office at (405) 744-6058 for a current list of tested teat dips.

Dipping versus spraying: Early reports indicated the practice of spraying teats to be only 50 percent as effective as dipping. However, more recent data show spraying to be just as effective as dipping provided at least the lower two-thirds of the teat is covered.

Vaccination: Studies have shown vaccinating cows with the *Escherichia coli* J5 vaccine at drying off, 30 days before calving and at calving resulted in a 70 to 80 percent reduction in the incidence and severity of clinical coliform mastitis during early lactation. Use of *E. coli* J5 bacterin does not reduce the incidence of new infections at calving, but does reduce the percentage of mammary glands with infections that become clinical. Use of coliform vaccines affords no protection against contagious mastitis pathogens or environmental streptococci.

Development of vaccines against *Staphylococcus aureus* is an area of active research. However, current control of *S. aureus* mastitis can only be achieved through proper milking hygiene (especially post milking teat dipping), dry cow therapy, and culling of chronic cows.

Sanitation: The risk of new intramammary infection is greatest during the early and latter part of the dry period. Because udders are not milked during these times, pathogens are not flushed from the lower portion of the teat canal. This may lead to new intramammary infections. The number of new infections is related to the bacterial population on the teat end. Therefore, exercise lots, loafing areas, stalls, and maternity pens should be clean and dry. Animals on pasture should not be allowed in ponds or muddy areas.

Preventing Drug Residues

Attention must be given to preventing drug residues in milk and meat. Label directions must be followed exactly to avoid residues after freshening, especially for cows with shorter than normal dry periods. Tests are available to determine antibiotic residues in milk. Most dairy cooperatives, cheese plants, and some veterinary clinics will run these tests or producers can buy their own test kit. If a question arises concerning whether or not the milk may contain antibiotics, a test should be conducted. **Warning: all antibiotic residue test kits do not detect all antibiotics.** Care must be taken to ensure the test used can detect the antibiotic residue in question.

The Late Dry Period (2-3 weeks prior to calving)

While dry cow treatment is beneficial in preventing new infections during the early dry period, the udder is vulnerable to new infections during the last two to three weeks of the dry period when dry cow therapy is no longer effective. Special attention must be given to springing cows and heifers. These animals must be kept clean and dry if mastitis is to be avoided during early lactation. Weather permitting, a clean grassy lot is an ideal calving area. Stalls with clean dry bedding, preferably straw or inorganic bedding, are recommended during inclement weather.

Recent studies on the use of persistent barrier teat dips starting 10 to 14 days prepartum may prove a viable management option for reducing new intramammary infections at calving. Studies indicate barrier dips persisting greater than three days may result in up to a 50 percent reduction in total, major pathogen and environmental streptococcal infections at calving in cows and heifers. This practice may be particularly beneficial in herds experiencing high rates of mastitis in early lactation or when environmental conditions are less than ideal.

Summary

Mastitis continues to be one of the most costly diseases of dairy cattle, and while mastitis cannot be eliminated, an effective control program will dramatically reduce the prevalence of and economic loss from mastitis. Dry cow therapy, the intramammary infusion of antibiotics immediately after the last milking of lactation, is one of the most important components of a comprehensive mastitis control plan. The potential benefits of dry cow therapy include:

- Higher cure rates than lactation therapy.
- Higher concentrations of long-acting antibiotics can be used safely.
- Retention time of antibiotic in the udder is longer.
- Incidence of new infections during the dry period is reduced.
- Damaged tissue is allowed to redevelop before freshening.
- Clinical mastitis at freshening is reduced.
- Salable milk is not contaminated with drug residues.

Other components of an effective mastitis control program include:

- Milking clean, dry udders.
- Using properly functioning milking equipment.
- Dipping teats immediately after milking with a product known to be safe and effective.
- Good udder hygiene between milkings.
- Prompt treatment of all clinical mastitis cases.
- Culling cows with chronic mastitis infections.
- Keeping accurate records of clinical mastitis and somatic cell counts in individual cows to assist in making management decisions.

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Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Robert E. Whitson, Director of Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Vice President, Dean, and Director of the Division of Agricultural Sciences and Natural Resources and has been prepared and distributed at a cost of 20 cents per copy. 0607

ANSI-4351-4