

An Overview of Mastitis

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ABSTRACT

Mastitis is the infection of teats, which is commonly present in the livestock of developing countries, including Pakistan. It is caused by multiple bacteria, fungi, and other infectious agents. It causes milk quality deterioration and destruction of mammary glands. It can be diagnosed using microscopic, chemical, and enzymatic methods. It can be controlled by antibiotics, anti-inflammatory drugs, and vaccines. Its control is necessary to improve milk hygiene and quality.

Introduction

Mastitis is the inflammation of the mammary glands of lactating animals [1]. Mastitis is a commonly prevalent disease which can infect all the mammals. It has been known for a long time and has been a great problem for animals' health and wellbeing. The infected animals remain in pain and tension because of the destruction of glandular tissues of teats. Currently, multiple animals are suffering from mastitis, and they are producing raw quality milk, which is injurious for consumer health [2]. Mastitis leads to wastage of milk as milk cannot be used for processing of products. Mastitis leads to premature deterioration of milk and a great fraction of milk is lost before going to end consumers. Along with this issue, mastitis can lead to the transferring of multiple infectious agents of zoonosis [3].

Etiology/ Transmission

Mastitis can be caused by multiple factors, including infectious and noninfectious agents. Noninfectious factors can be physical trauma, injury, or any pruritic chemical which upon contact with mammary gland damages mammary tissues and leads to inflammation of cells. Infectious agents may be bacteria, fungi, or some opportunistic protozoa. Milk is the best growth medium for multiple infectious agents and when any bacteria enter inside the cell, they easily grow on the infected cells. Multiple bacteria, including *Staphylococcus aeris*, *E. coli*, *Brucella melitensis*, *mycoplasma bovis*, *klebsiella spp.* etc. are among the major causative agents. Some fungi also can grow inside the mammary gland and can cause deterioration of the mammary glands. Multiple types of fungi, i.e., *Aspergillus*, *Cryptococcus*, *Histoplasma* etc., are notorious agents causing the mycotic fungi.

Pathogenesis and clinical signs

In the mastitis, milk-producing cells are destroyed, and the damage of epithelium occurs. The white blood cells invade the epithelium and puss is formed. The milk production is disturbed. Anaerobic bacteria convert the lactose of milk to lactic acid, hence disturbing the sweet taste of milk to sour taste. Anaerobic bacteria convert lactose into ketone bodies, causing milk to give a foul smell. If the damage extends to blood vessels, the platelets try to counter the damage through inflammatory and clotting mechanisms. However, if they fail then bleeding can occur leading to heavy blood mixed milk [4,5]. Damage of the mammary gland leads to inflammation and swelling, which makes the teat painful. Clinical signs include abnormality of udder e.g., change in color to red, stiffness, increased temperature and swelling etc. change in milk taste, color, and smell along with a decrease in milk quantity also indicates mastitis [6].

Diagnosis

Diagnosis of mastitis depends on the type of mastitis. Mastitis may be clinical or subclinical. Clinical mastitis can be diagnosed easily by visual signs. Detection of subclinical mastitis can be done using the California field mastitis test or by surf field mastitis test. In this test, common detergent or California reagent can be used for detection of infection in milk and milk can be graded on various scales. Microscopic detection involves counting of somatic cells and bacterial colony forming units [7]. Mastitis can be diagnosed using a pH meter. Normal pH of milk is little acidic (6.6) while mastitic milk tends to shift toward alkaline pH, which can be used for diagnosis of subclinical mastitis. Other tests include

catalase assay and resazurin rennet assay. They also can be used for the detection of mastitis [8].

Control

Control of mastitis depends upon the type of mastitis, and the etiological agent involved in the mastitis. Ant inflammatory agents are provided to reduce inflammation. Immune boosters are given to boost immunity along with long-acting broad-spectrum antibiotics that are used to reduce bacterial development. Physical massage and topical applications also assist in the reduction of signs. Intramammary infusion of antibiotics is recommended to stop the infection. Vaccines of mastitis also are being developed. Mastitis can be prevented by hygienic management of animals, providing comfortable bedding and hygienic floor. Awareness of farmers is necessary to reduce mastitis [9].

Conclusion

Mastitis is a commonly prevalent problem of lactating animals, causing economic concerns and public health problems. It is needed to be aware farmers and start mastitis control programs to limit mastitis. The control of mastitis is crucial to improve the milk production and quality of milk, which will lead to economic stability and improve the health of consumers.

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