

ajava

Asian Journal of Animal and Veterinary Advances



Academic
Journals Inc.

www.academicjournals.com

The Efficacy of Moxidectin Against Gastrointestinal Nematode Infections in Goats

¹C. Ragbetli, ²E. Ceylan and ²P. Tanritanir

¹Van Health Services Vocational College, University of Yuzuncu Yil, 65080-Van, Turkey

²Department of Internal Medicine, Faculty of Veterinary, Yuzuncu Yil University, 65080-Van, Turkey

Abstract: The aim of this study was to examine the efficacy of moxidectin treatment on goats naturally infected with gastrointestinal nematodes in Van region, Turkey. Two hundred and forty goats infected with gastrointestinal parasites were treated with 0.2 mg kg⁻¹ moxidectin (Cydectin, Abfar), subcutaneously. Ten randomly selected goats were not treated and allocated as a control group. Faecal samples were examined for gastrointestinal parasites qualitatively and quantitatively (EPG) in 0th, 7th and 14th days of treatment. Larvae of the parasite species of *Ostertagia*, *Haemonchus*, *Nematodirus* and *Trichostrongylus* were detected in the coprocultures of the infected animals performed before treatment. It was observed that moxidectin was 100% effective against the gastrointestinal nematodes.

Key words: *Trichostrongylidae*, goat, efficacy, moxidectin, gastrointestinal parasite

INTRODUCTION

Animal breeding is an important economical element for villagers in Van region. Parasitic infections, particularly gastrointestinal nematodosis causes of considerable economic loss in Turkey and the world (Gulanber *et al.*, 1998; Myers, 2002; Cirak *et al.*, 2005; Rahmann and Seip, 2007). In several studies conducted internationally and in Turkey, moxidectin have been found to be highly effective against a wide variety of external and internal parasites in different species of animals and many formulations (pour-on, oral and parenteral) (Kerboeuf *et al.*, 1995; Torres-Acosta and Jacobs, 1999). Moxidectin is very effective in goats than the other drugs. Since, moxidectin formulation is aqueous based solution significantly absorption comes out in domestic animals including goats. Moxidectin plasma concentrations which applied subcutaneously at 1 mg kg⁻¹ dose is 64% longer than doramectin plasma concentrations at the same dose (Escuredo *et al.*, 1999). The mechanism of effect of moxidectin, in treatment of endo and ecto parasites of cattle, sheep and horses has not been exactly known; it leads to loosening of terminal presynaptic nerves and activation similar to GABA stimulation of avermectins advances. Thus, GABA binds next to the postsynaptic receptors and as a result causes blockage of interneuronal transmission and eventually leads to paralyses and deaths (Lonneux and Losson, 1994).

The aim of this study was to examine the efficacy of moxidectin in treating goats naturally infected with gastrointestinal nematodes in Van region.

MATERIALS AND METHODS

Animals

The present study was carried out on goats from three private farms in Van. All goats in these farms were naturally infected with gastrointestinal (GI) nematodes. Goats aged between 1-3 years and

weighted between 35-50 kg. During the study period, all animals were housed in their usual winter housing facility and fed according to their regular feeding regimen with approximately 2 kg of hay and 1 kg of concentrate feed per goat. They had no limitation for access to drinking water.

Study Design

In this study, 240 of the 250 goats naturally infected with *Trichostrongylidae* sp. were allocated to treated group and 10 goats were allocated to control group and identified with ear tags. Two hundred and forty goats in the treated group were administered 0.2 mg kg⁻¹ moxidectin (Cydectin, Abfar), subcutaneously (Lounoux and Losson, 1994). The other group remained as an untreated control group.

Sample Collection and Analysis

Individual fecal samples were taken directly from the rectums of the goats on days 0 (pre-treatment) and 7, 14, (posttreatment) and brought to the Parasitology Laboratory in Faculty of Medicine, University of Yuzuncu Yil and examined for the eggs of gastrointestinal nematodes by the Fulleborn saturated salt solution method. Fecal egg-counts (EPG) (eggs g⁻¹) were determined using the modified McMaster technique (MAFF, 1986) and geometrical means of the results taken. Moreover, faecal cultures were done, to differentiate at genus level of trichostrongylid nematodes.

Statistical Analysis

Percent efficacy of moxidectin, based on reduction in fecal egg counts was calculated for the undifferentiated trichostrongyle eggs described by Morin *et al.* (1996).

RESULTS

In other words, the eggs of the parasites in these animals were not encountered on the 7th and 14th days after treatment. Larvae of the parasite species of *Ostertagia*, *Haemonchus*, *Nematodirus* and *Trichostrongylus* were detected in the coprocultures of the infected animals performed before treatment (Table 1).

Table 1: Geometric average of parasites EPG in samples before, 7 and 14 days post treatment

Groups	Before treatment		After treatment		Percentage of effectiveness of moxidectin
	0th day	7th day	7th day	14th day	
Moxidectin	800	0	0	0	100
0.2 mg kg ⁻¹	500	0	0	0	100
subcutan	950	0	0	0	100
	750	0	0	0	100
	500	0	0	0	100
	800	0	0	0	100
	900	0	0	0	100
	950	0	0	0	100
	800	0	0	0	100
	450	0	0	0	100
Geo. Aver. (N)	650	0	0	0	100 (%)
Control	400	450	400	400	0
	750	750	800	800	0
	700	750	700	700	0
	450	450	500	500	0
	500	500	400	400	0
	350	350	400	400	0
	900	950	900	900	0
	850	850	800	800	0
	950	950	900	900	0
	800	800	800	800	0
Geo. Aver. (N)	650	675	660	660	0 (%)

DISCUSSION

Gastrointestinal nematodes in goats cause regional economic losses in the world and Turkey. To decrease harmful effects of parasites, animal transportation should be provided under controlled conditions. Epidemiological control and eradication studies should be performed and animals with the parasite should be treated with appropriate anthelmintic drugs. Hoste and Chartier (1993) reported that subclinical and clinical gastrointestinal nematodiasis in goats led to loss of body weight and a constant decrease in milk productivity ranging from 2.5 to 10% and 13 to 25.1%, respectively.

Usage of moxidectin 1% solution at a dose of 0.2 mg kg⁻¹ was decreased weight loss and productivity of milk and wool. Bauer and Conraths (1994) performed a study in lambs which were experimentally infected with *H. contortus*, *Ostertagia* sp., *Trichostrongylus colubriformis*, *Cooperia curticei* and *Oesophagostomum* sp. and *Chabertia ovina*, moxidectin at a dose of 0.2 mg kg⁻¹, both as oral and parenteral formulations, have been found to be 100% effective and with no side effects. Torres-Acosta and Jacobs (1999) performed a study in goats which were experimentally infected with nematodes (*H. contortus*, *T. circumcincta* and *T. colubriformis*) 15, 22 or 29 days after treatment, moxidectin 0.1% oral drench at 0.2 mg kg⁻¹, have been found to be effective for goats treated 15, 22 and 29 days before infection with *H. contortus* were 100, 100 and 99.7%, respectively and corresponding values for *T. circumcincta* were 95.7, 99.9 and 94.9% with easy to use and no side effects. The other study was investigated effects of the single and pair applications of 1% of injectable moxidectin solution in 14 sheep aged between 2 and 6 infected with *Psoroptes ovis* and moxidectin was found to be effective 100% all of the sheep (Coles *et al.*, 1994). Moxidectin was used for the treatment of *Strongylus* sp. infection in horses and it was determined to be effective 100% (Xiao *et al.*, 1994). Some researchers have used moxidectin at doses of 0.3 and 0.5 mg kg⁻¹ in calves with naturally infected with gastrointestinal and lung nematodes, pour-on formulation. They have been found 100% effective on adult forms of *D. viviparus*, *Trichostrongylus axei*, *Ostertagia* sp. and *Nematodirus helvetianus* (Hubert and *et al.*, 1995). Tüzer *et al.* (1999) found successful results in lambs on the 7th (100%), 14th day (99.9%) and 28th day (100%) and in calves on the 7th (100%), 14th day (99.9%) and 28th day (98.9%) after treatment. In the present study, larvae of the parasite species of *Haemonchus*, *Ostertagia*, *Nematodirus* and *Trichostrongylus* were determined in the coprocultures of the infected animals prior treatment. Use of moxidectin in this study proved a high efficacy (100%) against above mentioned gastrointestinal nematodes when administered subcutaneously 0.2 mg kg⁻¹ on goats. We obtained successful results after the 7 and 14 days of the moxidectin treatment on goats. During and after the treatment of moxidectin, no adverse effects were observed in the goats.

Development of resistance for many antiparasitary drugs requires careful usage of these drugs worldwide (Kieran, 1994; Kulda, 1999). The risk of resistance development may be reduced to minimum by preventing the sales without prescription and by using the drug carefully. Although moxidectin is a novel drug, there are many forms in which resistance development are reported and local usage of moxidectin is required carefully (Besier and Love, 2003; Kaplan *et al.*, 2007). No development of resistance has been come across in present study. These results indicate that the moxidectin should be preferred for treatment of animals having gastrointestinal nematodes.

ACKNOWLEDGMENTS

This study was supported by a grant from the Scientific Research Projects Fund of Yuzuncu Yil University, Van, Turkey with a grant number 2006- MYOB31. Thanks to Prof. Dr. Hasan Yilmaz for diagnosing of parasites, at the Department of Parasitology in Faculty of Medicine.

REFERENCES

- Bauer, C. and F.J. Conraths, 1994. Comparative efficacy of moxidectin and mebendazole against gastrointestinal nematodes in experimentally infected lambs. *Vet. Rec.*, 135: 136-138.
- Besier, R.B. and S.C.J. Love, 2003. Anthelmintic resistance in sheep nematodes in Australia: The need for new approaches. *Aust. J. Exp. Agric.*, 43: 1383-1391.
- Cirak, V.Y., E. Guleöen and C. Bauer, 2005. The prevalence of strongyle infections and persistent efficacy of pyrantel embonate, ivermectin and moxidectin in Turkish horses. *Turk. J. Vet. Anim. Sci.*, 29: 175-181.
- Coles, G.C., D.J. Giordano-Fenton and J.P.2nd. Tritschler, 1994. Efficacy of moxidectin against nematodes in naturally infected sheep. *Vet. Rec.*, 135: 38-39.
- Escuredo, E., M. Carceles, S. Diaz, J.F. Sutra, P. Galtier and M. Alvenerie, 1999. Pharmacokinetics of moxidectin and doramectin in goats. *Res. Vet. Sci.*, 67: 175-179.
- Gulanber, A., E. Tuzer, A. Gargili, M. Toparlak, I. Efil, V. Keles and M. Ulutas, 1998. Efficacy of moxidectin against strongyl in nematodes in naturally infected horses. *Turk. J. Vet. Anim. Sci.*, 22: 465-466.
- Hoste, H. and C. Chartier, 1993. Comparison of effects on milk production of concurrent infection with *Haemonchus contortus* and *Trichostrongylus colubriformis* in high and low producing dairy goats. *Ani. J. Vet. Res.*, 54: 1886-1893.
- Hubert, J., D. Kerboueuf, J.P. Stang, B. Cardinaud and F. Blond, 1995. Efficacy of moxidectin pour-on against nematode infections in cattle. *Vet. Rec.*, 136: 632-634.
- Kaplan, R.M., A.N. Vidyashankar, S.B. Howell, J.M. Neiss, L.H. Williamson and T.H. Terrill, 2007. A novel approach for combining the use of *in vitro* and *in vivo* data to measure and detect emerging moxidectin resistance in gastrointestinal nematodes of goats. *Int. J. Parasitol.*, 37: 795-804.
- Kerboenf, D., J. Hubert, B. Cardinaud and F. Blond, 1995. The persistence of the efficacy of injectable or oral moxidectin against *Teladorsagia*, *Haemonchus* and *Trichostrongylus* species in experimentally infected sheep. *Vet. Rec.*, 137: 399-401.
- Kieran, P.J., 1994. Moxidectin against ivermectin-resistant nematodes: A global view. *Aust. Vet. J.*, 71: 158-159.
- Kulda, J., 1999. Trichomonads, hydrogenomes and drug resistance. *Int. J. Parasitol.*, 29: 199-212.
- Lonneux, J.F. and B.J. Losson, 1994. The efficacy of moxidectin 0.5% pour-on against *Hypoderma bovis* in naturally infested cattle: Parasitological and serological data. *Vet. Parasitol.*, 52: 313-320.
- MAFF, 1986. Manual of Veterinary Parasitological Laboratory Techniques. 3rd Edn., HMSO, London, ISBN-10: 0112427243, pp: 160.
- Morin, D., R. Valdez, C. Lichtensteiger, A. Paul, J. Dipietro and F. Guerino, 1996. Efficacy of moxidectin 0.5% pour-on against naturally acquired nematode infections in cattle. *Vet. Parasitol.* 65: 75-81.
- Myers, G., 2002. Strategies to control parasites in goats. Kentucky Ruminant Nutrition, Strategies to Control Parasites in Goats, pp: 41-47. http://www.uky.edu/Ag/AnimalSciences/dairy/ruminant_nutritionworkshop/runnut023.pdf.
- Rahmann, G. and H. Seip, 2007. Alternative management strategies to prevent and control endoparasite diseases in sheep and goat farming systems: A review of the recent scientific knowledge. *Landbauforschung Volkenrode*, 57: 75-88.

- Torres-Acosta, J.F.J. and D.E. Jacobs, 1999. Duration of activity of oral moxidectin against *Haemonchus contortus*, *Teledorsagia circumcincta* and *Trichostrongylus colubriformis* in goats. *Vet. Rec.*, 144: 648-649.
- Tuzer, E., M. Toparlak and K. Goksu, 1999. Efficacy of moxidectin against gastrointestinal nematodes in naturally infected lambs and calves. *Turk. J. Vet. Anim. Sci.*, 23: 105-108.
- Xiao, L., R.P. Herd and G.A. Majewski, 1994. Comparative efficacy of moxidectin and ivermectin against hypobiotic and encysted cyathostomes and other equine parasites. *Vet. Parasitol.*, 53: 83-90.