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Efficacy of Closantel 5% Against Cattle Gastrointestinal Parasites

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Abstract: Problem statement: There are several anthelmintic classes based on chemical structure that are in use, but, during the last 20 years, it has been increasingly noted that the target parasites have become resistant, the incidence varying with geographical location and mode of use. **Approach:** In this study, 60 apparently healthy cows under the same management conditions of the experiment, feces (EPG) were examined. Cows divided to 2 groups (30 = control, 30 = treated with closantel 5%) then treated cows received 10 mg kg^{-1} B.W closantel 5% oraly and After treatment the cow, faecal samples from each of 2 groups were examined in days 1-7-21-28 after treatment by wet-mount and willis-methods and MC-master slid used for egg count. **Results:** Therefore Closantel 5% drugs if used oraly by dosage 1 mL 10 kg^{-1} B.W in cow against *Fasciola hepatica* and *Haemonchus* spp. *Bunostomum phlebotomum* been quite effective (average percentage of drug effect = 97%) and used for control and prevention of parasitic infections in cow was recommended. **Conclusion:** Therefore Closantel 5% is an effective drug against cattle gastrointestinal helminthes in Iran.

Key words: Helminth parasites, several anthelmintic, plasma concentration, pharmacokinetic profiles, *Bunostomum phlebotomum*, closantel affects

INTRODUCTION

Anthelmintics are used extensively to control helminth parasites in animals and are especially useful in domestic farm livestock and those species that graze on pasture and inevitably ingest the infective stages of the parasites. There are several anthelmintic classes based on chemical structure that are in use, but, during the last 20 years, it has been increasingly noted that the target parasites have become resistant, the incidence varying with geographical location and mode of use. One proposed method of delaying the development of resistance is to combine two drugs with similar spectra of activity but with different modes of action (Baggot and McKellar, 1994; Barnes *et al*., 1995; Lifschitz *et al*., 2004; Lo *et el*., 1985 and El-Nabarawy *et al*., 2010). In addition, combinations of drugs can sometimes be used in conjunction with the knowledge of local epidemiology of parasites to reduce the frequency of treatment and further reduce exposure of the worms to the anthelmintics. It has been shown that the clinical effectiveness of anthelmintics is closely related to their pharmacokinetic profiles (Bassisi *et al*., 2004; Bogan and McKellar, 1988; Toutain *et al*., 1988; Craven *et al*., 2002).

Plasma availability can be affected by the formulation and route of administration.

Lanusse and Prichard (1993) noted that slight modifications to plasma concentration can have a large effect on the persistence and availability of avermectins such as ivermectin.

Ivermectin affects nematodes, whereas closantel, a salicylanilide, affects both blood-feeding nematodes and trematodes. The pharmacokinetics of ivermectin have been extensively reported in ruminants (Degroodt *et al*., 1994; Fairweather and Boray, 1999; EAVPT, 1986; Michiels *et al*., 1987), as have those of closantel (Vercruysse and Rew, 2002; Lanusse and Prichard, 1993; Montenegro *et al*., 2003; Lanusse *et al*., 1997; Mohammed-Ali and Bogan, 1987; Edem and Usoh, 2009; Akinnuga *et al*., 2010). Recently a novel product combining closantel and ivermectin in a single formulation has been developed and licensed for use in cattle. In order to ensure that the product can be expected to possess the same efficacy against sensitive helminths as those products licensed in singleconstituent formulations, it is necessary to establish that the pharmacokinetic profiles of ivermectin and closantel are not altered in the formulated dual component product (Lifschitz *et al*.,

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1999a; 1999b; Sallovitz *et al*., 2002; Toutain *et al*., 1997; Toutain and Koritz, 1997).

MATERIALS AND METHODS

In this study, 60 apparently healthy cows under the same management conditions of the experiment, feces (EPG) were examined. After determining the contamination of the animals after 3 stages feces samples examination they were randomly divided into 2 categories, 30 were immovable.

The first group (control) 30 head and did not receive any drug as only two other times in the stool were tested and the control group with normal saline for oral dosage form were studied simultaneously.

The second group is the treatment group and 30 head of livestock were studied by the drug closantel 5% were treated with oral doses 1 mL 10 kg^{-1} B.W conceived.

After treatment the cow, faecal samples from each of 2 groups were examined in days 1-7-21-28 after treatment. For fecal samples examination the wet method (Wet-mount) and Willis (willis-method) and for egg counts of Nematoda (EPG) the Mc-Master slide (MC-master method) was used.

According to the formula of 5% closantel effects on different days after treatment were evaluated:

$$\text{Effects of Drug} = \frac{100 \times R\left(\begin{matrix}\text{mean number of eggs per gram}\\ \text{of feces in the treated group}\end{matrix}\right) - p}{\left(\text{mean number of eggs per gram of feces in control group}\right)} \quad P\left(\begin{matrix}\text{mean number of eggs per gram of feces in}\\ \text{the control group}\end{matrix}\right)$$

RESULTS

Results of this study are set based on the Table 1-5.

Table 1: Mean number of eggs per gram of feces in case and control groups before treatment and groups divided

	Egg Per Gram of feces (EPG)			
Total	*Bunostomum phlebotomum*	*Haemonchus* spp.	*Fasciola hepatica*	
2009	543	781	685	Frequency
100	27	35/6	34/1	Percent

Table 2: Compares the number of eggs per gram of feces in different parasites one-day after treatment, according to study groups

			Egg Per Gram of feces (EPG)					
p	x^2	Total	*Bunostomum phlebotomum*	*Haemonchus* spp.	*Fasciola hepatica*	One-day after treatment		
0/02	7/07	1392	410	561	421	Frequency	Treated	Group
		100	29/5	40/3	30/2	Percent		
		2154	607	804	743	Frequency	Control	
		100	28/2	37/3	34/5	Percent		
		3546	1017	1365	1164	Frequency	Total	
		100	28/7	38/5	32/8	Percent		

Table 3: Compares the number of eggs per gram of feces in different parasites 7-day after treatment, according to study groups

			Egg Per Gram of feces (EPG)					
p	x^2	Total	*Bunostomum phlebotomum*	*Haemonchus* spp.	*Fasciola hepatica*	7-day after treatment		
0/000	601/28	710	126	280	304	Frequency	Treated	Group
		100	17/7	39/4	42/8	Percent		
		2149	591	793	765	Frequency	Control	
		100	27/5	36/9	35/6	Percent		
		2859	717	1073	1069	Frequency	Total	
		100	25/1	37/5	37/4	Percent		

Table 4: Compares the number of eggs per gram of feces in different parasites 21-day after treatment, according to study groups

			Egg Per Gram of feces (EPG)					
p	x^2	Total	*Bunostomum Phlebotomum*	*Haemonchus* spp.	*Fasciola Hepatica*	21-day after treatment		
0/039	6/48	290	74	124	92	Frequency	Treated	Group
		100	25/5	42/8	31/7	Percent		
		1911	612	689	610	Frequency	Control	
		100	32	36/1	31/9	Percent		
		2201	686	813	702	Frequency	Total	
		100	31/2	36/9	31/9	Percent		

Table 5: Compares the number of eggs per gram of feces in different parasites 28-day after treatment, according to study groups

			Egg Per Gram of feces (EPG)					
p	x^2	Total	*Bunostomum phlebotomum*	*Haemonchus* spp.	*Fasciola hepatica*		28-day after treatment	
267/0	64/2	54	12	19	23	Frequency	Treated	Group
		100	22/2	35/2	42/6	Percent		
		2074	634	753	687	Frequency	control	
		100	30/6	36/3	33/1	Percent		
		2128	646	772	710	Frequency	Total	
		100	30/4	36/3	33/4	Percent		

DISCUSSION

According to the chi-square test and the test results based on the difference between the two communities can be seen that the efficacy percentage of control and test groups except *Haemonchus* spp. parasite control (First day after treatment) is not significant (p>0/05).

But the efficacy of oral drugs closantel 5% solids horizons and control of parasites in the days before and after treatment than the control group is quite significant (p < 0/001) indicate that this positive effect on drug control and The test is in control of parasitic eggs.

Uppal *et al*. (1993) and Costa *et al*. (2006) efficacy of closantel on *Haemonchus* spp. 100% have been reported in India, which is partially consistent with the results of this study.

Mooney *et al*. (2009) and Echevarria *et al*. (1996) efficacy of closantel on sheeps *Fasciola hepatica* in Ireland in 14 days after treatment by counting Eggs Per Gram of cow feces (EPG) have reported up to 100% which is consistent with the results of this study .

Mwamachi *et al*. (1995) and Sivaraj *et al*. (1994) in Kenya efficacy of closantel on *Bunostomum* 52% in cows have reported that no consistent with the results of this study and efficacy of closantel on cows *Bunostomum* in iran is higher.

Al-Qudah *et al*. (1999) and Guerrero and Michael (1983) in Jordan the efficacy of albendazole + closantel on *Haemonchus* 100% and *Fasciola hepatica* 77% have been reported in camels.

Stromberg *et al*. (1985) in sheeps that infected with the Fascioloides efficacy rate of oral closantel 95-98 percent have been reported.

CONCLUSION

Closantel 5% drugs if used oraly by dosage 1 mL 10 kg^{-1} B.W in cow against *Fasciola hepatica* and *Haemonchus* spp., *Bunostomum phlebotomum* been quite effective (average percentage of drug effect = 97%) and used for control and prevention of parasitic infections in cow is recommended.

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