

Mastitis in Goats

UNP-102

Introduction

Mastitis is an inflammation of the mammary gland (udder) that causes a chemical and physical reaction in milk produced by goats. It is more frequent in dairy and meat goats raised under intensive and semi-intensive management practices. Depending on the severity of the disease, mastitis could result in decreased revenues for producers.

Mastitis is generally associated with poor hygienic practices and caused by the bruising of mammary tissue or teats from traumas, nursing, fly bites, or other wounds to the skin that provide an important barrier to infection. Mastitis is also associated with viral, bacterial or fungi and their toxins. Under stressful conditions such as extreme temperatures, muddy and wet living conditions, or a sudden change in diet, a doe's immune system is compromised and has a difficult time fighting off the invasion of foreign bodies that cause diseases like mastitis.

Another predisposing factor is the abnormal anatomy of the udder or teat. Infection occurs when infectious agents reach the mammary gland. The infectious agent enters through the milk canal, interacts with the mammary tissue cells, and multiplies. Some microorganisms release toxins. The mammary tissue reacts to these toxins and becomes inflamed. Does can contract infection after birth, but infection can also occur during lactation and after dry periods.

The most common bacteria that causes mastitis in goats are:

Coagulase-negative staphylococci bacteria, including *Staphylococcus aureus*, *Streptococcus agalactiae*, *S. uberis*, *S. dysgalactia*, and *S. caprae* *Mycoplasma capricolum*; Enterobacteria such as *Escherichia coli* coliforms (*Pseudomonas aeruginosa*, and *Clostridium spp.*)



Check for the presence of milk coagulation as an indicator of mastitis

The caprine arthritis-encephalitis virus (CAEV) causes mastitis in goats. In addition, mastitis can result from yeast infection, and it appears to be associated with the frequent use of penicillin, along with the prolonged and repetitive use of systemic and intra-mammary infusions.

Clinical Signs

The acute systemic form of mastitis comes on suddenly with an elevated fever above 105° F and an accelerated pulse. A doe may move slowly, experience depression, and lose its appetite. Typically, the mammary gland is hard, swollen, and reddish in color. It may also be hot and sensitive to touch. Milk secretions are watery and yellowish in color. A doe's milk may also flake and clot. In most severe cases, mastitis can be fatal. The acute form, however, can be easily diagnosed by the signs and presence of white blood cells in the milk.

The chronic form of mastitis occurs as a persistent and incurable infection. The udder may have hard lumps as a result of bacteria forming colonies and reactions occurring in the mammary tissues. In chronically affected halves, agalactia, which is the lack of milk, may occur.

The subclinical mastitis causes the most concern among producers and veterinarians because there are no visible signs of the disease. There is no swelling of the udder or detectable abnormalities in the milk to indicate the presence of mastitis. The sub-clinical form can eventually develop into the chronic clinical form of mastitis.

Diagnosis

Diagnosis is based on signs and history of the herd. A microbiologic milk culture, a somatic cell count (SCC), or an Enzyme-Linked ImmunoSorbent Assay (ELISA) test are used to diagnose infection. However, the microbiological culture is the most reliable source of diagnosis of mastitis of goats. Research data suggest that microbiologic culture of a single milk sample is reliable for detection of causal agent of the infection.

The SCC and the California Mastitis Test (CMT) are the most common tests used to diagnose mastitis in dairy goats. However, research has shown a lower significant relationship between the SCC and mastitis in goats.

The CMT is used to detect subclinical mastitis. The test is based on the reaction between the CMT reagent and the DNA genetic material of the somatic cells. A higher concentration in somatic cells leads to a higher CMT score. CMT scores are directly related to average somatic cell counts. The following table shows how they are related:

- N = (Negative)
- T = (Trace) indicate Subclinical Mastitis
- 1 = Subclinical Mastitis
- 2 = Serious Mastitis Infection
- 3 = Serious Mastitis Infection

Treatment

The treatment should be based on the results of the microbiologic culture obtained from milk samples. Dry off the affected half, and apply a commercially intramammary infusion of 2 percent chlorhexidine solution into affected half twice at 24-hour intervals. Treatment during the dry-off period is an efficient method for the cure of subclinical mastitis and for control of somatic cell counting. Drugs should be

administered for a period of 5 to 10 days to allow efficacy of the product.

The use of antibiotics or corticosteroids are recommended in some cases. Antibiotics like benzylpenicillin, cloxacillin, amoxicillin plus clavulanic acid, cephalonium and cefoperazone, erythromycin, tylicosin, kanamycin, penicillin, ampicillin, erythromycin, or tetracycline have been recommended to treat mastitis. However, cure rates may vary from animal to animal and according to the severity of the case. After treating goats with antibiotics, it is necessary to withdraw drug treatment to prevent antibiotics from building up in the milk, and meat that can be hazardous to humans. Dairy goat owners are advised to test milk from treated animals before readmitting them back into the milking program.

Glucocorticoids, can be administered early in the course of disease. Administration of dexamethasone in the mammary gland has been reported to reduce swelling.

In addition, intramammary infusing with ointments used to treat mastitis among dairy cows is effective among goats as well. However, observe tissue irritation after administration intramammary antibiotics.

Prevention

- Improve hygiene of the barn, milking practices, and utensils used for milking.
- Provide a clean environment with minimum stress for the goat herd. Dairy goats should be dehorned to avoid accidents and trauma to mammary glands.
- Kidding pens must be disinfected and bedding removed daily.
- Prevent foot rot and foot scald since foot infection has been attributed to mastitis.
- Treat wounds and drain abscesses properly; particularly watch for caseous lymphadenitis abscess in the udder.
- Improve milking techniques; disinfect teats and dry with paper towel before and after milking by immersing teats in an aseptic solution.
- Cull chronically infected goats from the herd.
- Purchase animals from a known source and palpate mammary glands.



Improve milking techniques and hygiene of the barn and maternity pens to prevent infection

- To dry off a mammary gland, simply stop milking the affected half. The lack of mechanical stimulation will cause the half to dry off. This procedure helps to reduce treatment costs and increase the efficacy of the drug to prevent reinfection.
- Isolate infected does from the herd and treat and to prevent transmission to other animals. Consider using 1 percent iodophor or 4 percent hypochlorite as a post-milking teat dip after milking; then dry with paper towels.

- Watch for does that have aborted and treat for uterine infection. The same microorganisms that cause abortion in does can also cause mastitis.
- Test dairy herds for tuberculosis, caprine arthritis encephalitis, brucellosis, and leptospirosis.

Note: Treatments involving extra-label drug use require milk and meat withholding periods. Consult local veterinarian for using extra-label drugs.



Post-milking teat dipping to prevent infection: the teats are dipped with a disinfectant solution (1% iodophors or 4% hypochlorite) after milking, then dry with paper towels

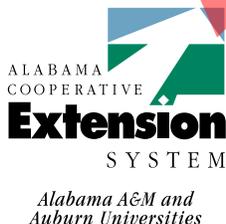


Kidding pens must be disinfected and bedding removed daily



References

- Berri, M., Rousset, E., Champion, J. L., Russo, P., and Rodolakis, A. (2007, August). Goats may experience reproductive failures and shed coxiella burnetii at two successive parturitions after a Q fever infection. *Research in Veterinary Science*, 83(1), 47-52.
- Brouillette, E., Grondin, G., Lefebvre, C., Talbot, B. G., and Malouin, F. (2004, August). Mouse mastitis model of infection for antimicrobial compound efficacy studies against intracellular and extracellular forms of staphylococcus aureus. *Veterinary Microbiology*, 101(4), 253-262.
- Chávez González, Y. R., Ros Bascuñana, C., Bölske, G., Mattsson, J. G., Fernández Molina, C., and Johansson, K. E. (1995, November). In vitro amplification of the 16S rRNA genes Mycoplasma bovis and Mycoplasma agalactiae by PCR. *Veterinary Microbiology*, 47(1-2), 183-190
- Hötzel, I., and Cheevers, W. P. (2001, August). Host range of small-ruminant lentivirus cytopathic variants determined with a selectable caprine arthritis-encephalitis virus pseudotype system. *Journal of Virology*, 75(16), 7384-7391.
- Karzis, J., Donkin, E. F., and Petzer, I. M. (2007, June). The influence of intramammary antibiotic treatment, presence of bacteria, stage of lactation and parity in dairy goats as measured by the California Milk Cell Test and somatic cell counts. *Onderstepoort Journal of Veterinary Research*, 74(2), 161-167.
- Kyozaire, J. K., Veary, C. M., Petzer, I. M., and Donkin, E. F. (2005, June). Microbiological quality of goat's milk obtained under different production systems. *Journal of the South African Veterinary Association*, 76(2), 69-73.
- Merck & Company, Incorporated. (2008). *The Merck veterinary manual*. New Jersey: Merck & Company, Incorporated.
- Moroni, P., Vellere, F., Antonini, M., Pisoni, G., Ruffo, G., and Carli, S. (2004, June). Antibiotic susceptibility of coagulase-negative staphylococci isolated from goats' milk. *International Journal of Antimicrobiological Agents*, 23(6), 637-640.
- Moroni, P., Pisoni, G., Antonini, M., Ruffo, G., Carli, S., Varisco, G., and Boettcher, P. (2005). Subclinical mastitis and antimicrobial susceptibility of staphylococcus caprae and staphylococcus epidermidis isolated from two Italian goat herds. *Journal of the American Dairy Science Association*, 88, 1694-1704.
- National Mastitis Council. (1990). Procedures for collecting milk samples. In *Microbiological Procedures for the Diagnosis of Bovine Udder Infection* (3rd ed.). Retrieved November 7, 2008, from <http://www.nmconline.org/sampling.htm>.
- Poutrel B, de Crémoux R., Ducelliez M., Verneau D. (1997). Control of intramammary infections in goats: impact on somatic cell counts. *Journal of Animal Science*, 75(2), 566-570.
- Schweiz, A. and Schweiz, T. (2006, December). Prevalence of subclinical udder infections and individual somatic cell counts in three dairy goat herds during a full lactation. *Schweiz Arch Tierheilkd*, 148(12), 641-648.
- Sela, S., Hammer-Muntz, O., Krifucks, O., Pinto, R., Weisblit, L., and Leitner, G. (2007, November). Phenotypic and genotypic characterization of Pseudomonas aeruginosa strains isolated from mastitis outbreaks in dairy herds. *Journal of Dairy Research*, 74(4), 425-459.



UNP-102

Maria Lenira Leite-Browning, DVM, Extension Animal Scientist, Alabama A&M University

For more information, call your county Extension office. Look in your telephone directory under your county's name to find the number.

Published by the Alabama Cooperative Extension System (Alabama A&M and Auburn Universities) in cooperation with the U.S. Department of Agriculture. An Equal Opportunity Educator and Employer.

New December 2008; UNP-102

© 2008 by Alabama Cooperative Extension System. All rights reserved.