

Staphylococcus aureus Mastitis-Cow Factors that Influence the Chance of Cure

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Staphylococcus aureus is an important bacterial cause of contagious mastitis on dairy farms worldwide. More importantly, it is often at the root of chronic high somatic cell counts, recurrent clinical mastitis, and damaged mammary gland tissue. Because it is contagious from cow-to-cow and very difficult to cure, control is heavily dependent on prevention of new infections. To control contagious spread of *Staph. aureus*, the use of proper milking procedures especially the correct use of teat dips is essential. It is also of great importance to identify *Staph.* infected cows by milk culture then segregate and milk these cows last if possible. Decisions must then be made whether to treat the individual case, cull the cow or stop saving milk from the infected quarter. Unfortunately, research indicates the cure rate after treatment ranges from 4-92% with overall success averaging a dismal 20-30%. In an attempt to explain this wide variation in cure rates, a review was conducted by Barkema et al. (2006) of multiple studies from approximately a 20 year span (1985-2005) and it was found that certain factors present in the cow, in the bacteria and in the choice of treatment regimen have a strong impact on the probability of cure but are rarely considered when making treatment decisions. Awareness of these factors gives the producer more tools to use in his decision making process in order to treat only those with the greatest chance of successful cure and return to normal milk production. Conversely, a producer can decide who to cull or at least who to place on a “do not breed list” because her chance of recovery is very low.

The cow factors identified that negatively affect the probability of cure include:

1. Increasing age of cow- The higher “parity” or higher number of times she has calved is associated with lower chance of cure. Older cows are more likely to become infected and develop clinical *Staph. aureus* mastitis than younger herd mates. It is thought that cure rates are lower due to a much larger mammary gland and therefore a much larger volume of tissue for an antibiotic to penetrate and clear of infection.
2. High Somatic Cell Count- The cure rate is much lower if the somatic cell count is high (above 1,000,000 cells/ml) by the time treatment is started.
3. Long Duration of Infection-The longer the mastitis process progresses before treatment, the lower the chance of cure. One study indicated a 70% cure rate in quarters treated within 2 weeks of infection versus a 35% cure rate when treated after 4 weeks in duration.
4. High Bacterial Colony Count- Higher colony forming unit count in the milk was associated with a decreased chance of cure. This count is often reported on milk culture results.
5. More than one Quarter Infected- The higher the number of quarters infected, the lower the chance to cure the cow. If all of the infected quarters are not cured, there is a good

chance of infection spreading to non-infected or re-infecting quarters within the same cow.

6. Infection of the Hind Quarters- Hind quarters consistently are less likely to be cured than front quarters. This could be a consequence of the larger mammary gland structure and difficulty penetrating all areas with sufficient blood levels of antibiotic.

An example of how useful this information is was illustrated by a study published in 1997 by Sol et al. in which a mathematical prediction was made if the cow would be cured with treatment based on her risk factors. The probability of cure of an older cow treated at 150 days in milk, infected in a hind quarter with a SCC of 2,000,000 cells/ml was calculated to be approximately 1%. However a heifer infected in a front quarter at 220 days in milk with a SCC of 500,000 cells/ml had a 61% probability of cure.

It is important to bear in mind that treatment decisions regarding *Staph. aureus* infected cows goes beyond the individual cow. Because it is contagious and often subclinical (milk looks normal), infected animals pose a risk of infection to herd mates at each milking. Identification of quarters producing milk with a high somatic cell count then culture of that milk is your best procedure to diagnose *Staph. aureus* mastitis. Successful treatment or culling of a *Staph.* infected cow results in fewer new mastitis cases, less milk thrown away due to antibiotic therapy, lower somatic cell counts in the bulk tank and less milk production loss due to damaged glandular tissue.