

Mastitis in Dairy Heifers

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The traditional view that heifers are mastitis free has been shattered. Until recent times, little attention has been paid to prevention of mastitis in replacement heifers prior to entering the milking herd. However, dairymen are beginning to find out and field studies have shown that mastitis in pre-fresh heifers can be an important source of increased clinical cases of mastitis for the milking herd as well as reduced herd milk quality due to increased bulk tank somatic cell counts. Up to 50% of the heifers have been reported to be infected at calving in some dairy herd. Many of these infections are clinical cases of mastitis. The end result of pre-freshening mastitis in heifers is damage to the mammary gland secretory tissue that may result in chronically decreased milk production.

Many bacteria have been isolated from the mammary gland of heifers prior to freshening. These include *Strep. agalactiae*, *Staph. aureus*, several of the other less pathogenic *Staph.* species, and on occasions, environmental *Streps*. In some herds, as many as 50% of the heifers have freshened with *Staph aureus* mastitis. Mycoplasmas can also infect heifers prior to their first calving. Some of these infections are seen with outbreaks of pneumonia or arthritis in calves. The bacteria that are involved and the prevalence of infection have been shown to vary seasonally and among different regions of the US. For instance, in California, one report indicated that all types of *Staph.* infections were more common in the fall while in Louisiana these infections were common throughout the year except in the summer months. Louisiana also had a higher prevalence of *Staph. aureus* and other *Staph.* species compared to California, Vermont and Washington.

Many of the bacteria causing mastitis in heifers before they freshen can be easily found by culture of the teat skin as well as other body locations such as the nose, hair, and vagina. Some bacteria seem to be normal inhabitants of the teat skin while others increased in numbers following even slight injury to the teat skin. Some heifers may become persistently colonized with *Staph. aureus* on their teat skin and this may be an important source of *Staph. aureus* for dairy herds intent on eliminating this contagious pathogen from the herd. The primary site from which environmental streps emerge to cause mastitis in heifers is bedding. Various flies are known to carry some of the *Staph*-type bacteria.

In one study, nearly a third of the heifers had evidence of mastitis at breeding age. In some herds, it appears that the level of infection tends to increase with age as the heifers approach calving. Heifers that are older at calving have an increased risk of mastitis, particularly from environmental sites.

Factors associated with heifer mastitis are not completely understood. Prior to weaning, commonly accepted reasons for mastitis in heifers are feeding discard milk from cows with mastitis or allowing calves to suckle one another in multiple calf housing. Prior to breeding, suggested factors are contaminated bedding leading to soiled teat ends, fly contamination or bites, teat injuries, and chapped teats. From breeding until calving the most common suggested predisposing factor is contaminated bedding. Certainly, there is considerable overlap of the factors across the entire life of the heifer from birth to calving.

In some areas of the US, flies are thought to be an important factors regarding heifer mastitis. These are usually Stable or Horn flies that are biting flies. The bites of flies on the teats allow increased colonization of the teats by bacteria. Teats with scabs and abrasions had a much higher prevalence of mastitis than those that appeared normal. Heifers in herds with fly control programs were reported to have lower prevalence of mastitis than heifers in herds without fly control. This was particularly evident with respect to *Staph. aureus* and environmental streps. Research studies have shown that Horn flies can transmit *Staph. aureus* to heifers causing mastitis. Insecticide impregnated ear tags have been shown in two studies to reduce the incidence of mastitis at first calving. However, the tags were only effective for about two months.

Be aware that the milk in pre-fresh heifers does not look like colostrum or milk. It is generally scant in amount and very thick and sticky similar to honey. There is a higher likelihood of pre-freshening infection in quarters that have water secretions with clots or flakes compared to those with thick, honey-like secretions.

A problem with mastitis in heifers prior to freshening should be suspected when heifers are freshening with blind or non-functional quarters; with elevated somatic cell counts (>250,000) on the first DHIA test; or more than 5% have clinical mastitis. Another sign is abnormally enlarged quarters with off milk any time prior to calving. Keep in mind that SCC taken before 14-21 days in milk should be viewed with caution as they will often be abnormally high during this time period and then return to normal levels.

A beginning step will be to identify the bacteria or other agents involved by culturing milk from heifers with mastitis soon after calving. The bacteria that is isolated will point you in the proper direction to begin a prevention program. If contagious bacteria such as *Strep. ag* or *Staph. aureus* are isolated, focus attention on the feeding and housing practices for pre-weaned calves. Feeding discard milk from mastitic cows, suckling calves or multiple calf housing units may be involved. If other Staph are found, check into teat injuries perhaps from fly bites. When environmental Streps are found, check out the bedding and housing areas especially those for close-up animals.

Treatment of pre-fresh heifers for mastitis is an option. Any treatment of heifers prior to freshening may constitute extra-label treatment and as such it should be carried out under the supervision of your dairy veterinarian. A written treatment protocol should be established and complete treatment records maintained. Thought should be given to the possibility of milk residues following calving. There is a wide range of antibiotic

sensitivity and resistance patterns for the bacteria causing mastitis in pre-fresh heifers. For this reason, some variation in treatment results should be anticipated.

One report indicated a reducing of almost 60% at freshening compared to 45 days pre-freshening following intramammary infusion of a dry cow antibiotic. They reported in this study a greater than 90% reduction in *Staph. aureus*, and Strep. species. The treated heifers produced 10% more milk during the first two months of lactation compared to their untreated herd mates and had lower somatic cell counts. Similar results have been reported in other studies when heifers were treated at less than 60 days prior to anticipated calving with dry cow antibiotic products. Antibiotic residues were noted in some heifers that calved within three weeks after they were infused with dry cow antibiotics. Overall, very few heifers freshened with residue in the milk. Use only commercially available, sterile, single use products.

Reports of field trial using lactating cow, antibiotic treatment to control mastitis in pre-freshening heifers have also been encouraging. Treatment has been shown to reduce the pre-freshening level of infection by most pathogens when sampled shortly after calving. Heifers calving within 7 days of treatment with lactating cow antibiotics have a higher risk of residual antibiotics in the milk than those treated more than 14 days prior to calving. Use only commercially available, sterile, single use products.

One study suggested that with *Staph. aureus* infections, the majority of the infection in heifers are already present by the time of breeding and pregnancy confirmation. Treatments for *Staph. aureus* infections were equally effective at any of the trimesters of pregnancy. For this reason in herds with *Staph. aureus* problems, they suggest that heifers could be treated with lactating cow antibiotic preparations at any convenient time from pregnancy confirmation until about 45 days prior to calving and an equally effective cure can be anticipated.

With either type of pre-freshening antibiotic treatment, great care must be taken not to introduce bacteria into the gland during the infusion process. To reduce the chances of introducing new infections, excellent restraint such as a tilt-table is required to allow full control over the heifer and adequate visualization of the teats and teat ends for thorough cleaning and disinfection prior to infusion. This will also greatly enhance infusion into the small teat orifices found on prepartum heifers. A partial insertion is strongly suggested.

There are vaccinations that may be useful to decrease the clinical signs of mastitis in heifers. The Staph-vaccines may be helpful in reducing the severity of gangrenous mastitis when administered prior to calving. The J5-type vaccines have been reported to reduce the severity and duration of clinical signs when administered during gestation and at calving. In neither case will the vaccines act to prevent new infections but may be helpful in reducing the effects of mastitis.

Mastitis in pre-fresh heifers can be a source of infection for the milking herd and negatively impact milk quality. Factors associated with heifer mastitis are feeding discard mastitic milk, group penning pre-weaned heifers, contaminated bedding leading to soiled teats, teat skin injuries and flies. Bacteria growing on the teat skin are a significant source of new infections. Many of the infections are present at the time of breeding and pregnancy confirmation. A variety of bacteria and mycoplasmas are involved and some are very resistant to treatment. With veterinary supervision, pre-fresh heifers can be successfully treated with either dry cow or lactating cow antibiotic therapy. Great care should be taken when infusing heifers and thought should be given to potential drug residue in milk.

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