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Haemonchosis with hypocupremia and hypoferremia in sheep

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Abstract
The study was undertaken to report an anaemic crisis in sheep affected with Haemonchosis. Physical examination of all animals showed blanched mucous membrane with severe tick infestation. The faecal samples were positive for *Trichostrongylid* group of egg and peripheral blood smears were negative for haemoprotozoa. Haemogram showed severe reduction of haemoglobin, packed cell volume and total erythrocyte count. Serum biochemistry revealed hypoproteinemia, hypoalbuminemia and decreased level of minerals (copper, iron and calcium). Larviculture of faecal samples confirmed the presence of *Haemonchus contortus* (78%) and other nematodes like *Oesophagostomum columbianum* and *strongyloides papillosus* (22%). The animals were treated with sus. Closantel @ 10mg/Kg b.wt PO, Inj. Vitamins (B1, B6 and B12) and oral iron supplements Heme up for 15 days. Post treatment analysis showed improvement in blood picture, protein level and copper and iron content. All sheep recovered successfully. Prophylactic treatments of flock mates were also recommended.

Keywords: Haemonchosis, anaemia, sheep, hypocupremia, hypoferremia

Introduction
Small ruminant farming is major source of income for landless poor and marginal farmers in developing countries. Parasitic diseases pose a serious threat to sheep and goat industry due to high susceptibility. Among helminthic infections, *Haemonchus contortus* is a major economic losses causing disease in sheep due to prolonged emaciation and decreased weight gain. This is most common in tropical and subtropical regions and warm temperate regions [1]. Warm and moist conditions favor the development of the free living ensheathed L_3 larvae in the environment. The disease was highly prevalent during rainy season, but the periodical outbreak occurs in transient favorable environment conditions [2]. The frequency and severity of disease depends on rainfall in the particular geographical area [3]. Sheep acquired infection by ingestion of *Haemonchus contortus* L_3 Larvae in pasture during grazing, reach the abomasum. These parasites are voracious blood feeder; each worm consumes 0.05 ml and results in sudden mortality due to anaemia and hypoproteinemia [4]. The larvae embedding and penetrating the abomasal mucosa elicits an inflammatory reaction results in excessive production of reactive oxygen species (ROS) includes superoxide radicals, hydroxyl radicals and hydrogen peroxide in the host[5]. Oxidative stress arises when there is an imbalance in production of oxidants and anti-oxidants in the host. Trace elements are essential for the production of anti-oxidants, increased utilization of microminerals for synthesis of anti-oxidant results in deficiency [6]. The present study describes the anemic crisis in sheep infected with Haemonchosis and associated mineral deficiency in sheep.

Materials and Methods
Three Pattanam sheep from different flock aged between 6-12 months were presented to Small Ruminant Medicine Referral Unit of VC&RI, Orathanadu with a history of death of others animals in the flock with normal appetite, unable to walk for a longer distance. Physical examination of animals showed dullness, blanched mucous membrane and severe tick infestation with normal body temperature. Whole blood, serum, peripheral blood smear and faecal samples were collected for laboratory diagnosis. The faecal samples were processed by centrifugal sedimentation technique and examined under microscope (10X and 40X). Peripheral blood smears were prepared on clean glass slide with a drop of blood collected from tip of the ear, air dried, the smears were fixed with methanol for a min, air dried and stained

with giemsa stain for 30 minutes. The stained smears were examined under oil immersion microscope (100X). Haematological analysis was carried out by manual method [7]. Serum biochemistry was done by semi-auto analyzer using commercially available kits. Faecal larviculture was performed as per standard procedures [8].

Results and Discussion

The faecal samples were positive for *Trichostrongylid* group of egg and peripheral blood smears were negative for haemoprotozoa. Haematological analysis showed severe reduction of haemoglobin, packed cell volume and total erythrocyte count (Table 1). This was according to the report of Kamel *et al*. (2012) [5]. Serum biochemistry showed hypoproteinemia and hypoalbuminemia and decreased level of iron, copper and calcium (Table 2). This was concomitant with the report of Nanev *et al*. (2016) [6], who reported that decreased level of serum trace elements such as copper, iron, zinc and selenium in lamb infected with haemonchosis due to impaired absorption of copper and increased utilization of these minerals for the synthesis of antioxidants to reduce oxidative stress. Faecal larviculture examination showed the mixed infection of helminths. *Haemonchus contortus* (Fig 1) L_3 larvae were identified by kinked tail (78%), *Oesophagostomum columbianum* (Fig 2) *as* long straight tail and *Strongyloides papillosus* (Fig 3) was identified based on morphology of oesophagus. The animals were treated with sus. Closantel @ 10 mg/kg PO, Inj. Vitamin (B1, B6 and B12) and oral iron supplements Heme up for 15 days. Tramboo *et al*. (2017) [9] reported that closantel was highly effective against haemonchosis in sheep compared to fenbendazole and ivermectin [10]. The owner was advised to use pour-on (1% Permethrin) to control ticks on sheep. Post treatment analysis was performed after 15 days of initial treatment and improvement was observed in blood picture, protein level, copper and iron content (Table 1 &2). All animals recovered successfully.

Table 1: Haematological analysis in sheep infected with haemonchosis

Parameters	Pre-treatment	Post treatment after 15 days
Haemoglobulin (g/dl)	2.0-3.0	5.2-6.8
Packed Cell volume (%)	8.0-12.0	19-22
Total erythrocyte count (10^6/µL)	1.54-3.72	4.93-5.01
White blood cell count (10^3/µL)	4.82-6.28	6.45-9.38
Mean corpuscular volume (fl)	32.25- 51.94	38.5-43.9
Mean corpuscular haemoglobin (pg)	8.0-12.98	10.5-13.57
Mean corpuscular haemoglobulin concentration (g/dl)	16.6-25	27.3-30.90

Table 2: Serum biochemical analysis in sheep infected with haemonchosis

Parameters	Pre-treatment	Post treatment (after 15 days)
Total protein (g/dl)	3.5-3.7	6.2-6.9
Albumin (g/dl)	1.29-1.70	2.6-3.0
Glucose (mg/dl)	77-128	68-76
Blood urea nitrogen (mg/dl)	22-31	16-24
Creatinine (mg/dl)	0.69-0.79	0.4-0.7
Aspartate transaminase (U/L)	67-282	1 42-157
Total bilirubin (mg/dl)	0.02-0.06	0.08
Copper (µg/dl)	46.05-60.23	68.05-89.11
Iron (µg/dl)	45.58-94.21	155.58-172.2
Calcium (mg/dl)	9.92-10.94	11.12-12.04
Phosphorus (mg/dl)	4.2 -5.21	5.31- 6.52

Fig 1: *Haemonchus contortus*

Fig 2: *Oesophagostomum columbianum*

Fig 3: *Strongyloides papillosus*

Conclusion

The present study confirmed the Haemochosis in sheep was associated with anaemia, hypoproteinemia and hypoalbuminemia along with decreased level of serum iron, copper and calcium. It may be due to increased utilization or decreased absorption from damaged gastrointestinal tract of the infected sheep.

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Reference

1. Dipali Parmar, Dinesh Chandra, Arvind Prasad, Etka Singh, Navneet Kaur and Abdul Nasir. Haemato-biochemical alterations in sheep due to experimentally induced *Haemonchus contortus* infection, International Journal of Current Microbiology and Applied Sciences. 2019; 8(5):2371-2376.
2. Prakash O, Gomathinayagam S, Harikrishnana TJ, Raman M, Pandiyan V, Sahoo S. *Haemonchus contortus* load and anthelmintics resistance in sheep and goats in Chennai, Tamil Nadu, India. International Journal of Chemical Studies. 2018; 6(5):2712-2716.
3. Qamar MF, Maqbool A, Khan MS, Ahmad N, Muneer, MA. Epidemiology of haemonchosis in sheep and goats under different managemental conditions. Veterinary World. 2009; 2(11):413-417.
4. Hurtado FA, Antonio M, Guzman. Immune response associated with resistance to haemonchosis in sheep. Biomed Research International, 2013. http: 10.1155/2013/162158.
5. Kamel HH, Mostafa AHM, Al-Salahy MB, Walaa MS, Wahba AA. Protein carbonyl, oxidative stress, anaemia, total free aminoacid and sheep haemonchosis relationship. Journal of Egyptian society of Parasitology. 2018; 48(1): 21-30.
6. Nanev V, Gabrashanska M, Vladov I, Yordanova I, Ermakov V, Tjutikov S. Alterations in trace elements associated with haemonchosis in lambs. Микрозлементм в медицине. животноводстве, растениеводстве. 2012; 1(18):135-139.
7. Benjamin MM. Haematology in outline of Veterinary clinical pathology, 3rd Edn, Kalyani Publishers, New Delhi, India. 2010, 48-92.
8. Soulsby EJL. Helminths, arthropods and protozoan of domesticated animals, 7th edn, Bailiere Tindall and Cassell Ltd., London, 1982
9. Tramboo SR, Shahardar RA, Allaie IM, Wani ZA, Maria Abbas. Efficacy of ivermectin, closantel and fenbendazole against gastrointestinal nematodes of sheep in Kashmir valley. Journal of Parasitic Diseases. 2017; 41(2): 380-382.
10. Westers T, Jones-Bitton A, Menzies P, Vanleeuwen JA. Efficacy of closantel against ivermectin and fenbendazole-resistant *Haemonchus* sp in sheep in Ontario, Canada, Veterinary Parasitology DOI:10.1016/j.vetpar.2016.08.009.