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Investigation of helminthic and haemoprotozoan diseases in anaemic goats

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Abstract

The study was undertaken to investigate the etiology of anaemia in goats. A total of 124 goats were screened for the anaemia. Out of 124 faecal samples and blood smear examined 36 (29.03%) and 23(18.54%) goats showed positive for helminthic infections and haemoprotozoan diseases. Among helminthic infections, 25.80% were *Trichostrongylid* group followed by *Strongyloides* spp (1.61%) and *Monezia* sp (1.61%). Blood parasites, *Anaplasma* spp account for 15.32% and 3.22% had mixed infection of *Theileria* spp and *Anaplasma* spp. Around 8.0 % of the suspected population were positive for both helminthic and haemoprotozoan diseases. The prevalence of diseases was higher during the month of December followed by August after the onset of the northeast monsoon season. Blood picture showed a severe reduction of haemoglobin, packed cell volume and total erythrocyte count. Serum biochemistry revealed hypoproteinemia, hypoalbuminemia and mildly elevated level of a liver enzyme (Aspartate transaminase) in goats infected with *Theileria* spp. The infected goats were treated with anthelmintics and antibiotics along with supportive therapy. The present study confirmed that 40.32 % of anaemia in goats was caused by helminthic and haemoprotozoan diseases. Prophylactic deworming and tick control measures were recommended to prevent economic losses associated with these diseases.

Keywords: Goat, anaemia, hypoproteinemia, helminth, haemoprotozoa

Introduction

Goats play an important role in food and national security of the rural poor. In India, 70% of landless labourers, small and marginal farmers are relied on goat husbandry practices. It has been emerging a very good source of income and providing local employment opportunity to rural people ^[1], which contribute 8% of GDP from the livestock sector. For each and every species blood is essential for survival, growth, productivity and reproductive performance. Anaemia is a condition often a symptom of disease results from either decreased haemoglobin or erythrocyte count or packed cell volume. It is mostly caused by helminthic infection, haemoprotozoan diseases, severe tick infestation and nutritional deficiency. Among endoparasitic diseases haemonchosis, fasciolosis and amphistomosis are responsible for sudden death in goat due to haemorrhagic anaemia and protein-losing gastroenteropathy and also cause lethargy, retarded growth rate, dry and rough hair coat, poor exercise intolerance in chronic conditions ^[2]. The ticks can cause direct losses by blood feeding behaviour and indirectly by the transmission of protozoan diseases like Babesiosis, Theileriosis and Anaplasmosis, which cause fever, anorexia, hemoglobinuria, anaemia, and enlargement of lymph node, neurological symptoms and death ^[3-4]. The collected literature reveals not much report on the etiology of anaemia in goats. The present article describes the prevalence of endoparasitic and haemoprotozoan diseases in anaemic goats.

Materials and Methods

A total of 124 suspected goats presented to Small Ruminant Medicine referral unit of Veterinary College and Research Institute, Orathanadu were screened for this study based on visible mucous membrane like pale pink, pale and blanched mucous membrane with normal appetite from May' 2019 to March' 2020. The animals with poor exercise intolerance with tick infestation also included in this study. Peripheral blood smear, faecal samples, whole blood and serum samples were collected from selected animals. Peripheral blood smears were prepared on a dry clean glass slide by making small prick on the tip of the ear after cleaning of dirt, air-dried and fixed with methanol for a min, and stained with Giemsa stain for 30 minutes. The stained smears were screened for the blood protozoa under oil immersion microscope (100X). Faecal samples were processed by a centrifugal sedimentation technique.

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About 4 ml of whole blood samples were collected from all animals directly from the jugular vein. A 2 ml of blood was stored in Ethylene Diamine Tetra Acetate (EDTA) tube for Haemogram and remaining blood let it in a clot activator biochemical analysis. The haematological analysis was carried out by a manual method [5]. Serum biochemistry was done by an Auto analyzer.

Results and Discussion

In the present study, a total of 124 faecal sample and blood smears were examined, of which 36 (29.03%) goats were positive for helminthic infection of *Trichostrongylid* group (25.80%), *Strongyloides* spp (1.61%) and *Monezia* sp (1.61%), Blood smear screened results showed 23 (18.54%) goats were positive for haemoparasites like *Anaplasma* spp and *Theileria* spp. of which 19 (15.32%) *Anaplasma* spp and 4 (3.22%) animals showed mixed infection of *Theileria* spp and *Anaplasma* spp. Among screened goats, 9 animals were positive for both helminthic and haemoprotozoan diseases. The diseases prevalence was higher during the month of December followed by August after the onset of continuous rainfall in the northeast monsoon (Table 1). Haematological analysis showed severe reduction of haemoglobin (Hb), total erythrocyte count (TEC) and packed cell volume (PCV) (Table 2). This was similar to that of Jayalakshmi *et al.* [6]

who reported that severe reduction of Hb, TEC, and PCV in sheep infected with haemonchosis. Serum biochemistry showed hypoproteinemia and hypoalbuminemia in goats with helminthic infection (Table 2), this was concordance with the report of Awad *et al.* [7], who reported that the sheep infected with haemonchosis causes increased mucosal permeability results in leakage of plasma protein into the gut responsible for hypoproteinemia and hypoalbuminemia. In this study, the mild elevated level of a liver enzyme (Aspartate transaminase) was also observed in goats infected with *Theileria* spp, this might be due to multiplication of *Theileria* spp in the liver. The goats infected with helminthic infection were treated with a single dose of sus. Closantel @ 10 mg/Kg PO, along with iron supplements heme up 5ml PO for 15days. Westers *et al.* [8] reported that the anthelmintic Closantel was effective against fenbendazole resistant *Haemonchus contortus* in sheep. For haemoparasites, the goats were treated with inj. Oxytetracycline @ 20mg/Kg IV along with supportive therapy. It was effective for both Anaplasmosis and Theileriosis in small ruminants [9]. The farmers were advised for prophylactic deworming of animals before the onset of monsoon season and also to implement tick control measures to prevent tick-borne diseases and associated economic losses.

Table 1: Month wise screening of anemic goats

Month	Number of animals screened	Number of animals positive	
		Helminthic infection	Haemoprotozoan diseases
May' 19	8	-	-
June' 19	7	-	1
July' 19	5	1	1
Aug'19	6	5	-
Sep' 19	16	2	3
Oct' 19	8	1	1
Nov' 19	9	1	-
Dec' 19	60	25	17
Jan' 20	2	-	-
Feb, 20	2	1	-
Mar, 20	1	-	-
Total	124	36	23

Table 2: Haemato-biochemical changes in anaemic goats

Haemogram		Serum biochemistry	
Parameter	Mean± S.E	Parameter	Mean± S.E
Haemoglobin (g/dl)	4.27 ± 1.26	Total Protein (g/dl)	4.6 ± 1.01
Packed cell volume (%)	15.56 ± 2.03	Albumin (g/dl)	1.26 ± 0.54
Total erythrocyte count X 10 ⁶	5.19 ± 1.56	Glucose (mg/dl)	60 ± 5.16
MCV(Pg)	34.30± 3.28	Aspartate transaminase (AST) U/L	160.4± 11.4
MCH(fl)	9.32± 1.95	Blood urea nitrogen (mg/dl)	21.21 ± 1.2
MCHC (g/dl)	27.24± 5.22	Creatinine (mg/dl)	0.89 ± 0.29

*S.E: Standard error

Conclusion

The present study confirmed that 40.32% of the anaemia in goats was caused by helminthic and haemoprotozoan disease. Prevalence of the disease was higher following northeast monsoon than others. Implementation of vector control measures is essential to prevent economic losses to the farmers.

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