

Klebsiella Mastitis

Klebsiella species are Gram-negative coliform bacteria. *K. oxytoca* and *K. pneumonia* are mastitis pathogens.

Source / Transmission

Klebsiella and other coliform bacteria are found in high numbers in organic matter, such as bedding and manure. Udders become infected with coliform bacteria through contact with organic matter in the environment or during milking. *Klebsiella* bacteria are shed in high concentration in the feces and milk of infected cows. Some *Klebsiella* infections have been shown to occur during milking when milk from an infected cow contaminates the milking unit and passes the infection to the next cow or cows that are milked. In addition, some types of bedding, particularly wood by-products, have been associated with high concentrations of *Klebsiella*.

Infection

Similar to *E. coli*, infection of the mammary gland with *Klebsiella* causes an immune response in which the bacteria are killed by white blood cells and endotoxin (LPS) is released. This immune response and the resulting inflammation cause clinical symptoms – see the *E. coli* factsheet for more details. *Klebsiella* cases are approximately 1/3 mild, 1/3 moderate and 1/3 severe¹. Unlike *E. coli*, *Klebsiella* invade deeply into the udder tissue and damage the secretory capacity of the gland. This means that some *Klebsiella* infections become chronic, and affected cows suffer long-term decreased milk production.

Treatment

The spontaneous cure rate for *Klebsiella* is less than that of other coliforms (estimated around 35%), and management of these cases can be very frustrating for the dairy producer. With treatment, cure rates may only be as high as 50%.² Review the SCC history of cows known to be infected with *Klebsiella* mastitis to decide whether treatment may be warranted. One or more previous months with a SCC over 200,000 is likely evidence of a chronic infection.

No intramammary antimicrobials are labeled for treatment of *Klebsiella* mastitis, so any intramammary

antimicrobial therapy is extra-label use and must be conducted under the supervision of a veterinarian.

Like *E. coli*, cows with severe cases of coliform mastitis should be treated with systemic and supportive therapies, including fluids, anti-inflammatories and systemic antimicrobial therapy.

Control

Since cows infected with *Klebsiella* may become chronic and subclinical, identification and management of these cows is important to control transmission and reduce the reservoir of infection in the herd. Chronically infected cows should be segregated and milked last, and culled when possible. As with other contagious mastitis pathogens, prompt detection of cows with new mastitis infections is also important to minimize transmission and the potential for chronic infections to develop.

Maintaining a clean, dry environment for cows is important to reduce exposure of the teat end to dirt and manure. This includes frequent scraping of alleys and holding pens, and keeping stalls or areas where cows lie down clean and well-bedded. The type of bedding used should also be considered. Pre- and post-milking teat disinfection and good milking hygiene is important to minimize transmission during milking. Coliform mastitis vaccines have proven effective at reducing the severity of clinical cases and are recommended in most herds.

References

¹ Managing Mastitis Pathogen Series: *Klebsiella*, <http://www.milkquality.wisc.edu>

² Pinzon et al. 2011. Decision tree analysis of treatment strategies for mild and moderate cases of clinical mastitis occurring in early lactation. *J. Dairy Sci.* 94(4):1873-1892