

COMPARATIVE EFFICACY OF PIPERAZINE CITRATE, LEVAMISOLE AND PINEAPPLE LEAVES EXTRACT AGAINST NATURALLY INFECTED ASCARIASIS IN INDIGENOUS CHICKENS

M. E. Hoque¹, M. Mostofa, M .A. Awal, M. E. Choudhury, M. A. Hossain¹ and M. A. Alam²

Department of Pharmacology, Faculty of Veterinary Science, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh

ABSTRACT

The experiment was carried out to determine the comparative efficacy of piperazine citrate, levamisole and pineapple leaves extract as anthelmintics against ascariasis in chicken in the Department of Pharmacology in collaboration with Department of Parasitology, Bangladesh Agricultural University, Mymensingh, Bangladesh, during the period from July to October 2004. Accordingly forty chickens naturally infected with ascarid parasite were selected for this experiment. The chickens were equally divided into 4 (A, B, C and D) groups. Group A was kept as infected control, while groups B, C and D were treated with piperazine citrate, levamisole and pineapple leaves extract, respectively. Although pineapple leaves extract showed less effectiveness in reducing parasite count in postmortem examination than piperazine citrate and levamisole but its use may be encouraging because of less adverse effects. In all treated groups total erythrocyte count (TEC), hemoglobin estimation (Hb) and packed cell volume (PCV) significantly ($p < 0.01$) increased and erythrocyte sedimentation rate (ESR) and total leukocyte count (TLC) significantly ($p < 0.01$) decreased. Body weight was found to be increased following administration of piperazine citrate, levamisole and pineapple leaves extract.

Key words: Piperazine citrate, levamisole, pineapple leaves, ascariasis, chicken

INTRODUCTION

In a developing country like Bangladesh, poultry production in rural areas is of great importance as a prime supplier of eggs and meat and as a source of income, especially to women. It provides supplementary income for about 45% and 40% of people in the rural and urban areas, respectively (BBS 1995). Scavenging village chickens have cultural, social, nutritional, economic, and sanitary functions in daily life. About 78% of the total egg and 86% of the total meat production of the country come from scavenging poultry (Alam, 1995). There are about 138.2 million chicken and 13 million ducks in Bangladesh (Anon., 1998). It provides protein need in our daily food menu in terms of meat and eggs. But it is not sufficient against need of our large population. The high percentage of chicken mortality due to various diseases including parasitic one, is a discouraging factor for the farmers who want to raise more chickens. Islam and Shaikh (1967) reported that internal parasites are present in chickens of Bangladesh. Ascariasis is a common problem of chickens in the tropical and subtropical countries of the world. A good spectrum of effective anthelmintics is available in the market. Among them piperazine citrate and levamisole are widely used for the treatment of ascariasis in chickens. Besides, now a days indigenous medicinal plants are also used as anthelmintics. Among them pineapple leaves extract is pioneer one. So, the present research work was conducted to evaluate the comparative efficacy of modern anthelmintics such as piperazine citrate, levamisole and indigenous plant pineapple leaves extracts for the treatment ascariasis in chickens.

MATERIALS AND METHODS

The experiment was conducted in the Department of Pharmacology in collaboration with Department of Parasitology, Bangladesh Agricultural University, Mymensingh, during the period from July to October 2004. A total of 40 indigenous chickens infected with ascarid parasites were purchased from the surrounding village to study the comparative efficacy of some patient anthelmintics and pineapple leaves extract against ascariasis.

Present address: ¹Postgraduate student, Department of Pharmacology, BAU, Mymensingh, ²Department of Agricultural Statistics, BAU, Mymensingh-2202, Bangladesh.

The chickens were weighed between 200 to 300 g and aged between 60 to 90 days and were selected on the basis of faecal examination. The infected chicken of grouped into A, B, C and D, each consisting of ten. Chicken of groups B, C and D were treated orally with single dose of piperazine citrate @ 200 mg/kg body weight, levamisole @ 20 mg/kg body weight and pineapple leaves extract @ 1 g /kg body weight, respectively, while chickens of group A kept as control. One chicken from each group was subjected to sacrifice before commencement of treatment and weekly after up to 28 days of observation to count the number of ascarid parasites as well as to observe any pathological changes present in tissues. Similarly, weekly recording of average body weight and collection of blood samples from wing vein with anticoagulant were performed from randomly selected five chickens of each group before and after treatment up to 28 days of observation.

Haematological parameters such as total erythrocyte count (TEC), haemoglobin (Hb), packed cell volume (PCV), erythrocyte sedimentation rate and total leukocyte count (TLC) were determined following methodology of Coffin (1955). The data were analyzed for significant variation between control and treated groups by repeated measures of analysis of variance.

RESULTS AND DISCUSSION

Effects of on the body weight and hematological parameters in chickens

After treatment, the anthelmintics significantly increased the body weight of chickens of groups B, C and D. and highest increased occurred in group D. But body weight of the chickens of control group A were not increased on 28th day beginning from the trial rather decreased gradually.

Total erythrocyte count (TEC), hemoglobin estimation (Hb) and packed cell volume of group A significantly ($p < 0.01$) decreased and those of groups B, C and D significantly ($p < 0.01$) increased. On the other hand, erythrocyte sedimentation rate (ESR) and total leukocyte count (TLC) of group A significantly ($p < 0.01$) increased and those of groups B, C and D significantly ($p < 0.01$) decreased. In case of TEC highest increase occurred in group B and incase of Hb and PCV that occurred in group C. But in ESR and TLC the highest decrease occurred in group C and group B, respectively (Table 1).

Table 1. Effects of piperazine citrate, levamisole and pineapple leaves extract on the body weight and hematological parameters in chickens

Groups	Anthelmintics used	Body weight (g)	TEC ($10^6/\text{mm}^3$)	Hb (g%)	PCV (%)	ESR (mm in 1 st h)	TLC ($10^3/\text{mm}^3$)
A	Control	205.314 ^d (2.185)	3.279 ^d (0.103)	8.930 ^d (0.187)	18.098 ^d (0.142)	0.569 ^a (0.142)	9.765 ^a (0.150)
B	Piperazine citrate	253.540 ^b (1.430)	3.818 ^a (0.034)	11.163 ^{abc} (0.103)	22.081 ^{ab} (0.139)	0.492 ^b (0.003)	7.739 ^{cd} (0.094)
C	Levamisole	238.868 ^c (4.675)	3.781 ^{bc} (0.036)	11.383 ^a (0.154)	22.085 ^a (0.147)	0.49 ^{bcd} (0.003)	7.950 ^b (0.028)
D	Pineapple leaves	283.744 ^a (5.581)	3.797 ^b (0.034)	11.194 ^b (0.133)	21.861 ^{abc} (0.136)	0.492 ^{bc} (0.003)	7.854 ^c (0.041)

Value given above represent the mean of 5 chickens. Figure in the parenthesis indicates standard error. Any two means having subscript difference indicate the significant difference.

The progress of body weight on 28th day after treatment in chickens of groups B, C and D might be due to proper absorption and metabolism of feed nutrients. Toledo and Castall (1981) observed when 50 chickens less than one week old were each infected orally with 300 eggs of *Ascaridia galli*, after 8 weeks the mean body weight of the infected chicken was 1085 g to that of 50 healthy control 1176 g. Kuczynska *et al.* (1994) reported that levamisole given orally at dose rate of 40 mg /kg improved body weight 1100 g as opposed to 900 g before administration of therapy in chicks. Islam *et al.* (2004) studied the efficacy of pineapples leaves extract was

Efficacy of anthelmintics against ascariasis in chickens

compared with three modern anthelmintics; ivermectin, albendazole and piperazine citrate mainly on the basis of faecal egg count reduction against ascariasis. The efficacy of ivermectin, albendazole, piperazine citrate and pineapple leaves extract on the basis of faecal egg count was found to be 100%, 83%, 100% and 33%, respectively. The mean body weights of the treated chickens increased significantly as compared to control group. Total erythrocyte count (TEC), haemoglobin (Hb) and packed cell volume (PCV) increased whereas erythrocyte sedimentation rate (ESR) decreased significantly following each treatment.

Effects on parasites

Before treatment one fowl from each group was slaughtered to count number of parasites (Ascarid). That was also done on 7th, 14th, 21st and 28th day of post-treatment. The administration of recommended doses of two patent drugs namely piperazine citrate, and levamisole and one indigenous medicinal plants namely pineapple leaves extract suddenly decreased number of parasites (Ascarid) in the chicken of group B, C and D (Table 2).

Table 2. Effects of piperazine citrate, levamisole and pineapple leaves on number of parasites (Ascarid) in chicken

Groups	Anthelmintics used	Number of parasites				
		Before treatment	After treatment			
		0 day	7 th day	14 th day	21 st day	28 th day
A	Control	15	16	18	20	23
B	Piperazine citrate	17	04	00	00	00
C	Levamisole	16	00	00	00	00
D	Pineapple leaves	18	08	05	01	00

No parasites were recorded on 7th day following treatment with levamisole and on 14th day after treatment with piperazine citrate. Similar findings have been reported by Pavlick and Dykova. (1975). Pineapple leaves evacuated cent percent parasites on 28th day following treatment. On the 28th day after treatment, one chicken from each group was slaughtered to observe the adverse effects of those drugs on internal organs of treated chicken, but there were no any significant pathological lesions found.

REFERENCES

1. Alam J (1995). Livestock resources in Bangladesh-present status and future potential. University Press Ltd. pp 12-29.
2. Anon. (1998). Annual Report. Department of Livestock Services, Dhaka, Bangladesh.
3. BBS (1995). Statistics Division. Ministry of Planning. Government of the Peoples Republic of Bangladesh.
4. Coffin DL (1955). *Manual of Veterinary Clinical Pathology*. 3rd edn., Comstock Publication. Associates Including Pleasantville, New York, USA.
5. Howlider MAR (1999). The Availability of feed and its importance of poultry production. International Poultry Show and Seminar, April 24-26. pp 42-51.
6. Islam AWMS and Shaikh H (1967). A survey of helminth in the gastro-intestinal tract of domestic chicken in Mymensingh district, East Pakistan. *Ceylon Veterinary Journal* 15: 107-109.
7. Islam SA, Mostofa M, Awal MA and Khan KA (2004). Efficacy of pineapple leaves extract compared with modern anthelmintics against ascariasis in calves. *The Bangladesh Veterinarian* 21: 9-13.
8. Kuczynska E, Ziomko I and Cencek T (1994). Intestinal tumor worm infections in broilers and hens. *Zaklad Chorob Inwazyjnych Instytut weterynaryjny AI, Partyzantow 57, 24-100 Pulawy, Poland Medycyna – Weterynaryjna* 50: 30-31.
9. Pavlick, J and Dykova, I (1975). Experimental infection with *Ascaridia galli* in young chickens of different age. *Acta Veterinaria Brno*. 44 (3): 223-233. *Helm Abstract Vol. 47(2)*, Abstract No. 639.
10. Toledo R and Castell S (1981). The effect of *Ascaridia galli* on the weight gain of broiler chickens. *Revista Cubana de Ciencias Veterinarian* 12: 275-278.