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Experimental Infestation to Gastrointestinal Nematodes in Sheep (Clinical and Parasitological Finding)

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Abstract: This survey was designed to study the parasitological features and clinical symptoms due to the infestation of gastrointestinal nematodes in sheep. Two sheep naturally infested to gastrointestinal nematodes were obtained and were selected as egg donors. For experimental infestation eight free worm lambs (5-6 months old) were selected and 50000 of third stage larvae of gastrointestinal nematodes that were obtained from eggs of donor sheep were fed to each of them. Four other lambs received placebo (control group). Daily stools from infected sheep were taken for parasitological examinations. Body weight and clinical symptoms were recorded. Twelve, 21, 35 and 60 days after infestation two lambs were slaughtered and established worms from fed larvae were counted. Results were analyzed by ANOVA. No clinical symptoms (except anemia) were found in the animals during this study however body weight is monitored during 60 days post infestation and indicated a significantly difference between live weight in infested and control groups. The adult worms occurred from fed larvae were 2665 (5.3%) and maximum E.P.G at 35th day post infestation was recorded. The lengths of male and female worms in the abomasums were 13.2 and 20.8 mm respectively. Also worms at 35th day post infestation had high size.

Key words: Experimental infestation, nematodes, parasitological finding, sheep, worms

INTRODUCTION

Infestation to gastrointestinal nematodes such as Haemonchus contortus *Ostertagia* (sp.) *Trichostrongylus* sp. and *Marshallagia marshalli* are occured commonly and they cause severe disease of the ruminant abomasum in many parts of the world. These worms infects mainly sheep and goats.The pathogenesis of gastrointestinal nematodes are the results of anemia and hypoproteinaemia caused by the blood sucking activity of the parasites. Large numbers of Haemonchus administered to sheep cause changes resembling those occurring in Ostertagiasis including rises in abomasal PH and increased plasma pepsinogen (Armour *et al*., 1988). However, the latter two effects do not contribute to the spontaneous disease. The following description is mostly based on studies on infestation to gastrointestinal nematodes in sheep.

The wide-spread prevalence of gastrointestinal helminthes in tropical and subtropical area has plagued the production potential of many livestock development programs by causing countless death and insidious economic losses (Alquarisy *et al*., 1987). One the main culprit is the abomasal nematode, Haemonchus contortus, which causes haemonchosis, anemia and parasitic gastroenteritis in sheep, cattle and goats (Leiper, 1985).

The incidence, pathology and significance of gastrointestinal nematodes in sheep has been reviewed by Altaif (1985), Altaif and Dargie (1986).

The present experiment was designed to study the response of the sheep to single infection with the nematode under experimental condition by comparing the clinical symptoms and parasitological aspects. The mucosal phase of the larval development in this host was also followed. The experimental design is similar to study (Al-khashali and Altaif, 1986).

MATERIALS AND METHODS

Experimental design: Two sheep that were naturally infested to gastrointestinal nematodes were obtained and were selected as donors for isolation of gastrointestinal nematodes eggs (500 eggs per gram feces). The sheep were housed in husbandry center of faculty of veterinary medicine in university of Tabriz. All biologic materials had been obtained with consent given according to institutional guideline. For experimental infestation eight lambs (5-6 months old) that had no worm infestation were

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selected. Their parasite-free status was checked by regular faecal examination. For this purpose fecal samples were collected from the rectum and were examined by salt flotation method (Saturated sodium chloride solution) with 3 gram feces.

Daily fecal pellets were taken from donor sheep and were broken down and mixed with vermiculate and stored in the dark place at 22 °c with 70-80% humidity for ten days. Infective Larvae (L_3) were recovered by Bearmann-techniqe.

Then 50000 of third stage larvae of gastrointestinal nematodes that were obtained from eggs of donor sheep were fed to each of the sheep. Four other lambs received placebo (control group).The sheep were weighed weekly and their daily stools were taken for parasitological examinations. Also clinical symptoms were recorded. Two randomly animals from the infected group were slaughted on days 12, 21, 35 and 60 post-infections, while the remaining four uninfected control animals were killed at the end of the experiment on day 60.

Parasitological methods: Fecal samples were collected from the rectum of each eight infected sheep and were examined by salt flotation method (Saturated sodium chloride solution) with 3 gram feces. When strongyle eggs were detected by this method, a modified Mc-Master technique was used to count the number of Eggs Per Gram (E.P.G) of feces (Mckenna, 1973).

Worm identification and measurements were done by light microscope. The number of worms is counted. An X20 objective lens was used, and the worm outline was traced onto thin drawing paper. A Planometer was used to complete the calculation of worm length.

Statistical analysis: The acquired data entered in SPSS package and were analyzed by one way analysis of variance method.

RESULTS AND DISCUSSION

Clinical observation: The majority of the infected animals showed signs of varying degree of anemia and a loss in body weight gain from day 21 on wards. Sign of moderate anemia were evident by pale conjunctival and other mucosa. These signs were more marked in infected sheep at day 21 post-infection.

Comparison of body weight gains in the infected sheep kept until days 60 with the gains in the 4 parasite-free sheep indicated that some depression of weight gain occurred from day 21 on ward and in day 60 post infection indicate a significant difference between live weight in groups (p<0/05) (Table 1).

Table 1: Comparison of body weight gain in infected and control sheep

	Body weight (Kg)		
Groups	before infection MS±SD	after infection MS±SD	Mean weight gain (kg)
Infected sheep	23.37±6.3	28±7.29	4.6
Control group	25.02±6.04	35.15±6.17	10.13

Table 2: Worm count and E.P.G in infected sheep

Sheep No.	Day slaughtered	Infecting larval dose establishment (%)	E.P.G
1		1087	0
2	12	(2.1)	
3	21	2156	105
4		(4.3)	
5	35	5035	5250
6		(10.7)	
7	60	2425	1435
8		(4.85)	

Parasitological findings: The average of adult worms occurred from fed larvae were 2665 (5.33%).Maximum number of established larvae was in 35th day post infestation (5035) and minimum number was in 12th day post infestation (1087). Maximum E.P.G at 35th day post infestation was recorded (E.P.G=5250). The lengths of male and female worms in the abomasums were 13.2 and 20.8 mm respectively. However worms at 35th day post infestation had high size. The data on Worm counts and E.P.G in infected sheep shown in Table 2.

In this survey the means of adult worms gastrointestinal nematodes resulting from larvae fed were 5.33%. Comparisons of this rate with similar survey indicate that in this study the rate of adult worm establishment is low. Armour *et al.* (1988) reported rate of worm establishment in *Ostertagia* ostertagi is 16%.This difference may be resulted from induced changes in temperature, humidity and light on larvae in maintenance period. Mckenna (1973) reported that maintenance of third stage larvae of Haemonchus contortus and Marshallagia marshali in 21°c for 8 days decreased 21-23% of adult worm forming. He showed in other experience that maintenance of stage larvae of *Trichostrongylus* (sp.) and *Ostertagia* (sp.) in 4°c for 1, 3, 7 and 12 days decreased 24, 38, 72 and 89% of adult worm forming, respectively. Of course adult worm forming is related to worm species. Since in similar condition the rate of adult worm forming from larvae in *Trichostrongylus*, *Ostertagia*, Oesophagostomum, Haemonchus and Chabertia is reduced (Armour *et al.*, 1988).

Maximum E.P.G at 35th day post infestation was recorded. In this survey until 12 th day post infection any eggs were not visible in infected sheep stool and beginning of egg appearance in fecal samples was 21 th post infection. Therefore incubatory period in this survey

for gastrointestinal nematodes was less of 3weeks.This is agreement with other investigations (Abbotte *et al*., 1984; Alquaisy *et al*., 1987; Armour *et al*., 1988).

Anemia and decreasing of body weight gain in infected sheep in present study are general accordance with the result of Bradley and Rahhakrishnan (1993), Silverman *et al.* (1996). Dargie (1975) descripted 3 stages in the development of anemia in sheep infected with gastrointestinal nematodes, which generally developed between about the 7 and 25th days after initial infection. These stages were characterized by fall in PCV accompanied by a negative or low fecal egg count and normal serum iron concentration. But in present study hematological factors were not assay.

The cause of don't appearance of clinical signs in this survey is the pleasing condition in breeding and diet in sheep in length of survey. Probably, if the infected sheep were maintenance longer 60 days, clinical signs such as triple phase anemia, chachexia and even death would appear. These results are agreement with experience of Abbote *et al.* (1984) that they express significant difference in body weight gain in sheep that were infected by third larvae of gastrointestinal nematodes, 27 weeks post infection, But in their experience were not observed distinguish clinical signs.

CONCLUSION

Infestation to gastrointestinal nematodes were causes anemia and reduction in body weight gain. Incubatory period for the worm was 21 days a maximum E.P.G (Egg Per Gram) at 35th day post infestation was recorded. Clinical symptoms due to infestation to gastrointestinal nematodes in sheep were distinguished 60 days after infestation.

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