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Incidence of theileriosis in bovine

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Abstract

Haemoprotzoan diseases have deleterious impact on health and production of animals, causing death in acute cases, production losses in chronically affected animals, which decrease economic share of livestock sector. The present study was carried out to determine the incidence of Theileriosis infection in 102 bovines from Tonk district of Rajasthan, India from July 2023 to November 2023. The conventional microscopy method of Giemsa-stained blood smears were used for screening blood samples for haemoprotzoans. Out of total screened 11(10.78 percent) bovines were found positive for Theileria spp. The reported incidence was based on history of affected animal, clinical signs and laboratory examination. Examination of Giemsa-stained blood smears revealed intra-erythrocytic piroplasms of Theileria.

Keywords: Incidence, bovine, theileriosis and Giemsa stain

1. Introduction

In tropical and subtropical regions of the world, haemoprotzoan infections are very common and cause major economic losses for the livestock industry (Velusamy *et al.*, 2014; Rajput *et al.*, 2005) [29, 23]. It is a serious challenge to the livestock improvement programme in India (Sitotaw *et al.*, 2014) [27]. India is a tropical country and the hot and humid climate is highly favourable for the growth and spread of the most common carriers of diseases or vectors leading to an increase in incidence of tick-borne diseases (Kohli *et al.*, 2014) [15]. It is mainly seen in cattle, sheep, goat and in wild ungulates (Radostits *et al.*, 2007) [24]. Geoclimatic and agro-ecological conditions of the area are hugely favourable for the multiplication and growth of *Hyalomma* ticks which act as natural vectors of Theileriosis. It is more common in the rainy season (Bhatnagar *et al.*, 2015; Ananda *et al.*, 2009) [5, 2]. Prevention of production losses due to haemoprotzoan disease, the early diagnosis and implementation of early treatment are important (Norval *et al.*, 1992) [20]. Diagnosis is usually made by direct visualisation with an optical microscope of the parasite in Giemsa-stained samples according to Martin-Sanchez *et al.* (1999) [18]. These infections are responsible for causing pyrexia, anaemia, loss of body weight and, decrease in milk yield and thus lead to severe economic losses to livestock owners. The diagnosis of Theileriosis disease is based on history, clinical signs and confirmed by microscopic examination of blood smear. Hence this report will be helpful in making control strategies against these diseases in this area.

Materials and Methods

This study was conducted at the Department of Veterinary Pathology, R. R. College of Veterinary and Animal Science, Deoli, Tonk, Rajasthan. The clinical study was conducted for a period of 5 months, from July 2023 to November 2023. A total of 102 cattle and buffalo were screened for haemoprotzoan diseases, out of which, eleven bovines were found positive for Theileriosis infection of these animals were subjected to detailed physical and clinical examination for the diagnosis of Theileriosis diseases irrespective of different breed and sex while age factor is included.

Sample collection and Staining: The study was carried out in 303 blood samples from clinically suspected indigenous and crossbred bovines which were clinically ill with varying

ranges of symptoms, received from a veterinary clinical complex, located in R. R. College of Veterinary and Animal Science, Deoli, Tonk, Rajasthan during period from July 2023 to November 2023. These samples were collected in EDTA containing vials from the Jugular vein and two thin peripheral blood films by puncturing ear vein from each cattle. After that, blood-thin films were fixed with methanol then stained with Giemsa's stain and examined under a microscope at low power, high power as well, with immersion oil for the identification of blood parasites as described by Benjamin (1978) [4] and Soulsby (1982) [30].

Results and Discussions

In the current study, a total of 102 bovines underwent screening based on physical examination, clinical evaluation, and laboratory analyses. Among these cases, 11 bovines (10.78 percent) tested positive for Theileriosis within the research area. Comparable findings were documented by Ghosh *et al.* (2018) [10], Sayin *et al.* (2003) [31], and Velusamy *et al.* (2014) [29] with reported prevalences of 10.75 percent, 11.1 percent, and 13 percent, respectively.

The examination of stained blood films revealed *Theileria* piroplasms in 15 samples (12.93 percent) of cattle, as observed by Kundave *et al.* (2015) [16]. Anwar (2018) [3] reported similar findings of 15.63 percent and 15.74 percent in buffalo and sheep, respectively, for theileriosis. Conversely, Brahmhatt *et al.* (2019) [6] and Khawale *et al.* (2019) [14] reported higher prevalences of 20.31 percent in Gir and Jaffrabadi calves and 22.38 percent, respectively. Comparatively higher percent of cases of Theileriosis were reported by Ananda *et al.*, (2009) [2], Debbarama *et al.*, (2020) [7] and Kohli *et al.* (2014) [15] as 31.06 percent, 22.9 percent and 27.2 percent respectively. In contrast, lower prevalence was reported by Khattak *et al.*, (2012) [13], Mahmud *et al.* (2015) [17], Muniraja *et al.* (2021) [19], Patel *et al.* (2017) [22] and Shahnawaz *et al.*, (2011) [25] as 5.2 percent, 5.82 percent, 0.78 percent, 3.63 percent and 3 percent for Theileriosis. Examination of Giemsa-stained blood smears under oil immersion lens revealed intra-erythrocytic piroplasms of *Theileria* only in eleven out of three hundred three blood smear examined. The piroplasms mostly, appeared as ring or oval-shaped with a small percentage of dots. There was anisocytosis (variation in size) and poikilocytosis (variation in shape) observed in erythrocytes and infected erythrocytes were appeared as echinocytes. Goyal *et al.* (2018) [11], Khan *et al.* (2011) [12] and Al-Emarah *et al.* (2012) [1] have reported that similar findings. Abnormalities in erythrocyte structure including anisocytosis, poikilocytosis, basophilic stippling and presence of reticulocytes were also observed by Durrani and Kamal (2008) [22]. The abnormality in erythrocytes is mainly caused by toxic action of parasites, erythrocyte oxidation, and immune-mediated response, according to studies by Singh *et al.* (2001) [26] and Stockham *et al.* (2000) [28]. To diagnose tropical theileriosis, the usual method is to examine Giemsa-stained blood samples under a microscope. This approach works well when the disease is in its acute stage, with a high enough presence of parasites that can be seen under a microscope. However, as the disease progresses to the chronic and carrier stages, the parasite levels are often too low to be detected microscopically.

Overall Age wise incidence of bovine screened under the present study was divided into 3 age groups *viz.* 6 months to 2 years of age, 2 to 3 years of age and above 3 years of age is presented in Table 1. The incidence of Theileriosis diseases in bovine group (6 months to 2 years) was 18.18 percent (2/11),

in the bovine group (2 to 3 years) was 36.36 per cent (4/11) and in the bovine group (above 3 years) was 63.63 per cent (7/11). A similar finding was reported by Ananda *et al.* (2009) [2] who observed higher incidence in adults than young bovine, due to inverse age resistance of the disease where adult showed more susceptibility than calves. This might be due to rapid immune responses to primary infection through a complex immune mechanism. The differences in the incidence rate might be due to variations in the number of samples included in the study geographical and climatic conditions, and feeding management of the study area.

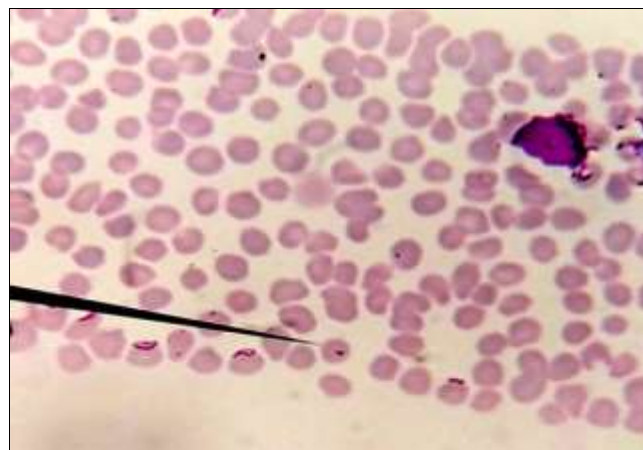


Fig 1: Intra-erythrocytic piroplasms of *Theileria* (Black arrows) in Giemsa-stained blood smear (100X)

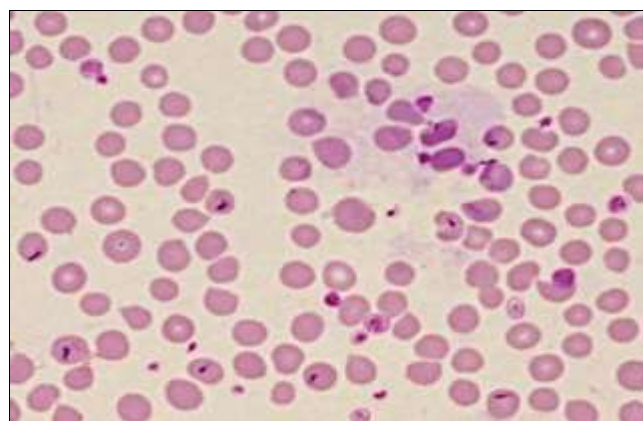


Fig 2: Anisocytosis and poikilocytosis in erythrocytes structure in Giemsa-stained blood smear (Under 100X)

Table 1: Overall Age wise incidence of Theileriosis diseases in cattle in Tonk and adjoining region.

Age group of animal	No. of animal screened	Total positive	Total positive percent
6 month to 2 year	9	2	18.18
2 year to 3 year	29	4	36.36
above 3 year	64	7	63.63
Total	102	11	10.78

Conclusion

The present study revealed that Theileriosis diseases are commonly found in adults in the study area. The overall incidence of Theileriosis diseases among screened bovines was found 10.78 percent. This study could be satisfied for field and it can prevent economic losses for farmers.

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References

1. Al-Emarah GYA, Khudor MH, Daham HR. Clinical, haematological and biochemical study to cattle naturally infected with *Theileria annulata* in north of Basrah province, AL-Qadisiya. *Journal of Veterinary Medical Science*. 2012;11(1):54-62.
2. Ananda KJ, D'Souza PE, Puttalakshamma GC. Prevalence of Haemo-protozoan diseases in crossbred cattle in Bangalore north. *Veterinary World*. 2009;2(1):15.
3. Anwar K. Epidemiology of tick-borne infection in ruminants in Peshawar. *The Journal of Advances in Parasitology*. 2018;5(1):6-10.
4. Benjamin M. Outline of veterinary clinical pathology, 3rd edn. The Iowa State University Press, Ames, Iowa, U.S.A; c1978. p. 5153.
5. Bhatnagar CS, Bhardawaj B, Sharma DK, Meena SK. Incidence of haemo-protozoan diseases in cattle in Southern Rajasthan, India. *International Journal of Current Microbiology and Applied Science*. 2015;4(3):509-514.
6. Brahmabhatt NN, Kumar B, Thakre BJ, Parmar VL, Choravada DR, Patel JA. Clinico-hematological Study of Theileriosis in Gir and Jaffrabadi Calves. *Indian Journal of Veterinary Sciences and Biotechnology*. 2019;14(4):36-39.
7. Debbarma A, Pandit S, Jas R, Baidya S, Batabyal S, Bachan M. Alterations of serum biochemical parameter in cattle naturally infected with tick-borne haemoparasitic diseases in West Bengal, India. *International Journal of Livestock Research*. 2020;10(9):91-95.
8. Dharanasha NK, Giridhar P, Byregowda SM, Venkatesh MD, Ananda KJ. Seasonal prevalence of blood parasitic diseases in crossbred cattle of Mysore and its surrounding districts of Karnataka. *Journal of Parasitic Diseases*. 2017;41(3):773-777.
9. Durrani AZ, Kamal N. Identification of ticks and detection of blood protozoa in Friesian cattle by polymerase chain reaction test and estimation of blood parameters in district Kasur, Pakistan. *Tropical Animal Health Production*. 2008;40:441-447.
10. Ghosh S, Gautam Patra G, Borthakur SK, Behera P, Tolenkhomba TC, Deka A *et al*. Prevalence of haemoprotozoa in cattle of Mizoram, *Biological Rhythm Research*. 2018. ISSN: 0929-1016 (Print) 1744-4179 (Online) [Journal homepage: http://www.tandfonline.com/loi/nbr20](http://www.tandfonline.com/loi/nbr20).
11. Goyal P, Chahar A, Tanwar RK, Fakhruddin and Shringi BN. Hospital-Prevalence of *Theileria annulata* Infection in Cattle-Calves Determined by Blood Smear and Lymph Node Aspirate Smear Examination in Bikaner, Rajasthan, India. *International Journal of Current Microbiology and Applied Sciences*. 2018;7(6):877-884.
12. Khan IA, Khan A, Hussein A, Riaz A, Aziz A. Haemato-biochemical alterations in cross-bred cattle affected with bovine theileriosis in Semi-Arid Zone. *Pakistan Veterinary Journal*. 2011;31(2):137-140.
13. Khattak RM, Rabib M, Khan Z, Ishaq M, Hameed H, *et al*. A comparison of two different techniques for the detection of blood parasite, *Theileria annulata*, in cattle from two districts in Khyber Pukhtoon Khwa Province (Pakistan). *Parasite*. 2012;19(1):91-95.
14. Khawale TS, Siddiqui MF, Borikar ST, Sakhare MP, Rajurkar SR, *et al*. Study of occurrence of theileriosis in cattle from Parbhani district, Maharashtra, India. *The Pharma Innovation Journal*. 2019;8:171-173.
15. Kohli S, Atheya UK, Thapliyal A. Prevalence of theileriosis in cross-bred cattle: Its detection through blood smear examination and polymerase chain reaction in Dehradun district, Uttarakhand, India. *Veterinary World*. 2014;7(3):168-171.
16. Kundave VR, Patel AK, Patel PV, Hasnani JJ, Joshi CG. Detection of theileriosis in cattle and buffaloes by polymerase chain reaction. *Journal of parasitic diseases: official organ of the Indian Society for Parasitology*. 2015;39(3):508-513.
17. Mahmud MAA, Belal SM, Sh, Hossain MA. Prevalence of theileriosis and Babesiosis in cattle in Sirajganj district of Bangladesh. *Research in Agriculture Livestock and Fisheries*. 2015;2(1):79-86.
18. Martin-Sanchez J, Viseras J, Adroher FJ, Garcia-Fernandez P. Nested polymerase chain reaction for detection of *Theileria annulata* and comparison with conventional diagnostic techniques: Its use in epidemiological studies. *Parasitology Research*. 1999;85:243-245.
19. Muniraja K, Subapriya S, Sangaran A, Vairamuthu S. Incidence of Blood Parasites in Bovine in Chittoor District of Andhra Pradesh, *International Journal of Scientific Research and Review*. 2021;10(4):18-23.
20. Norval RAI, Perry BD, Young AS. *The epidemiology of theileriosis in Africa* Academic Press. Orlando, FL; c1992. p. 23.
21. Parmar D, Chandra D. Studies on comparative haematological parameters in *Theileria annulata* infected cattle. *Journal of Entomology and Zoology Studies*. 2019;7(3):167-170.
22. Patel MD, Kumar N, Rathod PH, Tyagi KK, Sorathiya LM. Incidence and Haematological Changes in Haemoprotozoan Infections in Bovines of South Gujarat. *The Indian Journal of Veterinary Sciences and Biotechnology*. 2017;13(2):62-66.
23. Rajput ZI, Song-hua Hu, Arijo AG, Habib M, Khalid M. Comparative study of *Anaplasma* parasites in tick carrying buffaloes and cattle. *Journal of Zhejiang University Science B*. 2005;6(11):1057-1062.
24. Radostits OM, Gay CC, Hinchcliff KW, Constable PD. *Veterinary medicine: A textbook of the diseases of cattle, horses, sheep, pigs and goats*, Edn 10th. ed. Elsevier, Philadelphia; c2007.
25. Shahnawaz S, Ali M, Aslam MA, Fatima R, Chaudhary ZI, Hassan MU, *et al*. Study on the prevalence of a tick transmitted pathogen, *Theileria annulata*, the haematological profile of cattle from Southern Punjab (Pakistan). *Parasitology Research*. 2011;109:1155-1160.
26. Singh A, Singh J, Grewal AS, Brar RS. Study on some blood parameters of cross-bred calves with experimental *Theileria annulata* infections. *Veterinary Research Communications*. 2001;25:289-300.
27. Sitotaw T, Regassa F, Zeru F, Kahsay AG. Epidemiological significance of major hemoparasites of ruminants in and around Debre-Zeit, Central Ethiopia. *Journal of Parasitological and Vector Biology*. 2014;6(2):16.
28. Stockham S, Kjemtrup A, Conrad P, Schmit D, Scott M,

- Robinson, *et al.* Theileriosis in a Missouri beef herd caused by *Theileria buffeli*: Case report, herd investigation, ultrastructure, phylogenetic analysis, and experimental transmission. *Veterinary Pathology*. 2000;37:11-21.
29. Velusamy R, Rani N, Ponnudurai G, Harikrishnan TJ, Anna T, Arunachalam K, *et al.* Influence of season, age and breed on prevalence of haemo-protozoan diseases in cattle of Tamil Nadu, India. *Veterinary World*. 2014;7(8):574-578.
30. Soulsby PG, Lowthion D, Houston M. Effects of macroalgal mats on the ecology of intertidal mudflats. *Marine pollution bulletin*. 1982 May 1;13(5):162-6.
31. Sayin U, Osting S, Hagen J, Rutecki P, Sutula T. Spontaneous seizures and loss of axo-axonic and axo-somatic inhibition induced by repeated brief seizures in kindled rats. *Journal of Neuroscience*. 2003 Apr 1;23(7):2759-68.