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Short communication

Modulation of specific biochemical blood parameters by helminth infection in laboratory Beagle dogs

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Abstract

The objective of this study was to examine the independent effect of helminths infection on biochemical blood parameters in Beagles intended for laboratory use which may contribute to a change of experimental results. As a result of research, the authors confirmed the negative effect of helminth invasion on the metabolism of the liver and kidney in laboratory dogs. Stool samples from thirty Beagle puppies were examined for parasites before the puppies were moved to the animal facility, and all were dewormed with Vetminth paste on the day they were moved. Stool examination was performed three more times and animals were given Drontal Plus flavor (Bayer) and Baycox 5% (Bayer). A fourth parasitological examination revealed no intestinal parasites in the feces. Three blood biochemical tests were performed. Experimental results clearly indicate the significant impact of intestinal parasites in dogs used in experiments.

Key words: experimental dogs, *Toxocara canis*, *Isospora canis*, *Giardia lamblia*

Introduction

Shelters for homeless animals typically house animals of all ages that have varied epizootic and parasitological histories (Romaniuk et al. 2004). In contrast, dogs purchased from animal supply companies have a known breeding history and are under the supervision of a veterinarian from birth. However, while many studies have surveyed parasitological infections in animal shelters, few have reported the prevalence or course of parasitosis in groups of animals bred for use in medical experiments (Luty and Mizgajska 1999, Barutzki and Schaper 2003, Romaniuk et al. 2004). This study examined the prevalence of intestinal parasites in Beagles intended for laboratory use and revealed the difficulty of eradicating intestinal parasites in dogs living in animal facilities.

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Table 1. Biochemical blood test results in laboratory Beagle puppies.

Number of examination	No. of dogs	Variable	RR	No. (%) of dogs>RR	No. (%) of dogs<RR	No. (%) of dogs within RR	Median	Minimum	Maximum
I		glucose	3.9-6.7 mmol/l	1 (3.3)	9 (30)	20 (66.7)	4.59	1.7	7.5
		ASPT	1-37 u/l	29 (96.7)	0 (0)	1 (3.3)	53.3	37	98
		TP	55-70 g/l	0 (0)	23 (76.6)	7 (23.3)	51.7	44.2	61.3
		crea	3.32-7.47 mmol/l	0 (0)	15 (50)	15 (50)	86.2	65.9	101
II	30	glucose	3.9-6.7 mmol/l	1 (3.3)	8 (26.7)	21 (70)	4.97	1.9	7.8
		ASPT	1-37 u/l	29 (96.7)	0 (0)	1 (3.3)	52	37	96
		TP	55-70 g/l	0 (0)	23 (76.6)	7 (23.3)	51.87	41.1	61.6
		crea	3.32-7.47 mmol/l	0 (0)	13 (43.3)	17 (56.7)	86.56	67.9	99.5
III		glucose	3.9-6.7 mmol/l	0 (0)	0 (0)	30 (100)	5.73	3.9	6.7
		ASPT	1-37 u/l	0 (0)	0 (0)	30 (100)	32.2	21	37
		TP	55-70 g/l	0 (0)	0 (0)	30 (100)	62.69	52.1	69.3
		crea	3.32-7.47 mmol/l	0 (0)	0 (0)	30 (100)	97.98	89.5	132.8

Explanation of symbols: ASPT – aspartate aminotransferase, TP – total protein, crea – creatinine, RR – reference range.

Materials and Methods

Thirty Beagle puppies, aged 8-9 weeks at the start of the study, were purchased from reputable breeders and placed in six rooms prepared especially for housing experimental animals. Dogs staying with their mother were dewormed. Before introducing the puppies to the animal house parasitological stool examination was performed and according to its results dogs were dewormed with a Vetminth Virbac paste in a dose of 1 ml per 2 kg body weight. Stool examination was performed three more times and according to its results animals were given Drontal Plus flavor (Bayer; 1 tablet per 10 kg of body weight) and Baycox 5% (Bayer; 0,4 ml per kg of body weight). Finally, the fourth stool examination showed no intestinal parasites. Examination of faecal specimens was performed using Fulleborn's flotation technique and Darling's solution (50% saturated sodium chloride solution/50% glycerol) (Romaniuk et al. 2004). A quick SensPERT Giardia Test Kit (VetAll Laboratories) was used to detect *Giardia lamblia* (Gundłach et al. 1996) in the stool samples. Blood tests were performed three times: before the transfer to the animal facility, the third day after the transfer when the second stool analysis was performed, and seven days after Baycox treatment.

Results and Discussion

Beagle puppies that were purchased as laboratory animals had been dewormed twice according to the veterinarians who supervised the breeding facilities. Before moving the puppies to the animal facility, stool samples were examined for parasites. All samples showed *Isospora canis* oocysts (extensiveness of invasion – 100%), and there were *Toxocara canis* eggs (86.6%) in most samples. Some samples showed *Giardia lamblia* (16.6%) as well. Accordingly, all dogs were dewormed with Vetminth paste. However, a stool analysis three days later showed that parasites were still present. The infection level of *Toxocara canis* (73.3%) had decreased slightly at the second examination, but the level of *Giardia lamblia* (16.6%) ans *Isospora canis* (100%) remained unchanged. This prompted us to use Drontal Plus Flavour tablets, which are purported to treat *Giardia spp*. in dogs. Accordingly, Drontal Plus Flavour was administered to all puppies for three consecutive days. Three days after the last dose, faecal samples were examined again. Drontal Plus Flavour was successful in combating *Giardia lamblia* (0%) and *Toxocara canis* (0%), and infections with *Isospora canis* decreased from 100% of the animals to 60%. In order to eliminate coccidian infection, a Baycox 5% prepara-

tion was used after the second parasitological stool examination. In the authors' experience, Baycox is effective against the intracellular developmental stages of coccidia and is very effective in treating *Isospora suis* in piglets; thus, it was the treatment of choice here (Mundt et al. 2005). Three days after the use of Baycox, a fourth parasitological stool examination was performed. Faecal samples from all puppies were negative for *Toxocara canis* eggs, *Isospora canis* spores and the *Giardia lamblia* antigen. During the entire study period, the Beagle dogs were examined clinically on a daily basis. The helminth infections were asymptomatic. In addition to stool examination, three blood biochemical examinations were performed to determine the impact of the parasites on the puppies. Despite the lack of clinical symptoms of parasitic infection, blood tests showed that parasitosis affected the puppies' physiology (Table 1). We conclude that even laboratory dogs can have intestinal parasites and that Vetminth paste and Drontal Plus tablets are ineffective for treating intestinal parasites in laboratory dogs. The novelty of this study is the presentation of the extent to which parasitic infestations in young Beagle dogs using in the experiment might alter the results of biochemical blood parameters, and thus the outcome of the experiments could not be credible. Beagle dogs are the only breed of dogs alloved for the experimental use and, according to the authors' knowledge, the rule is that the dogs are devormed before the use in the research, which, as we proved, may be unsuccesful.

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