How to Reduce Mastitis and Somatic Cell Counts in Your Dairy Herd

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Introduction

Definition

Mastitis is a bacterial infection of the udder and is still the most costly disease in the dairy industry, with losses estimated as high as $300 per cow a year.

Mastitis organisms enter the udder through the teat end and streak canal except for mycoplasma which may also infect the respiratory system and may be transmitted in the blood or through the lymphatic system to the udder. The streak canal is held closed by a circular muscle that holds milk in and foreign matter out. Also, the streak canal is lined with keratin, which traps and kills organisms that attempt to invade through the teat end.

Mastitis-causing organisms

About 95% of all infections are caused by Streptococcus agalactiae, Staphylococcus aureus, Streptococcus dysgalactiae, Streptococcus uberis, and Escherichia coli. The remaining 5% are caused by other organisms.

Contagious Organisms

Contagious organisms are spread by hands, milking units, etc. They include S. agalactiae, S. aureus, S. dysgalactiae, and mycoplasma.

S. agalactiae lives in the udder and cannot exist outside the gland for long periods. It is susceptible to penicillin and, once eliminated, usually does not return to the herd unless infected cows are purchased.

S. aureus lives in the udder and on the skin surfaces of an infected cow. It can be controlled effectively with good management and is moderately susceptible to antibiotics when the infection first involves the gland. Older infections usually do not respond to treatment. Severe cases may cause death.

S. dysgalactiae may live almost anywhere: in the udder rumen and feces and in the barn. It can be controlled with proper sanitization and is moderately susceptible to antibiotics, is an indicator of teat end damage.

Mycoplasma is a unique organism. It does not fit the description of bacterium or a virus and is classified as a microbe. Mycoplasma does not have cell walls, leaving them unaffected by most antibiotics that interfere with cell-wall formation. Since no effective treatment is available, the best way to control this disease is to avoid purchasing cattle from known positive-tested herds. In addition, if cattle are routinely purchased, the bulk tank and pot herd milk should be sampled monthly. Mycoplasma can be spread through the use of contaminated bottle mixes, syringes, and teat tubes in treating mastitis cows. Other infected cows are major sources of infection which can be transmitted by the milking machine components, hands of the operator, use of common rags and sponges, and directly from the environment. Post-milking teat dipping is essential for proper control. Mycoplasma organisms live in the soil of pastures and cooling ponds. Because mycoplasma lives in the environment, eradication of the disease is often impossible. Cows also shed or do not shed the organisms in the milk, so culture is not always a positive way to find mycoplasma. Positive cows become negative cows, negative cows become positive cows that become clinical with mastitis and do not cure with repeated treatment or become clinical in multiple quarters should be culled, and this will control mycoplasma. Routinely culling cows with clinical mastitis that will not clear up, a cow has five episodes of clinical mastitis in lactation. Culling cows that dramatically drop in milk production will not only eliminate mycoplasma but other infections that are not going to cure. Pasteurizing calf milk will stop the spread of mycoplasma to calves who exhibit mycoplasma as tilt ear, joint infections and respiratory problems.

Control of Contagious Organisms

The spread of contagious organisms are controlled by post milking teat dipping and except for mycoplasma, are eliminated by dry cow therapy. Herds with contagious mastitis problems must cover the whole teat to the base of the udder to control the spread.

Environmental Organisms

Environmental organisms live in the cows' environment and are always present. These organisms like high moisture and warm temperatures, they are like “Yankee’s,” they like to come to Florida.

E. coli bacteria are environmental pollution organisms; they live in feces, polluted water, bedding material. Excellent sanitation is needed for their control. They are not susceptible to antibiotics. This is a major cause of clinical mastitis in dairy cattle.

Klebsiella bacteria are in the Coliform family, they are often associated with green sawdust bedding, but can be found in our sand bedding, like e.coli, they seem to multiply in any bedding with time; the bedding becomes seeded with bacteria from the cows skin and from their feet, especially in barns that flush with recycled water.

S. uberis live most everywhere; in the rumen, feces and even in the udder. This is becoming the most troublesome mastitis organism in the S.E. US. Many cows with uberis shed tremendous numbers of cells into their milk and a few cows can elevate somatic cell and standard plate counts and these cows often will continue to produce well over one hundred pounds of milk daily and not show clinical signs.

Control of Environmental Organisms

To reduce the bacterial load of environmental organisms one must try to keep the environment as clean and dry as possible , this means scraping lots, removing old mud and replacing it with new dirt at least once a year, bed freestalls at least once every four days to keep bacterial numbers low. Milk clean dry udders is a must, this will help offset the problem of a dirty environment.

When do Infections Occur?

The rates of new infections are the highest during the first two weeks of the dry period and the last two weeks of the dry period. New infection rates are also high in early lactation and diminish as the lactation proceeds.

Infection Dynamics

To understand mastitis infection, you must realize how its level changes on a herd basis. New infections can be brought into the herd in four general ways: I) new infections during lactation; 2) new infections during the dry period; 3) infected heifers entering the herds; and 4) infected cow purchases.

Infections are eliminated in four general ways: 1) spontaneous recovery, elimination by the animal's own defense mechanism, 20% effective 2) use of lactation therapy, usually 30-90% effective; 3) dry period therapy, usually 80-90% effective; and 4) culling animals, very effective (100%).

Proper Milking Procedures

Proper milking procedures are important for the prevention of mastitis and for insuring complete milk removal from the udder.

Mastitis can decrease total milk production by 15 to 20%. To minimize loss and achieve maximum milk yield, a practical milking management scheme should be followed.

The term "milking management" includes care for the environment in which cows are housed or pastured. The dairy cow should have a clean, dry environment. This helps reduce the potential for mastitis and increases milking efficiency by reducing time and labor to clean udders before the milking process.
Moving cows

Movement of cows should be in a quiet gentle manner. If cows are frightened or hurried, the milk letdown process may be disturbed. Therefore, rough handling of dairy cattle should be avoided.

Milking Procedures

How much time is taken to prepare udders and teats for milking determines how fast one can milk, if it takes 1 minute to "prep" each cow, one man can only milk 60 cows per hour, if it only takes 30 seconds to "prep" cows that man can milk 120 cows per hour.

Many large herds in warm climates wash and sanitize in a floor mounted wash pen, cows drip dry, enter the parlor, units applied and removed by ATO's when done and post dipped, this saves time, money, towels, dip.

My belief that one must milk clean dry udders, how you get to that condition is your choice, you can do the sanitizing the udders as stated above and apply units when the cows come in the parlor, then post dip before they leave the parlor. This method gives the most consistent milking preparation at all milking shifts and makes milker training easy and provides management with the most control of the milking operation. The burden is on management to make sure the cows are housed in clean freestalls, or a clean environment as possible, that the holding area wash pen is adequately sized to allow you both a wash cycle but room to drip dry before entering the parlor and the wash system is well maintained to clean the cows. This method of cow preparation will yield the highest turns per hour, allowing one to milk the maximum number of cows. This method only works with clean cows, properly working take offs and equipment, it will be a disaster in poorly managed dairies with filthy cows.

The other end of the milking procedures scale is the full prep method with organized routines of pre- dipping, stripping and wiping and application of units with in specific times. This method is by far the most expensive to carry out, requires more labor, more training and supervision on all shifts to keep consistent milking procedures. This method also increases the total milking time of the herd, but does reduce the amount of time the milker unit is on the individual cows.

There are many methods to milk cows, how you do it depends on your beliefs, labor, facilities, equipment, I still believe you must milk clean dry udders, how you do this is your choice.

Mastitis Detection

Milking may begin with a check of all quarters for mastitis. Any cows that show clinical mastitis should be examined and appropriate action taken. If fore milking is not done, visual checking for inflamed quarters is done by milker’s and herd health people in the barns or lots, if a high level of contagious bacteria is in the herd, fore stripping is

needed. The use of conductivity meters also can be used if they are part of your milking system.

Udder Preparation

The object of udder preparation is to ensure that clean dry udders and teats are being milked. The United States government's pasteurized milk ordinance (PMO) also states that a sanitizer must be applied before milking. How you get this done is your decision.

Predipping

Predipping with teat dip has become popular. The advantage may just be getting the water out of the milking barn so wet udders are not being milked.

The proper procedure for predipping involves dipping or spraying a pre-dip on the teats. A thirty second contact with sanitizer is needed to kill organisms. Then the sanitizer is wiped off with a paper towel.

Predipping may be beneficial in reducing mastitis, but the actual dipping, dip contact time, and wiping with a towel increase the total milking time. If the dip is not wiped off, excessive chemical residues in milk may occur. If contact time is not sufficient, then it's a very expensive premilking regime.

Attachment and Detachment of the Milking Unit

To attach the milking unit to the teats, apply the cluster allowing a minimum of air admission and adjust to prevent liner slip. Air entering the unit may cause the propulsion of mastitis organisms from one infected teat into a non-infected teat. This also may happen when one teat cup is removed before the others. .

Following milk-out, the machine should be removed only after the vacuum to the teat is shut off. This is accomplished most commonly by use of a vacuum shut off valve or milk hose clamp, which prevents the back jetting of bacteria from one teat to another.

Back Flushing

Research has demonstrated that back flushers do reduce the number of bacteria on the liners between cows, but do not reduce the number of bacteria on teats. Back flushers also may stop the spread of contagious organisms, but this can also be accomplished at a much lower cost by teat dipping. There is no effect on environmental pathogens that are encountered between milkings.

Back flushers may be effective in stopping the spread of contagious mastitis; however, there is limited research to support this view. Because of the high initial cost,

the need for daily maintenance, and limited efficacy, back flushers are not routinely recommended.

Milking Machine Factors

Research has demonstrated that "liner slip" is one area in which the milking machine may increase mastitis. This is when air is admitted through the top of the teat cup. Milk and bacteria, if present, may be propelled into the teat end of an adjacent teat, thus causing a new bacterial infection. Also, the use of malfunctioning pulsators can cause teat end damage and increase the rate of new infection.

The milking machine has little effect on mastitis if properly operated and functioning according to the manufacturer's specifications. Clearly though, when operated improperly, milking machines can have a role, and malfunctioning equipment can cause mastitis in several ways. If the pulsator is dirty and does not function properly, this will cause the massage phase to be eliminated with the teat end being damaged. A vacuum controller that is dirty also will not function properly and again damage the teat end. Damage to this entry area for organisms increases the risk of mastitis.

Post-Milking Teat Dipping

There is only one way to effectively stop the spread of mastitis in the dairy herd, and that is by applying teat dip to every quarter of every cow after every milking. Teat dips are used to remove milk residue left on the teat and kill organisms on the teat at the time of dipping. They also leave a residual film of sanitizer between milkings.

Types of Teat Dips

There are many effective teat dips on the market that are effective in preventing new infections. Effective coverage of the teat is more important than the type of dip being used.

Dip or Spray?

The only way to apply post dip is dipping: spray is fine for predipping.

Dry Cow Therapy

Dry cow treatment is administered after the last milking of the cow before the dry period. Care must be taken to scrub the teat end with cotton and alcohol before infusion and to use teat dip after infusion.

There are many antibiotics available for dry cow therapy, use the one that seems to work for you.

The idea of dry period therapy has been accepted because antibiotics can be put into a slow release base that allows them to stay in the udder longer. They are not constantly being milked out of the udder as is the case with lactation therapy. Antibiotics can be administered in high quantities because there is no concern for milk levels and antibiotic residues.

While dry treatment is very effective, if must be administered properly and the dry cows must have favorable environmental conditions. Teat ends must be scrubbed clean with cotton alcohol pads before injecting the dry treatment. If the teat ends are not cleaned properly, you may inject into the udder very high numbers of bacteria, which would overwhelm the antibiotic just administered. Unsanitary treatment procedures cause rather than eliminate mastitis.

Management of dry cows also is very important in mastitis control. If dry cows are exposed to muddy or dirty conditions, risks of mastitis will increase. This is especially true at the time of calving; cows are under much stress during this period and if an udder is exposed to wet dirty conditions, mastitis will increase. If you believe that your dry cow therapy program is ineffective, it may be because of poor treatment procedures and/or improper management of the cows during the dry period and at calving.

Summary

Mastitis is a very complicated and expensive disease. If you can keep your cows as clean as possible, have a proper nutrition program, keep your milking equipment in proper milking order, milk clean dry udders and teats, post dip and dry treat all cows going dry, treat clinical mastitis as you find it, and cull chronic clinical mastitis after five episodes per lactation, your life will be all “Milk and Honey.”

Notes