PREVALENCE, MICROMETRY AND SERUM PROTEIN PROFILE IN MICROFILARIAL INFECTION OF DOGS

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Dirofilaria spp. is one of the most common parasites in dogs seen in many areas of the world, particularly in tropical and subtropical regions (Calvert and Rawlings, 1997). It has been reported to infect a wide variety of species of animals including dogs, cats, ferrets, foxes, wolves, sea lions and horses. The distribution of infection being influenced by the population of animals that complete the life cycle and have microfilaremia and a mosquito vector that will carry the early larval stages (Atkins, 1991). *Dirofilaria immitis, D. repens, D. reconditum, D. grassi and Dipetaloma dracunculoides* mainly cause this disease of dogs in India and the prevalence of infection is dependant on several factors such as season, breed, age, gender *etc.* Martin and Collins (1985) had reported that the infection was more prevalent in summer month's due to copious secretion of larvae during the period. Male dogs are found to get infected more (Hribernik, 1989) with the younger animals severely affected (Radhika, 1997). The present work was undertaken to study the prevalence of microfilariosis in dogs in the city of Trivandrum, to identify the species responsible for the disease condition and to assess the serum protein profile of dogs clinically infected with microfilaria.

Materials and Methods

Five hundred and Four (504) dogs brought with various ailments and general check-up at District Veterinary Centre, Trivandrum from March, 2001 to February, 2002 formed the base population for the study.

Details such as breed, age, sex and clinical signs especially falling of hairs, pruritis, chronic cough, dypsnoea, respiratory crackles (Calvert and Rawlings, 1997), scrotal edema and anorexia were recorded.

All the dogs were screened for microfilaria. Diagnosis of infection was done by wet film and blood smear examinations. For wet film examination a drop of fresh blood from ear tip was collected on to a clean glass slide and a cover slip was applied over it. Before drying, the film was examined for the presence of microfilariae under the low power of the microscope (Soulsby, 1982; Saseendranath *et al.*, 1986). Blood smears were prepared and stained with Giemsa's stain (1:10) and observed under oil immersion of the microscope (Valsala and Bhaskaran, 1974). Ten microfilariae were randomly chosen for the micrometrical studies from the blood smears stained with Giemsa. Morphology, head length, tail length, total length, tail width, maximum width, nerve ring and length of excretory pore from the head of each microfilaria were selected as parameters for identification (Yen *et al.*, 1982). Prevalence for the year and individual months, breed, age and sexwise predisposition of cases were calculated. The period

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was divided into dry (December to May) and wet (June to November) periods. The serum total protein (direct biuret method), albumin and creatinine were estimated by the auto analyzer using the kits supplied by M/s.Agappe Diagnostics.

Results and Discussion

1. Prevalence

The prevalence rate of the infection for the period was found to be 26.59 per cent, the infection prevailing through out the year. The incidence was higher in the summer (dry) months (34.62 per cent) with a peak in the month of May (48.08 per cent). The results are given in Table (1).

Table 1. Month wise distribution of microfilaria cases

Sl. No.	Month	Positive cases	Total cases	Pre-valence
1	March - 2001	9	25	36.00
2	April – 2001	11	26	42.31
3	May – 2001	25	52	48.08
4	June – 2001	6	32	18.75
5	July – 2001	9	35	25.71
6	August – 2001	11	49	22.45
7	September – 2001	10	50	20.00
8	October – 2001	7	59	11.86
9	November – 2001	10	45	22.22
10	December – 2001	14	57	24.56
11	January – 2002	12	46	26.09
12	February - 2002	10	28	35.71

The yearly prevalence obtained is in agreement with that of Saseendranath *et al.* (1986) who obtained 24.2 per cent prevalence in dogs in Thrissur. But the rate was much higher than that obtained by Radhika (1997) who got 7.59 per cent. The high population of mosquitoes in summer with a consequent immediate transmission of microfilariae to the dogs in early post monsoon period and eventual attainment of adulthood by end of winter, resulting in the production of larvae in the summer was the reason attributed for the higher prevalence (Webber and Hawking, 1955). The presence of marshy waterlogged areas close to the region and the proximity to the coastal belt also would have added to the increased prevalence as observed by Magi *et al.* (1989) in the coastal areas.

Out of the 134 dogs infected with microfilariosis at various degrees observed as falling of hairs, pruritis, chronic cough, dyspnoea and respiratory crackles (Calvert and Rawlings, 1997). Maximum cases were recorded for German Shepherd (40 per cent) followed by Pomeranian (27 per cent), nondescript (26 per cent), Dachshund (18 per cent), Labrador (10 per cent), Dobermann (6 per cent), Great Dane (4 per cent), Cocker Spaniel (0.75 per cent), Rottweiler (0.75 per cent) and Dalmatian (0.75 per cent). The finding is in agreement with the findings of Atkins (1991) who opined that large sporting breeds of dogs are more predisposed to the disease. A higher number of German shepherd dogs followed by other sporting breeds brought to the hospital led to the increased representation of infection in such dogs. A high prevalence was noticed in males (77.6 per cent) than females in the study affrimating the findings of Hribernik (1989) and Radhika (1997) who opined that male dogs are infected more often probably because of their increased outdoor exposure. A higher occurrence was noticed in dogs less than six years of age (67.9 per cent) than the dogs belonging to more than six years age group which is in accordance with the findings made by Radhika (1997). The results are given in Table (2).

2. Micrometry

The microfilariae were observed as sheath- less with a tapering head and a long tail. The nerve ring and the excretory cells at the excretory pore region of microfilariae could be well appreciated. The tail was long and tapering, leaving a clear space at the end. The head length was found to be 5.3 ± 1.06 μm, tail length 9.4 ± 2.67 μm, tail width 1μm, maximum width 4.9 ± 0.56 μm, nerve ring 30 ± 3.23 μm, excretory pore from the head 39.1 ± 5.83 μm and total length to be 221.2 ± 6.92 μm. The biometry was found in agreement with Soulsby (1982) and

Table 2. Breed, gender and age wise distribution of microfilaria cases

Breed	Male	Female	Age	
			Upto 6 years	Above 6 years
Cocker spaniel	1	-	1	-
Dachshund	13	5	13	5
Dalmatian	1	-	1	-
Doberman	4	2	6	-
German Shepherd	31	9	33	7
Great Dane	4	-	4	-
Labrador	6	4	8	2
Non descript	24	2	12	14
Pomeranian	19	8	12	15
Rottweiler	1	-	1	-

Radhika (1997), even though a comparatively higher value for the length and the width of the microfilariae (285 ± 8.6µm and 6.0 ± 0.2µm respectively) was observed by the latter. The biometry indicated that the observed microfilariae could be that of *Dirofilaria repens*. The results are given in Table (3).

Table 3. Micrometry and serum protein profile

I. Micrometry	
Head length	5.3 ± 1.06µm
Tail length	9.4 ± 2.67µm
Total length	221.2 ± 6.92µm
Tail width	1.0 ± 0.00µm
Maximum width	4.9 ± 0.56µm
Nerve ring	30 ± 3.23µm
Excretory pore from the head	39.1 ± 5.83 µm
II. Serum protein profile	
Total protein	6.84 ± 0.9 g per cent
Albumin	2.4 ± 0.7 g per cent
Globulin	4.4 ± 1.03 g per cent
Creatinine	0.94 ± 0.5 mg per cent
Albumin : Globulin ratio	0.56 ± 0.25

3. Serum protein profile

Serum analysis revealed the total protein content to be 6.84 ± 0.9g per cent, albumin 2.4 ± 0.7g per cent, globulin 4.4 ± 1.03 g per cent and creatinine to be 0.94 ± 0.5 mg per cent. The albumin : globulin ratio was calculated to be 0.56 ± 0.25 (Table 3). From the present study it could be inferred that the serum total protein and globulin fraction were greater and the albumin : globulin ratio was lower than the normal values in the infected dogs affirmating the findings of Radhika (1997). The increase in total protein than normal may be due to the increased globulin fraction in the serum as a mechanism to counteract the infection.

Summary

The study was conducted to assess the prevalence of microfilariosis in dogs in the city of Trivandrum, to identify species responsible for the disease condition by morphology and micrometry and to assess the serum protein profile of dogs clinically infected with Dirofilaria. Screening of 504 dogs brought to the District Veterinary Centre, Trivandrum formed the basis of study. Diagnosis was done by wet film and blood smear examinations. Ten microfilariae were randomly chosen for the micrometrical studies. The serum total protein, albumin and creatinine were estimated. It was inferred that the infection prevailed through out the year and the incidence was higher in the dry months (34.62 per cent) with a peak in the month of May (48.08 per cent). Large sporting dogs like German shepherd was found to get infected more (40 per cent) than other breeds. A higher occurrence was noticed in males (77.6 per cent) and in dogs less than 6 years of age (67.9 per cent). The head length was found to be 5.3 ± 1.06 µm, tail length 9.4 ± 2.67 µm, tail width 1 µm, maximum width 4.9 ± 0.56 µm, nerve ring 30 ± 3.23 µm, excretory pore from the head 39.1 ± 5.83 µm and total length to be 221.2 ± 6.92 µm. The biometry suggested that the microfilariae could be that of *Dirofilaria repens*. Serum analysis revealed the total protein content to be 6.84 ± 0.9g per cent, albumin 2.4 ± 0.7g per cent, globulin 4.4 ± 1.03g per cent and creatinine to be 0.94 ± 0.5 mg per cent. The albumin : globulin ratio was calculated to be 0.56 ± 0.25.

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