The Pharma Innovation Journal 2023; SP-12(11): 328-330

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; SP-12(11): 328-330
© 2023 TPI
www.thepharmajournal.com
Received: 04-08-2023
Accepted: 10-09-2023

Late SS
Department of Veterinary Clinical Medicine, Ethics and Jurisprudence, KNP College of Veterinary Science, Shirwal, Satara, Maharashtra, India

Ambore BN
Department of Veterinary Clinical Medicine, Ethics and Jurisprudence, KNP College of Veterinary Science, Shirwal, Satara, Maharashtra, India

Swami SB
Department of Veterinary Clinical Medicine, Ethics and Jurisprudence, KNP College of Veterinary Science, Shirwal, Satara, Maharashtra, India

Pawar PD
Department of Veterinary Parasitology, KNP College of Veterinary Science, Shirwal, Satara, Maharashtra, India

Dhaygude VP
Department of Veterinary Pathology, KNP College of Veterinary Science, Shirwal, Satara, Maharashtra, India

Jadhav SN
Department of Veterinary Biochemistry, KNP College of Veterinary Science, Shirwal, Satara, Maharashtra, India

Corresponding Author:
Ambore BN
Department of Veterinary Clinical Medicine, Ethics and Jurisprudence, KNP College of Veterinary Science, Shirwal, Satara, Maharashtra, India

Studies on haemato-biochemical changes in ovine theileriosis

Late SS, Ambore BN, Swami SB, Pawar PD, Dhaygude VP and Jadhav SN

Abstract
A total of 100 sheep blood samples were screened for detection of ovine theileriosis by using blood smear examination and PCR. Out of that, 63 cases were positive for ovine theileriosis. Blood samples were subjected to record the haemato-biochemical changes in *Theileria* infection. Mean values of Hb, PCV, TEC and TLC showed significant ($p<0.01$) decrease in *Theileria* infected sheep. Also, mean values of Free haemoglobin were significantly ($p<0.05$) increased in *Theileria* affected sheep as compared to the control group. Biochemically the mean values of total protein ($p<0.01$), albumin, SGOT, SGPT and Iron get significantly decreased ($p<0.05$) while a non-significant decrease in TIBC value was found in *Theileria* affected sheep compared to the control group.

Keywords: Ovine theileriosis, haematology, free haemoglobin, TIBC

Introduction
Theileriosis is a tick born haemoprotozoan disease which affects a wide range of animals and results in heavy morbidity and mortality. Theileriosis is extensively studied in dairy cattle because of its economical importance compared to ovine theileriosis. Till now, very few research has been undertaken on ovine theileriosis as many cases go unnoticed in the field because of disease unawareness and also the detection of theileriosis is mainly based on blood smear examination and molecular analysis which is not routinely performed at field level. In Maharashtra *Theileria luwenshuni* was reported as the main species responsible for causing ovine theileriosis.

Materials and Methods
A total of 100 sheep were screened for theileriosis by using microscopic examination of blood smear and PCR method. Samples were collected from Veterinary Clinical Complex of Krantisingh Nana Patil College of Veterinary Science and nearby villages. Out of those, 63 samples were positive for theileriosis and blood samples of positive cases were subjected for haematological and biochemical study. About 3 ml of blood was collected in K3EDTA anticoagulant vacutainer for hematological examination by Auto blood analyzer machine (Abacus ABJ Vet-5). For blood smear examination blood was collected from ear vein. Serum samples were analysed for total protein, albumin, SGOT, SGPT, iron and TIBC by biochemical analyser (ALTA Semi auto Chemistry Analyzer, ADX_CHEM 220).

Results and Discussion
Haematological examination in *Theileria* affected sheep revealed highly significant ($p<0.01$) decrease in mean values of haemoglobin, packed cell volume, total erythrocyte count and lymphocytes as compared to control group. Free haemoglobin count showed significant ($p<0.05$) increase as compared to control group. Whereas Neutrophils, Monocytes, Eosinophils and Basophils counts were within the normal range. Platelet count was significantly ($p<0.05$) decreased in *Theileria* affected sheep compared to control group (Table 1). Similar findings of decreased haemoglobin count, Packed cell volume, Total erythrocyte count, Total leukocyte count has also been reported by various researchers including Bhosale (2020) [1], Mahmoud *et al.* (2019) [5], Dhaygude *et al.* (2021) [2] in *Theileria* affected sheep. Significant decrease in the level of haemoglobin occurs because the infected erythrocytes with parasite were get destroyed by macrophages by hematophagous activity in the spleen, lymph nodes and other organs of the reticuloendothelial system (Sandhu *et al*., 1998) [8].

There is an increase in the osmotic fragility of erythrocytes during the disease which leads to decrease in level of PCV (Singh *et al*., 2001) [9]. Erythrocytes containing piroplasms get destructed resulting in decreased TEC (Mahmoud *et al*. 2019) [5]. The decreased TLC in *Theileria* positive animals occurred due to destruction of WBCs due to infection. These results were in agreement with Minnat (2012) [7] and Mahmoud *et al.* (2019) [5]. Haemoglobin present outside of erythrocytes is known as free haemoglobin. Diseases in which haemolysis of RBCs occurs result in increased free haemoglobin concentration. Lymphocytopenia reveals presence of bone marrow damage and autoimmune disorder while neutrophilia is indicative of inflammatory condition.

Table 1: Haematological values (Mean ± S.E) in *Theileria* infected animals and control group

Parameters	Group A (n=63)	Group B (n=37)
Haemoglobin (g/dl)	7.043±0.08**	9.254±0.198
Free Haemoglobin (g/ dl)	0.102±0.034*	0.011±0.001
PCV (%)	21.175±0.231**	29.846±0.6401
TEC (x 10^6 /µl)	6.912±0.09**	10.327±0.253
TLC (x 10^3 /µl)	10.226±0.204**	13.980±0.215
Neutrophils (%)	49.444±1.063	46.270±1.196
Lymphocytes (%)	32.159±0.810*	42.892±0.932
Monocytes (%)	0.885±0.175	0.840±0.085
Eosinophills (%)	0.203±0.508	0.109±0.426
Basophills (%)	0.000±0.000	0.000±0.000
Platelets (×10^5/ µl)	2.666±0.089*	2.951±0.071

Superscript indicate statistically significant ** (p<0.01) *(p<0.05)

The total protein and albumin values of sheep infected with *Theileria* were significantly decreased as compared to the control healthy group of animals. Hussein *et al*. (2007) [3] reported that decrease in total protein may be due to toxic effect of metabolite of *Theileria* spp. on liver cells. Extravascular accumulation of proteinaceous fluids resulting from affected lymph nodes results in decreased total protein count (Mbassa *et al.*, 1994) [6]. Decrease in level of albumin may result from increase in excretion of albumin due to renal failure, impairment in its synthesis and extensive protein degradation during prolonged fever or may be due to liver failure or insufficiency (Singh *et al.*, 2001) [9]. Mean values of ALT and AST of sheep infected with *Theileria* were significantly increased compared to control group. Similar findings have been observed by Mahmoud *et al.* (2019) [5] and Jayalakshmi and Premalatha (2020) [4]. Mean values of iron were increased while TIBC was decreased in comparison with the control group. During extravascular haemolysis Iron level in serum increases while the TIBC level decreases or remains unchanged (Watanabe *et al.*, 1998) [10]

Table 2: Biochemical values (Mean ± S.E) in *Theileria* infected animals and control healthy group

Parameters	Group A (n=63)	Group B (n=37)
Total Protein (g/dl)	6.018±0.105**	6.903±0.060
Albumin (g/ dl)	2.519±0.038*	2.830±0.05
SGOT (IU/L)	147.45±1.937*	123.223±1.184
SGPT (IU/L)	32.432±0.320*	29.321±0.354
Iron (µg/ dl)	177.897±1.317*	166.595±1.179
TIBC (µg/ dl)	303.206±2.272	309.659±1.539

Superscript indicate statistically significant **(p<0.01) *(p<0.05)

Fig 1: Paleness of Mucous Membrane indicating anaemia

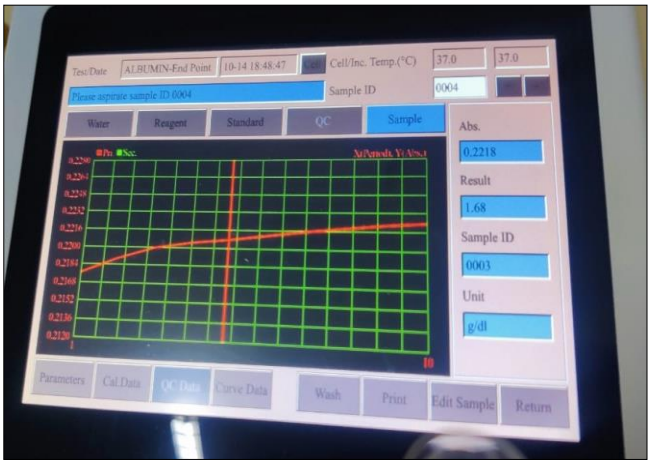

Fig 2: Biochemical Analysis

Conclusions

1. The important haematological findings in ovine theileriosis were decreased Hb level, PCV count, TEC and TLC count.
2. Free haemoglobin level increases in severe extravascular haemolysis.
3. In ovine theileriosis biochemical parameters such as total protein and albumin gets decreased while SGOT and SGPT levels got increased. Further, where severe extravascular haemolysis was present, serum iron level got increased while TIBC level got decreased or remains unchanged.

Acknowledgment

The authors are thankful to the Associate Dean, KNPCVS, Shirwal, for availing the research facilities.

References

1. Bhosale A, Bhikane A, Chavhan S, Jadhav R, Mohan A, Kushwaha N. Prevalence and clinico-therapeutic management of bubaline theileriosis in Marathwada region of Maharashtra. International Journal of Livestock Research. 2020;10(9):55-165.
2. Dhaygude VS, Kundu K, Kamdi BP, Bagal UR, Bhosale SB, Divya Sabharwal. Investigations on First Confirmed Outbreak of Ovine Theileriosis (*Theileria luwenshuni*) from Maharashtra State, India. Indian Journal of Animal Research. 2021;(55):951-955.
3. Hussein AH, Mohammed NAES, Mohammed HK. Theileriosis and babesiosis in cattle: haemogram and some biochemical parameters. In Proceedings of XIII International Congress of International Society of Animal Hygiene. 2007;17:21.
4. Jaylakshmi K, Premalatha N. Investigation of helminthic and haemoprotozoan disease in anemic goats. Journal of Entemology and Zoology Studies. 2020;8(3):43-45.
5. Mahmoud MHS, Al-Dhalimy AMB, Al-Dujaily AH. Study of hematological and biochemical changes in sheep and goats infected with theileriosis at al-najaf province, iraq. Biochemical and Cellular Archives. 2019;19(1):803-806.
6. Mbassa GK, Balemba O, Maselle RM, Mwaga NV. Severe anaemia due to haematopoietic precursor cell destruction in field cases of East Coast Fever in Tanzania.Veterinary Parasitology. 1994;52(4):243-256.
7. Minnat TR, Abdulwadood IM. Study of clinical, hematological and serological diagnosis of ovine theileriosis in Basrah province. Basrah Journal of Veterinary Research. 2012;11(4):8-19.
8. Sandhu GS, Grewal AS, Singh A, Kondal JK, Singh J, Brar RS. Haematological and biochemical studies on experimental *Theileria annulata* infection in crossbred calves. Veterinary research communications. 1998;22(5):347-354.
9. Singh A, Singh J, Grewal AS, Brar RS. Studies on some blood parameters of crossbred calves with experimental *Theileria annulata* infections. Veterinary Research Communications. 2001;25(4):289-300.
10. Watanabe K, Ozawa M, Ochiai H, Kamohara H, Iijima N, Negita H, *et al*. Changes in iron and ferritin in anemic calves infected with Theileria sergenti. Journal of veterinary medical science. 1998;60(8):943-947.