

Cardiovascular Diseases and Reproduction in Farm Animals

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ARTICLE INFO

Received:  February 20, 2025

Published:  March 04, 2025

Citation: Cornelius Chijioke Nwoga and Jervas Ikechukwu Ugwuoke. Cardiovascular Diseases and Reproduction in Farm Animals. Biomed J Sci & Tech Res 60(5)-2025. BJSTR.MS.ID.009515.

ABSTRACT

Cardiovascular diseases (CVDs) in farm animals, though less studied compared to humans, significantly impact reproductive performance and overall productivity. These diseases, including congenital heart defects, cardiomyopathies, and vascular disorders, can lead to impaired blood circulation, reduced oxygen supply to reproductive organs, and metabolic imbalances. In breeding animals, CVDs are associated with reduced fertility, embryonic loss, and compromised fetal development due to inadequate placental perfusion. Additionally, stress-induced cardiovascular disorders, particularly in high-producing livestock, exacerbate reproductive inefficiencies. Advances in veterinary diagnostics, including echocardiography and biomarkers, have improved early detection and management of CVDs, helping mitigate their effects on reproduction. Preventative strategies, such as genetic selection, optimal nutrition, and stress management, are essential in maintaining cardiovascular and reproductive health in farm animals. This review highlights the interconnection between cardiovascular health and reproductive efficiency, emphasizing the need for integrated management approaches to enhance livestock productivity.

Introduction

Cardiovascular diseases play a significant role in the health and reproduction of farm animals. Understanding these aspects is crucial for improving animal welfare and productivity. The interplay between cardiovascular health and reproductive outcomes is particularly evident in various farm species, highlighting the need for further research in this area. Cardiovascular diseases (CVD) in farm animals, particularly goats, present significant challenges to animal health and agricultural productivity. Various factors contribute to these diseases, including parasitic infections, nutritional deficiencies, congenital defects, and toxic exposures. Understanding these aspects is crucial for effective management and prevention strategies. While cardiovascular diseases are a significant concern in farm animals, some may argue that the focus should also include other health aspects, such as infectious diseases or metabolic disorders, which can equally impact reproductive success and overall productivity. While the focus on CVD in farm animals is critical, it is also essential to consider the broader implications of animal-based diets on cardiovascular health in humans, as these diets can contribute to increased CVD risk due to various biochemical factors [Najjar [1]].

Discussion

Parasitic Infections

- Goats are susceptible to several parasites that can lead to severe cardiovascular issues, such as myocarditis and pericarditis, ultimately causing heart failure [Kumar, et al. [2]].
- Protozoan and rickettsial parasites found in the blood can also inflict significant damage to the cardiovascular system [Kumar, et al. [2]].

Nutritional and Toxic Factors

- Nutritional myodegeneration and exposure to cardiotoxic plants are common causes of heart disease in goats [Soto-Blanco & Cámara, [3]].
- Congenital defects, such as ventricular septal defects, further complicate the cardiovascular health of these animals [Soto-Blanco & Cámara, [3]].

Diagnostic and Monitoring Techniques

Traditional diagnostic methods like electrocardiography (ECG) can be stressful for animals, leading to inaccuracies. Alternatives like photoplethysmography (PPG) offer non-invasive monitoring of cardiovascular parameters (Borchevkin, et al. [4]).

Cardiovascular Diseases in Farm Animals

- **Prevalence and Types:** Cardiovascular diseases, including cardiomyopathy and valvular disease, are common in veterinary species, leading to significant morbidity (Russell [5]).
- **Impact on Production:** The cardiovascular system is vital for the growth and high milk production in dairy cows. Studies show that high-yielding cows exhibit fewer cardiac dysrhythmias compared to low-yielding counterparts, indicating a direct link between cardiovascular health and productivity (Dehkordi, et al. [6]).
- **Genetic Factors:** Genetic predispositions to cardiovascular diseases are noted in purebred animals, which can affect breeding decisions and overall herd health (Meurs [7]).
- **Reproductive Implications**
- **Fetal Growth Restriction (FGR):** FGR in ovine models has been linked to cardiovascular dysfunction in neonates, suggesting that placental insufficiency can lead to long-term cardiovascular issues (Rock, et al. [8]).
- **Cardiovascular Health and Reproduction:** Healthy cardiovascular function is essential for successful reproduction, as it influences nutrient delivery and overall health during gestation.

Conclusion

Cardiovascular diseases (CVDs) in farm animals pose significant challenges to reproductive efficiency and overall herd productivity. The intricate relationship between cardiovascular health and reproduction highlights the need for proactive management strategies to

minimize the impact of CVDs on fertility, gestation, and offspring viability. Early detection through advanced diagnostic tools, combined with appropriate breeding selection, nutritional support, and stress management, can help mitigate the risks associated with cardiovascular disorders. Future research should focus on genetic predispositions, early biomarkers, and improved therapeutic interventions to enhance cardiovascular and reproductive health in livestock. A holistic approach integrating veterinary medicine, genetics, and farm management practices will be crucial in ensuring sustainable and efficient animal production.

Conflicts of Interest

The authors declare that no economic interest or conflict of interest exists.

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ISSN: 2574-1241

DOI: 10.26717/BJSTR.2025.60.009515

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