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Mastitis in dairy animals: unraveling the path to prevention and control

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ABSTRACT

Mastitis is a common disease of dairy animals that causes inflammation of the mammary glands resulting in decreased milk production and poor milk quality. it may be caused by infectious agents or by other factors including injury to udder and improper milking practices. Mastitis leads to severe economic losses because of poor milk quality, decreased milk quantity, treatment costs and culling of animals. A diversified approach is required for mastitis prevention and control. Dry cow therapy, proper vaccination, proper nutrition and good housing management leads to reduction of mastitis risk in dairy animals. Effective mastitis control leads to increased milk production, less expense, and overall good herd health. This can be achieved by efficient management techniques, treatment alternatives, record-keeping, and data analysis. Dairy producers can minimize the impact of mastitis, enhance milk quality and output, and generate revenue by implementing these preventive measures into practice.

Introduction:

Mastitis is a common and costly condition that primarily affects dairy animals. It is characterized by mammary gland inflammation and may be brought on by several infectious and non-infectious sources.

Mastitis is an infection of the udder, more especially the mammary gland, which can alter the composition and quality of the milk. It is primarily brought on by pathogen entering the udder and infecting it [1]. However, it can also arise as a result of other things such as physical injury, hormonal abnormalities and inadequate milking techniques. Mastitis is significant since it has a negative effect on the health of the herd as well as milk production and quality. Mastitis lowers milk productivity because sick cows produce less milk, culling rates go up and treatment costs go up. Mastitis also alters the composition of milk, causing a rise in somatic cell count (SCC), the presence of bacteria, and inflammatory compounds, rendering the milk unfit for consumption or use in the production of dairy products [2]. Mastitis costs dairy producers and the sector as a whole a significant amount of money [3]. Reduced milk output, poorer milk quality, higher veterinarian expenditures, treatment costs, and possible animal losses all have an impact on finances. Mastitis not only affects individual cows but also negatively impacts the health and production of the entire herd. Mastitis has an economic impact that extends beyond acute losses. Dairy farms with a high mastitis prevalence may see lower milk sales, a tarnished reputation, and lost consumer confidence in the quality and safety of their dairy products.

Etiology of Mastitis:

Mastitis is caused mostly by infectious organisms, such as bacteria, invading the udder and causing inflammation. Understanding the cause of mastitis is critical for developing effective control and preventative techniques. Staphylococcus aureus, Streptococcus agalactiae, Streptococcus uberis, Escherichia coli, and Klebsiella spp. are the most prevalent bacteria that cause mastitis [4]. These bacteria can enter the udder through the teat canal during milking or from other sources. Each bacterial pathogen has unique properties and means of transmission. For example, Staphylococcus aureus can survive in the udder and can transfer from cow to cow during milking. Streptococcus agalactiae is mostly spread by infected milking equipment or hands. Environmental infections such as Streptococcus uberis and Escherichia coli are regularly identified in cows and can enter the udder through contaminated bedding, water, or feces. While bacterial infections are the most common cause of mastitis, non-infectious factors can also play a role. These include udder injuries, trauma from unsuitable milking practices, prolonged exposure to wet and unclean circumstances, inadequate udder cleanliness, and hormonal abnormalities. Non-infectious reasons frequently compromise the udder's defense mechanisms, rendering it more vulnerable to bacterial invasion.

Risk Factors for Mastitis:

Mastitis is a multifactorial disease, and understanding the risk factors associated with its occurrence is crucial for effective control and prevention.

Cow-related factors play a significant role in mastitis susceptibility. Various aspects related to the cow's physiology and health can influence the likelihood of mastitis occurrence. Some important cow-related risk factors include Age and parity, Udder conformation and Genetic predisposition. Milking practices and the quality of milking equipment have a direct impact on mastitis prevalence. Inadequate milking routines and faulty equipment can introduce pathogens or cause damage to the cow's teats, leading to mastitis [5]. Key risk factors in this category include Milking hygiene, Milking machine function and Milker competence and training.

The environment in which cows are housed and managed can significantly influence mastitis prevalence. Several environmental factors can create a conducive environment for bacterial growth and increase the risk of mastitis. Key risk factors in this category include Bedding materials and cleanliness, Ventilation and cow comfort and Exposure to damp or unsanitary conditions.

Clinical Signs and Diagnosis:

The obvious indications of inflammation and infection in the udder are referred to as clinical mastitis. It is distinguished by visible changes in the milk, udder, and overall health of the cow. Clinical mastitis frequently causes changes in milk color, consistency, and odor. The milk could be clumpy, runny, red, or flaky. It may have an unpleasant odor or flavor. The udder of an infected cow may become swollen, hot to the touch, and painful. The udder skin may appear red or damaged, with obvious lumps or abscesses.

Subclinical mastitis refers to infections that do not exhibit visible signs but still cause damage and reduced milk quality. It is crucial to identify subclinical mastitis as it can contribute significantly to overall mastitis prevalence and economic losses. Detection methods for mastitis detection include California Mastitis Test (CMT), Somatic Cell Count (SCC) measurement, Individual cow milk culture, Bacteriological culture, Polymerase Chain Reaction (PCR), Immunoassays (ELISA).

Mastitis Control Strategies:

Mastitis control is essential for maintaining overall health and productivity of dairy animals. It can be achieved by implementing milking hygiene practices, teat preparation and sanitization, proper milking machine maintenance, and regular udder health monitoring [6]. Implementing the milking hygiene practices during the milking process play an important role in preventing the spread of mastitis. Clean and hygienic milking routine must be followed in this regard. This involves a clean atmosphere, clean hands and gloves, and teat preparation before and after milking. Mastitis can be avoided by properly cleaning and preparing the teat. To ensure effective operation, the milking machine should undergo routine maintenance and inspection. Proper hoover levels, regular machine inspections, and routine cleaning and sanitization are all part of this.

Mastitis Prevention Measures:

1. Dry Cow Therapy:

Dry cow therapy is an important mastitis prevention method. It entails injecting antibiotics into cows' udders during the dry period, which is the time between lactations when the cow is not producing milk. Dry cow therapy tries to eliminate existing intramammary infections while also preventing new infections during the dry time [7].

2. Vaccination:

Vaccination helps to prevent mastitis by activating the immune system of the cow to develop antibodies against certain mastitis-causing bacteria. Vaccines are available for several of the most common mastitis organisms, including Staphylococcus aureus and Streptococcus agalactiae. Depending on the vaccine and the intended immunological response, vaccination can be done prepartum (before calving) or throughout the lactation phase.

3. Nutrition and its Impact on Mastitis Prevention:

Proper nutrition is essential for dairy cows' immune systems and avoiding mastitis. A well-balanced diet that matches cow nutritional needs aids in the optimization of immunological function and overall udder health. Protein, vitamins (such as vitamin E and vitamin A), and minerals (such as selenium and zinc) are important nutrients for udder health. It is also critical to maintain an optimal body condition score (BCS) by effective food management, since both undernutrition and overnutrition might raise the risk of mastitis.

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4. Housing Management and its Role in Reducing Mastitis Risks:

Proper housing management is critical in lowering mastitis risks. Clean, well-ventilated housing settings reduce exposure to environmental diseases while also providing cows with a comfortable, stress-free living environment. correct drainage to avoid damp and muddy circumstances, frequent cleaning and disinfection of housing facilities, correct ventilation to maintain optimal air quality, and suitable resting places with clean and pleasant bedding materials are all important parts of housing management for mastitis prevention. Overcrowding should also be avoided since it can cause stress and the spread of infectious mastitis bacteria among cows [8].

Mastitis Prevention Protocols:

Implementing efficient mastitis preventive procedures is critical for reducing the occurrence of mastitis in dairy cows. This includes careful milking hygiene practices, comprehensive teat preparation and sanitization, and routine cleaning and maintenance of milking equipment. Udder health monitoring is critical for early identification and rapid action. Visual assessment of the udder and milk, together with somatic cell count (SCC) tests, aids in the identification of instances of subclinical mastitis.

Treatment Options for Clinical Mastitis:

Managing clinical mastitis requires prompt and proper therapy. Antibiotics are widely administered under veterinarian supervision and with strict adherence to specified dose and withdrawal intervals. Individual cow care, proper identification of affected quarters, and meticulous record-keeping are all essential. Monitoring treatment outcomes allows for adjustments in management practices and guarantees that clinical mastitis instances are effectively controlled.

Record-Keeping and Data Analysis for Mastitis Management:

Maintaining thorough records and analyzing data are critical components of effective mastitis management. Comprehensive mastitis case, treatment, and outcome records give useful information. Patterns, risk factors, and areas for improvement are revealed through data analysis. Using this data allows you to make more educated judgements, fine-tune methods, and execute targeted treatments. Effective record-keeping and data analysis increase mastitis management efforts, resulting in enhanced udder health and a lower incidence of mastitis.

Economic Considerations and Cost Analysis:

Mastitis causes significant economic hardship for dairy producers all over the world. According to studies, the economic costs linked with mastitis are enormous. Mastitis-related expenditures amount for nearly $400 to $500 million in the United States alone, according to worldwide research [9]. Mastitis causes significant economic losses in Pakistan, where dairy production is a major industry. Mastitis affects milk output by 10-25% and raises veterinary expenditures by 5-10% each year, according to research done in Pakistan. Mastitis has a significant economic impact on Pakistan's dairy sector, emphasizing the importance of efficient control and preventative methods. Dairy producers can reap large economic rewards from implementing mastitis management and preventive methods. Milk output might rise by 2-3% for every 1% reduction in mastitis prevalence, according to studies. Farmers can improve milk quality by reducing mastitis incidence, resulting in better milk prices and possible market rewards. Effective mastitis control decreases veterinarian expenditures connected with treatments and interventions, which saves money. Farmers can also reduce culling rates and enhance reproductive performance by avoiding mastitis, leading in cheaper replacement costs and improved herd lifetime.

Conclusion:

Mastitis control can be achieved by implementing the prevention and control techniques as early as possible. Apart from the major economic losses, Mastitis also has an impact on milk production, milk quality, animal welfare, and the dairy industry's overall sustainability. Dairy farmers may use preventative measures to lower the incidence of mastitis, enhance udder health, maximize milk supply, lower treatment costs, and boost profitability. Effective management practices are advantageous for individual farms as well as the overall health and productivity of the dairy sector.

Future research and development in mastitis control are still required despite present knowledge and management strategies. Future work should focus on creating improved diagnostic tools, more potent vaccines, and creative mastitis prevention strategies. New technologies like precision farming and genomics have the potential to enhance mastitis management. Furthermore, while taking into consideration regional circumstances and resources, research should address unique problems encountered in various farming systems and geographic areas.

References

[1] Hamadani H, Khan A, Banday M, Ashraf I, Handoo N, Bashir A, et al. Bovine mastitis-A disease of serious concern for dairy farmers. Int J Livest Res. 2013;3(1):42-55.
[2] Sharma N, Singh N, Bhadwal M. Relationship of somatic cell count and mastitis: An overview. Asian-Australasian Journal of Animal Sciences. 2011;24(3):429-38.
[3] Hogeveen H, Huijps K, Lam T. Economic aspects of mastitis: new developments. New Zealand veterinary journal. 2011;59(1):16-23.
[4] Poutrel B, Bareille S, Lequeux G, Leboeuf F. Prevalence of mastitis pathogens in France: Antimicrobial susceptibility of Staphylococcus aureus, Streptococcus uberis and Escherichia coli. J Vet Sci Technol. 2018;9(2):1-3.
[5] Mein GA. The role of the milking machine in mastitis control. Veterinary Clinics: Food Animal Practice. 2012;28(2):307-20.
[6] Bhakat C, Singh AK, Mandal A, Karunakaran M, Mohammad A, Mandal D. Udder health maintenance to augment milk production in dairy cattle: A review. Indian Journal of Animal Research. 2022.
[7] Eberhart R. Management of dry cows to reduce mastitis. Journal of Dairy Science. 1986;69(6):1721-32.
[8] Pyörälä S. New strategies to prevent mastitis. Reproduction in domestic animals. 2002;37(4):211-6.
[9] Janzen J. Economic losses resulting from mastitis. A review. Journal of Dairy Science. 1970;53(9):1151-60.