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Studies on diagnosis and therapeutic management of Theleriosis in cows

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Abstract
Theileriosis is caused by tick-borne protozoan parasite *Theileria annulata* causing high morbidity and mortality in cattle. During the period of study, the clinical signs, haematological parameters, biochemical parameters and therapeutic management was evaluated. Various clinical signs recorded in cows affected with Theleriosis were Inappetance, Pyrexia, superficial lymph nodes enlargement, anemia, and respiratory distress. Giemsa stained Blood smear examination revealed various trophozoitic stages of *Theleria annulata* in the erythrocytes. Hemato-biochemical studies revealed a significant reduction in Hemoglobin, Total erythrocyte count, Packed cell volume, along with significant decrease in leucocytes and neutrophils in the affected animals. Biochemical parameters revealed a significant elevation in ALT and AST with non-significant increase in BUN, Creatinine along with a decrease in Total protein and albumin. Theleriosis affected animals were treated with Buparvaquone @ 2.5 mg/kg b. wt. intramuscularly along with supportive therapy. Following therapy, improvement in the clinical signs and haemato biochemical parameters were recorded.

Keywords: *Theileria annulata*, diagnosis, hematology, biochemistry, therapy

Introduction
Theileriosis is one of the major tick borne haemo- protozoan disease affecting ruminants, wild ruminants and horses caused by *Theileria annulata* and it is transmitted by a tick called Hyalomma anatolicum. Theileria organisms are an obligate intracellular protozoan parasite belonging to phylum Apicomplexa, order Piroplasmida, family Theileridae and genus Theileria. Bovine tropical theleriosis causes increased morbidity and mortality. Crossbred cattle are affected more than indigenous cattle (Boss indicus). Once infected the animals remain carrier for life time, since the organisms hide in macrophage and lymphoid tissue (Jitendra, 2018) [3]. Various species Theileria include *Theileria parva* transmitted by Rhipicephalus ticks causes East Coast Fever and it is the important and pathogenic. *Theileria annulata* transmitted by Hyalomma ticks causes Tropical theileriosis. *Theileria orientalis* transmitted by Haemaphysalis ticks causes Oriental theileriosis (Vinu *et al*, 2021) [14].

Materials and Methods
In the present study, blood samples were collected from the jugular vein of suspected animals showing signs of pyrexia, reduced milk production, enlarged Lymph nodes, pale mucous membranes and presence of ticks. Blood smears were prepared from the ear tip of the suspected animals. Thin Blood smears were prepared and stained using Giemsa stain. The organisms were identified by the characters as described by (Soulsby 1982).
Blood samples were collected on day 0 and 7 from those cows which revealed positive for Theleriosis upon Blood smear examination. The collected blood was distributed into two tubes: Plain, EDTA, and heparin-containing tubes. EDTA blood was used for hematological estimation. Plain tube blood was used for serum separation. Serum samples were collected and used to estimate total protein, albumin, alanine transaminase (ALT), aspartate aminotransferase (AST), blood urea nitrogen (BUN), and creatinine using specific test kits. Blood samples were also collected from apparently healthy animals for comparision of haemato-biochemical parameters with the affected ones.

The cows diagnosed with Theleriosis were treated with Inj. Zubion (Buparvaquone @ 2.5 mg/kg b. wt. Intramuscularly on first day, Dextrose normal saline @ 500 ml intravenously for 3- 5 days depending upon dehydration status, Inj. Melonex plus (Meloxicam, Paracetamol) @ 0.5 mg/kg b.wt. Intramuscularly till pyrexia subsided along with Inj. Tribivet (Vitamin B-Complex) @10 ml, intramuscularly for 7 days, Inj. Ferritas (Iron Dextran) @ 10 ml intramuscularly an alternate days for one week. Therapeutic efficacy was assessed based on remission of clinical signs and improvement in hemato biochemical parameters.

Results and Discussion

The present investigation was carried out on cows of various age groups with signs of inappetence, decreased milk production, dullness, lethargy, pyrexia, swollen prescapular lymph nodes, nasal discharges, pale conjunctival mucous membranes and buccal mucous membranes suggestive of anemia (Fig 1). Ticks present on the body was collected and identified as Hyaloma spp. (Fig.2). Microscopic examination of the Giemsa stained blood smears revealed various trophozoitic stages of *Theleria annulata* in the erythrocytes (Fig.3). After treatment, remission of clinical signs was observed on day 7. These findings are in accordance with Dede *et al.* 2014 [1]. The observed clinical findings in crossbred cattle with theileriosis such as anorexia, enlarged superficial lymph nodes, and corneal opacity were in agreement and Sudan *et al.* (2012) [12].

Fig 1: Anemia- Pale Conjunctival mucous membrane

Fig 2: Hyaloma Anatolicum Tick -10x

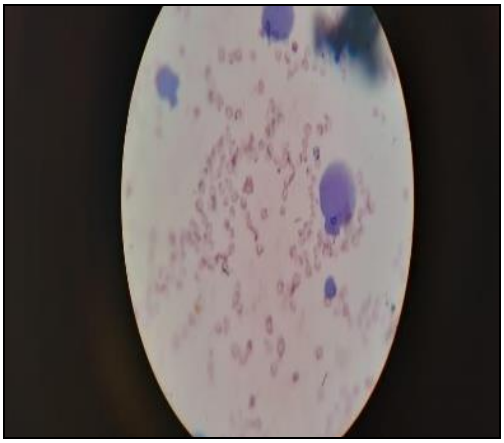

Fig 3: Trophozoite stages of Theleria annulata within erythrocytes

Anorexia could be attributed to persistent fever; moreover the enlargement of superficial lymph nodes could be explained by lymphoid hyperplasia in early stage of the disease. Affected animals revealed increased temperature with pale mucus membrane, enlargement of Lymph nodes (Verma and Singh, 2016) [13].

In the present study, Hematological changes revealed a significant reduction ($p<0.01$) in hemoglobin, Total erythrocyte count associated with a non-significant reduction in packed cell volume (PCV) as compared to healthy control animals. There was a significant decrease ($p<0.05$) in both white blood cells (WBCs) and neutrophils with increased lymphocyte count as compared with the control group. These results are in agreement with Saleh *et al.*, (2011) [7]. Increased production of reactive oxygen species and cytokines attributed to the development of Anemia (Saleh *et al.*, 2011) [7]. Changes in leucogram might be attributed to persistent harmful effects of *Theileria* on the haemopoietic organs especially bone marrow and their interference with the process of leucogenesis and due to proliferation of lymphocytes in the lymphoid organs as defensive response to invading parasite. Relative increase in numbers of lymphocytes and monocytes reflects compensatory mechanism as target cells in response to their invasion with *Theileria*.

Biochemical parameters revealed a significant elevation ($p<0.05$) in ALT and AST with a non-significant increase in BUN and Creatinine. While, a decrease in total protein and albumin was observed as compared with the healthy control (Table 1 and 2). These results are in agreement with Singh *et al.* (2017) and Kumar *et al.* (2018) [5]. Which indicate inflammatory changes in hepatic and glomerular cells which in turn affected their functions. During the Theleria infection, liver and kidney damage occurs resulting in protein deficiency (Dede *et al.* 2014) [1]. Elevation of Blood urea nitrogen and Creatinine in the present study was attributed to the severe damage to the collecting tubules, Lymphoid aggregation in kidney interstitial spaces and haemorrhages (Sandhu *et al.* 1998) [8].

In the present investigation, single dose of buparvaquone @ 2.5 mg/kg body weight intramuscularly was effective in the management of Theleriosis in cows along with supportive therapy. Post therapy, rectal temperature, mucous membrane color, appetite, and reached normalcy. Administration of buparvaquone once reduced Theileria infection from the affected animals and revealed 100 percent recovery (Devadevi *et al.*, 2018) [2] and 98.8% recovery (Morrison *et al.*, 1998) [6]. Vitamins administered in the present study was attributed to the antioxidant potential (Singh *et al.*, 2012) [10].

Table 1: Mean hematological findings in healthy and Theleriosis affected cattle

S. No	Parameter	Healthy Control	Theleriosis affected Cows	
			Day 0	Day 7
1	Hemoglobin (g/dl)	10.82±0.44	8.06±0.24**	10.06±0.24**
2	Total Erythrocyte Count (X 10^6/µL)	5.19±0.23	3.64±0.13**	4.64±0.13**
3	Total Leucocyte Count (X 10^3/µL)	8.66±1.65	6.73±0.92**	7.73±0.92*
4	Packed Cell Volume (%)	32.73±1.34	23.81±3.69	28.81±3.69
5	Neutrophils (%)	62.98±2.70	55.04±1.51*	59.04±1.51*
6	Lymphocytes (%)	31.90±0.75	39.61±4.07	35.61±4.07
7	Monocytes (%)	3.18±0.29	3.45±0.88	3.36±0.88
8	Eosinophils (%)	1.58±0.18	2.97±0.10	2.10±0.10

* Significant at (p<0.05), ** Significant at (p<0.01)

Table 2: Mean biochemical findings in healthy and Theleriosis affected cattle.

S. No	Parameter	Healthy Control	Theleriosis affected Cows	
			Day 0	Day 7
1.	ALT(U/L)	31.23±0.74	46.94±1.65*	38.92±2.14*
2.	AST(U/L)	42.65±0.41	59.24±0.33*	48.38±1.02*
3.	Blood Urea Nitrogen (g/dl)	19.23±1.22	31.66±1.36	28.74±0.98
7.	Creatinine (g/dl)	6.22±0.03	6.77±0.10**	6.77±0.10**
8.	Total Protein (g/dl)	7.02±0.03	5.77±0.10**	6.52±0.10**
9.	Albumin (g/dl)	3.81±0.07	2.01±0.03**	2.18±0.03**

* Significant at (p<0.05), ** Significant at (p<0.01)

Conclusion

Conflict of Interest: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

1. Dede S, Altug N, Deger Y, Ozdal N, Ceylan E. Serum biochemical profile and protein fractions in cattle with Theleriosis. Revue Med. Vet. 2014;165(5-6):137-143.
2. Devadevi N, Rajkumar K, Vijayalekshmi P. Efficacy of buparvaquone in the treatment of bovine benign theileriosis. Int. J Chem. Studies. 2018;6(3):3110-3112.
3. Jitendra KN, Tripti G, Madan MM. Therapeutic management of theileriosis in bovines. Journal of Entomology and Zoology Studies. 2018;7(2):495-497.
4. Kalyan SH, Prasad G, Das P, Behera SK, Behera JB, Rajesh, *et al.* Theileriosis in crossbred cows and its therapeutic management: First report from Lushai hill district of Mizoram. Parasit Dis. 2016;40(3):605-610.
5. Kumar V, Ramprabhu R, Mohana PT, Gopal K. Prevalence and pathological study of Haemo protozoan infection in cattle. Intas Polivet. 2018;19(II):228-230.
6. Morrison WI. The Merck Veterinary Manual. Ed. 8th, Merck and Co. Inc. Whitehouse Station NJ, USA; c1998. p. 31-33.
7. Saleh MA, Mahran OM, Al-Salahy MB. Corpuscular oxidation in newborn crossbred calves naturally infected with Theileria annulata. Vet Parasitol. 2011;182(2-4):193-200.
8. Saleh MA, Mahran OM, Al-Salahy MB. Corpuscular oxidation in newborn crossbred calves naturally infected with *Theileria annulata*. Vet Parasitol. 2011;182(2-4):193-200.
9. Sandhu GS, Grewal AS, Singh A, Kondal JK, Singh J, Brar RS. Haematological and biochemical studies on Experimental Theleria annulata infection in Crossbred calves. Veterinary research Communications. 1998;2295: 347-354.
10. Singh A, Singh J, Grewal AS, Brar RS. Studies on some blood parameters of cross bred calves with experimental *Theileria annulata* infections. Vet Res Comm. 2001;25: 289-300.
    DOI: 10.1023/A:1010678625336.
11. Singh SK, Dimri U, Sharma MC, Swarup D, Kumar M, Tiwary R. *Psoroptes cuniculi* induced oxidative imbalance in rabbits and its alleviation by using vitamins A, D3, E, and H as adjunctive remedial. Trop Anim Health Prod. 2012;44(1):43-48.
12. Singh J, Acharya AP, Panda SK, Patra BK, Behera K. Thelerial infection in young bovine calves in Odisha, India. Journal of Entomology and Zoology Studies. 2017;5(5):1201-1204.
13. Sudan V, Sharma RL, Yadav R, Borah MK. Turning sickness in a riverine buffalo naturally infected with *Theileria annulata* and its successful therapeutic management. Comp clin Path; c2012.
    DOI: 10.1007/s00580-012-1566-7.
14. Verma AK, Singh SK. Control and therapeutic management of bovine tropical theileriosis in crossbred cattle. International Journal of Veterinary Sciences and Animal Husbandry. 2016;40(1):208-210.
15. Vinu MN. Theileriosis in cattle: Treatment and management. Inter. J of Vet Sci. and Animal Husbandry. 2021;6(1):01-03.