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Ancylostomosis and its Therapeutic Control in Dogs

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ABSTRACT

In first part of the study, a total of 203 fecal samples of dogs (pet ad stray) were examined for the presence of the *Ancylostoma caninum*. Stray dogs were more commonly affected and higher prevalence was noted in pups than adults. Dogs of either sex were nearly equally affected. In the second part of study, therapeutic trials were conducted using mebendazole and pyrantel pamoate in dogs naturally infected with ancylostomes. The efficacies of the drugs were assessed in term of reduction of number of ova in the fecal samples. The egg per gram of faeces was significantly lower ($p < 0.05$) in dogs treated with mebendazole and pyrantel pamoate compared to control animals on day 21st day. Mebendazole and pyrantal pamoate reduced EPG by > 90% on final day of treatment. No side effects were noted due to any of these drugs. In conclusion, canine ancylostomosis may be controlled with mebendazole and pyrantal pamoate. However, a molecular epidemiological study may be carried out in throughout a year.

Key Words: *Ancylostoma caninum,* pups, mebendazole, pyrantel pamoate

INTRODUCTION

Ancylostomosis is a wide spread parasitic disease of dogs and cats and is caused by *Ancylostoma caninum* and *A. braziliense*. These parasites occur commonly in the small intestine of dogs and various wild carnivores (Urquhart et al., 2000). The larval stages of ancylostoma are associated with creeping eruptions in man that is generally referred as cutaneous larva migrans (Prociv and Croese, 1996). Their migration causes progressive linear eruptive lesions in skin. Skin lesions associated with cutaneous infection, range from moist eczema to ulceration, which may be severe on fact. In dogs, such lesions appear after rain when dogs are allowed to play in wet soil. Creeping eruptions commonly occur in children playing in places contaminated with excreta of dogs and cats. These parasites are voracious blood suckers and pups become profound anaemic quickly (Urquhart et al., 2000).

Previously we found that prevalence of ancylostomes was higher in stray dogs compared to pet dogs (Ashraf et al., 1994).

The severity of clinical disease is related to intensity of infection age, nutritional status, iron reserves and presence of acquired immunity in dogs. Keeping in view the importance of this disease, we aimed to determine the prevalence of ancylostomosis in dogs and to control the parasites using mebendazole and pyrantel pamoate in dogs naturally infected with ancylostomes.

MATERIALS AND METHODS

The study was conducted during summer 2005 in dogs (n = 148) presented to the Pet Centre, Department of Clinical Medicine and Surgery, University of Veterinary and Animal Sciences, Lahore, Pakistan for different ailments. These animals were regarded as pet dogs. Moreover, the fecal

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samples from stray dogs (n = 55) were also collected in the different localities of Lahore City. The fecal samples (n = 203) were collected either directly from the rectum of the dogs in the case of pet dogs or the fecal samples from stray dogs were collected soon after defecation.

The fecal samples were immediately processed for the identification of ova of ancylostomes by direct microscopic examination, flotation and sedimentation techniques (Anonymous, 1986).

Therapeutic Trail

For therapeutic study, dogs (n = 30) naturally infected with ancylostomes were randomly divided into 3 groups (A, B and C). Dogs of group A and B were treated with mebendazole (10 mg/kg BW) and pyrantel pamoate (10 mg/kg BW) respectively, while dogs of group C were kept as control. Counting of eggs was made using modified McMaster technique (Anonymous, 1986) on day 0, 7th, 14th and 21st post treatment (PT). Efficacy of drugs was calculated on the basis of reduction in fecal egg counts (Figure 1).

Statistical Analysis

Statistical programme SPSS (version 12) was used for data analysis. The Kolmogorov Smirnov test was employed to test the normal distribution of the data. The prevalence was analyzed using Chi Square method. The data of therapeutic trial was analyzed using ANOVA. The group differences were determined by the Duncan's multiple range test. Differences were considered significant at $p < 0.05$.

RESULTS AND DISCUSSION

Out of 203 fecal samples examined, 120 (59.1%) were found positive for ancylostomes (Table 1). The parasites were more frequently ($p < 0.001$) found in stray dogs (72.7%) compared to pet dogs (54.0%). However, the prevalence of ancylostomes was alike ($p > 0.05$) on gender basis (Table 1). The prevalence of ancylostomes was same in all age groups though the ancylostomes were numerically higher in pups compared to other age groups (Table 1). Previously we found lower prevalence (36.5%) of ancylostomes in dogs in the same City in 1992 (Ashraf et al., 1994). However, the previous study was conducted during summer and autumn seasons that may be a factor for lower prevalence. In the same study, the parasites were more commonly found in stray dogs compared to pet dogs, a pattern that was also observed in the current study. This may be due to the fact that pets are kept under good hygienic conditions and provided with balanced food compared to stray dogs. Additionally, the stray dogs are more exposed to re-infection compared to pet dogs. Similar results were also recorded by Minnaar and Krecek (2001) and Giraldo et al. (2005). Various workers have recorded the variation in the prevalence of ancylostomosis in dogs. For instance, Rubel and Wisnersky (2005) reported the prevalence of 57.8% in dogs, whereas 88% by Wachira et al. (1993) and 57.8 % by Vicente et al. (2004). The difference in prevalence may be due to different environmental and managemental conditions. In the current study, the

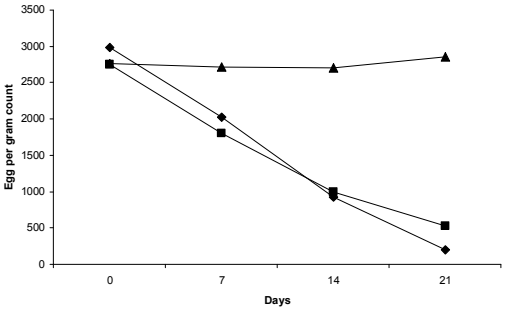

Figure 1 Fecal egg count of dogs naturally infected with ancylostomes that were either not treated (▲) or treated with mebendazole (■) and pyrantel pamoate (♦) on different days of treatment

prevalence was numerically higher in pups (63%) than adults (50%). Similar results have also been reported by Ponce et al. (2005). No difference was noted on the basis of sex (Table 1) as the prevalence of ancylostomes was alike in male (59.2%) and female (57.1%). Similar outcomes were observed for prevalence based on age. The prevalence was numerically higher ($p = 0.35$) in young pups compared to other age groups (Table 1).

Table 1 Prevalence of ancylostomes based on breed, sex and age facotors in dogs

Factor		Ancylostomes		
		Total No. examined	No. of positive	Percentage
Breed				
	Stray	55	40	72.7
	Pet	148	80	54.0
Sex				
	Male	189	112	59.2
	Female	14	8	57.1
Age				
	> 1 yr	40	20	50.0
	6-12 mn	60	35	58.0
	1-6 mn	103	65	63.0

Yr = year, mn = months

This lack of difference may be due to the fact that the study was conducted in the summer season. Moreover, the number of adult dogs studied was few.

Most of veterinarians recommend the regular prophylactic use of anthelmintics to minimize risks to both dogs and people against ancylostomes infection Therefore, in many countries, regular anthelmintic treatment of dogs is advocated as a preventative health measure for canine and human populations. However, increasing occurrence of resistance to anthelminthic drugs is well documented in animal where frequent and intensive treatment with anthelminthics has been widely practiced. In the 1970s, pyrantel was highly effective against *A. caninum*, with trials revealing therapeutic efficacies exceeding 95%. In 1987, an apparent treatment failure of a pyrantel/oxantel combination product against *A. caninum* in a greyhound imported into New Zealand from Australia was reported.

In therapeutic trials, two drugs (Pyrantel Pamoate and mebendazole) were used in attempt to control the ancylostomes infection in dogs. There was a significant ($p < 0.05$) decrease in the EPG count in treated animals compared to control animal (Figure 1). Based on the reduction of ova in the fecal samples, it was shown that both drugs proved equally good to reduce the burden of parasites and efficacy was ranged >90% for both drugs.

Guerrero et al. (1981) evaluated two schedules of anthelmintic oral treatment, using mebendazole powder in 73 dogs naturally infected with common helminthes. Mebendazole powder was administered to 26 dogs at doses of 22 mg/kg once daily for 3 days and was compared with the same dose given only daily for 5 days into 23 dogs. The dogs that were kept as controls received a placebo treatment for 5 days. Efficacy results for the 3-day treatment schedule of mebendazole was 99.4% effective against *Ancylostoma caninum*. Mebendazole powder given on the 5-day treatment schedule was 100% efficacious against the foregoing parasites. Anthelmintic efficacy against *Dipylidium caninum* was not detected in either schedule of treatment. Clark et al. (1991) conducted eight trials in dogs to determine the efficacy of ivermectin and pyrantel pamoat against *Dirofilaria immitis, Ancylostoma caninum, Uncinaria stenocephala, Toxocara canis,* and *Toxascaris leonina*. Three studies involved induced infection with *D. immitis*, and 5 studies involved induced or natural infection with hookworms and ascarids. Efficacy of the combined product against *A. caninum* was 98.5%. In the intestinal parasite trials,

each individual component was found not to interfer with the anthelmintic action of the other. Similar results have been recorded by other workers (Genchi et al., 1990; Sarinas and Chitkara, 1997). Nolan et al. (1992) and Clark et al. (1991) also observed that pyrantel pamoate was 99.6% and 93.87 % effective respectively against *Ancylostoma caninum*. No side effects were observed.

In conclusion, ancylostomes were more frequently observed in stray dogs compared to pet dogs. However, further study is needed to determine the distribution of the parasites in different localities around a year.

REFERENCES

Anonymous, 1986. In: *Mannual of Parasitological Laboratory Techniques*. Her Majesty's Stationary Office, London. Ministry of Agriculture, Fisheries and Food, U.K.pp: 27-28.

Ashraf, K., M. S. Mian, and N. Ahmed. 1994. Study on the taxonomy and prevalence of the species of genus *Ancylostoma* and effects of natural infection on various blood parameters in dogs. *Pakistan Journal of Science*, 46: 29-32.

Clark, J. M., C. P. Daurio, R. E. Plue, R. Wallace and S. L. Longhofer. 1991. Efficacy of ivermectin and pyrantel pamoate combined in a chewable formulation against heartworm, and ascarid infections in dogs. *Veterinary Parasitology*, 53: 517-520.

Genchi, G., G. Traldi, and M. T. Manfredi. 1990. Field trials of the anthelmentics efficacy of nitroscanate and mebendazole in dogs. *Veterinary Record*, 126: 77-80.

Giraldo, M. I., N. I. Garcia, and J. C. Castano. 2005. Prevalence of intestinal helminthes in dogs from Quindio Province. *Biomedica*, 25: 346-352.

Guerrero, J., G. Pancai, and B. Michael. 1981. Comparative anthelmentic efficacy of two schedules of mebendazole treatment in dogs. *American Journal of Veterinary Research*, 42: 425-427.

Minnaar, W. N. and R. C. Krecek. 2001. Helminths in dogs belonging to people in a resource-limited urban community in Gauteng, South Africa. *Onderstepoort Journal of Veterinary Research*, 68: 111-117.

Nolan, T. J., S. Niamatali, V. Bhopale, S. L. Longhofer, and G. A. Schad. 1992. Efficacy of a chewable formulation of ivermectin against a mixed infection of *Ancylostoma braziliense* and *Ancylostoma tubaeforme* in cats. *American Journal of Veterinary Research*, 53: 1411-1413.

Ponce-Macotela, M., G. E. Peralta-Abarea and M. N. Martinez-Gordillo. 2005. *Giardia intestinalis* and other zoonotic parasites: Prevalence in adult dogs from the Southern Part of the Mexican city. *Veterinary Parasitology*, 131: 1-4.

Prociv, P. and J. Croese. 1996. Human enteric infection with *Ancylostoma caninum* hookworms reappraised in the light of a "new" zoonosis. *Acta Tropica*, 62: 23-44.

Rubel, D. and C. Wisniresky. 2005. Magnitude and distribution of canine fecal contamination and helminth eggs in two areas of different urban structure Greater Buenos Aires, Argentina. *Veterinary Parasitology*, 133: 339-347.

Sarinas, P. S. and R. K. Chitkara. 1997. Ascariasis and hookworm. *Seminars In Respiratory Infections*, 12: 130-137.

Urquhart, G. M., J. L. Armor, A. M. Duncan and F. M. Jennings. 2000. In: *Veterinary Parasitology*. 3rd (ed). ELBS Longman, UK. pp: 50-51: 274-276.

Vicente, J., F. Palomares, R. R. De-Ibanez, and J. Ortiz. 2004. Epidemiology of *Ancylostoma spp.* in the endangered Iberian lynx (*Lynx pardinus*) in the Donana national park, South West Spain, *Journal of Helminthology,* 78: 179-183.

Wachira, T. M., M. Sattran, E. Zeyhle, and M. K. Mjenga. 1993. Intestinal helminthes of public health importance in dogs in Nairobi. *East African Medical Journal*, 70: 617-619.