Prevalence of Zoonotic Parasites in Stray Cats in Baghdad

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ABSTRACT:

BACKGROUND:

It is known in recent years that stray cats can transmit several serious zoonotic parasitic diseases to man especially immunocompromised patients.The aim of this study is to detect such parasites in stray cats in Iraq.

METHODS:

Serum and faecal samples were taken from 126 stray cats from different areas of Baghdad, subjected to serological test (IHAtest) and parasitological examination to detect cyst,oocyst,ova of zoonotic arasites ,as well as careful examination of skin and hair for ectoparasites.

RESULTS:

Positive seroprevalence (72.2%) for Toxoplasma gondii were found in stray cats, 114 examined cats (90.4%) were found to be infected with different zoonotic enteric parasites.Three types of ectoparasites(73%) infested these cats..Some of these parasites were recorded for the first time in Iraq which include: Cryptosporidium spp, Giardia spp, Capillaria spp, Toxascaris leonine, Aelurostrongylus abstrusus, Ixodes spp, Felicola subrostratus .

CONCLUSION:

The high seroprevalence of T. gondii and high infection rates for zoonotic enteric parasites and ectoparasites in stray cats could be the cause of theincreased incidence of human enteric and skin diseases in this country.

KEY WORDS: Zoonosis , Parasites ,Stray cats.

INTRODUCTION:

Toxoplasma gondii, an obligate intracellular protozoan parasites infects humans and abroad spectrum of vertebrate hosts. Toxoplasmosis is an endemic diseases with a world wide distribution and is mainly subclinical in immunocompetent people[1]. Nevertheles,in congenitally infected children and immunocompromised persons such As human immunodeficiency virus-infected individuals, organ transplant recipients and cancer patients, infection causes high rates of morbidity and mortality [2]. Transmission of T.gondii occurs principally from ingestion of sporulated oocysts, shed by infected cats,by ingestion of tissue cysts in different hosts(herbivores and birds) . It was assumed that cats probably play a major role in transmission of T. gondii, through faecal contamination of soil, food or water [3].It was found that detection of T. gondii oocyst in cat faecal examination is difficult,so serological procedures are important for determining the epidemiological significance of T.gondii infection[1].Toxoplasmosis is highly endemic in human population in Iraq [4-6].and other eighbouring countries[7-10],especially in the recent years but concerning studies in cats which play the main role in transmission is still rather scarce and there is very little informations concerning T. gondii and other enteric zoonotic parasites of cats in Iraq[11-13]. On the other hands many recent studies in some countries revealed the great role of cats (domestic and stray) in transmission of several enteric human diseases especially those of parasitic origin[14-17].The aim of this study is to detect the most important intestinal parasites of stray cats related to public health inorder to determine the best methods of their prevention.

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MATERIALS AND METHODS:

126 stray cats were caught for this study from different areas of Baghdad from the period of October 2001 toSeptember 2002. The informations collected on each animal included sex, and approximate age, 2 ml of blood were collected by cephalic or jugular vein puncture from each cat, allowed to clot and centrifuged at 2000 r.p.m for 5 minutes. Serum was removed and stored at -20 c until assayed.Sufficient amount of faeces was taken from each animal. Sera were examined for antibodies against T. gondii with indirect haemagglutination (IHA) test as described by Rose and Friedman [18]. Sera were screened in 1/32, 1/64, 1/128, 1/256, 1/512, 1/1024 dilutions. Atiter of > 1/64 was considered positive [12]. Seroprevalence was defined as the percentage of samples testing positive for antibodies to T. gondii. Faecal samples were examined within 24 hours of collection to detect oocysts , cysts,ova, and larvae of the parasites by using concentration method (Flotation zinc sulphate technique) and Baermann technique. Lugols" iodine, acid fast stain were used for identification of protozoan oocysts and cysts [1].

The hair and skin of the cats were carefully examined for ectoparasites .

RESULTS:

The overall seroprevalence was 72.2%, (91 positive sera from 126 cats) as ahown in Table (1) .Data on titers, sex and age are summarized in Table (2) .Antibodies to T. gondii were found in 73.7% of males (42 from 57) and 71% of females (49 from 69) The prevalence of antibodies varied with the age.Only 23 0f 45 juvenile cats (51.1%) had antibodies,whereas 65 of 75 adult cats (86.6%) were seropositive. The microscopical faecal examination for intestinal parasites revealed that out of 126 stray cats, 114 of them (90.4%) showed parasitic infection, as noticed in Table (3). Protozoan oocysts and cysts were detected in 32 cats (25.4%).They varied greatly in Their sizes and shapes, so Lugols" iodine and acid fast stain have been used to identify them. Large oocysts were shown to be of Isospora spp. (23.7%) while the very small ones were diagnosed as Cryptosporidium spp (7.9) (positive acid fast).The Cysts of Giardia spp were also detected. (4%).However ova of other intestinal parasites have been identified as following : Toxocara cati (46%) ,Toxascarisleonina (32.5%) ,Ancylostoma spp (50.7%) , Capillaria spp (34.9%) , Physaloptera praeputiali (25.3%) , Aelurostrongylus abstrusus larva (2.3%) , Taenia like (65%), Dipylidium caninum (41.7%) .The adult and the male cats showed more percentage of infection than the juvenile and the females .Mixed intestinal parasitic infections were found in 53 stray cats (42%) .Examination of the hair and skin of the cats exhibited three types of ectoparasites: The common cat flea (Ctenocephalides felis) in 65 cats (51.5%) Ticks (Rhipicephalus spp and Ixodes spp)in 10 cats (7.8%) and Lice (Felicola subrostratus (Mallophaga) in17 cats (13.4%). The burden of these external parasites ranged from 1 to 10 per each cat, also mixed ectoparasite infestation were noticed in 8 cats (6.3%). Of the 114 cats positive for intestinal parasites, 65.3% were seropositiv for T. gondii. However no association was found between the prevalence of T. gondii antibody and the prevalence of intestinal parasites.

Table 1: Distribution of seropositive cats in relation to sex&age

Sex & Age	N0. of cats	N0.of seropositive	% of infection
Male	57	42	33.3
Female	69	49	38.9
Total	126	91	72.2
Adult(.> 6m)	75	65	51.6
Juvenile (< 6m)	45	23	18.2
Unknown (age)	6	3	2.4
Total	126	91	72.2

Table 2: IHA titers distribution in relation to sex & ages .

Cat population	< 1/32	1/64	1/128	1/256	>1/512
Male	15	8	11	12	11
Female	20	10	14	16	9
Total	35	18	25	28	20
Adult(>6m)	10	15	16	17	17
Juvenile(<6m)	22	12	6	4	1
Unknown(age)	3	1	1	1	0
Total	35	28	24	22	18

Table3: Prevalence of different parasites in 126 stray cats with refernce to their Age.

Parasitic species	No.of infected Adult cats	%of infection	No. of infected Juvenile cats	%of infection
Protozoa :				
Isospora spp	22	17.4%	8	6.3%
Cryptosporidium spp.	6	4.7%	4	3.2%
Giardia spp.	4	3.2%	1	0.8%
Nematodes:				
Toxocara cati	43	34.1%	15	11.9%
Toxascaris leonina	26	20.6%	15	11.9%

Ancylostoma spp	50	39.6%	14	11.1%
Capillaria spp.	40	31.7%	4	3.2%
Aelurostrongylus abstrusus	3	2.3%	0	0%
Physaloptera Praeputialis	23	18.2%	9	7.1%
Cestodes:				
Taenia like	69	54.7%	13	10.3%
Dipylidium caninum	39	30.9%	14	11.1%
Ectoparasites:				
Fleas (Ctenocephalides felis)	55	43.6%	10	7.9%
Ticks (Rhipicephalus & Ixodes spp.)	8	6.3%	2	1.5%
Lice (Felicola subrostratus(Mallophaga)	12	9.5%	5	3.9%

DISCUSSION:

Although there are numerous studies on the seroprevalence of T . gondii and other intestinal parasites of cats in many countries, but very little studies had been performed in Iraq[12,13] which dealt with only few numbers of cats .The overall Seroprevalence of T. gondii in stray cats in this study was 72.2% which is much Higher than that obtained by Alsaeed(1982)[12],in Mosul.It is difficult to compare Because of the different area of study and time of study conducted ,as well as the Number and different living habit of the cats although the same serological test (IHA) Was used. The high titers of stray cats in the present study which range from 1/64 to 1/512 in different ages and sexes may give an idea about the big role of stray cats in the increased incidence of the disease among Iraqi peoples in the last decades as shown by many investigators[4-6] especially among the pregnant and aborted women This fact may be understood well if we noticed the high seroprevalence of human toxoplasmosis in neighboring countries like Turkey(10) (55%), Saudi Arabia[9] (37%) Jordan [7] (26%), Syria [8] (65%) . These may be attributed to the similar food habits in these countries where eating raw or undercooked meat, liver are common, togetherb with contact with the feline excreta containing the infective oocysts. It is not considered sex to be a determining factor of infection as other studies have conducted [12,19], although male seroprevalence tends to be slightly higher (73.6%) Than female (71%) in this study which agree with the hypothesis put forward by Smith [20] suggesting that the higher prevalence in male can be explained by the territorial habits associated with them, as they have a wider area of operation than Females .In this study, it was found a wide difference concerning the age, with the majority of seropositive cats included in the group of adults(65/126) while the number of juveniles infected was noticeably smaller (23/120) .

Nevertheles this seroprevalence rate in juvenile (19.1%) was worth noting. It was believed that the juvenile cats found to be seropositive were truly parasitized,having acquired the infection congenitally or per os and were not carriers of specific maternal IgG antibodies since they were considered to be positive from atiter assigned by IHA > 1/64 . This agree with the study done by Dubey(1994) [3] that proved cats maintained specific IgG antibodies transmitted to them by the mother presented low titers(< 1/32) in three months after birth. The difference in prevalence found with respect to age coincides with other studies where higher prevalence is cited in the adult group than in the juvenile one(19--21).showing that with age the risk of exposure to T gondii increases.However Knaus &Fehler(1989) [22] showed a large difference between stray cats with a seroprevalence of 72.5% and household cats with 40%..The higher seroprevalence of stray groups is explained by the hunting and predation habits .hunting and predation habits .Their diet including wild birds ,rodents and toxoplasma infected placentas and still born fetuses).Nevertheles studies done in the united states[14,23]did not pointout significant differences between household cats and stray cats. No oocysts of T.gondii were found in cat faeces ,as in other studies in Spain[19] &in Columbia[24] (south America) .This is possibly because the oocysts are excreted by cats during a short period of time (1-2 weeks) after primary infection ,however on reinfection because ofdeveloping immunity ,cats shed fewer oocysts or none atall and for ashorter time .[1] Overall prevalence of other intestinal parasites was (90.4%) which considered to be very

high .In Iraq afew informations on the prevalence of intestinal parasites in cats is available[12,!3] who found some gastrointestinal helminthes in alimited numbers of household and stray cats with varying prevalence and without detecting the trematodes that were found previously by Al-Dabbage et al (1964)[11]. The results of this study although confirmed the findings of some intestinal helminthes detected previously but also failed to find eggs of trematodes . The most valuable thing in this study is the detection of some important protozoan oocysts and Cysts for the first time in Iraq . These include cysts of Giardia spp ,oocysts of Isospora spp , oocysts of Cryptospsridium spp. .The importance of the latter organisms arises in the recent years especially amongst the immunosuppresed individuals causing persistant diarrhea .It seems that no specific host for these coccidian organisms and the stray cats may be one of reservoirs for human infection [1, 14]. The detected intestinal nematodes in the present study include some of the zoonotic importance like : Toxocara cati (46%) which considered as a visceral larva migrans in human beings, mostly in children .It is world wide in distribution especially in Iran[16] & Turkey[17] , where cats ascarid eggs discovered recently in soil of different public places and playgrounds in high prevalence .It is of worth importance which indicates high public health risk especially in rural areas where lack of sanitation is common . The other zoonotic feline helminth detected is the Capillaria spp. Which was well known that rats and mice could be the source of the eggs of Capillaria hepatica passed with the cat faeces , due to their predation by cats [25] .

It was found that humans could be infected through ingestion of eggs of Capillaria hepatica ,passed with the cat faeces , leading to severe granulamatous lesions in their livers which is very difficult to be diagnosed .This should be taken into consideration as a new risk factor in our country .The public health importance of detecting eggs of Ancylostoma spp.in fecal samples of the investigated cats is due to the previous informations [1, 25] , showed the participating of the infective larvae of this parasite in the "creeping eruption" (human cutaneous larva migrans) which characterized by tortuous , erythematous pruritic eruption of the human skin . It was reported in India and Africa that the human infection with Physaloptera spp is not uncommon [26, 27].

Toxascaris leonine ova were seen in numerous numbers of fecal samples examined (32.5 %) which infect cats and dogs only, were seemed not to be recorded before from cats' feces in Iraq. The using of Baermann technique allowed to identify the larvae of Aelurostrongylus abstrusus (lung worm of cat) for the first time in this country too . As far as concerned with the zoonotic feline cestodes , Dipylidium caninum which can infect accidently the children [1] ,its' egg pockets were identified .The eggs of Taenia like detected in cat fecal samples may include that of Taenia pisiformis and Echinococcus multilocularis , the latter parasite is well known to cause the multilocular hydatid cyst in man , one case of which was recorded inIraq[28] Some recent studies[14, 15] done in U.S.A,by examining the serum and fecal samples of cats by serological and parasitological methods revealed the important role of some enteric zoonotic organisms in the transmission of enteric diseases among the immunocompromised humans . For ectoparasites detected in the present study,the cat fleas(Ctenocephalides felis) were common (51.5%) which seems to be of much higher infestation rate than previous records[12,13] , the importance of this flea is its' ability to be an intermediate host for D. caninum, as well as causing human skin rash ,erythema of the face [29]. Another external parasites seen on skin of stray cats are the Ticks infestation (Rhipicephalus spp. & Ixodes dammini) (7.8%) and Lice infestation (Felicola subrostratus , (Mallophaga) (13.4%) which were not recorded before in Iraqi cats. The role of Ixodes dammini in transmission of Lyme disease to man was well known [30]. It was concluded that results obtained by this study may be of great use as they will be the basis of further studies that will permit us to deepen our knowledge of the epidemiology of T.gondii and other feline enteric zoonotic parasites.

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