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RESEARCH ARTICLE

HEAMATOLOGICAL CHANGES IN TICKS INFECTED GOATS (*CAPRA HIRCUS*) IN MHOW REGION (M.P.)

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ABSTRACT

The present study was concerned with haematological estimation of infected goat with ticks were done in Mhow region (M.P.). Haematological values were altered in infected goats as compare to control goats. The present study was conducted in three seasons rainy summer and winter. Total 30 goats were included for present study. In all three season RBC, Hb, Neutrophiles, basophiles, Lymphocytes, Platelets, PCV, MCV and MCH value was decreased as compared to control value at 0, 7 and 21 days. WBC, Eosinophiles and Monocytes value was increased as compared to control value at 0 days and decreased at 7 and 21 days.

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INTRODUCTION

Blood composition of animal might be influenced by certain factors such as effects of parasites, nutrition, management, and great of animals, sex, age diseases and stress factors that might affect blood values (Schalm *et al.,* 1975). Direct effects of ticks on their hosts include tick toxicities, haematological changes, metabolic disturbances, anaemia and tick worry, which can result in production losses and deaths (O'Kelly & Seifert 1969). It has been established that tick control can decrease the prevalence of tick-borne diseases (Tatchell 1992). Ectopararasites commonly ticks, mites, lice and ked are important parasites because of their disease transmission, blood feeding habit and skin damage in most of the live stock population (CSA, 2004). Ectoparasites of small ruminants cause blood loss and very heavy infestations result with severe anaemia. Moreover, they are the most important vectors of protozoan, bacterial, viral and rickettsial diseases (Radostits, 2007). It is often difficult to assess the correct health status of an animal without recourse to an examination of its blood, as it is a fast and readily available technique employed in assessing clinical, nutritional and health status of animals, as well as giving some insight into their production performance potential (Aderemi *et al.*, 2000).

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The disease problems in the small ruminants are a major hurdle in better economic return in livestock industry, which need timely and effective intervention in management (Balashov, 1972).Parasitic infestations have significant impact on husbandry, productivity, diseases and welfare of livestock round the globe (Kakar and Kakarsulemankhel,2008). Some parasitic infestations may cause death when the control measures are neglected (Hayat, 1987).

Looking to importance of ticks infection and their harmful effects on goats specially on blood the present investigation "Haematological changes in ticks infected goats (*Capra hircus*) in Mhow region (M.P.)" was undertaken.

MATERIALS AND METHODS

Study area: Mhow (Indore region) was selected for the present study. Following Mhow villages were include for present study:

Bhatiyakhera, Ahilyapur, Ambapur, Bai, Amada

Experimental animal

Goat (*Capra Hircus*) was selected for the present investigation. The survey and sample collection were done in 30 goats fromMhow.

Experimental ectoparasite

For the present study hard ticks were collect as ectoparasite on observed *Capra hircus* (Host).

Collection of Blood sample

The blood samples were taken from the jugular vein of each animal with a sterile disposable syringe.

Experiments

Experiments were carried out in the following experimental and control group of goat (*capra hircus*).

Non – infected (Control) group

This group was utilized for collection of blood to find out the normal value of hematological parameter.

Infected (Experimental) group

This group was utilized for collection of blood to find out the infected value of haematological, parameters. This group was divided in three categories- rainy, summer and winter season. Each category was 10 goats for the experimental purpose.

Haematological parameters

All the haematological parameters were done which were RBC, WBC, Hb, Neutrophiles, Basophiles, Lymphocytes, Eosinophiles, Monocytes, Platelets, PCV, MCV and MCH.

RESULTS

In all three season haematological investigation of infected and control animal were summarized in table (1) and presented by Graph (1, 2 and 3)

In present investigation the control (non-infected goat) haematological values were RBC (15.01±0.26 million/ml), WBC (12.50±0.17cells/cmm), Hb (10.20 ±0.13 g/dl), Neutrophiles (60.33±0.22%), Eosinophiles (1.60±0.14%), Lymphocytes (35.80±0.91%), Basophiles (0.50±0.17%), Monocytes (1.7547±0.03%), Platelets (4.72±5.84x 10^5/ml), PCV (33.40±0.62%), MCV (56.50±0.40fl) and MCH (7.01±1.12gm/l).

Haematological values in rainy season

In the present investigation at the 0, 7 and 21 days haematological values were RBC (12.40±0.22, 8.40±0.37 and 7.20±0.33 million/ml), WBC (13.88±0.16, 11.10±0.17 and 10.90±0.23 cells/cmm), Hb (9.30 ± 0.21, 8.75±0.26 and 6.90 ±1.20 g/dl), Neutrophiles (58.99±0.20, 50.01±0.54 and 35.10±0.99%), Eosinophiles (1.83±0.17, 1.30±0.22 and 0.93±0.18 %), Lymphocytes (34.99±0.54, 47.10±0.23 and 62.83±0.20%), Basophiles (0.46±0.15, 0.20±0.17 and 0.00±0.20 %), Monocytes (3.73±0.16, 1.39±0.18 and 1.14±0.19%), Platelets (3.21±5.77, 2.85±3.40 and 2.01±6.56 x 10^5/ml), PCV (29.40±0.48, 21.10±0.91 and 19.60±1.0%), MCV (54.10±0.41, 60.60±0.31 and 50.20±0.61 fl) and MCH (5.12±1.23, 5.01±0.23 and 3.05±0.32gm/l).

Haematological values in summer season

In the present investigation at the 0, 7 and 21 days haematological values were RBC (13.60±0.24, 11.40±0.36 and 10.20±0.40 million/ml), WBC (13.40±0.17, 12.50±0.19 and 11.90±0.27cells/cmm), Hb (10.01 ± 0.22, 9.75 ± 0.29 and 8.05 ± 0.41g g/dl), Neutrophiles (60.13±0.30, 54.88±0.45% and 40.03±0.78%), Eosinophiles (1.78±0.17, 1.36±0.96 and 1.01±0.55%), Lymphocytes (35.01±0.88, 42.05±1.20 and 58.01±1.50%), Basophiles (0.48±0.12, 0.31±0.15 and 0.20±0.19%), Monocytes (2.60±0.25, 1.40±0.28 and 1.20±0.31%), Platelets (4.25±4.52 , 3.75±4.04 and 3.11±3.55 x 10^5/ml), PCV (32.41±0.48, 29.12±0.76 and 26.5±0.76%), MCV (54.12±0.41, 48.09±0.66 and 41.52 ±0.66 fl) and MCH (6.11±1.69, 6.02±1.98 and 5.12±0.45 gm/l).

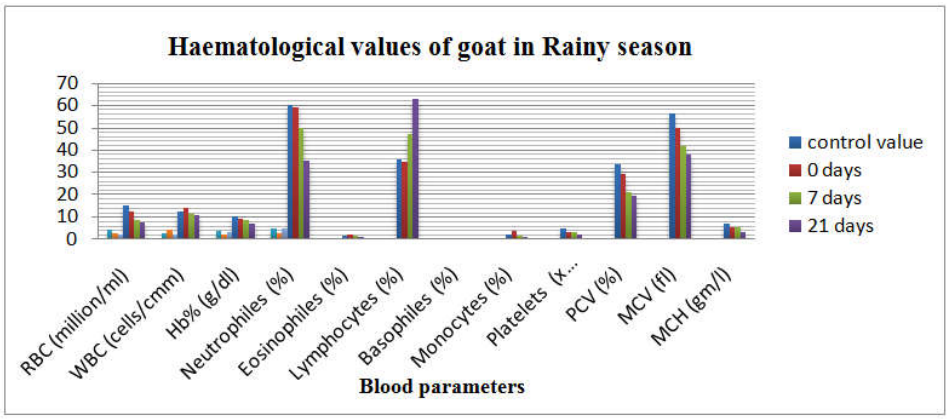
Haematological values in winter season

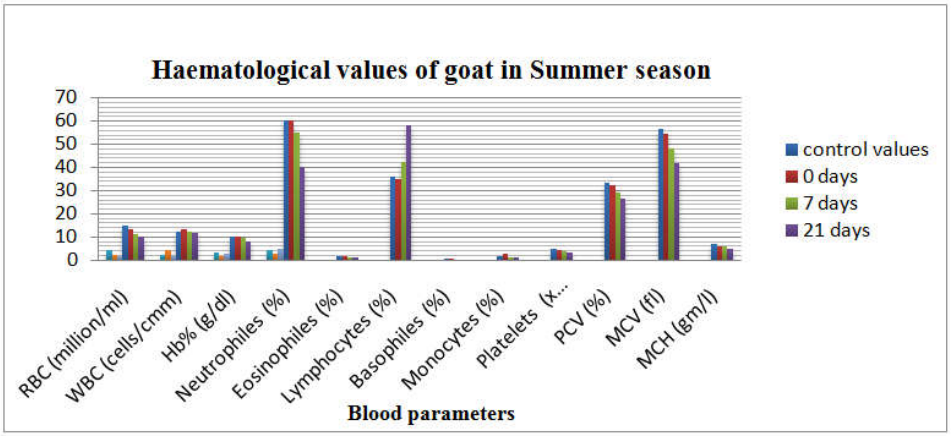
In the present investigation at the 0, 7 and 21 days haematological values were RBC (14.10±0.21, 13.20±0.19 and 13.90±0.31 million/ml), WBC (13.10±0.17, 12.90±0.19 and 11.70±0.27 cells/cmm), Hb (10.08 ± 0.31, 9.93 ± 0.35 and 8.05 ± 0.41g/dl), Neutrophiles (60.25±0.44, 57.01±0.51 and 48.12±0.65%), Eosinophiles (1.71±0.39, 1.40±0.23 and 1.35±0.19%), Lymphocytes (35.44±0.81, 39.77±1.55 and 48.88±1.45%), Basophiles (0.49±0.15, 0.40±0.21 and 0.35±0.27%), Monocytes (2.21±0.33, 1.42±0.25 and 1.30±0.27%), Platelets (4.65±4.05, 3.91±2.23 and 3.55±2.01 x 10^5/ml), PCV (33.01±0.45, 30.12±0.41 and 28.8±0.39%), MCV (54.31±0.50, 50.44±0.44 and 45.37 ±0.40 fl) and MCH (6.78±1.23, 6.01±1.43 and 5.91±1.31 gm/l).

In all three season RBC value was decreased as compared to control value at 0, 7 and 21 days. WBC value was increased as compared to control value at 0 days and decreased at 7 and 21 days. Hb value decreased as compared to control value at 0, 7 and 21 days. Neutrophiles and basophiles % decreased as compared to control value at 0, 7 and 21 days. Eosinophiles % increased at 0 days and decreased at 7 and 21days as compared to control value. Lymphocytes value decreased at 0 days and increased at 7 and 21 days as compared to control value. Monocytes value increased at 0 days and decreased at 7 and 21days as compared to control value. Platelets, PCV, MCV and MCH values decreased at 0, 7 and 21 days as compared to control value. Haematological values were highly altered in rainy season then summer followed by winter season.

DISCUSSION

In the present investigation haematological values were altered in infected goats as compare to control goats. In all three season RBC, Hb, Neutrophiles, basophiles, Lymphocytes, Platelets, PCV, MCV and MCH value was decreased as compared to control value at 0, 7 and 21 days. WBC, Eosinophiles and Monocytes value was increased as compared to control value at 0 days and decreased at 7 and 21 days. The haematological findings in sheep infested with *Hyalomma* species were lower in red blood cells, packed cell volume, hemoglobin concentration,





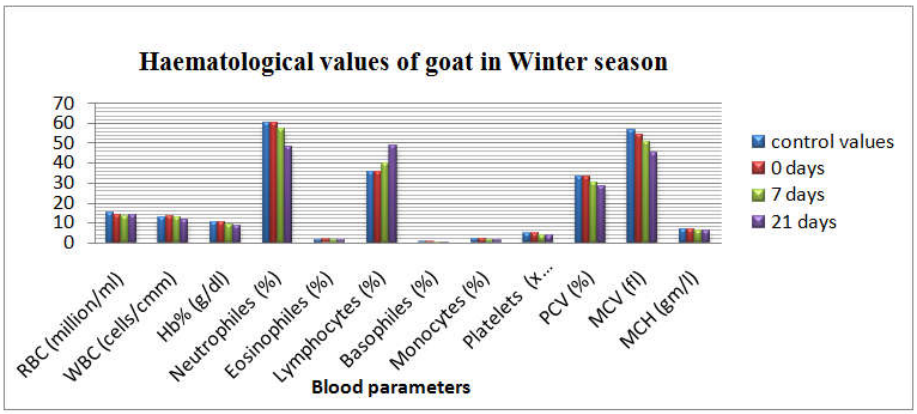


Fig. Graph (1, 2 and 3) presented hematological changes in hard ticks infected goat (*Capra hircus*) in rainy, summer and winters season at Mhow

Table 1. Haematological changes in hard ticks infected goat (*Capra hircus*) in different season at Mhow.

Parameters	Control value	Rainy season			Summer season			Winter season		
		Experimental values (Mean Values)			Experimental values (Mean Values)			Experimental values (Mean Values)		
		Days interval			Days interval			Days interval		
		0days	7 days	21 days	0days	7 days	21 days	0 days	7 days	21 days
RBC (million/ml)	15.01 ±0.26	12.40 ±0.22	8.40 ±0.37	7.20 ±0.33	13.60 ±0.24	11.40±0.36	10.20 ±0.40	14.10 ±0.21	13.20±0.19	13.90 ±0.31
WBC (cells/cmm)	12.50 ±0.17	13.88 ±0.16	11.10 ±0.17	10.90 ±0.23	13.40 ±0.17	12.50±0.19	11.90 ±0.27	13.10 ±0.17	12.90 ±0.19	11.70 ±0.27
Hb% (g/dl)	10.20 ±0.13	9.30 ±0.21	8.75 ±0.26	6.90 ±1.20	10.01 ±0.22	9.75 ±0.29	7.90 ±1.20	10.08±0.31	9.93±0.35	8.05±0.41
Neutrophiles (%)	60.33 ±0.22	58.99±0.20	50.01 ±0.54	35.10 ±0.99	60.13 ±0.30	54.88±0.45	40.03 ±0.78	60.25±0.44	57.01 ±0.51	48.12±0.65
Eosinophiles (%)	1.60±0.14	1.83 ±0.17	1.30 ±0.22	0.93 ±0.18	1.78 ±1.10	1.36 ±0.96	1.01 ±0.55	1.71±0.39	1.40±0.23	1.35±0.19
Lymphocytes (%)	35.80 ±0.91	34.99 ±0.54	47.10±0.23	62.83 ±0.20	35.01 ±0.88	42.05±1.20	58.01 ±1.50	35.44±0.81	39.77±1.55	48.88±1.45
Basophiles (%)	0.50 ± 0.17	0.46± 0.15	0.20 ± 0.17	0.00 ± 0.20	0.48± 0.12	0.31 ± 0.15	0.20 ± 0.19	0.49±0.15	0.40±0.21	0.35±0.27
Monocytes (%)	1.77± 0.03	3.73 ±0.16	1.39 ±0.18	1.14 ±0.19	2.60±0.25	1.40±0.28	1.20±0.31	2.21±0.33	1.42±0.25	1.30±0.27
Platelets (x 10^5/ml)	4.72 ± 5.84	3.21 ± 5.77	2.85 ± 3.40	2.01 ±6.56	4.25±4.52	3.75±4.04	3.11±3.55	4.65±4.05	3.91±2.23	3.55±2.01
PCV (%)	33.40 ± 0.62	29.40 ±0.48	21.10 ±.0.91	19.60 ±1.01	32.41±0.63	29.12±0.76	26.5±0.99	33.01±0.45	30.12±0.41	28.08±0.39
MCV (fl)	56.50 ± 0.40	50.10± 0.41	41.60 ± 0.31	38.20 ± 0.61	54.12±0.41	48.09±0.66	41.52±0.74	54.31±0.50	50.44±0.44	45.37±0.40
MCH (gm/l)	7.01±1.12	5.12±1.23	5.01±0.23	3.05±0.32	6.11±1.69	6..02±0.98	5.12±0.45	6.78±1.23	6.01±1.43	5.91±1.31

mean corpuscular hemoglobin, mean corpuscular hemoglobin and mean corpuscular hemoglobin concentration than non infested ones and indicated that the normocytic normochromic type of anemia (Aram Ahmad *et al.,* 2013). Rajendran and Hafeez (2003) studied hematological changes in crossbred cattle and reported significant reduction in PCV, Hb, TEC and TLC in tick infested group which is in close agreement with present findings. Lymphocyte count was higher in experimental infected goat at day 21 and the control group however significant difference was not observed in mean of eosinophil. Basophil and MCV values in all the tick infected goats and control group.Sengupta and Basu (2008) also observed significant reduction in Hb concentration and higher counts of TLC and eosinophils in goats infected with sacroptic mange. The similar was supported by Basu *et al*.(1989); Bock *et al.*(1997) and Adejinmi *et al*. (2004) While the Tyler and Cowell (1996) and Pfaffle *et al.* (2009) classified the type of anemia as macrocytic normochromic depending on values of MCV, MCHC to lesser extent on (MCH) values in tick infestation. The higher total leukocyte counts in the infested sheep than non-infested sheep; may be due to inflammation caused by tick bite which leads to migration of white blood cells as a response toward the tick bite.

The lower red blood cell, packed cell volume, hemoglobin concentration and platelets count in infested sheep than non-infested ones is in agreement with that reported with Kumar (2010) in infested goats in India. The finding of this study is also supported by study done on tick infested cross breed cattle (Rajendran and Hafeez, 2003). In the present investigation haematological values were altered in infected goats as compare to control goats. It was concluded that ticks infection caused the significant alteration in the hematological values of goat. The PCV, RBC, Hb, MCV, MCHC, MCH and Platelets were lower while the WBC values were higher in the ticks infected goat. The results of present study supported above mention author.

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