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Research Paper

Comparative clinical competence of two commercial injectable ivermectin against caprine haemonchosis (*Haemonchus contortus*)

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Abstract

The foremost purpose of the study reported here was to perform a pharmacological evaluation of two different injectable ivermectin formulations in goats infected with haemonchosis. Twenty one (n=21) goats were randomly divided into three groups A, B and C whereas each group consisted of seven (n=7) goats. Product A and Product B were injected subcutaneously to the goat in group A and group B, respectively. Goat in group C was kept as infected control group giving any treatment. With 7th, 14th, 21th and 28th days of treatment, a significantly (P<0.01) decreased of egg per gram (EPG) count was found in treated goat of group A and B, respectively. In experimental period, the EPG count of control group C were significantly (P<0.01) increased. In group A and B reduction of mean EPG on 7th, 14th, 21th and 28th day after treatment were 83.9%-80.8%, 81.7%-80.7, 78.1%-77.0% and 73.7%-61.2%, respectively, whereas in control group C the mean EPG were 6.7%, 9.2%, 21.4% and 30.9%, respectively. The body weight was increased significantly (P<0.01) after treatments in group A and B, respectively except untreated control group C. To sum up, two commercial products contain ivermectin have similar clinical competence against haemonchosis in goat.

Keywords: *Clinical Competence, Goat, Ivermectin, Haemonchosis.*

1. Introduction

Haemonchus contortus, also known as red stomach worm, wire worm or barber's pole worm, is very common parasite and one of the most pathogenic nematodes of ruminants. This parasite is responsible for anemia, bottle jaw, and death of infected sheep and goats, mainly during summer months in warm, humid climates. Parasitic infections, especially metazoan parasites, have been a persistent and major constraint on the growth and development of goats. Haemonchus contortus is a predominant, highly pathogenic and economically important gastrointestinal parasite of sheep and goats (Mortensen et al. 2003). These parasites are common blood feeders that cause anaemia and reduced productivity and can lead to death in heavily infected animals (Vatta et al. 2001). Ivermectin is the most widely used anthelmintic, and this extensive use has led to the selection and emergence of IVM-resistant nematode populations in several areas of the world (Waller P 2003). Frequent and indiscriminate use of anthelmintics has led to resistance in gastro intestinal nematodes against a wide range of drugs (YADAV et al. 1993; RAM et al. 2007). In developed countries, the principle of controlling parasitic diseases are based on pasture and barn management (Rodistis et al. 2000) and protective therapy, but in Bangladesh where animals are generally maintained in mixed farming system with no pasture land for grazing, these applications can cause limitation to control parasites. Control of parasitic diseases is mainly based on regular anthelmintics treatment in Bangladesh. Now various groups of anthelmintics with

narrow and broad spectrum activities have been discovered, ivermectin is one of the latest broad spectrum anthelmintics of them (Chowdhury et al. 2014). The mail goals of the current work were to determine the comparative clinical efficacy of two ivermectin product on haemoncosis in goats.

2. Materials and methods

2.1. Study duration and study animal

The study was conducted for a period of 28 days. About twenty one (n=21) Black Bengal goats weighing between 14 to 16 kg were selected on the basis of their age, sex and breed. The animals were maintained in intensive husbandry condition and supplied with sufficient water and feed per day. Total goats were randomly divided 3 groups. Two injectable ivermectin formulations (Acimec®, ACI Ltd. and Amectin®, Acme Lab. Limited, Bangladesh) were used (0.2 mg/kg, SC) for positive control against Haemoncus sp. as Group A and B. Goats of group C was kept as control without giving any treatment. Before trials day 0, initial body weight, total egg per gram count of parasites were recorded. During the study period the fecal samples were collected directly from the rectum.

2.2. Egg per gram count

EPG count by using Modified Stoll's egg counting method on 7th, 14th, 21th and 28th day, respectively.

2.3. Measurement of body weight

The body weight of all cattle was taken as described by (Samad 2001).

Body weight = Length x (Girth) 2/300 x 2.2 kg
Here Length = Length from the point of shoulder to the buttock in inches.
Girth was also measured in inches at the point of xyphoid cartilage.
Body weights were recorded on day 7, 14, 21 and 28 following the treatments of goats.

2.4. Statistical analysis

The collected data were statistically analyzed by using statistical programmed MSTAT-C by Russel (1996). A one way ANOVA was done by F variance test.

3. Results

The result of the comparative clinical competence of two different products of ivermectin against haemoncosis in goat is shown in Table 1. In treatment group A, mean EPG count before treatment was 275 and after treatment mean EPG on 7th, 14th, 21th and 28th day were 29.3, 33.3, 39.0 and 47.3, receptively. Reduction of mean EPG on 7th, 14th, 21th and 28th day after treatment were 82.90%, 80.70%, 78.10%, and 72.30 % respectively. In treatment group B, mean EPG count before treatment was 265 and after treatment mean EPG on 7th, 14th, 21th and 28th day were 32.2, 32.8, 39.7 and 62.4, receptively. Reduction of mean EPG on 3rd, 7th, 14th and 28th day after treatment were 80.20 %, 80.01 %, 77.60 % and 61.10 %, respectively. In untreated control group C, the mean EPG of untreated control group on pre-treatment (day 0) was 255. The mean EPG on the 7th, 14th, 21th and 28th day were 175, 175, 201 and 240, receptively. The mean EPG were increased 6.20 %, 9.2 0%, 21.40 % and 32.10 % on 7th, 14th, 21thand 28th day, respectively.

Table 1: Clinical Competence of Two Different Commercial Products of Ivermectin on EPG Count In Goats

		Pre-treatment	Post-treatment							
		0 day	7th day		14th day		21th day		28th day	
Group	Treatment	Egg	Egg	EPG (%)	Egg	EPG (%)	Egg	EPG (%)	Egg	EPG (%)
A	Product A (Acimmec®)	275±3.5	29.3±0.8*	82.9(↓)	33.3±0.1*	80.7(↓)	39.0±0.0*	78.1(↓)	47.3±0.8*	72.3(↓)
B	Product B (Amectin®)	265±2.2	32.2±3.5*	80.2(↓)	32.8±0.2*	80.01(↓)	39.7±0.2*	77.6(↓)	62.4±0.5*	67.1(↓)
C	Control	255±1.1	175±0.8*	6.2(↑)	175±1.0*	9.20(↑)	201±2.0*	21.4(↑)	240±0.8*	32.1(↑)

Level of significance *: P<0.01

Table 2: Clinical Competence of Two Different Commercial Products of Ivermectin on Body Weight (Kg) In Goats

Group	Treatment	Pre-treatment	Post-treatment			
		0 day	7th day	14th day	21th day	28th day
A	Product A (Acimmec®)	14.00±0.8	14.25±0.9*	14.80±1.5*	15.15±1.9*	16.05±1.3*
B	Product B (Amectin®)	14.30±1.0	14.68±1.2*	14.75±1.6*	14.90±1.6*	15.50±1.3*
C	Control	15.00±1.3	14.75±1.0*	14.50±0.4*	14.00±2.6*	13.80±1.7*

Level of significance *: P<0.01

The body weight was increased significantly (P<0.01) in group A and B, respectively (Table 2). Mean body weight before treatment was 14 and after treatment mean body weight on 7th, 14th, 21th, and 28th day were 14.25, 14.80, 15.15 and 16.05 in group A, receptively. Mean body weight before treatment was 14.30 and after treatment mean body weight on 7th, 14th, 21th and 28th day were 14.68, 14.75, 14.90 and 15.50 in group B, receptively. Mean body weight of untreated control group C at day 0 was 15 and on the 7th, 14th, 21th and 28th day were 14.75, 14.50, 14.00 and 13.80, respectively.

4. Discussion

The clinical competence of two products was evaluated on the basis of the percentage of reduction in mean egg count compared to the mean egg count per gram of feces. A significant (P<0.01) reduction of EPG count was found on 7th, 14th, 21th and 28th day of treated goat of group A and B, respectively. On the other hand, the EPG count of control group were significantly (P<0.01) increased 7 day onwards up to study period. This study supports the previous findings recorded by (Islam and Samad 1989). In controlled studies of goat (Mooney et al. 2009) also reported more than 98 % efficacy in hill sheep flock in the west of Ireland. (Ponikarov, 1989) reported 100% efficacy of Ivomec-F (Ivermectin) at the dose rate of 1.0 mgkg-1 body weight when given as a sc injection against gastrointestinal nematodes. (Shastri 1989) reported 97.5% and 93.3% efficacy of Ivermectin against gastrointestinal nematodes in goats. The body weight increased significantly (P<0.01) after treatments in group A and B. (Baggherwal et al. 1991) observed 100% efficacy of Ivermectin against naturally acquired nematodiasis in goats with a single subcutaneous injection of 0.2 mg/kg body weight. (Mukherjee et al. 1994) reported 100% efficacy of Ivermectin against all types of nematodes (Trichostrongylus spp, Strongylus spp, Trichuris spp and Nematodirus spp) in goat during a comparative study of 3 anthelmintics in Cashmere. (Docastro and Cocuzza 1995) reported that Ivermectin was highly effective at the dose rate of 200μg/kg body weight against gastrointestinal nematodiasis in goats. (Yadav et al. 1996) observed 99-100% efficacy of Ivermectin against gastrointestinal nematodes in sheep and goat at the dose rate of 0.2 mg/kg body weight. The body weight was increased and this may be due to removal of parasitic load, proper absorption and metabolism of nutrient in the parasite free gastrointestinal tract. The body weight significantly decreased in untreated control group due to overload of parasites within the body of goats.

5. Conclusion

The present finding reveals that both commercial products are effective for reduction of EPG of haemonchosis in goats. These two drugs have wide therapeutic index and they may kill or inhibit egg production of gastro-intestinal haemonchosis. However, the preliminary control efficacy studies of anthelmintics may help to explore the details of pharmacokinetic study.

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