



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(7): 1171-1172
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www.thepharmajournal.com
Received: 01-04-2022
Accepted: 04-05-2022

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Pathological changes in heart of sheep affected with *Clostridium perfringens* type D enterotoxemia

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Abstract

Enterotoxemia is most common clostridial disease of sheep and also known as overeating disease or pulpy kidney disease, caused by *Clostridium perfringens* type D. The present study was conducted to describe the gross and histopathological changes in heart due to *Clostridium perfringens* type D enterotoxemia in sheep. In the present investigation, a detailed necropsy was performed on 362 sheep irrespective of age, sex and breeds. Out of these, 66 sheep found positive on the basis of gross and histopathological examination of carcasses. An overall incidence of enterotoxemia infection in sheep was recorded as 18.23%. Grossly, heart showed haemorrhages, and congestion. Microscopically, sections of heart showed haemorrhages between the myocardial fibres. Some of sections showed congestion and mononuclear and polymorphonuclear cells infiltration in between the cardiac muscle fibres with separation of myocardial fibres.

Keywords: *Clostridium perfringens* type D, enterotoxemia, heart, histopathology, and sheep

Introduction

Clostridium perfringens causing Intestinal infections are commonly known as enterotoxemia. *Clostridium perfringens* is anaerobic, immobile, gram-positive, rod shaped, bacteria and able to produce spore, a form of resistance that helps it persistence and survival, making *Clostridium perfringens* hardly to complete elimination. This bacterium is classified into five toxigenic groups, viz. type A, type B, type C, type D and type E, based on secretion of four lethal toxins namely alpha, beta, epsilon and iota toxins. Epsilon toxin is the main cause of development of *Clostridium perfringens* type D enterotoxemia in sheep which alters the permeability of the vascular endothelium. Some factors which are responsible for *Clostridium perfringens* type D enterotoxemia such as high levels of carbohydrates, high-protein diets and rich grasses, can aggravate the abundant growth of *Clostridium perfringens*, as well as production of toxins, leading to the development of enterotoxemia (Songer, 1996) [6]. It can be diagnosed by gross and pathological examination.

Materials and Methods

The affected tissue samples of heart from carcasses of sheep were collected for proposed investigation irrespective of sex, age groups and breeds from various Veterinary hospitals, rural areas in and around Bikaner district of Rajasthan. The samples received from field veterinarians in the Department of Veterinary Pathology were also included in this study. During this study necropsy was performed on 362 sheep irrespective of age, sex and breeds. After postmortem examination and recording of gross findings in heart were collected in 10% neutral buffered formalin. The parts of affected tissue measured 2-5 mm thickness and presenting the lesions with normal tissue, were used for fixation and histopathological examination. For histopathological examination, processing of tissue was done by paraffin embedding using acetone and benzene technique (Lillie, 1965) [3]. The tissue sections of 4-6 micron thickness were cut and stained with hematoxylin and eosin staining method as a routine.

Results and Discussions

During this study post mortem examination was done on 362 sheep irrespective of age, sex and breeds. On the basis of gross and histopathological examination 66 sheep found positive for this disease. Grossly, heart showed haemorrhages, and some of section showed congestion (Fig.1). Microscopically, congestion was observed in 48 cases (72.72%). Haemorrhages were recorded in 46 cases (69.69%). Inflammatory cells infiltrations were observed in 56 cases (84.84%).

Congestion, and inflammatory cells infiltration were noticed. Some of section showed haemorrhages between the myocardial fibres (Fig.2). Microscopic findings were in conformity with Kumar *et al.* (2019) [2] and Mekathoti (2018) [4].

Gross findings were similar to those described by Gokce *et al.* (2007) [1], Uzal and Songer (2008) [7] and Sasikala *et al.* (2016) [5].



Fig 1: Gross photograph of heart showing congested blood vessels

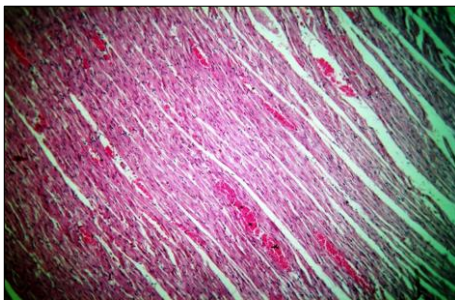


Fig 2: Microphotograph of heart showing haemorrhages between myocardial fibres. H&E, 100X

Conclusion

Clostridium perfringens type D causes enterotoxemia which is a highly fatal disease that develops as an outbreak, and it causes heavy economic losses worldwide. Hence, it can only be cured by adopting proper vaccination schedule and balanced diet.

Acknowledgement

Dr. Vishnu Sharma Former Hon'ble Vice Chancellor of RAJUVAS, Bikaner and Dr. R. K. Singh Dean, C.V.A.S. Bikaner for providing all facilities in this institution required during present investigation. Mr. Om Prakash gave me technical help during this research, Mangal Chand, Mr. Saleem and Jitendra also helped me, providing material for this research.

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