Dry Cow Therapy for Mastitis Control

Dan N. Waldner
Extension Dairy Specialist

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:

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

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 infu-
6. Dip teats in an effective germicidal product after treat-
7. Identify treated cows and remove them from the milking

**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 prepara-
tions 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 ineffec-
tive 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 dis-
carded 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 treat-
ment 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 com-
pared 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, patho-
gens 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 coopera-
tives, 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 antibi-
otics, 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.
The Oklahoma Cooperative Extension Service

Bringing the University to You!

The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

- It provides practical, problem-oriented education for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.
- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.