

Milk fever in dairy animal

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Abstract

India possesses one of the largest livestock populations in the world, with about 193.46 million cattle and 109.85 million buffaloes, which play a vital role in milk production and the livelihood of rural farmers (Department of Animal Husbandry and Dairying, 2022). However, dairy animals are often affected by several metabolic diseases, among which milk fever (parturient paresis) is one of the most common and important disorders. Milk fever usually occurs around the time of calving due to a sudden decline in blood calcium levels, particularly in high-producing cows and buffaloes. The disease is mainly associated with factors such as high milk yield, improper nutrition, mineral imbalance, and advanced lactation age. Affected animals commonly show signs such as weakness, muscle tremors, difficulty in standing, and recumbency, which may lead to serious complications if timely treatment is not provided. Diagnosis of milk fever is generally based on clinical symptoms, recent history of calving, and the animal's response to calcium therapy.

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INTRODUCTION

India has one of the largest livestock populations in the world, which plays an important role in the rural economy and dairy sector. According to the Basic Animal Husbandry Statistics (BAHS) of the Government of India, the country possesses a large number of dairy animals. The total cattle population in India is about 193.46 million, while the buffalo population is about 109.85 million. These animals contribute significantly to milk production and provide livelihood support to millions of farmers in the country (Department of Animal Husbandry and Dairying, 2022). Despite having a very large population of livestock in the country, farmers often do not have adequate knowledge about the various diseases affecting animals. Due to the lack of proper awareness and veterinary information, many livestock diseases remain unrecognized or untreated at the early stage. This situation negatively affects animal health and productivity and ultimately has an adverse impact on the rural economy of India. Among the various diseases affecting dairy animals, milk fever is one of the most important metabolic disorder. Studies have reported that milk fever causes substantial economic losses in the dairy sector due to reduced milk yield, treatment expenses, and loss of productive animals (Goff, 2018).

In severe cases, the disease may lead to the death of animals or premature culling from the herd, further increasing economic losses to farmers (Radostits et al., 2007). In addition, milk fever also increases the risk of other diseases such as mastitis, retained placenta, and ketosis, which further affects animal health and farm profitability (MSD Veterinary Manual, 2023).

WHAT IS MILK FEVER

Milk fever is a metabolic disease of dairy animals, especially cows and buffaloes, that occurs around the time of calving due to a sudden decrease in blood calcium levels (hypocalcemia). This condition usually appears within 24–72 hours after parturition, when the demand for calcium for milk production increases rapidly and the animal's body cannot supply enough calcium. As a result, the affected animal may show symptoms such as weakness, loss of appetite, muscle tremors, difficulty in standing, and in severe cases paralysis if not treated promptly (Radostits et al., 2007).

RISK FACTORS

Milk fever in dairy animals is associated with several risk factors related to nutrition, management, and physiological condition of the animal. High milk producing animals are at greater risk because the demand for calcium increases rapidly at the onset of lactation. Older cows, especially those in the third lactation or later, are more susceptible as their ability to mobilize calcium from bones decreases with age. Improper feeding management during the dry period, particularly diets high in calcium before calving, can reduce the animal's ability to regulate calcium metabolism. In addition, certain breeds such as Jersey and crossbred cows, over-conditioned animals, and lack of proper mineral supplementation also increase the likelihood of milk fever around parturition.

PATHOGENESIS OF MILK FEVER

Milk fever develops due to a disturbance in calcium balance in dairy animals around the time of calving. At the beginning of lactation, a large quantity of calcium is suddenly required for the production of colostrum and milk. Under normal conditions, the body maintains blood calcium concentration through hormonal regulation involving parathyroid hormone (PTH) and active vitamin D, which promote the release of calcium from bones and increase its absorption from the intestine and kidneys. However, in some animals particularly high-producing or older cows these regulatory mechanisms cannot respond rapidly enough to meet the sudden increase in calcium demand. As a result, the level of calcium in the blood decreases, leading to hypocalcaemia.

The reduced calcium concentration interferes with normal neuromuscular function, because calcium is essential for proper nerve transmission and muscle contraction. Consequently, affected animals develop signs such as muscle weakness, tremors, reduced rumen activity, and inability to stand. If the calcium deficit becomes severe and treatment is delayed, the condition may progress to recumbency, circulatory collapse, coma, and even death.

CLINICAL SIGNS OF MILK FEVER

In typical cases of milk fever, affected cows initially show signs of restlessness, excitement, and slight muscle tremors, particularly in the muscles of the head and limbs. As the condition progresses, the animal becomes weak and unsteady, begins to stagger while walking, and eventually goes down into a sitting or sternal position. In many cases, the cow shows a characteristic posture in which the neck is bent or curved to one side, often referred to as an "S-shaped" or "kinked" neck. If the disease becomes more severe and treatment is not provided promptly, the animal may lie flat on its side (lateral recumbency) and may progress to circulatory failure, coma, and even death.

After the animal goes down, several additional symptoms may be observed, including a dry muzzle, dull or staring eyes, cold ears and limbs, constipation, and marked drowsiness. The heartbeat becomes weak

and rapid, and the body temperature often drops below normal, especially during cold, wet, or windy weather conditions. These clinical signs mainly occur due to the significant reduction of calcium levels in the blood, which affects normal nerve and muscle function. In some cases, further complications may develop. For example, bloat (ruminal tympany) is common in animals that are unable to sit upright because the gas produced in the rumen cannot be expelled properly. Additionally, cows that remain recumbent for a long time may become susceptible to secondary problems such as pneumonia or exposure, particularly if they are left outdoors in unfavourable weather conditions.

DIAGNOSIS OF MILK FEVER

Milk fever in dairy animals is usually identified by observing the symptoms shown by the animal, the history of recent calving, and the animal's response to calcium treatment. This disease mostly occurs within one to three days after calving, when the demand for calcium in the body suddenly increases for milk production. Farmers may notice early signs such as restlessness, loss of appetite, muscle tremors, weakness, and difficulty in standing or walking. As the condition progresses, the animal may sit in a sternal position with the neck bent to one side or may lie down and become unable to get up. Other common signs include cold ears and legs, dull eyes, reduced body temperature, and general weakness. When such symptoms appear in high-producing cows or buffaloes shortly after calving, veterinarians usually suspect milk fever.

To confirm the disease, blood tests can be carried out to check the level of calcium in the blood, which is generally found to be much lower than normal in affected animals. However, under field conditions where laboratory testing may not be easily available, veterinarians often rely on a practical method of diagnosis. In such cases, the animal is treated with intravenous calcium solution, and if the animal shows quick improvement such as becoming more alert, attempting to stand, or regaining strength it strongly indicates that the problem was milk fever. For farmers, early recognition of the symptoms and seeking timely veterinary treatment is very important because animals usually recover quickly when calcium therapy is given at the right time. Thus, careful observation of clinical signs, knowledge of the animal's calving history, and the response to calcium treatment together help in the accurate diagnosis of milk fever (Radostits et al., 2007).

TREATMENT OF MILK FEVER

Milk fever is a serious metabolic disorder in dairy animals and requires immediate treatment to restore normal calcium levels in the body. The most common and effective treatment is the administration of calcium solutions, usually calcium borogluconate, to quickly increase the level of calcium in the blood. Generally, about 300–500 ml of a 40% calcium borogluconate solution is given slowly through

intravenous injection by a veterinarian. In many cases, combined mineral solutions containing calcium, magnesium, phosphorus, and dextrose are used because these minerals help improve nerve function, muscle activity, and energy levels in the affected animal.

In addition to intravenous treatment, subcutaneous injection of calcium solution at several sites under the skin may also be given, especially in field conditions. Most animals show rapid improvement within a short time after calcium therapy, often attempting to stand within a few hours. Along with medication, proper care and management are also important. The affected animal should be kept in a comfortable sitting position, placed in a clean and dry shelter, and provided with fresh water and soft feed. In cases where the animal is lying down for a long time, special attention should be given to prevent complications such as bloat or pneumonia.

After recovery, it is recommended not to milk the cow for about 24 hours, and milking should then be gradually resumed over the next few days. Early diagnosis and timely treatment greatly improve the chances of recovery and help prevent serious complications of milk fever (Radostits et al., 2007).

PREVENTION OF MILK FEVER

Milk fever can be largely prevented through proper feeding and management of dairy animals during the transition period, which usually includes the last 3–4 weeks before calving and the first few weeks after calving. During this time, special attention should be given to the animal's diet because mineral imbalance is one of the main causes of milk fever. One of the simplest preventive methods is to limit excessive green fodder and high-calcium feeds during the last two weeks of pregnancy and instead provide good quality hay or balanced dry feed. Maintaining a balanced ration with an appropriate ratio of dietary minerals such as calcium, phosphorus, and magnesium helps the animal maintain normal calcium metabolism and reduces the chances of milk fever.

Another important management practice is to keep dry cows on a relatively low-calcium diet before calving. This practice stimulates the animal's natural calcium-regulating system, enabling it to mobilize

calcium from bones more efficiently when the demand suddenly increases after calving. If the body condition of the cow needs improvement before calving, energy-rich but low-calcium feeds such as cereal grains or certain types of hay can be provided. Cows that are close to calving should also be kept in an easily accessible area or paddock so that farmers can observe them regularly and detect early symptoms of milk fever.

In some cases, preventive mineral supplementation may also be useful. Calcium supplements can be given at the time of calving or shortly after calving to support the sudden increase in calcium demand for milk production. In certain situations, veterinarians may also recommend vitamin D₃ injections a few days before calving, which helps improve calcium absorption in the body. In herds with frequent cases of milk fever, oral calcium or mineral mixtures containing calcium and magnesium may be given around the time of calving to reduce the risk of the disease. With proper nutrition, careful observation, and timely preventive measures, the occurrence of milk fever in dairy animals can be greatly reduced.

CONCLUSION

Milk fever, also known as parturient paresis or hypocalcemia, is a common metabolic disorder of dairy animals that usually occurs around the time of calving. The disease develops due to a sudden decline in blood calcium levels when the demand for calcium increases rapidly for milk production during early lactation. Affected animals commonly show symptoms such as weakness, muscle tremors, difficulty in standing, cold ears and limbs, and recumbency, which may lead to serious complications or even death if timely treatment is not provided. Diagnosis is generally based on clinical signs, recent history of calving, and confirmation through low blood calcium levels or rapid recovery after calcium therapy. Treatment mainly involves the administration of calcium solutions such as calcium borogluconate, along with proper supportive care. The occurrence of milk fever can be reduced through balanced feeding, adequate mineral supplementation, and proper management of animals during the transition period before and after calving, which ultimately helps improve animal health and dairy productivity.

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