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PREVALENCE AND SEASONALITY OF BABESIOSIS IN DOGS TREATED AT A UNIVERSITY VETERINARY CLINIC IN KADUNA, NIGERIA FROM 1990 TO 1999

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SUMMARY

Out of 4,293 dogs treated for various problems in a University Veterinary Clinic in Kaduna, Nigeria from 1990 to 1999, 384 dogs were selected by simple random sampling from clinic records. A total of 180 dogs were treated against babesiosis. Babesia parasites were demonstrated in the blood smears of 97 dogs. There were no significant (P>.0.05) associations between babesiosis in treated dogs and age, breed, season and sex. Babesiosis was more prevalent in the rainy season than in the dry season. Local dogs, females and dogs of over 24 months of age were at greatest risk of suffering from babesiosis. The implications of these findings with respect to the management and control of babesiosis in dogs in Clinics are discussed.

KEY WORDS: Prevalence, Seasonality, Babesiosis, Dogs, Veterinary Clinics, Kaduna, Nigeria

INTRODUCTION

Babesiosis, a tick-borne protozoan disease of animals caused by parasites of the genus *Babesia* is of world wide importance and frequently treated in many veterinary clinics. *Babesia* is transmitted through the bite of the Ixodes ticks.

Canine babesiosis ranges in severity from relatively mild to fatal and hemolytic anemia is the hallmark. The causative organism is either *Babesia canis* or *Babesia gibsoni.* The major *Babesia* species are both host and vector specific; thus *Babesia canis* is found exclusively in the dog with the tick *Rhipicephalus sanguineus* as its major tick vector. *Babesia gibsoni* occurs mainly in Asia, North America and North and East Africa (Tapoada, 1998). The common brown dog tick, *Rhipicephalus sanguineus* is the most predominant tick of dogs in Nigeria. It does not readily attack humans but usually prefers non-human hosts for completion of its development (Okoli *et al*, 2006). Thrusfield (1986) stated that humans are not usually susceptible but that splenectomized people can develop the disease. Babesiosis is endemic in Nigeria and according to Dipeolu (1975), tick vectors of *Babesia* parasites occur in large numbers in most parts of Nigeria.

The prevalence of babesiosis varies from one part of the country to another as Oduye and Dipeolu (1978) noted from blood smears from 500 dogs in Ibadan, Nigeria, that *Babesia canis* accounted for 53% parasitemia. Sarror *et al* (1979) on examining 254 dogs in Zaria for blood parasites found out that 22% had *Babesia canis*; Odewunmi and Uzoukwu (1979) while investigating the incidence of blood parasites in 116 dogs at Enugu found out that *Babesia canis* accounted for 55.17%. *Babesia canis* can affect dogs of all ages, although young dogs are mostly affected (Lobetti, 1998). Seasonal variation occurs, with the highest incidence in the summer months (Lobetti, 1998).

Babesiosis is a source of worry to dog owners. This study has been prompted by the large number of cases treated in the clinics as tick fever (babesiosis) and is thus aimed at establishing possible association between the demonstration of babesia parasites in stained blood smears and

babesiosis. It is also aimed at establishing possible relationship between age, sex, breed, season and babesiosis as well as between clinical signs such as pale mucous membrane, diarrhea icterus and babesiosis.

MATERIALS AND METHODS

The study area

Kaduna State of which Kaduna is the headquarters is located within the semi-arid and sub-humid zones of North Central zone of Nigeria. The state is situated between $8^0 45^{//}$ and $11^0 30^{//}$N and $6^0 10^{/}$ and 9^0E. The mean annual temperature is about 34^0C with the hottest months being from March April (40^0C) and the coldest period (13.2^0C) is between December and January during the severe harmattan. Rainfall varies between 1,000mm and 1,500mm and rainy season lasts for 150-200 days (May October) (RIM, 1993). The dry season occurs from late October to early April.

Data collection

Information on babesiosis was gathered by going through the treatment records of the clinic for ten years (1990 to 1999). Among the information collected were the total number of dogs treated for various problems within the period; the total number of animals treated specifically for babesiosis and the dates of treatment; others were the ages, breed, sex of the dogs, the clinical signs shown by the dogs before treatment and the number of the blood samples smeared and those positive for *Babesia* parasite.

Statistical analysis

The data obtained were reduced into tables with respect to frequency of babesiosis and non babesiosis cases according to months, season, breed, age and sex. The Odds ratios (OR) for each were also calculated to determine whether or not association existed between the factors and babesiosis. A 95% confidence interval (C.I) on OR was also calculated for each factor to determine if the association between the variable factors and babesiosis was significant. The age of the dogs was considered in months. The breed of dogs other than the local breeds was grouped as exotic. The seasonal (monthly) variation in the distribution of canine babesiosis for the period of study (1990-1999) was determined by reducing the 10-year data to one year using the 12-monthly ratio-to-moving average method (Harnett and Murphy, 1974).

RESULTS

The study showed that canine babesiosis was observed monthly within the period. The highest prevalence rate of 73.3% was recorded in the months of May and July, both being rainy season months. The mean monthly frequency recorded was 80.8%. Odds ratios for the 12 months were not significant at 95% confidence interval (Table I) A total of 180 dogs were treated against babesiosis with 97 (53.9%) diagnosed as being positive for *Babesia*.

Seasonal distribution showed that dogs were at highest risk of suffering from babesiosis in rainy season (1.0 times) compared to dry seasons (0.9 times). The ratio of susceptibility for dry and rainy season was 1:1.1. Odds ratio for the season were not significant at 95% confidence interval (Table II and Fig. 1).

The breed distribution of babesiosis compared to other canine diseases showed that local dogs were 1.02 times more at risk of being infected by *Babesisa* on exposure compared to exotic dogs. The breed specific mortality rate for babesiosis was also higher in local dogs (54.3%) than in exotic dogs (53.4%) (Table III).

TABLE I: Distribution of babesiosis in dogs treated with *Berenil*[R] according to month

Months	No. Treated	No. Positive for Babesiosis	No. Negative for Babesiosis	Month Specific Rate (MSR) (%)	Odds ratio (MSR) (%)	95% confidence interval
January	15	7	8	46.67	0.78	0.27-2.09
February	15	8	7	53.33	0.98	0.35-12.75
March	15	8	7	53.33	0.98	0.35-2.75
April	15	9	6	60.00	1.28	0.44-3.74
May	15	11	4	73.33	2.35	0.71-7.61
June	15	5	10	33.33	0.43	0.14-1.32
July	15	11	4	73.33	2.35	0.71-7.61
August	15	6	9	40.00	0.57	0.19-1.68
September	15	10	5	66.67	1.71	0.56-5.26
October	15	7	8	46.67	0.75	0.27-2.09
November	15	7	8	46.67	0.75	0.27-2.09
December	15	8	7	53.33	0.98	0.35-2.75
TOTAL	**180**	**97**	**83**			

TABLE II: Distribution of babesiosis in treated dogs according to season

Season	No. Treated	No. Positive	No. Negative for Babesiosis	Seasonal specific rate (SSR) %	Odds ratio (OR)	95% confidence interval on OR
Dry	90	48	42	53.33%	0.98	0.59-0.63
Rainy	90	49	41	54.44%	1.02	0.61-1.70
	180	**97**	**83**			

TABLE III: Distribution of babesiosis in treated dogs according to breeds

Breed	No. Treated	No. Positive for Babesiosis	No. Negative Babesiosis	Breed specific rate (BSR) in%	Odds ratio	95% confidence interval
Exotic	86	46	40	53.4%	0.98	0.58-1.67
Local	94	51	43	54.3%	1.02	0.61-1.70
Total	**180**	**97**	**83**			

The distribution by age of babesiosis showed that dogs of over 24 months of age had the greatest risk of suffering from babesiosis (2.1 times) followed by dogs between the ages of 13-18 and 0-6 months. Dogs between the ages of 7-12 months were least at risk of coming down with babesiosis (Table IV). The age specific rate of babesiosis showed that dogs of over 24 months had the highest rate (70.9%) followed by dogs of 13-18 months old (56.2%), while the lowest (40.8%) was recorded in dogs of 7-12 months of life.

The sex distribution of babesiosis showed that females had the greatest risk of suffering from the disease (1.1 times) compared to males. The breed specific mortality rate for babesiosis was higher in female dogs (56.4%) than in males (51.9%). Odds ratios for the sex distribution was not statistically significant (P>0.05) (Table V).

Clinical signs observed in dogs treated for babesiosis included pale mucous membrane, icterus and diarrhea (Table VI).

TABLE IV: Distribution of babesiosis in treated dogs according to age

Age (months)	No. Treated for babesiosis	No. Positive for Babesiosis	No. Negative for Babesiosis	Age specific rate (ASR) %	Odds ratio	95% confidence interval
0-6	75	42	33	56.00%	1.09	0.63-1.90
7-12	49	20	29	40.82%	0.59	0.31-1.13
13-18	16	9	7	56.25	1.10	0.39-3.09
19-24	9	4	5	44-44	0.68	0.18-2.61
724	31	22	9	70.97	2.09	0.92-4.76
Total	**180**	**97**	**83**			

TABLE V: Distribution of babesiosis in treated dogs according to sex

Sex	No. Treated for Babesiosis	No. Positive for Babesiosis	No. Negative for Babesiosis	Sex specific rate (SSR) in %	Odds ratio	95% confidence interval
Male	102	53	49	51.96%	0.93	0.57-1.52
Female	78	44	34	56.41%	1.11	0.65-1.88
Total	**180**	**97**	**83**			

TABLE VI: Clinical signs observed in dogs treated for babesiosis

Clinical signs	No. Treated	No. Positive	No. Negative
Pale mucous membrane	132	72	60
Icterus	49	27	22
Diarrhea	98	49	49
Total	**279**	**148**	**131**

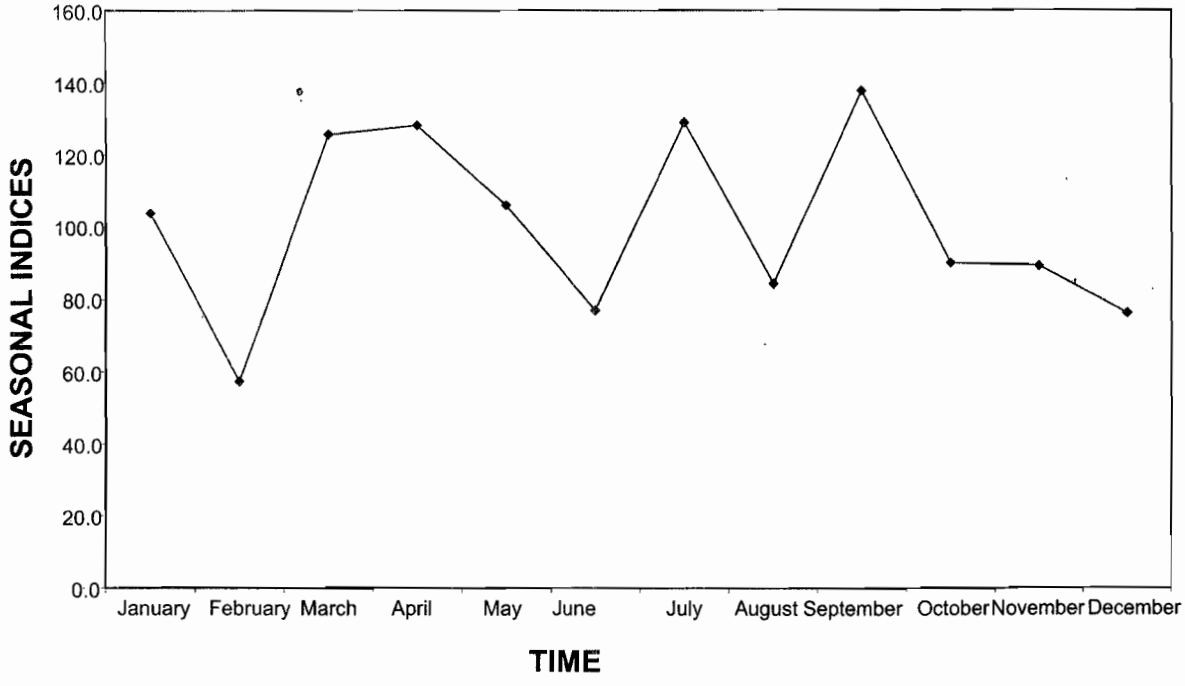

Figure1: Plot of seasonal indices of monthly distribution of cases of babesiosis

DISCUSSION

There was no significant (P>0.05) seasonal difference in the distribution of babesiosis in this study. Babesiosis was more prevalent in May and July and these months fall within the period of rainy season (Fig. 1). This contrasts the observation of Lobetti (1998) and Collett (2000), that the prevalence of babesiosis in dogs is highest in summer. Dipeolu (1975) however, reported a high rate of blood parasites in dogs during the end of the rains and the dry season.

Local breed of dogs had more babesiosis than exotic breed. This contrasts the observation by Odewunmi and Uzoukwu (1979). This may be due to the fact that more people kept local dogs than exotic dogs. It may also be that local dogs roam about more than exotic dogs and could pick up ticks which are vectors of babesiois in the bush. It is obvious from the data however that the ratio of susceptibility for exotic and local dogs, 1:1.04 was narrow.

The distribution by age of babesiosis revealed that dogs of more than 24 months of age had the highest risk of suffering from babesiosis. This could be due to lowered resistance associated with old age. This in contrast with the observation of Odewunmi and Uzoukwu (1979) and Lobetti (1998) who reported that babesiosis was higher in younger dogs than in older dogs.

The distribution by sex of babesiosis showed that female dogs were 1.1 times more susceptible than male dogs. This agrees with the observation of Odewunmi and Uzoukwu (1979). The higher prevalence of babesiois could be due to the female dogs' habit of roaming about to sustain their puppies. There was no significant association between infection in female and male dogs.

Chi-square (X^2) analysis also showed that there was no significant relationship between babesiosis and the clinical signs pale mucous membrane, icterus and diarrhea (Table VI). This may be because these clinical signs were present in non babesiosis cases.

CONCLUSION

The hypothesis that there may be seasonal variation in the occurrence of babesiosis with more cases occurring in the rainy season was

upheld. There was no significant association between babesiosis and age. Local breeds were found to be more affected than exotic breeds. Female dogs were affected more than male dogs. Babesiosis needs to be prevented by controlling the vector tick by routinely dipping or spraying pets, by using tick collars or spot-on preparations and by environmental control by spraying the premises.

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