Contagious Agalactia in Sheep and Goats

► *Contagious agalactia is a common disease that can affect dairy sheep and goats around the world*

Introduction

Contagious agalactiae (CA) is a form of mycoplasmosis. Mycoplasmosis or *Mycoplasma* is costly for the dairy sheep and goat industry and can lead to incidences of mastitis (inflammation of mamary glands), arthritis (inflammation of joints), keratoconjunctivitis (pink eye), bronchopneumonia (inflammation of the lungs), and abortion among small ruminant animals. It is caused by a microorganism of the genus *Mycoplasma*.

Although the main causal agent is the *Mycoplasma agalactiae*, the *M. mycoides* subspecies *capri (Mmc)*, *M. capricolum* subspecies *capricolum (Mcc), and M. putrefaciens* also affect sheep and goats. *Mycoplasma ovipneumoniae* is associated with bronchopneumonia and produces high mortality in kids and lambs.

Mode of Transmission

The disease is transmitted by the introduction of a carrier into a goat herd or sheep flock. The carriers, animals that are chronically infected that are not displaying symptoms, can infect other susceptible animals in the herd or flock. Symptomless does and ewes may shed *Mycoplasma* strain mainly in their milk for a long time. Transmission occurs when lambs or kids are nursing. The incubation period ranges from 1 week to 2 months. Studies have shown that for the disease to develop, *Mycoplasma spp* must invade the host cells and cause further tissue damage. *Mycoplasma* infection can lead to subclinical mastitis (disease present but not easily identifiable) cases and further develop into chronic cases. The disease can also be transmitted sexually. Asymptomatic buck and ram (no symptoms present) carriers are a concern when it comes to transmitting and controlling the spread of the disease. An infected herd's morbidity rate (percent of sick animals) can reach up to 90% and mortality up to 30%, respectively.

Symptoms

Sheep flocks and goat herds may experience acute outbreaks of CA and chronic cases are common in some animals. The degree of severity and clinical signs depend on the genetic make-up of the infecting *Mycoplasma* specie. Inflammation of the mammary glands (mastitis), keratoconjunctivitis (pinkeye) and polyarthritis (inflammation of the joints) are the most common signs of CA.

Severely infected animals can exhibit severe lameness due to polyarthritis with hot swollen joints, weight loss and fever. Bronchopneumonia is frequently associated with highly mortality rates in lambs and kids that exhibit a cough, shortness of breath, runny nose, loss of appetite, and severe weakness. Abortion can also occur frequently in infected herds and flocks.

Diagnosis

Serological diagnosis can confirm a clinical diagnosis. A reliable diagnosis can be achieved by isolating the *Mycoplasma* strain from the milk of infected does and ewes, or from synovial fluid of animals with polyarthritis, and from eye or nose secretions of pinkeye and pneumonia cases. The ELISA (immunologic test) is commonly used. Complementary immunoblotting test is applied. Polymerase chain reaction (PCR) tests can be applied in the diagnosis of the *M. ovipneumoniae*. Post-mortem diagnosis can be achieved by isolation of *Mycoplasma* from udder, regional lymph nodes, joints, and lungs tissues. Samples must be cooled at 4°C and submitted rapidly to a microbiology laboratory.

Treatment

Mycoplasma can be treated with antibiotics such as tetracycline, erythromycin, tylosin, or tiamulin. The use of erythromycin and tylosin can destroy milk-producing tissue in small ruminants. Prognosis for complete recovery is guarded. Culling of infected animals is highly recommended.

Prevention

The biggest challenge is to develop methods of diagnosis capable of accurate detection of chronic and subclinical infections, and the development of high efficacy vaccines to prevent it.

- Avoid purchasing breeding stock from unknown sources. Screen through serology the breeding stock. Sick animals must be isolated from the rest of the flock or herd and culled.

- Apply biosecurity measures: disinfect isolation pens and contaminated materials before mixing with healthy animals.

- Separate lambs and kids from a positive mother at birth, and feed heat treated colostrum to 56°C for 1 hour. Also feed them with pasteurized milk or a milk replacer.

- Apply California Mastitis Test to identify does and ewes with sub-clinical mastitis before the treatment.

- Does and ewes with mastitis should have milk samples withdrawn and sent to a diagnostic laboratory for microbiological isolation of the agents, and to determine treament.

- Keep a closed herd.

- Apply sanitary measures and use a new needle per animal when giving shots.

References

Becker, C. A., Ramos, F., Sellal, E., Moine, S., Poumarat, F., & Tardy, F. (2012, August). Development of a multiplex real-time PCR for contagious agalactia diagnosis in small ruminants. *Journal of Microbiological Methods, 90*(2), 73-79.

Bergonier D., & Poumarat, F. (1996, December). Contagious agalactia of small ruminants: epidemiology, diagnosis and control. *Revue scientifique et technique* (International Office of Epizootics), *15*(4), 1431-1475.

Bergonier, D., Berthelot, X., & Poumarat, F. (1997, December). Contagious agalactia of small ruminants: current knowledge concerning epidemiology, diagnosis and control. *Revue scientifique et technique* (International Office of Epizootics), *16*(3), 848-873.

Besser, T. E., Cassirer, E. F., Potter, K. A., VanderSchalie, J., Fischer, A., Knowles, DP.,…Srikumaran, S. (2008, February). Association of *Mycoplasma ovipneumoniae* infection with population-limiting respiratory disease in free-ranging Rocky Mountain bighorn sheep (*Ovis canadensis canadensis*). *Journal of Clinical Microbiology*, *46*(2), 423-430.

Besser, T. E.., Cassirer, E. F.., Potter, K. A., & Foreyt, W. J. (2017, June 7). Exposure of bighorn sheep to domestic goats colonized with *Mycoplasma ovipneumoniae* induces sub-lethal pneumonia. *PLoS One, 12*(6):e0178707.

Bowen, J. S. (2018). Mycoplasmosis in goats. In *Merck Veterinary Manual*. Retrieved from https://www.merckvetmanual.com/musculoskeletal-system/lameness-in-goats/mycoplasmosis-in-goats#v3284164.

Carolina, C. A. L., Vidotto, O., Conrado, F. O., Santos, N. J. R., Valente, J. D. M., Barbosa, I. C.,…Vieira, R. F. C. (2017, December). *Mycoplasma ovis* infection in goat farms from northeastern Brazil. *Comparative Immunology, Microbiology and Infectious Diseases, 55*, 1-5.

Gómez-Martín A., Corrales, JC., Amores,,J., Sánchez, ,A. Contreras, A., Paterna,A., & De la Fe, C. (2011, November). Controlling contagious agalactia in artificial insemination centers for goats and detection of *Mycoplasma mycoides* subspecies capri in semen. *Theriogenology, 77*(6), 1252-1256.

Gómez-Martín, A., Amores, J., Paterna, A., & De la Fe, C. (2013, October). Contagious agalactia due to *Mycoplasma spp.* in small dairy ruminants: Epidemiology and prospects for diagnosis and control. *The Veterinary Journal, 198*(1), 48-56.

Gómez-Martín, A., Uc, N., Vieira, L. A., Gadea, J., Cadenas, J., Sánchez, A., & De la Fe, C. (2015, March). Survival capacity of *Mycoplasma agalactiae and Mycoplasma mycoides subsp capri* in the diluted semen of goat bucks and their effects on sperm quality. *Theriogenology, 83*(5), 911-919.

Hegde, S., Hegde, S., Spergser, J., Brunthaler, R., Rosengarten, R., & Chopra-Dewasthaly, R. (2014, November). In vitro and in vivo cell invasion and systemic spreading of Mycoplasma agalactiae in the sheep infection model proliferating upon favorable conditions to cause persistent chronic infections. *International Journal of Medical Microbiology*, *304(*8), 1024-1031.

Hegde, S., Gabriel, C., Kragl, M., & Chopra-Dewasthaly, R. (2015, July). Sheep primary cells as in vitro models to investigate *Mycoplasma agalactiae*. *Pathogens and Disease*, *73*(7), pii: ftv048.

Hegde, S., Hegde, S. M., Rosengarten, R., Chopra-Dewasthaly, R. (2016, September 23). *Mycoplasma agalactiae* induces cytopathic effects in infected cells cultured in vitro. *PLoS One*, *11*(9), e0163603.

Olaogun, O. M., Kanci, A., Barber, S. R., Tivendale, K. A., Markham, P. F., Marenda, M. S., & Browning, G. F. (2017, October). Survey of Victorian small ruminant herds for mycoplasmas associated with contagious agalactia and molecular characterisation of *Mycoplasma mycoides subspecies capri* isolates from one herd. *Australian Veterinary Journal, 95*(10), 392-400.

Poumarat, F., Le Grand, D., Gaurivaud, P., Gay, E., Chazel, M., Game, Y., & Bergonier, D. (2012, July 9). Comparative assessment of two commonly used commercial ELISA tests for the serological diagnosis of contagious agalactia of small ruminants caused by *Mycoplasma agalactiae*. *BMC Veterinary Research, 9*(8), 109.

Maria Leite-Browning, DVM, *Extension Animal Scientist,* Alabama Agricultural and Mechanical University

For more information, contact your county Extension office. Visit www.aces.edu/directory.

New April 2018, UNP-2129

www.aces.edu