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Hemato-biochemical alteration in naturally infested goats with monieziosis

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Abstract

The intention of the research is to ascertain how natural infection of *Moniezia expansa* affects goat haematological and biochemical variables. From each animal's rectum and jugular vein, respectively, faeces and blood samples were taken. The parasite was identified by gross morphological and microscopic examination. The hemato-biochemical variables were estimated and significant decrease in PCV, Hb and TEC was observed along with a decrease in total protein and albumin concentration in serum.

Keywords: Goat, Moneizia, protein, albumin

Introduction

Both in India and around the world, the need for animal protein is rising quickly. It is advantageous to raise goats because their meat is so much regarded. Since they can be sold for immediate financial requirements, goats are regarded as the "poor man's cow" or "money bank" in the rural Indian economy. It is raised for milk as well as meat, and both products are equally nutritious. Goats have a shorter breeding cycle than other large animals, and they can have numerous offspring during a single parturition. The gastro-intestinal parasitism is a significant barrier in goat husbandry, aside from the other illnesses. The helminth infections of small ruminants' gastrointestinal tract not only have a negative impact on their health, increasing morbidity and mortality, but they also have an indirect financial impact due to the high cost of parasite treatment and control (Nwosu *et al.* 2007; Mafruchati, 2020) ^[1, 2]. Among the intestinal parasite of goats, Moneizia is an important cestode with a prevalence of more than 12% in the eastern part of India (Brahma *et al.*, 2015) and is an important parasite that decreases the goat productive efficiency. There are at least 12 different species of Moneizia that can infect both domesticated and wild ruminants. Only *M. expansa* and *M. benedeni* have been recognised as separate species among them (Guo, 2017) ^[3]. Diarrhea, anorexia, weight loss, abdominal distention, anaemia, edoema, general weakness, growth retardation, decreased meat and milk supply, appetite loss, digestive inefficiency, severe debility, and even mortality in severe cases are the main clinical indicators associated with GI problems (Mosa *et al.* 2020) ^[4]. In both clinical and subclinical helminthic infections, the worms either directly infect the host, sucking blood, which lowers blood glucose levels and causes anaemia and hypoproteinemia, or they inadvertently compete with the host for vital minerals or amino acids (Ahmed *et al.* 2015) ^[5]. Hematology and serum biochemical tests have therefore been demonstrated as crucial markers of animal health, displaying the degree of host tissue damage and the severity of the infection. There is limited information available that displays the relations between the hemato-biochemical alterations and the Moneizia infection in goats. So, the present work was undertaken to determine the influence of Moneiziosis on some hemato-biochemical changes in naturally infested goats under the agroclimatic conditions of the Patna region.

Material and Methods

A total of 10 naturally *Moneizia expansa* infected and 10 healthy (Control) Black Bengal goats maintained at private goat farm in Patna, Bihar, India were selected for the study. Approximately 10 ml blood was withdrawn from jugular vein, out of which half portion was transferred in EDTA containing vial and remaining portion was allowed to clot for serum separation. Separated serum were stored at -20 °C till further use.

Collection and identification of parasite

10gm of faeces was collected in sterile plastic container from each animal. Adult tape worm was collected from the sample and washed with physiological saline. The parasite morphology was analysed by light microscopy (fig.1)

Haemato-biochemical examination

Blood sample collected with anticoagulant was subjected to haematological analysis. Haemoglobin (Hb) concentration was estimated by cyanmethemoglobin method by using Drabkin’s solution (Tulip diagnostic Pvt. Ltd, India). Total erythrocyte count (TEC) was done manually using haemocytometer (Neubauer’s chamber). Each sample was counted thrice, and the mean will be calculated. PCV was determined using capillary tubes in microhaematocrit centrifuge based on the technique described by Jain (1993) [13].

Total protein and albumin was estimated using commercial kit ((Tulip diagnostic Pvt. Ltd, India) as per manufacture protocol. Globulin was calculated by subtracting albumin from total protein.

Results

The results of haematological parameters is represented in fig.1. there was significant decrease ($P>0.05$) in hemoglobin concentrations, TEC and PCV of clinically infected animals

as compared to goat belonging to control group. There were significant ($P>0.05$) decreasing trends was observed in total protein and albumin concentration in infected group as compare to healthy control. Globulin concentration was no significantly higher in heathy control group as compare to infected group.



Fig 1: Gross morphological and microscopic examination of *Moneizia* spp.

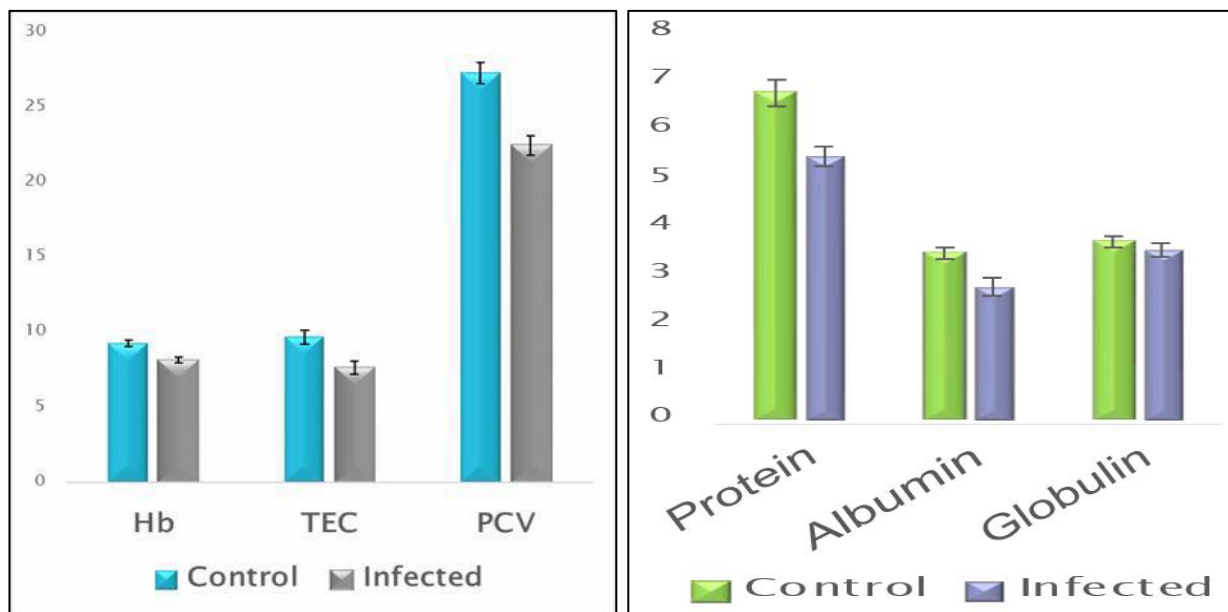


Fig 2: Hemato-biochemical variables in naturally infected goats with *M. expansa*

Discussion

The production system for small mammals is severely hampered by GI parasitism. *Moneizia* spp., a GI parasite, is a significant cestode that inhibits the host's ability to utilise nutrients, which lowers the host's productivity. The study area's agroclimatic conditions are favourable for *Moneizia* spp. development. *Moniezia* spp. infection levels in semi-arid goat populations have been found to be higher, which may be due to shorter rainy seasons, higher temperatures that may favour *Moniezia* spp. development, or a increased availability of intermediate parasite hosts nearby (Schulze 1997) [12]. In the present paper a host- parasite interaction of *Moneizia* spp. with a reference to hemato-biochemical alterations in natural infested goats is presented. The hemato-biochemical and parasitological findings may be easily connected with the

clinico-physical observations of the current study. The clinical symptoms displayed by the infected animals were consistent with a number of earlier research. Animals with severe *M. expansa* infestations had previously been shown to exhibit dullness, depression, emaciation, weakness, diarrhoeic diarrhoea, dirty hind quarters, fever, and anaemia (Miglani *et al.* 1993; Kar *et al.* 2007) [6, 7]. The weakness and emaciation observed in the present study could easily be correlated with hypoproteinemia leading to a loss in body muscles during severe gastrointestinal parasitic infestations (Ahmed *et al.* 2015) [5]. GI helminths continuously sucking blood cause a loss of plasma proteins as well, which causes hypoproteinemia and ascites (Kumar *et al.* 2015) [8]. PCV, Hb, and Total Erythrocyte levels may have decreased as a result of acute blood loss from parasites' sucking activity and

haemorrhages (Amulya *et al.* 2014) ^[11]. The oxygen-transporting protein with iron found in vertebrate red blood cells is known as haemoglobin. Red blood cell haemoglobin levels decrease, which reduces the blood's ability to carry oxygen. This causes anaemia symptoms and, in severe cases, can cause death. Increased plasma leakage from the damaged intestine brought on by the parasites is thought to be the source of the low protein content in GI parasitism (Radostits *et al.* 1994) ^[9]. This loss is mostly caused by a loss of albumin, which is smaller and more sensitive to fluid flow. Increased albumin catabolism and protein malabsorption through the injured intestinal mucosa may have contributed to the albumin depletion (Tanwar and Mishra, 2001) ^[10].

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