JIVA 7(2): 2009, 77-79

CANINE FILARIOSIS

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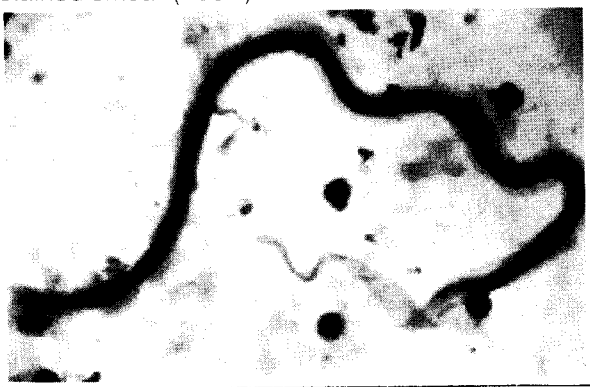
Introduction

Dog, the faithful companion of mankind from the early days of civilization is prone to many diseases due to import, mixing of animals and errors in management, among which parasitic diseases constitute a major problem. Diseases due to filarial nematodes are common in many parts of the world where the climate permits an abundant and susceptible population of intermediate insect host. Major filarial nematodes in dogs are Dirofilaria repens, Dirofilaria immitis, Dipetalonema reconditum, Dipetalonema grassi, Dipetalonema dracunculoides, Brugia pahangi etc. Radhika (1997) and Sabu et al. (2005) identified microfilaria of Dirofilaria repens as the sole cause of canine microfilariosis in Kerala and the prevalence of microfilariosis in dogs in Trichur was only 7.59 percent at that time. Now-a-days it seems alarmingly increasing. It occurs in dogs above 6 months of age. High infestation rates observed in male dogs than females might be due to hormonal effect on susceptibility of dogs to infection.

Pathogenicity

Pathological role of Dirofilaria immitis has been documented extensively, but lack of specific clinical manifestations and recognized pathogenicity of Dirofilaria repens infection in dogs has lead to only brief mention in most veterinary text books referring it as a harmless worm residing in the subcutaneous connective tissue (Soulsby, 2005). Canine filariosis results in multi organ pathology. This multi organ pathogenicity might be due to toxic and immunological effects of circulating microfilariae irrespective of the species of filariae infected.

Figure 1: Microfilaria of Brugia malayi in Giemsa stained smear (100X)



Clinical signs

Dogs with microfilaraemia may exhibit a variety of clinical signs. It includes anorexia, fever, congested mucous membrane, vomiting, oedema of hind limbs and scrotum, lymphangitis, pruritic dermatitis characterized by itching, cutaneous nodules and erythema. Respiratory and cardiac signs like cough, dyspnoea and exercise intolerance were noticed in infected dogs. Other less common signs are epilepsy, haemoglobinuria and ascites.

Haemato-biochemical changes

Haemotological changes associated with filariasis include leukocytosis, eosinophilia, anaemia, thrombocytopaenia and elevated erythrocyte sedimentation rate. According to Niwetpathomwat et al. (2007) and Hashem and Badawy (2008) leukocytosis in filariosis might be due to increased phagocytic removal of tissue break down products of microfilariae or inflammatory response to the parasite. Anaemia in canine filariosis might be due to haemolysis as a result of destructive motility of microfilariae (Kitagawa et al., 1989). The thrombocytopenia in microfilaraemic animals may result from immune mediated platelet destruction (Anuchai et al.,2006 and Niwetpathomwat et al.,2007)

Serum biochemical abnormalities included elevated levels of serum total protein, globulin, serum enzymes like alanine amino transaminase (ALT), aspartate amino transaminase (AST) and

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alkaline phosphatase (ALP), blood urea nitrogen and creatinine. The increased serum levels of ALT, AST and ALP in microfilarosis revealed liver dysfunction secondary to circulatory disturbance (Hashem and Badawy, 2008) or due to localizatrion of large number of circulating microfilariae in the hepatic portal vein (Ananda and D'souza, 2006). Paes-de-Almeida et al. (2003) suggested that the pathogenesis of kidney disease in dirofilariasis was associated with deposition of immune complexes in the glomerular basement membrane.

Eventhough a variety of tests could be used for diagnosing canine filariosis, the detection of microfilariae in wet blood film remained the best method of ascertaining that the dog was infected. Routine diagnosis is carried out through microscopical examination of morphology of microfilaria in Giemsa stained smears. However, it is difficult to differentiate closely related species of microfilariae because of the similarity in their morphology. Special staining procedures like histochemical staining to detect acid phosphatase activity could overcome this problem (Yen and Mak, 1978). Molecular techniques like polymerase chain reaction (PCR) and sequencing have provided scope for better speciation of microfilariae.

Treatment

The administration of levamisole hydrochloride @ 7.5mg/kg body weight subcutaneously for seven consecutive days (Radhika et al.,1999) and @ 10-12 mg/kg body weight orally for 30 days (Dillon, 2000) were found to be effective in canine microfilariosis. Soulsby (2005) reported that an oral administration of ivermectin @ 0.05-0.1 mg/kg body weight reduced microfilaremia by 90% within 24 hrs. Single oral dose of ivermectin @ 100 μg/kg body were found to be most effective for canine microfilariosis. Bazzocchi et al. (2008) stated that treatment with ivermectin @ 6μg/kg per os weekly combined with doxycycline (DOXY; 10 mg/kg/day orally) resulted in significantly faster reduction of circulating microfilariae and higher adulticidal activity compared with either ivermectin or doxycycline alone. A therapeutic plan for filariosis should consist of both specific (microfilaricidal) and clinically supportive treatments to improve hepatic and renal function to obtain optimum results. Single oral dose of Ivermectin @ 6μg/kg body weight monthly once can be recommended as a preventive.

Microfilaria of Brugia malayi

Recent studies at the Department of Clinical Veterinary Medicine, College of Veterinary and Animal sciences, Mannuthy revealed a new microfilaria from canine blood, which is sheathed and it is identified as microfilariae of Brugia malayi, the dreadful human lymphatic filarial nematode (Figure 1). (Anon, 2008) Identification of the species of microfilaria is confirmed by histochemical staining, immunological studies and molecular techniques. (Ambily et al.,2009 , Ambily, 2009). Chansiri et al. (2002) surveyed 53 feline blood samples from the endemic area of Surat, Thani and Narathiwat, Southern provinces of Thailand and found that 15 of the domestic cats were infected with Brugia malayi, suggesting the role of domestic cats as animal reservoir for Brugia malayi in endemic areas of Thailand. The presence of brugian filariosis in dogs of Kerala which is an endemic foci of the disease in human beings, warrants further epidemiological studies on the zoonotic aspect of this dreadful disease.

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