



River Valley Veterinary Clinic

January 2017 Newsletter

I've got a Hot Quarter here!!

When a cow's milk changes consistency, we know its mastitis, but what's the best way to treat it?

The best place to start is with the infection itself. Mastitis is an inflammatory reaction in the milk producing tissue of the udder in response to a bacterial infection. An increase in blood flow to the quarter brings in inflammatory cells to fight the bugs, creating a hard, hot, swollen, red quarter. The flecks (or chunks) seen in the milk are inflammatory cells that have died in the line of duty, taking the bugs out with them.

These inflammatory cells along with skin cells that are shed normally make up the cow's Somatic Cell Count (SCC). While there isn't a direct relationship between mastitis and SCC, the changes in SCC can be used to determine whether an active mastitis infection is new or chronic. The accepted SCC threshold for infection is 200k. Cows with a SCC >200k are more likely to have an active infection or residual inflammation from an infection that has already been cleared. However, a cow with mastitis may not have a SCC >200k because her healthy SCC is so low. Therefore SCC can't be used alone in making treatment decisions. An active infection is identified based on symptoms in the udder and the cow.

A Bulk Tank milk culture can be used to monitor what pathogens are circulating within the herd and identify specific areas for improvement. See the end of the newsletter for a review on collecting a good bulk tank sample. The goal of a bulk tank culture is to have a Total Plate Count of <5,000 CFU/mL. While the legal limit is 100,000 CFU/mL, a problem should be investigated if the count goes over 20,000 CFU/mL. The culture report shows a count of various pathogens that make up the Total Plate Count and includes the ideal count, and ranges of moderate, high and very high counts that should cause concern. The specific bacteria with a high count will help identify the source of future individual mastitis cases. This list provides the source of each pathogen as it is listed on a Bulk Tank Culture Report:

- Coliforms: from manure making its way directly into the milking system, a sanitation issue
- LAC Neg GN rods: these non-specific bugs form biofilms in the milking machine or milk line and can be difficult to remove
- *S. agalactiae*: contagious
- Environmental Streptococci: grow in dirty bedding
- *Staphylococcus aureus*: contagious
- CNS: contagious
- Mycoplasma: contagious
- *Truperella pyogenes*: pus-forming bacteria from chronic infections that should be treated and kept out of the tank

The sources of infection can be grouped into two categories: contagious and environmental pathogens. The **Contagious Pathogens** are transmitted between cows via the milking machine and include *Streptococcus agalactiae*, *Staphylococcus aureus*, and *Mycoplasma* spp. In the 1950's, the Five Point Plan for Control was developed that has had a huge positive impact on controlling contagious infections, and each of the five points is considered a standard of care today. They include dry cow therapy; post-milking teat dipping; regular milking machine maintenance; treating clinical cases and culling chronically infected cows.

The **Environmental Pathogens** come from anywhere in the cow's environment, most often from manure on the teats or udder or contaminated bedding. These pathogens can be divided into two groups based on their cell structure: Gram negative or Gram positive. The Gram negatives include *E. coli*, *Enterobacter*, *Klebsiella*, *Serratia* and *Citrobacter*, which characterize as the Coliforms on a Bulk Tank Culture. The Gram positives include *Streptococcus uberis*, *Streptococcus dysgalactiae*, *Enterococcus* spp and those specific to growing in sand: *Lactococcus lactis lactis* and *Aerococcus veridans*. The Five Point Plan does not work against environmental infections and so control efforts must focus on maintaining clean and dry bedding as well as milking teats that are also clean and dry.

However, recent research has determined that the source of infection is no longer as clear cut as we thought: the pattern of spread can change during the course of infection. Bacteria that typically come from the environment can infect a cow normally, but then adapt to spread from cow to cow in the milking parlor as a contagious pathogen would.

Five Steps to the Successful Treatment of Individual Cases

The successful treatment of a case of mastitis depends largely on having a good protocol in place for treating the cow. Having it in writing is even better: every person on the farm, including your vet, will know what should happen when a cow is identified.

1. Identify a Case. At milking time, milkers should identify the case and possibly sample the milk, depending on your protocol. Their job is to milk, not interrupt the pace of milking to treat mastitis in the parlor. Providing a simple way to record the cow in question and the quarter, like on a whiteboard or piece of paper placed on a nail, dramatically increases detection rates. After the cow is milked and leaves the parlor, she can be examined and treated appropriately by management.

2. Severity of Infection. Mastitis cases can be divided into two categories: not severe or severe. Non-severe cases have

either signs in the milk only or that and a hot quarter. Severe cases involve symptoms beyond the udder: off-feed, depressed, fever or sunken eyes.

3. Review the Cow's History. While severely infected cows should be treated immediately, a little more time can be taken to determine the best course of action for a non-severe infection. Review the cow's treatment record and her SCC at the last test. Has she been treated for mastitis in that quarter in the last 7-14 days? If so, she has a repeat infection and should be treated a little differently than if it were a new infection. Her last test SCC will help determine the length of treatment. Here's how the history and SCC work together:

- SCC <200k and a New Case – short duration (1-3 day) Intramammary (IMM) treatment
- SCC <200k and a Repeat Case – longer duration (4-8 days) IMM treatment
- SCC >200k and a New Case – longer duration (4-8 days) IMM treatment
- SCC >200k and a Repeat Case – this is a tricky one, because she's turning into a problem mastitis cow where short term treatment will not be successful and a long term IMM treatment may not work either. There are other options at this point that can be chosen based on her days in milk, days carried calf, age, number of times she's been treated for mastitis this lactation, milk production...the list goes on. Depending on where she is, she could be fully dried off, dry off only that quarter, given extended therapy or leave the herd.

4. Treatment Selection. Knowing how long treatment will last, what will the treatment be? The short answer, it depends!! This is where milk cultures come into play. Knowing what is causing the infection means a more specific IMM treatment can be used that is labeled for the specific bacteria rather than taking a stab in the dark. See the end of the newsletter for a review on taking a sterile milk sample. Milk cultures take 24 hours to grow, and waiting to treat a non-severe infection by a day shouldn't impact the severity of the infection or hinder treatment. In Wisconsin dairies, milk culture results follow this breakdown: 30% no growth, 25% Gram negative (Environmental pathogens), 20% Streps, 15% Staphs and 10% other bacteria. If 30% don't grow anything, how is that useful? In no growth cultures, the infection may have already been cleared by the cow's immune system and residual inflammatory cells that won the fight are being excreted in the milk. An infection is considered cured when the udder returns to a normal texture, the milk may take longer to return to normal since it is flushing away the old cells and dead bacteria. It is also possible for improper handling or lab errors to cause a no growth if the sample isn't refrigerated properly before culturing. If the cow continues to be sick and had a no-growth, a new sample can be cultured or she could be treated regardless of the culture results. With a positive culture result, the lab will be able to recommend a IMM treatment that will be most effective.

If culturing isn't feasible, it is possible to assume that about 50% of all mastitis is Gram negative and the remaining are Streps or Staphs. Use your veterinarian's knowledge to choose the best IMM treatment. Not every treatment is labeled for Gram

negatives; most are just labeled for Staphs or Streps. This doesn't mean it won't kill a Gram negative, it just hasn't been researched. Your veterinarian knows which are which, just ask!!

5. Additional Treatment. Add these based on the other symptoms a cow has. If the quarter is hot, give an anti-inflammatory such as banamine, dexamethasone (not to pregnant cows!!!) or aspirin. Apply an ointment to the udder to locally reduce swelling. If the cow has a fever, she will need antibiotics and oral fluids if she is dehydrated. If she's this sick, she's likely becoming toxic and will need extra care. The RVVC newsletter from August 2015 about toxic mastitis goes into detail about what is going on inside a toxic cow and how she should be treated.

Clinical mastitis is the most common disease among dairy cattle and the most costly to the dairy industry. While prevention is always the best option, some cows will still manage to get mastitis. But not to worry, you know how to treat it! (And have it written down, too.)

Collecting Bulk Tank Milk Sample for Culture

(from the UW Milk Quality Lab)

1. Agitate the tank for at least 10 minutes
2. Take the sample from the top of the tank with a clean dipper or sterile syringe, transfer it to a milk culture vial
3. Sample the tank once daily for 3-5 days to get the best combined sample of the herd.
4. Freeze the sample immediately. The lab will thaw and combine the individual samples for one bulk tank culture.

Collecting Milk Samples for Culture

(from the UW Milk Quality Lab)

1. Label a new/sterile milk collection vial with the cow's ID, the affected quarter and date of sample collection
2. Remove large debris with a single use towel
3. Pre-dip to sanitize the skin with 20-30 seconds contact time
4. Dry teat with a single use towel
5. Prestrip 3-4 times to remove bacteria from the teat canal that could contaminate the sample
6. Scrub teat end with alcohol wipe or gauze soaked in 70% alcohol,
7. Collect milk in vial. Don't touch inside of vial to avoid contaminating sample
8. Place in refrigerator or cooler until it can be placed on the culture media.