

Developing a Plan for Treating Mastitis: Part 2

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There are five things that a dairy producer should consider when developing treatment protocols for clinical mastitis. The first is the bacteriological causes of mastitis and how the causes affect treatment protocol. This was discussed in the first article in this series published in the January 2002, Colorado Dairy News. Other considerations in developing treatment protocol include:

****A simple system of grading the severity of mastitis into three categories of mild, moderate and severe.

****Development of cost effective treatment protocols that consider the drug cost, the amount of milk discarded, and the success in achieving bacteriological cures, reducing somatic cell counts, and preventing future relapses.

****Establishment of a bacteriological cure as well as a clinical cure.

****An appropriate record system to allow outcome assessment of treatment protocols.

Grading system for mastitis

A simple system for grading the severity of mastitis is the basis for deciding which treatment protocol to initiate.

Grade 1 mastitis is a mild case of mastitis characterized only by changes in the appearance of milk. These changes may include flakes or clots seen only in foremilk. If dairies are not routinely practicing forestripping, most cases of mild mastitis may be missed.

Grade 2 mastitis is a moderate case of mastitis characterized by changes in the milk and signs of inflammation in the affected quarter such as swelling, increased temperature and sensitivity, and redness.

Grade 3 mastitis is a case of mastitis characterized by changes in the milk, signs of inflammation in the gland, and signs that the cow is sick. Figure 2 shows that as the severity of mastitis changes, the bacterial isolates for the mastitis change. The proportion of coliform cases (Coliform + No Growth) more than doubles as the severity of cases goes from mild to severe (27% vs. 60.2%, respectively). The proportion of cases caused by streps and staphs decrease from 52% in mild cases to 28% in severe.

Insert fig 2 graph

The common recommendation to treat mild cases of mastitis with intra-mammary antibiotic tubes seems logical because over half the cases of mild mastitis are caused by bacteria that are likely to be susceptible to the antibiotics in commercial tubes. On other hand, it makes sense to treat severe cases of mastitis with antibiotics that are given intravenously or intramuscularly because a greater proportion of severe cases are caused by coliform bacteria. Moderate cases of clinical mastitis will likely benefit from a combination of systemic and intra-mammary therapy.

Treatment of Mild to Moderate Cases of Mastitis

Studies of Gutterbock have shown that clinical cure rates for mild cases of mastitis were similar whether antibiotics were used or not. (See sidebar this page, under Mastitis Research.) Fifty to 60% of the mild clinical mastitis cases were caused by coliform bacteria and would not have benefited from intra-mammary antibiotic therapy. Although clinical cure rates are similar whether antibiotics are used, the relapse rates are higher when antibiotics are not used. Hence, intra-mammary antibiotics are used to achieve bacteriological cures and prevent future relapses of mastitis. A significant part of the cost of treatment with some antibiotics is the cost of extended milk discard needed to prevent antibiotic residues in milk.

Clinical versus Bacteriological Cures

A clinical cure occurs when the appearance of the milk returns to normal. Bacteriological cures occur when the bacteria causing the mastitis are eliminated from the quarter. Clinical cures can occur without bacteriological cures. The cows' immune response returns the appearance of milk to normal in 6-8 milkings from the onset of the mastitis whether bacteria have been eliminated or not. The important reasons for achieving bacteriological cures are that the rate of relapses are reduced, somatic cell counts are reduced, and the quarter is not a source of bacteria to infect herd mates.

The effectiveness of commercial intra-mammary antibiotics tubes are usually evaluated on the basis of clinical cures. Yet, the milk of most cows with mild mastitis returns to a normal appearance within 6-8 milkings from onset of clinical mastitis whether or not cows are treated with intra-mammary antibiotics. The clinical cure rates were essentially identical whether cows were treated with oxytocin or commercial intra-mammary antibiotic tubes. The real benefit for using commercial intra-mammary antibiotic tubes is not to achieve clinical cures but to achieve bacteriological cures for environmental strep and CNS mastitis. By achieving bacteriological cures, the risk of cows having relapses of clinical mastitis is markedly reduced, somatic cell counts are reduced, and with bacteriological cures, bacteria are not being shed from the quarter and it is not a source of infection for herd mates.

Developing record systems for mastitis

Record systems provide a means to evaluate the effectiveness of treatment regimens for mastitis. Good record systems can help determine not only when milk can be sold for human consumption but also when it is safe to sell the cow for slaughter.

Mastitis Research

A trial comparing three treatments for mild mastitis was conducted by Gutterback in three California dairy herds. All cows were milked twice daily.

Group A received a treatment of amoxicillin (Amoximast[®]) in the affected quarter every 12 hours for a total of three treatments.

Group C received a treatment of cephalosporin (Today[®]) every 12 hours for a total of two treatments.

Group O were treated with 100 units of intramuscular oxytocin every 12 h for two or three milkings. Clinical cures were defined by the return of the quarter and milk to normal.

No difference existed in clinical cures (67.6, 67.7 or 66.7%) between groups. Two thirds of the quarters were perceived as having clinical cures whether the quarters received antibiotics or not.

A second trial was conducted using the same treatment groups to assess the costs of the three treatment strategies.

The clinical cure rates were 83% for oxytocin, 79% for amoxicillin, and 86% cephalosporin. Again the clinical cure rates were high and nearly equal for the treatments.

The cost of treatments was different for the 3 groups: The total cost of treatment per case of mild mastitis was \$34.88 per case for Group O (oxytocin), \$35.52 per case for Group A (amoxicillin), and \$54.47 per case for Group C (cephalosporin). The cost of treating cows with cephalosporin was \$20 greater per case than amoxicillin because of the need to discard normal appearing milk that contained antibiotic residues. Though not included in the financial analysis, relapse rate differed between groups. Cows with a mastitis caused by strep and treated with oxytocin had a 75% relapse rate compared to a 20 to 25% relapse rate when treated with amoxicillin or cephalosporin.