

Are You Treating Cases of Clinical Mastitis Correctly for the Best Chance of a Cure?



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Mastitis is an infectious disease caused by a variety of bacteria and other pathogens. These infectious pathogens can originate in either the cow's environment or can be spread from dairy cow to dairy cow, especially at milking time. Once bacteria or other pathogens gain access to the mammary gland through the teat sphincter or duct, an infection becomes established. The cow's immune system responds to this infection and the resulting inflammation can be seen in abnormal appearing milk, i.e. flakes, and/or high somatic cell count. Abnormal appearance in milk usually lasts 4 to 6 days after the initial infection.

Currently, Environmental Pathogens Leading Cause of Mastitis

Clinical mastitis is characterized by changes in the physical appearance of milk or swelling of the udder. In contrast, subclinical mastitis does not result in visible signs, but the somatic cell count is elevated. Of clinical mastitis cases, approximately 85% can be classified as nonsevere where cows present with abnormal milk or a swollen udder. In severe cases (i.e. cows have a fever or lack of appetite), these cows need to be treated immediately with a protocol developed with your herd veterinarian. The primary organisms causing mastitis have changed over time and vary between farms. With the routine use of efficacious teat dips and dry cow therapy, mastitis caused by contagious organisms has been reduced. Today, more cases are caused by environmental organisms.

Why Culture Milk?

In order to determine the best therapy for a clinical case of mastitis, a sterile milk sample should be collected and cultured to attempt to identify the causative organism. By identifying the organism causing the clinical case of mastitis, a targeted treatment protocol can be employed. Antibiotic therapy is designed to assist a cow's immune system fight the infection. Certain antibiotics are more effective against bacteria that have certain types of bacterial cell walls. Bacterial species are often referred to as either Gram positive or Gram negative, based on the staining pattern of the cell wall when viewed under a microscope. Narrow spectrum drugs, found in most intramammary products, are active against either Gram-negative or Gram-positive bacteria whereas broad spectrum antibiotics are active against both. Thus, to be effective the correct acting antibiotic must be chosen for a specific organism. For some bacteria, such as *Mycoplasma* or *Serratia*, no antibiotic treatment is considered effective. Also, the efficacy and duration needed of antibiotic therapy relates to how a pathogen attaches to tissues within the mammary gland. Some pathogens, i.e. *E.coli*, infect the linings of the mammary gland whereas others, i.e. *Staph. aureus*, deeply invade the milk synthesizing tissues in the mammary gland and are harder to treat effectively.

Culture results indicate "no growth"

One of the biggest frustrations when culturing milk samples is receiving results labeled "overgrown" or "no growth". "Overgrown" results occur most often when the milk sample became contaminated at the time of collection. Milk samples should be collected after teat(s), especially teat ends, are cleaned using a single-use alcohol pad. The milk sample is collected in a sterile collection tube prior to antibiotic treatment and the opening of the tube does not come in contact with the teat or other dirty surfaces. Milk samples to be plated off-farm should be stored on ice if delivered to the lab within 24 hours of sample collection or frozen.

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When summarized across multiple research trials, 26% of milk samples collected from cows with clinical mastitis indicated a result of “no growth”. So why does this occur? Two possibilities exist. First, the causative bacteria might have been eliminated before the case of clinical mastitis was detected. *E. coli* infections, which often result in non-severe mastitis, are a common example where the bacteria has been eliminated but the appearance of milk remains abnormal. Essentially, the “no growth” culture result indicates, at the time the milk sample was collected, the clinical signs were not accompanied by an active infection. One should consider this “no growth” result a desired outcome as the cow eliminated the mastitis-causing bacteria. In severe clinical mastitis cases caused by *E. coli*, the toxins produced by this species of bacteria are the cause of the severe symptoms. Thus, the reason dairy cows are given supportive therapy and not antibiotics.

Another possibility is that the number of mastitis-causing organisms was decreased by the cow’s immune system such that the causative organism cannot be detected in the milk. An example may be milk samples from cows with chronically high SCC. The immune system may decrease the numbers of causative bacteria found in the milk, but a long term infection remains in the udder tissues. Additional samples collected at a later time might be needed to detect the causative organism in this case.

Return to Normal Appearing Milk ≠ Mastitis Cure

Unfortunately, clinical signs, such as appearance of milk, are not good indicators as to whether the mastitis-causing organism has been eliminated and the choice of treatment was effective. To determine if the treatment or lack of treatment was effective, additional milk sampling, approximately 2 weeks post-clinical symptoms and antibiotic treatment, is required. Reoccurrence of mastitis infections can be explained by the use of an antibiotic which did not completely clear the causative pathogen even though the appearance of milk and/or udder swelling decreased after the initial treatment.

Bottom Line

To effectively treat cases of mastitis, the organism causing clinical mastitis must be determined. To do this, aseptic milk samples must be collected and plated to determine the organism causing the case of clinical mastitis. Results are used to determine the best course of treatment, whether to treat with antibiotics and if so which one. Not all bacterial causes of mastitis respond to antibiotic treatment. The immune systems of cows can eliminate some types of bacteria. Also, determining the causes of mastitis in your herd today can help your veterinarian develop treatment protocols for cows with mastitis in the future.