

# PARASITIC DISEASES AS CAUSES OF MORTALITY IN DOGS IN KENYA: A RETROSPECTIVE STUDY OF 351 CASES (1984-1998)

J.M. Kagira and P.W.N. Kanyari

Department of Pathology, Microbiology and Parasitology, Faculty of Veterinary Medicine, University of Nairobi,

P.O. Box 29053, Kabete via Nairobi, Kenya.

## Abstract

A 15-year (1984 - 1998) retrospective study using post mortem records was carried out at the University of Nairobi Veterinary School to evaluate the role of parasitic diseases as causes of mortality in dogs. Of the 2492 dogs presented, 351 (14%) were diagnosed as having died from parasitic causes. Gastro-intestinal helminths accounted for 68% of all parasitic conditions with ancylostomiasis as the leading cause of mortality (41%). Ancylostomiasis mainly affected young puppies. Spirocercosis was the second most important parasitic condition with 78 dogs (22%) affected with this disease. There was a marked decline in the number of spirocercosis cases during the last three years of the study (1996-1998).

## Introduction

The expected prevalence of parasites and the resulting mortality rates of companion animals are important information for the veterinarian. This is because the positive predictive value of diagnostic tests (i.e. the probability that the result reflects the true disease status) declines with prevalence (1). Public health control measures also depend on knowledge of the prevalence, as does the routine task of making a preliminary diagnosis.

A number of surveys have been conducted on the prevalence and mortality from internal parasites of dogs. The studies have mainly been conducted in the developed countries especially in North America. The most frequently observed parasites include hookworms, whipworms, ascarids, coccidia, tapeworms, and heartworms (2, 3, 4). Most of the parasites affect the dog subclinically. The only exception is the hookworm, which causes serious blood loss due to its blood-sucking activity. Acute gastrointestinal haemorrhage and anaemia due to rapidly developing blood loss, especially in pups, may result in death. Spirocercosis is common in warm climatic zones in Kenya and its prevalence is reportedly high due to the increased access of dogs to the larvae of the worm in the coprophagous beetles, which act as the intermediate host (5). Very little information is available on the role of parasites causing mortality in dogs in Kenya. This information is important in evaluating and recommending parasite control measures in canine health programmes. The following retrospective study was undertaken to gather information on parasitic diseases in areas within a 15-Km radius of the University of Nairobi Veterinary School.

## Materials and Methods

The study examined the records of the University of Nairobi Veterinary School from 1984-1998 inclusive. The School mainly receives necropsies from veterinary clinics in the neighbouring areas of Kiambu district and Nairobi province. Most of the dogs, especially those from Nairobi are well cared for. Exotic breeds (Alsatisans, Dobermans and Labradors) accounted for 60% of all dogs presented at the post-mortem facility.

The study compared the number of dogs dying from various parasitic diseases to the total number of dogs killed by all diseases.

## Results

A total of 2492 dogs were examined, of which 351 were diagnosed as dying from parasitic diseases. Thus parasitic conditions accounted for about 14% of all the mortalities. The contribution of parasitic diseases ranged from 9% in 1985 to as high as 24% in 1996. Of the 351 deaths, gastro-intestinal helminthiasis accounted for 68%. The proportion of the dogs killed by hookworms (*Ancylostoma caninum*) was the highest (41%). This was more so in the years 1990 (63%), 1991 (58%), and 1986 (47%) (Table 1). Other gastro-intestinal worms encountered included *Toxocara canis* and tapeworms (*Dipylidium caninum*). It was observed that helminthiasis mostly affected young puppies and dogs over 8 years old. Some conditions positively associated with hookworms included parvovirus enteritis, pneumonia, and infestation with other helminths and ectoparasites. The dogs were mainly presented with bloody faeces, emaciation, and severe anaemia. On post mortem examination severe hemorrhagic enteritis presenting as bloody intestinal contents and eroded mucosa was manifested. Hookworms could be observed both in the lumen and attached to the ulcerated mucosa of the intestines mainly the small intestine.

Spirocerosis was the second most important parasitic condition. A total of 78 dogs (22% of all the parasitic diseases) died from this condition. The incidence of the disease was highest in 1988 (43%), 1989 (45%) and 1995 (36%) ((Table 1). The number of cases from 1990 seems to have dropped significantly, while some years (1997 and 1998) there were no recorded cases. The condition affected dogs of all ages and the main owner complaints were anorexia, vomiting (regurgitation), progressive emaciation and sudden death.

At necropsy, the findings were spondylitis, aneurysm of aorta (rupture causing sudden death), osteosarcoma, fibrosarcoma and emaciation.

The tick-borne diseases, babesiosis and ehrlichiosis, included 9% of the total number of the parasitic cases. Their occurrence was highest in the years 1996 (23%) and 1997 (34%). There were no recorded cases of the tick-borne diseases in 1992, 1994 and 1995 ((Table 1).

## Discussion

From this study it can be concluded that parasitic diseases play a major role in causing mortality among domestic dogs in Kenya. The study shows that 14% of all the dogs presented were affected by parasitic diseases. The greatest contributors were *Ancylostomum caninum* (41%) and *Spirocerca lupi* (22%). The importance of endoparasites as causes of canine infections has been emphasized by others (2, 3, 4). In a study on the prevalence of parasitism in dogs at a veterinary hospital in USA, 38.5% of the dogs were found to be infected by hookworms (2). Other worms encountered in this study included whipworms (14.9%), ascarids (8.5 %) and tapeworms (2.2%). Another study reported that 34.8 % of canine fecal specimens examined were affected with one or more parasitic worms, mainly hookworms (14.4%) and *Trichuris vulpis* (12.3%). In Iran, 97% of all the dogs investigated were infected with *Ancylostoma caninum* (6).

The difference in the prevalence rates in the different studies has been postulated as due to the presence or absence of risk factors such as age, sex, locality, and the different treatment methods adopted by the owners. The urban localities which have been indicated as risk factors associated with intestinal parasites (3) could be responsible for the high occurrence of parasitic diseases in this study. Most of the cases at the Kabete Veterinary School were received from the urban dwellers. The urban dogs were most frequently parasitised than the non-urban counterparts possibly due to higher level of contamination with the parasite-laden faeces and an increased rate of transmission (7).

In this study the only hookworm reported was *A.caninum*. Studies done elsewhere have shown a similar scenario where other hookworms (*A. brazillense* and *Uncinaria stenocephala*) were found to occur at a lower incidence, compared with *A.caninum* (2, 8). *U.stenocephala* is best adapted to colder temperate climates (9) and therefore the low frequency of the worm was expected in this study.

Severe hemorrhagic enteritis in the current study was observed more in young puppies than adult dogs, suggesting that many of them became infested during milk suckling and that specific immunity to the parasites develops with age, probably as a consequence of repeated exposure. Experimental studies done in helminth naive dogs showed development of non-specific resistance to intestinal infections with increasing age (10).

Spirocerosis is the second most important disease in causing mortalities and the importance of the disease has been documented by others (5, 11). In the same Veterinary School, in 1963 -1964, a necropsy survey of 286 pet dogs found that 94 (33%) had *S. lupi* infection (11). Another survey involving 346 dogs in Kenya showed that the prevalence of *S. lupi* infection was 78% (85% in 294 native dogs and 38% in 52 pet dogs) (5). As such, it is possible that over the years there has been a decline in the number of spirocerosis cases.

The lesions observed in this study have been documented by others. In a study at the same Veterinary School between 1963-1973, it was reported that 43 dogs necropsied had oesophageal sarcomas (12). Another study (5) showed that the distribution of *S. lupi* infections was more prominent in the aorta (269 dogs), oesophagus (217), thoracic vertebrae (16) and stomach (8). A high correlation between the aortic lesions and the oesophageal granuloma has also been observed (10). This observation was also confirmed in this study. These residual lesions (aneurysms) are caused by the larvae of *S. lupi* as they migrate in the aortic wall on their way to the oesophagus.

The study has shown that *A. caninum* and spirocerosis are of major importance in causing mortality in dogs in this area of central Kenya. *A. caninum* and *Toxocara* species are proven zoonotic agents (9) and as such public health control measures should be enhanced. *Toxocara canis* is of particular importance, causing visceral and ocular larval migrans especially in children (13). This study has also shown that spirocerosis is still highly prevalent despite very little published information on the disease since 1977 (5).

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**Table 1:** Number of dogs killed by the parasitic diseases.

YEAR	A	%	B	%	C	%	D	%	E	%	F
1984	13	37	10	29	3	9	9	26	35	16	218
1985	8	53	4	27	1	7	3	2	15	9	174
1986	16	47	7	21	2	12	9	26	34	22	156
1987	12	46	4	15	3	11	7	3	26	13	209
1988	8	35	10	43	2	8	3	13	23	13	183
1989	10	37	12	45	3	11	2	7	27	11	241
1990	15	63	2	8	2	8	5	21	24	10	237
1991	15	58	1	4	4	15	6	23	26	18	148
1992	7	35	5	25	0	0	8	40	20	11	190
1993	10	40	5	20	3	12	5	20	25	17	151
1994	10	38	5	19	0	0	11	42	26	21	127
1995	4	29	5	36	0	0	5	36	14	10	148
1996	13	43	3	10	4	23	10	33	30	24	125
1997	2	17	-	0	4	34	6	50	12	14	87
1998	4	40	-	0	1	10	5	50	10	10	98
Total	147	41	78	22	32	9	94	27	351	14	2492

**KEY:**

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