

Efficacy of pyrantel embonate, febantel and praziquantel against *Giardia* spp. in naturally infected dogs

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Abstract

Giardiasis is recognized as an important disease in humans and in young animals of several species in most areas in the world. The prevalence of *Giardia* spp. in dogs varies greatly, but has been reported to be very high in breeding kennels and in puppies. Chemotherapeutic treatment is recommended for all infected dogs to cure acute symptoms of giardiasis, to avoid reinfections and to reduce the potential zoonotic risk for man. In Germany nitroimidazole derivatives such as metronidazole and recently the benzimidazole fenbendazole are used to treat giardiasis in dogs. The objective of this study was to prove the therapeutic efficacy of pyrantel embonate, febantel and praziquantel (Drontal® Plus, Bayer AG) against *Giardia* spp. in naturally infected dogs under field conditions.



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A test for *Giardia*-specific antigen (ProSpecT® *Giardia* Microplate Assay) performed in dogs from private owners identified 35 dogs between eight months and fourteen years old and 3 dogs between six and fifteen weeks old to be naturally infected with *Giardia* spp. All 38 dogs were treated orally with combination tablets (144 mg pyrantel embonate, 150 mg febantel and 50 mg praziquantel) at the recommended dosage on two consecutive days. The therapeutic response was assessed on day three after the last medication by means of the coproantigen test for *Giardia*-specific antigen. On the third day after the final administration of the tablets 35 of the 38 treated dogs were negative for coproantigen of *Giardia* and 3 were positive. Signs of toxicosis were not observed in any dog.

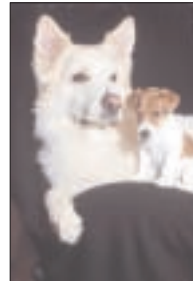
The results of the study indicate that the combination tablets (144 mg pyrantel embonate, 150 mg febantel and 50 mg praziquantel) given at the recommended dosage on two consecutive days are effective for treating naturally acquired giardiasis in dogs.

Introduction

Giardia are flagellate protozoa parasitic in man and numerous animal species. Chemotherapeutic treatment is recommended for all infected dogs to cure symptoms of giardiasis, to avoid reinfections and to reduce the potential zoonotic risk for man. Hitherto giardicidal drugs mostly used in dogs are nitroimidazole derivatives such as metronidazole. Following in vitro studies (Edlind et al. 1990, Morgan et al. 1993), which provide a preliminary indication for the efficacy of benzimidazoles against *Giardia*, the efficacy of fenbendazole (Barr et al. 1994) and a combination of praziquantel, pyrantel pamoate, and febantel (Barr et al. 1998) against naturally acquired giardiasis in dogs could be demonstrated. The objective of this study was to prove the therapeutic efficacy of pyrantel embonate, febantel and praziquantel (Drontal® Plus) against *Giardia* spp. in naturally infected dogs under field conditions.

Materials and Methods

Preliminary examinations for infections with *Giardia* spp. were performed in dogs from private owners in the Southwest of Germany by means of the ProSpecT® *Giardia* Microplate Assay. A total of 38 suitable dogs (Table 1) with a positive test result (selection criterion) were identified for inclusion in the study. The dogs were weighed prior to the treatment and treated orally with combination tablets (one tablet per 10 kg bodyweight contains 144 mg pyrantel embonate, 150 mg febantel and 50 mg praziquantel) at the recommended dosage on two



consecutive days. The combination tablets were administered to the dogs in a quantity of about 1/2 tablet / 5 kg bodyweight per day. On day 3 after the last medication individual samples of spontaneously passed faeces from the dogs were collected and examined for *Giardia*-specific antigen. The efficacy of pyrantel embonate, febantel and praziquantel against *Giardia* was assessed with reference to the qualitative results of the ProSpecT *Giardia* Assay for coproantigen by comparing the results before and after the treatment.



Table 1: Age and bodyweight of the *Giardia* positive dogs and number of administered combination tablets containing pyrantel embonate, febantel and praziquantel

No.	Age	Bodyweight (kg)	Dose rate/ tablets	No.	Age	Bodyweight (kg)	Dose rate/ tablets
01	4 years	34	2 x 4	20	8 months	27	2 x 3
02	6 years	40	2 x 4	21	8 months	18	2 x 2
03	2.5 years	25	2 x 3	22	10 months	6	2 x 1
04	12 months	35	2 x 3.5	23	3 years	6	2 x 1
05	14 years	8	2 x 1	24	5 years	28	2 x 3
06	10 months	28	2 x 3	25	16 months	44	2 x 5
07	15 months	31	2 x 3.25	26	13 months	32	2 x 3.5
08	13 months	24	2 x 2.5	27	8 years	12	2 x 1.5
09	14 months	26	2 x 3	28	6 weeks	10	2 x 1
10	10 months	42	2 x 4	29	15 weeks	13	2 x 1.5
11	16 months	40	2 x 4	30	10 weeks	4	2 x 0.5
12	18 months	65	2 x 6.5	31	7 years	29	2 x 3
13	4 years	13	2 x 1.5	32	4 years	33	2 x 3
14	12 months	38	2 x 3.75	33	2 years	27	2 x 3
15	10 months	44	2 x 4.5	34	3 years	30	2 x 3
16	12 months	27	2 x 3	35	4 years	25	2 x 3
17	11 months	20	2 x 2	36	3 years	32	2 x 3.5
18	16 months	20	2 x 2	37	12 months	30	2 x 3
19	19 months	23	2 x 2.5	38	5 years	30	2 x 3

Results and Conclusion

The efficacy of pyrantel embonate, febantel and praziquantel against *Giardia* was assessed on day 3 after the final administration of the test product by means of the coproantigen test for *Giardia*-specific antigen. On the third day after the final dose of the test product 35 of 38 animals (Table 2) were negative for coproantigen of *Giardia* (Efficacy: 92.1 %). Signs of toxicosis were not observed in any dog. The present study, through the use of the coproantigen test, which detects the antigen GSA 65 excreted by trophozoites, was able to prove that metabolically active trophozoites of *Giardia* were not present in 35 out of 38 tested dogs after the treatment. The results indicate that the combination tablets (144 mg pyrantel embonate, 150 mg febantel and 50 mg praziquantel) given at the recommended dosage on two consecutive days are effective for treating naturally acquired giardiasis in dogs.

Table 2: Efficacy of Drontal Plus against *Giardia* in dogs proved by means of coproantigen test

Dog age	Number of <i>Giardia</i> positive dogs before treatment	Number of <i>Giardia</i> positive dogs after treatment	Number of <i>Giardia</i> negative dogs after treatment
< 1 year	14	0	14
> 1 year–2 years	10	1 (No. 9)	9
> 2 years	14	2 (No. 31; 35)	12
Total	38	3	35

Literature

- Barr, S.C., D.D. Bowman, and R.L. Heller 1994. Efficacy of fenbendazole against giardiasis in dogs. *Am. J. Vet. Res.* 55: 988-990
- Barr, S.C., D.D. Bowman, M.F. Frongillo, and S.L. Joseph 1998. Efficacy of a drug combination of praziquantel, pyrantel pamoate, and febantel against giardiasis in dogs. *Am. J. Vet. Res.* 59: 1134-1136.
- Edlind, T.D., T.L. Hang, and P.R. Chakraborty 1990. Activity of the anthelmintic benzimidazoles against *Giardia lamblia* in vitro. *J. Inf. Dis.* 162: 1408-1411.
- Morgan, U.M., J.A. Reynoldson, and R.C.A. Thompson 1993. Activities of several benzimidazoles and tubulin inhibitors against *Giardia* spp. in vitro. *Antimicrob. Agents Chemother.* 37: 328-331.