



Staphylococcus aureus: A Practical Summary for Controlling Mastitis

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Introduction

Staphylococcus aureus (*S. aureus*) mastitis is extremely difficult to control by treatment alone. To date, successful control is gained only by preventing new infections and culling infected animals. All staphylococci bacteria are Gram-positive and similar in structure to *Streptococcus* spp. Milk culturing laboratories can distinguish *S. aureus* from other staphylococci using a coagulase test.

Organisms with characteristics of staphylococci and a negative coagulase test are called “coagulase negative staphylococci,” which is commonly abbreviated as CNS. Those that display a positive coagulase test result are considered *S. aureus*.

Where are these organisms found?

Reservoirs of *S. aureus* are **infected udders, teat canals, and teat lesions**, but it is also commonly found on teat skin, muzzles, and nostrils. The bacteria spread to uninfected quarters by teat cup liners, milkers’ hands, washcloths, and flies. Staphylococci can colonize damaged teat skin and teat lesions, which increases the chance of teat canal colonization and subsequent udder infection. Furthermore, **heifers are a reservoir for *S. aureus*** and can calve with an infection, which may be unknowingly spread to uninfected herdmates.

How does *S. aureus* spread to the mammary gland?

The spread of *S. aureus* can occur through **milkers’ hands, washcloths, teat cup liners, and flies**. During milking, irregular vacuum fluctuations can force bacteria up into the teat canal, leading to the potential for new infection. There is considerable debate surrounding the cause of *S. aureus* infection in heifers prior to

first calving, but **feeding *S. aureus*-contaminated colostrum** to calves may be an important route.

How can you prevent and control mastitis caused by *S. aureus*?

Proper milking procedures, including the use of efficacious **pre- and postmilking teat disinfectants**, will help to reduce the number of new infections. Important milking-time considerations, which will help reduce the spread to uninfected cows, include the **use of gloves and single-use towels**, as well as the practice of milking infected cows last.

Furthermore, a backflush system may help reduce bacterial numbers within the liners, but rinsing units by hand is not recommended. Though the data is limited, if an *S. aureus* problem exists on a farm, careful colostrum selection, and even pasteurization, is certainly one area to consider to reduce infection rates. Furthermore, testing new herdmates will help to identify reservoirs of these contagious bacteria.

Vaccination against *S. aureus* has variable outcomes, with some research showing it may reduce the severity and incidence of initial infections with *S. aureus* (Rainard et al., 2021). However, vaccination should not be relied on as the first line of defense against *S. aureus* infection. Talk with your veterinarian before implementing a vaccination protocol.

When are *S. aureus* mastitis infections most likely to occur?

Due to the contagious nature of these bacteria, new infections are likely to occur during lactation. **Cows in early lactation are at increased risk** for new infections because of the increased stress and immune suppression

associated with the postpartum period. Cows with high milk production are not at greater risk than cows with low milk production.

How likely will *S. aureus* be cured?

Successful treatment during lactation is more likely if detected and treated early, whereas the response is lower when treating chronic infections. **New clinical infections should be treated promptly** and appropriately, especially in first-lactation cows. Treatment effectiveness decreases as the cow ages and even as the first lactation progresses.

Use of a strip cup or similar device is strongly recommended for detecting abnormal milk. The use of Dairy Herd Improvement somatic cell count (SCC) records, in addition to visual observation of forestripped milk and milk culture results, will indicate the effectiveness of treatment. Cows with an SCC less than one million are more likely to be cured of an infection compared with those over this cutoff point.

With an increasing prevalence of heifers calving with *S. aureus* mastitis, many researchers evaluated the use of either lactating or dry cow antibiotic therapy to reduce infections at calving. Many producers find it easier to treat heifers closer to calving, when they are readily available in a close-up pen. Therefore, treatment with a lactating-cow product has proven beneficial. Treatment of heifers with a cephapirin-based, lactating-cow mastitis treatment at 14 days before expected calving can reduce intramammary infections at calving (Oliver et al. 1992).

In addition, researchers have looked at the efficacy of pirlimycin treatment both in heifers prior to calving and in all animals as an extended therapy treatment during lactation. In heifers, a single tube of pirlimycin treatment in each quarter approximately six to 12 days prior to calving reduces *S. aureus* infections at calving (Roy et al. 2007).

Single quarter extended therapy with repeated label doses of pirlimycin improves cure rates. Whether these cure rates justify the additional expenses and effort, the increased risk of antibiotic resistance, and the potential risk of antibiotic residue in milk will need to be determined on a case-by-case basis. It is always recommended that you **consult your herd veterinarian** prior to starting any treatment, especially off-label drug protocols.

References

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Roy, J. P., D. Du Tremblay, L. DesCoteaux, S. Messier, D. Scholl, and E. Bouchard. 2007. Effect of precalving intramammary treatment with pirlimycin in nulliparous Holstein heifers. *Canadian Journal of Veterinary Research* 71 (4): 283-91.

Quick Notes

- *S. aureus* is a contagious mastitis pathogen spread from cow to cow at milking.
- Use of gloves, efficacious pre- and postmilking teat disinfectants, and single-use towels will help control this pathogen.
- The younger the animal and the earlier in lactation, the better the chance for cure following antibiotic treatment.
- New infections in heifers may be traced back to feeding of *S. aureus*-contaminated colostrum early in life.
- Antibiotic therapy of *S. aureus* yields limited success; prevention should always be the main focus.

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