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Original Article

Helminth Infections of Stray Dogs from Garmsar, Semnan Province, Central Iran

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Abstract

Background: The aim was to study the gastro-intestinal helminths of stray dogs of Garmsar, Semnan Province, Central Iran, and its impacts on human health and animal production.

Methods: During 2006, the alimentary tracts of 50 stray dogs at necropsy, selected from villages around Garmsar, were removed, and examined for helminth infections. Subsequently helminths were collected from the contents of each part and scraped sample of small intestines of washed materials in a 100-mesh sieve. To identify the species of helminths, the nematodes were cleared in lactophenol and cestodes were stained using carmine acid.

Results: Mixed infection was the rule and 40 dogs (80%) harbored more than one species of helminth. *Taenia hydatigena* was the most prevalent species (80%) followed by *Echinococcus granulosus* (64%), *Toxocara canis* (22%), *Mesocestoides lineatus* (12%), *Taenia multiceps* (10%) and *Dipylidium caninum* (4%). The mean intensity of worm infection was low (1-3) except for that of *E. granulosus* (645). No significant difference was noticed between sex, age and most helminth infections except for that of sex and *T. hydatigena* ($P=0.001$) as well as age and *T. canis* ($P=0.001$).

Conclusion: Although human infection with *T. hydatigena* is unlikely, but other helminths reported in this study are of zoonotic importance, and may pose a threat to community health, and reduce the productions of ruminants harboring taeniid metacestodes.

Keywords: Helminth infections, Stray dog, Iran

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Introduction

Dogs are associated with more than 60 zoonotic diseases among which parasites in particular helminthiases, can pose serious health concern (1) as well as significant economic impacts from veterinary standpoint. The number of stray dogs that coexist with human being is high in most cities and villages of the world, especially in developing countries, because of this bring about great quantity of feces, which constitute a potential risk of infection for human beings especially children due to their land-grabbing habit. Because the distribution and intensity of disease are influenced by climatic, geographical, cultural, and economic factors, it is necessary to analyze situation in every given region. Accordingly, several studies have been carried out on the gastrointestinal parasites of stray dogs in the world and Iran.

This study was performed in order to determine the prevalence and intensity of helminth infections among stray dogs from villages around Garmsar, and to emphasize the importance of this concept for public health and veterinary standpoint.

Materials and Methods

During 2006, based on random sampling, 50 stray dogs (39 males and 11 females) from villages around Garmsar, in Semnan Province, were humanely euthanized. Their sex and age were recorded. At necropsy, their

alimentary canals were removed and the contents of each part were washed under running water using a 100-mesh sieve. The lining membrane of small intestines was gently scraped with a scalpels blade and the contents were examined under a dissecting microscope. The large worms were collected from the washed materials and the remainder was examined under the dissecting microscope. Cestodes were stained with carmine acid and the nematodes were cleared in lactophenol and were identified according to morphological characteristics described by Khlail et al. for cestodes (8) and Anderson for nematodes (9). Statistic analyses using Chi square (χ^2) were applied on resulting data to evaluate the effects of age and sex on parasitism.

Results

Table 1 shows the prevalence, intensity, and confidence interval of helminths found in 50 stray dogs (39 males and 11 females) from villages around Garmsar.

In contrast to low intensity (1-3), the prevalence of helminth infections (10-80%) was high. A significant relation was found between sex and age and infection with *T. multiceps* ($P=0.001$) and *T. canis* ($P = 0.001$) respectively, but not for other helminth infections ($P>0.05$).

Table 1: Prevalence, C.I.* , intensity and range of GI helminths in 50 stray dogs from villages in Garmsar ,Iran

Parasites	Positive n (%)	C.I (95%)	Mean ± SD	Range
<i>Taenia hydatigena</i>	40 (80.0)	0.69 - 0.91	3 ±0.33	2-4
<i>T. multiceps</i>	5 (10.0)	0.02 - 0.18	1	1-1
<i>Echinococcus granulosus</i>	32 (64.0)	0.51- 0.77	645 ±1663	120 - 3000**
<i>Dipylidium caninum</i>	2 (4.00)	0.00 - 0.09	1	1-1
<i>Mesocestoides lineatus</i>	6 (12.0)	0.03 – 0.21	1.5 ± 0.33	1-3
<i>Toxocara canis</i>	11 (22.0)	0.11 - 0.33	1.5 ± 0.17	1-2

* C.I == Confidence interval for prevalence

** Two dogs harbored 20 and 10000 *E. granulosus*, respectively were omitted from statistical analysis.

Discussion

Overall prevalence rate and variety of species of gastrointestinal helminths of stray dogs observed in this study, are in line with previously published reports in Iran, in which *T. hydatigena*, as well as its larval stage: *Cysticercus tenuicollis* have been reported to be the most common *Taenia* (4,7) of carnivores and metacestode (10) of ruminants in Iran. Although human infection with *T. hydatigena* is unlikely, but other helminthes found in this study have medical and veterinary importance. The highest prevalence rate (64%), mean intensity (645) and the highest total number of *E. granulosus* collected from a single stray dog Garmsar (10,000), where 10.5% Of ruminants (11) and the highest prevalence rate of human hydatidosis have been reported (12) show that echinococcosis-hydatidosis is very prevalent in both animals and man in studied region and special attention should be paid to develop a control program. On the

other hand, coenurosis produced by *Coenurus cerebralis*, the larval stage of *Taenia multiceps* which seems to be reported from man in Iran (13) is not uncommon in small ruminants (14). *Dipylidium caninum*, a dog cestod reported from man in Iran (15) and *M. lineatus* with zoonotic importance in other parts of the world, are a fairly common parasites of Iranian stray dogs (4,7). Several studies have shown that *Toxocara canis* is prevalent among stray dogs, household dogs and sheep dogs and wild carnivores of Iran (4, 6, 16). *Toxocara* and *Taenia* eggs have been isolated from the soil samples of public places and household courtyards examined in Iran (17, 18). Consequently few case reports exist on the human visceral larva migrans (VLM) induced by *T. canis* in Iran (19). On the other hand, visceral leishmaniasis, cryptosporidiosis and dirofilariasis due to *Dirofilaria immitis* (20, 21, 22) which were respectively

reported from 17%, 5% and 7% of stray dogs in the studied areas, are well recognized parasites transmissible to man by dog. Therefore stray dogs due to their number, lack of veterinary attention, roaming freely around and enter the residential areas in villages and black tents of tribal people, having often free access to animals dead in the field or to dispersed after illegal butcheries, (a phenomenon not uncommon in Iran) and poor levels of hygiene attention in communities that are socio-economically disadvantaged, exacerbate the risk of disease transmission and constitute a potential risk of infection for human beings as well as livestock. The quantity of canine feces deposited on public and private property in cities and villages worldwide is both a permanent nuisance and an important health issue (23).

Our findings showed that stray dogs are under constant exposure to risk factors to many parasites. Therefore to control stray dogs population, to avoid contamination of environment, water supplies and food with dog feces, to reinforce social behaviors, to take care of pets and avoid having them being in contact with contaminated environments are essential to ensure human health and reduction economic losses caused by stray dogs parasitism.

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