Research Article

Prevalence of gastrointestinal parasites in Faisalabad and comparative efficacy of Ivermectin and Albendazole

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Abstract

Current study was conducted to evaluate the prevalence rate of gastrointestinal tract (GIT) parasites of cats in Faisalabad and check the comparative efficacy of Ivermectin and Albendazole. A total of 384 fecal samples of cats were collected randomly from different government and private clinics of district Faisalabad. Ivermectin and Albendazole were used for the treatment against the GIT parasites. After clinical examination, 70 positive cats with GIT parasites were grouped as follows: group A (n=30) which was treated with graded doses of ivermectin (merial), similarly group B (n=30) treated with graded doses of albendazole (zental) and group C (n=10) kept as a control. Fecal samples were processed in postgraduate laboratory, Department of Clinical Medicine and Surgery, University of Agriculture, Faisalabad. Quantitative fecal examination was performed to observe the egg per gram of feces before and after treatment. The percentage of infection was found higher in female cats 33.33% than male 24.44%. The prevalence in adults and kittens was recorded as 24.10% and 42.45% respectively. *T. cati* was found more prevalent with the infection rate of 7.03% followed by *T. leonina*, *A. duodenalis*, *A. abstrus*, *T. Taeniaformimus*, *D. caninum*, *A. tubaeforme* and *T. gondii* with the infection rate of 5.4, 4.1, 3.7, 2.6, 2.3, 2.3 and 1.8% respectively. Comparatively ivermectin showed more significant results against GIT parasites of cats than albendazole.

Keywords: Ivermectin; Albendazole; Prevalence; GIT parasites; Cats; EPG

Introduction

Domestic cats (*Felis catus*) have originated from wild cats (*Felis silvestris*) which are species of Africa and Europe. Generally

both cats poses approximately same behavior i.e. hunting but now domestic cat is consider as distinguished specie. Companionship of human and cat has been

for the last 9500 years [1-12]. Gastrointestinal (GIT) parasitic infestation is the most common cause of morbidity in the domestic cats. Both wild and domestic cats play a vital role in the transmission of these parasites [2]. Cats are infected by different types of parasites i.e. round worms (*T. cati* and *T. leonina*) which are creamy colored, 3-5 inch long and cause blockage of small intestine. Kittens are more susceptible than adults. They transmitted by ingestion of worm eggs or larva. Similarly, hook worms (species of *Ancylostoma*) have cylindrical body of 0.5 inch in length. They penetrate into intestine and cause anemia and death in untreated cases. Tapeworms (cestodes) have flat segmented body and their eggs can be observed near rectum, tail and in feces but infection is rare.

Different types of protozoa can also cause severe damage to intestinal tract i.e. *Isospora felis* causes coccidiosis and damages the mucosa of intestine, resulting in diarrhea in kittens but less common in adults. *Giardia* is present in small intestine and causes chronic or acute diarrhea which may be continuous or intermittent in nature. *T. gondii* is present in small intestine and transmitted vertically as well as by ingestion of infected material with sporulated oocyst and causes Toxoplasmosis. The prevalence of GIT parasites are associated with environmental condition, geography, cat population (including feral, household and stray etc.) and adoption of prophylactic measures [3-13].

Different anthelmintics are effective against GIT parasites of cat i.e. Vermix (diphenthane-*yo* 0.1 gm + methylbenzene 0.1 cc) has good efficacy against hook worm, ascarid and tape worm but not for *Physaloptera* [4-12]. Nitroscanate has good response against *T. cati* and *A. tubaeforme* and paste of paraziqual 0.34% and febental 3.4% is mixed in feed of cat. This paste is effective against specie of *Taenia*

and *T. cati* [5]. The ivermectin and albendazole are most common locally used anthelmintics. Ivermectin also shows good response against arthropods, nematode as well as plant parasites [6]. The effect of ivermectin varies from specie to specie and inters individuals. This anthelmintic is lipophilic, insoluble in water but soluble in organic substances. It has no effect on the breeding performance of animals. Pharmacokinetics of ivermectin is influenced by route of administration and formulation. Subcutaneous (S/C) injection of ivermectin shows good response than oral and topical route. Ivermectin absorbs slowly through S/C tissues and persists for long time [7]. Ivermectin has inhibitory potential for GABA associated parasitic nerve transmission. Moreover, use of ivermectin caused paralysis of pharyngeal muscles which consequently caused the flaccid paralysis of nematode [8].

Albendazole which belongs to benzimidazole class has good efficacy against nematode, fluke, cestode, lung worm and protozoa's. Benzimidazole paralyzed the worm by tubulin binding (protein structure of microtubule). Hence block of microtubules causes problem in uptake of glucose. In this way energy mechanism is stopped which causes paralysis and death of worm. This study was conducted to evaluate the prevalence of the GIT parasites in cats and check the comparative efficacy of ivermectin and albendazole.

Materials and methods

Collection of samples

For examination of GIT parasites, fecal samples of 384 cats were collected randomly from clinic of Clinical Medicine and Surgery (C.M.S), Civil Veterinary Hospital (C.V.H), Medina town veterinary hospital, Juj wala veterinary hospital and private clinic (Pets Health Center) of Faisalabad. The samples were properly labelled for identification and transported to the the

postgraduate laboratory, Department of Clinical Medicine and Surgery, University of Agriculture, Faisalabad.

Chemotherapy

Samples were examined before and after administration of ivermectin and albendazole. Firstly fecal sample examined by direct method if sample was positive for GIT parasite then chemotherapy performed. After that McMaster technique performed at 0th, 7th and 21th day of post treatment. Clinical signs vomiting, chronic diarrhea, poor quality and rough hair coat, swollen abdomen, less active of body, poor digestion of food, unthrifty, abdominal pain, partial

anorexia, sometime blood in stool and anemia were observed. To evaluate the efficacy of ivermectin and albendazole against GIT parasites, a total of 70 cats positive with GIT parasites were randomly selected and grouped as follows. Group A-1, A-2 and A-3 treated with graded doses of ivermectin subcutaneously @ 150, 250 and 300µ/kg respectively (n=30) (Table 1). Group B-1, B-2 and B-3 treated with graded doses of albendazole orally @ 30, 35 and 40mg/kg respectively (n=30) (Table 2). And group C was kept in control group to compared the normal parameters (n=10).

Table 1. Comparison of means of ivermectin (merial)

Ivermectin doses	Mean ± SE
150µg/kg	57.6±1.968 C
250µ/kg	86.1±2.373 B
300µ/kg	94.3±1.700 A

Means sharing similar letters are statistically non-significant (P>0.05). The effective doses against the GIT parasites were 300, 250 and 150µg/kg with the mean reduction of eggs 94.3, 86.1 and 57.6% respectively

Table 2. Comparison of means of Albendazole (zental)

Albendazole doses	Mean ± SE
30mg/kg	50.7±4.182 C
35mg/kg	72.8±1.812 B
40mg/kg	86.3±1.391 A

Means sharing similar letters are statistically non-significant (P>0.05). The effective doses against the GIT parasites were 40, 35 and 30mg/kg with the mean reduction of eggs 86.3, 72.2 and 50.5% respectively

Statistical analysis

Data analyzed through analysis of variance technique and significant difference was done using least significant difference (LSD) test at 5% level of significance. T-test was applied for comparison between means.

Results

The sample was considered as a positive on finding the one or more eggs and parasites. Animal data such as sex, breed and age was recorded. Egg or parasitic identification was made on the basis of size and morphology. It was observed that cats usually harbor different kind of parasites due to improper care and unhygienic conditions by the

owner. To check the rate of prevalence of GIT parasites in cats selected areas randomly visited during period from December 2015 to April 2016.

Out of 384 cats only 112 cats were positive for GIT parasites i.e. (round worm, tape worm, hook worm and protozoa) and the overall prevalence found was 29.16%. Specie wise *T. cati* was found more prevalent with the infection rate of 7.03% followed by *T. leonina*, *A. duodenalis*, *A. abstrusus*, *T. Taeniaformimus*, *D. caninum*, *A. tubaeforme* and *T. gondii* with the infection rate of 5.46, 4.16, 3.38, 2.6, 2.34, 2.34 and 1.82% respectively. It was

observed that male cats were more resistant to GIT parasites than female cats due to resistance of body and mucosal immunity of intestine. Figure 1 shows the comparison of effect of ivermectin and albendazole on prevalence of GIT parasites in cats. The prevalence rate was high in female 33.33% than male 24.44%. Kittens were more sensitive to GIT parasites than adults due to lack of mucosal immunity. Adults were resistant due to natural tendency to cleanliness and private living space. The rate of prevalence of GIT parasites were high in kittens 42.45% than adult 24.10%. It was

also noticed that the 92 cats which were positive for GIT parasites out of 112 cats, infected due to improper management, poor feeding and unhygienic condition. The rate of prevalence was high (82.14%) due to unhygienic conditions and improper management. The monthly prevalence was found in December (17.94%), January (18.86%), February (22.36%), March (25.92%) and April (42.22%). During the April and March the prevalence rate was high due to climatic conditions of Faisalabad, Pakistan being conducted for maturation and growth of parasites of GIT.

Figure 1. Comparison b/w graded doses of ivermectin and albendazole at 7th and 21th day of post treatment

Discussion

The gastrointestinal parasites like *T. cati*, *A. duodenale*, *T. gondii*, *D. caninum*, *G. duodenalis*, *T. taeniaformimus*, *T. leonine* and *A. tubaeforme* are thought to be common intestinal parasites of domestic cats. There are several factors involved in the parasitic infestation of cats i.e. unhygienic condition, decrease the feed quality, poor management, decrease in the mucosal immunity. Climatic factor also plays a major role in the prevalence of GIT parasites. Due to parasitic infestation of GIT

cats usually suffer from vomiting, diarrhea, rough hair coat, poor digestion of food, unthrifty, abdominal pain, partial anorexia, sometime blood in stool and anemia [13]. In the present study, the findings are according with the results of Memon *et al.* [1]. They reported 24% overall prevalence rate of GIT parasites in cats. Their results showed that the prevalence rate was higher in female (28%) than male (20%) and kittens were more susceptible (30%) than adults (21.42%). In the parallel to results of present study reported that the prevalence of GIT

parasites in the domestic cats was (34.3%) and *T. cati* (20.3%) were observed most common. Arbabi and Hossein (2008) recorded that the prevalence of GIT parasites was higher in male (59.3%) than female (40.7%) [9]. In another study it was found that the nematode (*T. cati*) was most prevalent parasite than other GIT parasites [10]. Similarly, 63.4% sero prevalence was found in stray cats in Madrid [11].

In the light of above findings, it was suggested and concluded that care is being taken by the owner for the maintained the health status of cat. Cats usually infected by GIT parasites due to improper management and unhygienic condition. Infected cats act as a source of infection for others. Among the feline GIT parasites i.e. *T. cati*, *A. duodenalis*, *A. tubaeforme*, *T. gondii* and *G. deodenalis* have zoonotic potential. The zoonotic character parasites found in this study must serve to alert to the physician and public health agencies. It was also observed that ivermectin showed significant results against the GIT parasites than albendazole.

The similar type of frequency of gastrointestinal parasites and protozoa was observed in 502 cats of Brazil, between 2005 and 2014 which shows that prevalence of parasites is increasing in the felines and control measures should be adopted against these parasites [12]. In another study prevalence of gastrointestinal parasites was observed in city of Belgrade (Serbia). All helminthosis diagnosed in the research possess a zoonotic potential. The highest prevalence of toxocarosis was established in dogs younger than 1 year (19, 32%) and in cats oldern than 8 years (27.27%). Ancylostomatidosis was diagnosed with the highest prevalence in samples from animals between 1 and 8 years old (16.66% of dogs and 22.22% of cats) [13].

Conclusion

Present study showed that the overall prevalence of gastero intestinal parasites was was 29.16% in cat. Specie wise *T.cati* was found more prevalent with the infection rate of 7.03% followed by *T. leonina*, *A.duodenalis*, *A. abstrusus*, *T. Taeniaformimus*, *D. caninum*, *A. tubaeforme* and *T. gondii* respectively. It was observed than male cats were more resistant to GIT parasites than female cats due to resistant of body and mucosal immunity of intestine.

Authors' contribution

Conceived, designed and performed the experiment: N Iqbal, SA Mahfooz, & MK Khan, Analyzed the data: HM Rizwan, A Abbas, RZ Abbas & A Ashar, Wrote the paper: HM Rizwan, A Abbas, RZ Abbas & A Ashar.

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