VETERINARY TODAY INTERNATIONAL
ISSN 2583-8288

Neonatal Calf Management Scientific Strategies for Improving Survival and Productivity

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doi.org/10.5281/VeterinaryToday.19598270

Abstract

The neonatal period in calves represents a critical window that determines future health, productivity, and survivability. Due to the absence of transplacental transfer of immunoglobulins in bovines, newborn calves are born immunologically naive and rely entirely on colostrum intake for passive immunity. Proper neonatal care, including immediate postnatal management, timely colostrum feeding, appropriate housing, balanced nutrition, and preventive health measures, plays a crucial role in reducing morbidity and mortality. This article provides a comprehensive scientific overview of newborn calf management practices, emphasizing evidence-based approaches to improve calf survival, growth performance, and overall herd productivity. Adoption of these management strategies is essential for sustainable and profitable livestock farming.

Keywords: Newborn calf, Colostrum, Passive immunity, Calf management, Neonatal care

1. Introduction

The neonatal period of a calf, extending from birth to approximately four weeks of age, is a highly critical phase characterized by rapid physiological adaptation to extrauterine life. During this stage, calves are particularly vulnerable to environmental stressors and infectious diseases, resulting in high morbidity and mortality rates if proper management is not ensured.

Due to the epitheliochorial nature of the bovine placenta, there is no transplacental transfer of immunoglobulins, rendering the newborn calf immunologically naive at birth (Radostits *et al*., 2007). Therefore, scientific and timely management practices, especially those related to colostrum feeding, hygiene,

and environmental control, are essential for ensuring calf survival, health, and future productivity (Mee, 2008).

2. Immediate Care After Birth

Immediately after birth, ensuring the establishment of effective respiration is the first priority. Mucus and fetal membranes should be cleared from the nostrils and oral cavity to prevent asphyxia. Physical stimulation, such as rubbing the calf with a clean towel, helps initiate breathing and enhances circulation. Natural licking by the dam not only aids in drying the calf but also promotes maternal bonding and thermoregulation. In adverse climatic conditions, additional measures such as artificial drying and provision of heat sources may be necessary to prevent hypothermia. The umbilical cord should be disinfected promptly using antiseptic solutions such as iodine or chlorhexidine to prevent bacterial infections (Mee, 2008).

3. Colostrum Feeding and Passive Immunity

Colostrum feeding is the cornerstone of neonatal calf management. It provides essential immunoglobulins, nutrients, vitamins, and growth factors necessary for immunity and development (Fig 3.1 & 3.2). Calves should receive colostrum within the first one to two hours after birth, as intestinal permeability to immunoglobulin absorption decreases rapidly after birth (Godden, 2008). The recommended quantity is approximately 10% of body weight within the first 24 hours. High-quality colostrum containing adequate immunoglobulin concentration is essential to prevent failure of passive transfer (FPT), which is associated with increased disease susceptibility and mortality (Godden, 2008).

Fig 3.1 Colostrum feeding

Fig 3.2 Maternal Immunity

4. Housing and Environmental Management

Proper housing is vital to protect calves from environmental stress and disease exposure. Clean, dry, and well-ventilated housing systems, such as individual calf pens or hutches, are recommended to minimize pathogen transmission (Mee, 2008). Bedding materials like straw should be maintained dry and replaced regularly (Fig 4.1). Hygiene practices, including routine cleaning and disinfection of housing and feeding equipment, are essential for maintaining calf health.

Fig 4.1 Housing and Environmental Management

5. Feeding and Nutritional Management

After colostrum feeding, calves should be provided with whole milk or milk replacer at approximately 10% of their body weight per day. Feeding should be done at body temperature to ensure proper digestion. Early introduction of calf starter feed promotes rumen development, while access to clean drinking water supports metabolic processes and hydration (Fig 5.1) (Heinrichs & Heinrichs, 2011).

Fig 5.1 Calf starter feeding

Health Care and Disease Prevention

Newborn calves are susceptible to diseases such as diarrhea and pneumonia, which are major causes of calf mortality. Preventive measures include adequate colostrum intake, proper hygiene, vaccination, and deworming programs. Early detection and prompt treatment of clinical signs are essential for reducing disease severity and improving survival rates. Oral fluid therapy remains a key component in the treatment of calf diarrhea (Smith, 2012).

6. Growth Monitoring and Performance Evaluation

Monitoring growth parameters such as body weight, feed intake, and behavior is essential for evaluating calf health. A target average daily gain of 400–600 grams is considered optimal. Regular monitoring helps in early detection of growth retardation and health issues (Heinrichs & Heinrichs, 2011).

7. Weaning Management & Animal Welfare Considerations

Weaning should be carried out gradually, typically between six to eight weeks of age, when calves are consuming sufficient starter feed. Gradual reduction of milk feeding ensures smooth transition and proper rumen development (Heinrichs & Heinrichs, 2011). Animal welfare is an important aspect of calf management. Providing a clean, comfortable environment, minimizing stress, and allowing natural behaviors contribute to better health and productivity. Welfare-oriented management practices are essential for sustainable livestock production (Mee, 2008).

8. Conclusion

Scientific management of newborn calves is essential for improving survival rates, health, and long-term productivity. Emphasis on colostrum feeding, hygiene, nutrition, and disease prevention significantly enhances calf performance. Adoption of evidence-based practices ensures sustainable and profitable dairy farming.

9. References

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