

Study on Haemato-Biochemical profile in Goats suffering from Gastrointestinal Parasitism in Jaipur district of Rajasthan

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Journal of Livestock Science (ISSN online 2277-6214) 6:52-55

Received on 16/04/2015; Accepted on 2/5/2015

Abstract

This cross sectional study aims at determining the effect of gastrointestinal (GI) parasitism on haematological and biochemical parameters in goat. From Jaipur District of Rajasthan, 39 goats of either sex were screened by Direct Smear Method and simple floatation technique for the presence of helminthes eggs in their faeces. The goat found positive for eggs of helminthes eggs were again subjected to quantitative evaluation by modified McMaster's technique for the determination of level of parasitic infestation. Animals having high level of infection (EPG >1000 and or OPG >2000) were considered as infected animal. A total of 23 goats were found positive for helminthic infestation and rest 16 were found negative which were used as control for further scrupulous comparative elucidation of haematobiochemical study. Results indicated that there was significant decrease ($p<0.05$) in the mean Hb, PCV, TEC and TSP of all the infected animals. However, there was significant increase ($p<0.05$) in TLC, neutrophil, lymphocyte, eosinophil and monocyte count in infected goat.

Key words: Goat, parasitism, haemato-biochemical profile, Rajasthan

Introduction

Gastrointestinal (GI) parasitism has been reported as major threat and a primary constraint to small ruminant industry causing production losses and even mortality in severe cases (Tariq *et al.*, 2010). Helminth infection of gastrointestinal tract is one of the major problems in goats which are characterized clinically by enteritis, anemia, emaciation, dehydration and death. These changes are responsible to affect the growth, body weight, yield and reproductive performance of animal leading to economic loss of the farmer (Sharma *et al.*, 2014). In sub-clinical form worm sucks blood continuously (Maiti *et al.*, 1999) resulting in anemia, hypoproteinemia and lower blood glucose. Serum biochemistry and haematological analysis have been found to be important and reliable indicator for assessing an animal's health status and might give an assessment of the degree of damage to host tissue as well as severity of infection (Otesile *et al.*, 1991). Therefore, the present investigation was to study the effect of gastrointestinal helminthosis on haematological and biochemical profile in goats.

Material and Methods

The present investigation was carried out in the Department of Teaching Veterinary Clinical Complex, M.J.F. college of Veterinary and Animal Sciences, Chomu, Jaipur, Rajasthan.

Collection and analysis of faecal samples

Five grams faecal sample was collected directly from the rectum of each goat in a clean polythene bag. The faecal samples were analysed by Direct Smear Method and Simple/Salt Flotation Technique for the presence of helminthes eggs. The goats found positive for eggs of helminthes eggs were again subjected to quantitative evaluation by modified McMaster's technique for the determination of level of parasitic infestation as described by Eysker and Ploeger (2000), animals having high level of infection i.e., Eggs per gram (EPG) more than 1000 were considered as infected animal (group 1), rest of the apparently healthy animals considered as group 2, were used as control for comparative haemato-biochemical study.

Evaluation of haemato-biochemical parameters

Pre-prandial blood samples, from each animal, were collected for haematobiochemical investigations. The haematological parameters studied were Haemoglobin (Hb) (g%), Packed cell volume (PCV) (%), Total erythrocyte count (TEC) ($\times 10^6/\text{mm}^3$), Total leucocyte count (TLC) ($\times 10^3/\text{mm}^3$) and Differential leucocyte count (DLC). Biochemical parameters studied were Glucose (mg%), Creatinine (mg/dl), total serum protein (TSP) (g/dl), albumin (g/dl), globulin (g/dl) and albumin-globulin ratio. Data collected, was analyzed statistically as per the methods described by Snedecor and Cochran (1994).

Results and Discussion

Out of 39 goats, 23 goats found positive for helminth infestation were selected as infected (group 1) and the rest 16 apparently healthy animals were used as control (group 2). There was significant reduction in Hb, total erythrocyte count and PCV values; whereas there was a significant increase in total eosinophil count and total leukocyte count in infected goat as compared to healthy goats (Table 1). The reduction in PCV, Hb and Total Erythrocyte may be due to acute loss of blood by sucking activity and haemorrhages caused by various parasites (Bhat *et al.* 2004 and Amulya *et al.*, 2014). In present study the increase in TLC is caused may be due to an increase in local immune response by eosinophils and also may be due to presence of secondary bacterial infection. The increase in neutrophils, monocytes and eosinophils are caused due to phagocytic activity of the cell digesting the particulate matter and debris of parasites as an effect of cell mediated immune response. Increase in level of lymphocytes is associated with an increase in cell-mediated immunity and antibody-mediated immunity. Leukocytes and eosinophils detected in the present study were similar to those previously reported by Amulya *et al.*, (2014) and Ahmed *et al.*, (2006).

Significant decrease in total protein and albumin level was observed in infected goat in comparison to healthy animals. The lower level of total serum protein and albumin observed in the present study corroborated with the earlier reports of Jas *et al.* (2008) and Ashok Kumar *et al.* (2005). The low level of protein in GI parasitism is attributed to increased plasma leakage through the injured gut caused by the parasites (Radostits *et al.*, 1994). This loss is predominantly due to selective loss of albumin having smaller size and osmotic sensitivity to fluid movement

(Tanwar and Mishra, 2001). The fall in albumin might have been aggravated by increased catabolism of albumin and protein malabsorption through the damaged intestinal mucosa. In infected animals, A:G ratio value was significantly lower and globulin was non- significantly higher than the healthy animals. The presence of infection stimulates the host's immune system resulting in increased synthesis of gamma globulin (Tarazona *et al.*, 1982), which was evident from a decrease in A:G ratio in infected animals.

Table 1. Haemato-biochemical profile of goats infected with gastrointestinal parasitism and apparently healthy goats.

	Parameters		Healthy goats (Group 1)	Infected goats (Group 2)
			Mean \pm SE	Mean \pm SE
1.	Haematological parameters	Hb (g%)	12.31 \pm 1.81 ^a	8.65 \pm 1.27 ^b
		PCV %	42.72 \pm 1.32 ^a	36.21 \pm 1.17 ^b
		TEC ($\times 10^6$ /cumm)	9.47 \pm 0.71 ^a	7.51 \pm 0.49 ^b
		TLC ($\times 10^3$ /cumm)	8.61 \pm 1.51 ^a	9.12 \pm 1.31 ^b
2.	DLC	Neutrophils (%)	50.37 \pm 1.91	53.28 \pm 1.52
		Lymphocytes (%)	46.92 \pm 0.31	51.22 \pm 0.57
		Monocytes (%)	2.89 \pm 0.14	3.10 \pm 0.21
		Eosinophils (%)	2.65 \pm 0.53	2.97 \pm 0.65
		Basophils (%)	0.39 \pm 0.26	0.57 \pm 0.34
		Total eosinophil count (/ μ l)	309.2 \pm 21.76 ^a	529 \pm 17.31 ^b
3.	Biochemical parameters	Total serum protein (g/dl)	6.98 \pm 1.27 ^a	5.19 \pm 1.31 ^b
		Albumin (g/dl)	4.29 \pm 1.31 ^a	3.26 \pm 1.05 ^b
		Globulin (g/dl)	2.13 \pm 0.17	2.29 \pm 0.31
		A:G ratio	2.71 \pm 0.58 ^a	1.20 \pm 0.29 ^b
		Creatinine (mg/dl)	1.73 \pm 0.81	1.21 \pm 0.35
		Glucose (mg%)	61.39 \pm 2.35	58.41 \pm 2.21

Values with different superscript in same row differ significantly ($p < 0.05$)

The creatinine and glucose levels did not differ significantly among groups and were within the normal physiological range for goats Amulya *et al.*, (2014) and Tiwari *et al.*, (2003).

Conclusion

Present study concluded that prevalence of gastrointestinal parasites in provinces around Chomu district was found to be high amongst Caprine species.

Acknowledgement

The authors wish to express sincere thanks to Dean, staff and students of M.J.F. College of Veterinary and Animal Sciences for providing the support and technical assistance in completion of this study.

References

1. Ahmed M.I, Ambali A.G. and Baba S.S. 2006. *Journal of Food, Agriculture & Environment*. 4 (2): 71-74.
2. Amulya,G; Sudharani,R; Ismail Shareef M; Gopinath, S.M. 2014. Haemato-Biochemical changes in sheep suffering from gastrointestinal parasitism. *Indian J. Field Vets*. 10 (2):20-22.
3. Ashok Kumar, Vihan V.S., Rana, R. and Vinod Kumar. 2005. Blood Biochemical changes in some important parasitic infestations in goats for clinical appraisal. *Indian Journal of Small Ruminants* 11: 156-160.
4. Bhat M.S, Sudhan N.A and Mir A.Q. 2004. Haematobiochemical Studies in sheep infected with natural gastrointestinal namatodiasis. *Indian Journal of Veterinary Medicine*, 24(2): 76-78.
5. Eysker, M. and Ploeger, H.W. 2000. Value of present diagnostic methods for gastrointestinal nematode infections in ruminants. *Parasitology* 120: S109-S119.
6. Jas, R., Datta. S. and Ghosh, J.D. 2008. Haemato-biochemical impact of gastrointestinal nematodosis in Bengal goat. *Journal of Veterinary Parasitology* 22: 21 – 26.
7. Radostits, O.M., Blood, D.C. and Gay, C.C. 1994. *Veterinary Medicines*. 8th Edn., Bailliere Tindal, London, pp. 1223-1272.
8. Soulsby, E.J.L. 1982. *Helminthes, Arthropods and Protozoa of Domesticated Animals*. 7th Edn. Bailliere Tindal, London, pp. 809.
9. Tanwar, R.K. and Mishra, S. 2001. Clinico-Haemato-biochemical studies on intestinal helminthiasis in poultry. *Veterinary Practitioner* 2: 137-140.
10. Tariq K.A, Chishti M.Z, Ahmad. F and Shawl A. S. 2010. *Journal of Helminthology*. 84:93-97.
11. Sharma P, Sharma D, Dogra PK and Mandial R.K. 2014. Comparative efficacy of fenbendazole and oxcyclozanide-tetramisole combination against gastrointestinal nematodes in naturally infected Gaddi goats. *Veterinary Research International*, 2(1): 15-17.
12. Maiti SK, Rao V.N and Ali S.L.1999. Clinicohaematological and therapeutic studies in parasitic gastroenteritis in sheep. *Indian Veterinary Journal*, 76(5): 435-437.
13. Otesile E.B, Fagbemi B.O and Adeyemo O. 1991. *Vet Parasitology*. 40 (3-4): 207-216.
14. Snedecor, G. and Cochran, W.G. 1994. *Statistical Methods*. 7th Edn. Allied Pacific (P) Ltd., Bombay.
15. Tarazona, J.M., Sanz-Pastor, A., Babin-M-Del, M., Dominguez, T., Parra, I., Pasto-A-Sanz and Del-M-Bebin, M. 1982. Caprine Trichostrongyloidis II clinical studies of field infections. *Anales-del-Instituto-Nacional-de-Investigaciones Agrarias; Ganadera-Spain* 14:111-124.
16. Tiwari A, Roy S, Roy M and Awasthi B.K. 2003. Haematological and biochemical changes in goats during naturally occurring coccidiosis. *Indian Veterinary Medical Journal*, 27: 263-264.