

The Efficacy of Moxidectin and Doramectin against Gastrointestinal Nematode Infection in Cattle

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Abstract: The efficacy of doramectin (Dectomax, Pfizer) and moxidectin (Cydectin, Abfar) against gastrointestinal nematode infection was evaluated in cows which were naturally infected with these nematodes. For that purpose over 100 cows' faeces were tested for gastrointestinal nematodes with the saturated salt solution method. Infected cows were selected according to the McMaster criteria. To establish whether the cows were infected with gastrointestinal nematodes, their coprocultures were screened for the presence of *Ostertagia*, *Haemonchus*, *Nematodirus* and *Trichostrongylus* species. Thirty cows which had acquired nematodes naturally were allocated to three groups of 10. The cows in the first and second group were administered subcutaneous 1% doramectin and moxidectin in injectable form at 0.2 mg/kg, respectively. The third group was separated as a control. Faecal samples from animals were examined one week before the start of treatment and on days 0, 7 and 14 of treatment. One and two weeks after the treatment, the examination of faecal samples from both treated groups showed that doramectin and moxidectin were 100% effective against gastrointestinal nematode infection. In contrast, the egg numbers in the control group were variable but not lower.

Key Words: *Trichostrongylidae*, cattle, efficacy, doramectin and moxidectin.

Şıgırlarda Gastrointestinal Nematod Enfeksiyonlarına Karşı Moxidectin ve Doramectinin Etkisi

Özet: Bu çalışma mide bağırsak nematotları ile doğal enfekte şıgırlarda Doramectin (Dectomax, Phizer) ve Moxidectin'in (Cydectin, Abfar) etkisini belirlemek için yapılmıştır. Bunun için yaklaşık 100'ün üzerinde hayvan dışkısu doymuş tuzlu su flotasyon yöntemi ile muayene edilmiş, enfekte hayvanlar McMaster yöntemi ile gram dışkıdaki yumurta sayılarına göre 10'arlı üç gruba ayrılmışlardır. Enfekte hayvanların dışkı kültüründe *Ostertagia*, *Haemonchus*, *Nematodirus* ve *Trichostrongylus* cinsi parazitlerin larvaları belirlenmiştir. Birinci gruba 0,2 mg/kg deri altı yolla Doramectin , ikinci gruba 0,2 mg/kg Moxidectin uygulanmıştır. Üçüncü grup kontrol olarak bırakılmıştır. Uygulamadan bir hafta önce, uygulama günü ve uygulamanın 7., 14. günleri hayvanların dışkı kontrolleri yapılmıştır. Uygulamadan bir ve iki hafta sonra yapılan gram dışkı yumurta sayımlarında her iki ilacın da mide bağırsak kıl kurtlarına %100 etkideği gözlenmiştir. Kontrol grubunda ise gram dışkıdaki yumurta oranları değişmekle birlikte hiçbir azalma gözlenmemiştir

Anahtar Sözcükler: *Trichostrongylidae*, şıgır, etkinlik, doramectin ve moxidectin

Introduction

Trichostrongylidosis is a prevalent infection in Turkey and causes major economic losses (1,2). Although there are many anthelmintics to combat trichostrongylidosis, resistance to these medicines as a result of continual use results in both a decrease in the medicine's effectiveness and an increase in economic losses. Fortunately, some new anthelmintics such as doramectin and moxidectin have high efficacy against both endo- and ectoparasites (3).

Doramectin is an anthelmintic belonging to the avermectin group and is produced by the fermentation of a candida called *Streptomyces avermitis*, whereas moxidectin is a new macrocyclic lactone and is produced by *Streptomyces cyanogriseus noncyanogenus* (3). Both doramectin and moxidectin have been used against gastrointestinal nematodes in various pharmaceutical forms (injectable, intramuscular, subcutaneous, oral and pour-on) with successful results (3-9).

In some previous studies, doramectin was administered to sheep naturally infected with gastrointestinal nematodes at a dosage of 0.2 mg/kg and found to have an efficacy of 100% (7,10,11). At the same dosage doramectin was administered to experimentally infected cattle and efficacy rates against *O. ostertagia* of 98-100%, and against *C. oncophora* of 76.7-99.9% were reported (12).

Some authors have used doramectin and moxidectin as a pour-on and obtained successful results. The efficacy of doramectin pour-on formulation against species *Haemonchus*, *O. ostertagia*, *Oesophagostomum radiatum*, *C. oncophora* and *C. punctata* in cattle has been reported at more than 97%, and the efficacy of moxidectin pour-on formulation against gastrointestinal nematodes in naturally acquired lactating cattle has been reported at 98.9% (5,11).

In another study, moxidectin was administered to sheep and cattle with trichostrongylosis at a dosage of 0.2 mg/kg, and the decrease in egg numbers per gram of faeces ranged from 95% to 100% (5,8,12-14). The efficacy of moxidectin in goats experimentally infected with *H. contortus*, *O. circumcincta* and *T. colubriformis* at an oral dosage of 0.2 mg/kg has been reported at 99.7%-100%, 99.7%-100% and 94.9%-99.9% for each nematode, respectively. In contrast, the efficacy of moxidectin at the same dosage against *T. colubriformis* was 0% (15).

In this study, the efficacy of doramectin and moxidectin was investigated against gastrointestinal nematodes in naturally infected cattle in Van, a city in eastern Turkey.

Materials and Methods

This study was conducted on cattle from two private farms in Van. Samples of faeces were collected directly from the rectums of the cattle and brought to the Veterinary Medicine Parasitology Lab at Yüzüncü Yıl University and examined for the eggs of gastrointestinal nematodes by the Fulleborn saturated salt solution method. Gastrointestinal nematode-positive animals were allocated to three groups of 10, taking into account the EPG numbers of the McMaster method. The first group was subcutaneously administered 0.2 mg/kg of doramectin, and the second group was subcutaneously administered 0.2 mg/kg of moxidectin. The third group

was left as a control. Faecal samples from animals were analyzed for EPG numbers on days 0, 7 and 14 of treatment and geometrical means of the results taken. Coprocultures were performed to diagnose *Trichostrongylidae* genus in infected animals.

Results

The results of EPG counts before, during and after the treatment for *Trichostrongylidae* species are presented in the Table. The egg counts from the two trials on days 7 and 14 of treatment were reduced by 100% compared to the control group. There were no eggs in the faeces of the two treatment groups in the examination conducted by the Fulleborn saturated salt solution method.

Doramectin and moxidectin, which were used subcutaneously to treat cattle with *trichostrongylosis* at a dosage of 0.2 mg/kg, resulted in an efficacy level of 100% (Table).

Larvae of the parasite species of *Haemonchus*, *Ostertagia*, *Nematodirus* and *Trichostrongylus* were detected in the coprocultures of the infected animals performed before treatment.

Animals displayed no medicine-related side effects after the treatment. Moreover, some initially cachectic animals have made significant positive progress in their condition after the treatment.

Discussion

Gastrointestinal nematode infection is epidemic in Turkish cattle and causes great economic losses (1,2). Although there are several anthelmintics in use against nematodes, resistance has developed to these long-used anthelmintics (3,8,16). For this reason both parasitologists and pharmacologists have started to work on developing effective new combined and persistent preparations against gastrointestinal nematodes. In line with this goal the newly marketed preparations doramectin and moxidectin are effective against both ecto- and endoparasites (3).

In numerous studies conducted internationally and in Turkey, doramectin and moxidectin have been found to be highly effective against gastrointestinal nematodes in various animals (7,8,12,14,15,17-19). This is the first

Table. The Efficacy of Doramectin and Moxidectin against Gastro-intestinal Nematodes in Cattle.

Groups	No	Egg counts in per gram faeces (EPG)						Efficacy%
		Before Treatment	Treatment Day	Mean	After Treatment			
					7 th day	14 th day	Mean	
Moxidectin 0.2 mg/kg Subcutan	1	450	650	550	0	0	0	100%
	2	600	600	600	0	0	0	
	3	250	300	275	0	0	0	
	4	750	500	625	0	0	0	
	5	1500	1350	1425	0	0	0	
	6	700	950	775	0	0	0	
	7	1000	950	975	0	0	0	
	8	1200	1100	1150	0	0	0	
	9	500	400	450	0	0	0	
	10	850	800	725	0	0	0	
Geo-mean		697.128	691.748	685.503				
Doramectin 0.2 mg/kg Subcutan	1	250	450	350	0	0	0	100%
	2	700	850	775	0	0	0	
	3	500	450	575	0	0	0	
	4	550	500	525	0	0	0	
	5	1000	650	825	0	0	0	
	6	1100	1500	1300	0	0	0	
	7	250	750	500	0	0	0	
	8	950	1000	975	0	0	0	
	9	600	300	450	0	0	0	
	10	450	500	475	0	0	0	
Geo-mean		566.342	627.331	625.585				
Control	1	550	700	625	500	900	700	0
	2	750	600	675	450	500	475	
	3	700	600	650	450	250	350	
	4	350	100	225	100	150	125	
	5	500	450	475	200	500	350	
	6	300	500	400	550	400	475	
	7	650	150	400	300	300	300	
	8	450	150	300	350	900	625	
	9	450	950	700	500	950	725	
	10	700	600	650	850	100	475	
Geo-mean		518.217	385.624	479.317	371.225	392.406	416.252	

report from Turkey about the efficacy of doramectin and moxidectin against gastrointestinal nematodes in cattle.

In this study, the efficacy of doramectin and moxidectin at a subcutaneous dosage of 0.2 mg/kg, in cattle with naturally acquired gastrointestinal nematodes

in Van was 100%. During and after treatment with doramectin and moxidectin, no side effects were observed in the animals. Furthermore, significant weight gain was observed in the cachectic animals.

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