RISK FACTOR ANALYSIS ASSOCIATED WITH CANINE MONOCYTIC EHRLICHIOSIS (CME) IN MATHURA DISTRICT OF UTTAR PRADESH

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ABSTRACT

Present study was carried out in 30 ehrlichia positive dogs to analyze the risk factors associated with ehrlichiosis in dogs. Study revealed that over all prevalence of CME was highest in summer season as compare to winter, higher in GSD breed and lowest in pug, saint Bernard and spitz, more in male as compare to female and in age wise prevalence maximum cases was found in above 12 months of age of dogs. Details regarding these risk factors are discussed in this article.

Key words: Canine ehrlichiosis

Introduction

Canine monocytic ehrlichiosis (CME), also known as tropical canine pancytopenia, is defined as an infectious multisystemic disorder caused by intracellular parasite known as *Ehrlichia* belongs to family Anaplasmataceae (Barman *et al*., 2014). Disease is transmitted by a brown dog tick known as *Rhipicephalus sanguineus* (Trotz *et al*., 2003). Clinically the disease can be identified by pyrexia, depression, lethargy, subcutaneous haemorrhage, epistaxis, lymphadenopathy (Harrus and Waner, 2011), spleenomegaly (Reardon, 1981; Sharma *et al*., 2016) and thrombocytopenia (Harrus *et al*., 1996). Disease may appear either as acute, subacute or chronic (Ristic and Holland, 1993). Occurrence of disease depend on host as well as non-host factor like age, sex and breed of animal, tick population in particular geographical area and season etc. Although all breeds of all age are susceptible for ehrlichiosis, German Shepherd and Siberian Huskies are at greater risk of developing disease (Harrus *et al*., 1997). Infection is common in both the sexes of all age but some serological studies suggested higher occurrence of disease in male animals (Costa *et al*., 2007). Present study elaborates the various risk factor associated with occurrence of ehrlichiosis in canine population in and around Mathura district of Uttar Pradesh.

Materials and Methods

Study area

Present study was carried out on clinical cases in Teaching Veterinary Clinical Complex (TVCC) of DUVASU, Mathura and nearby areas of Mathura district.

Screening of animals and confirmation of disease

Total 35 dogs were screened on the basis of presence or absence of classical clinical signs of ehrlichiosis. All screened dogs underwent optical microscopy followed by conventional and nested PCR to confirm the presence of infection which revealed *Ehrlichia* positive cases in 30 dogs. Nested PCR positive cases were taken for further study.

Risk factor analysis

All the possible risk factors were analysed by recording the patient data carefully in a pre-defined manner. Age, sex and breed of animals, season of occurrence of case were recorded for each positive case of ehrlichiosis followed by calculation of percentage positivity according to age, sex, breed and season. Dogs were categorized into different group to record the data for evaluation of a particular risk factor associated with disease. Data were summarised to evaluate significant findings (Table 1).

Percentage positivity on the basis of sex

Per cent positivity in dogs was recorded on the basis of sex. For those dogs were categorized in 2 categories male and female.

$$\% \text{ Positivity} = \frac{\text{No. of positive cases given by nested PCR in different sex (n)}}{\text{Total no. of } \textit{Ehrlichia} \text{ positive cases given by nested PCR (N)}} \times 100$$

Percentage positivity on the basis of age group

In the present study per cent positivity in dogs was recorded on the basis of age group. For that dogs were categorized into 3 categories. Category 1 includes dog with age 0-6 months, category 2 includes dog with age 6-12 months and category 3 includes dog with age 12 months).

$$\% \text{ Positivity} = \frac{\text{No. of positive cases by nested PCR in different age groups (n)}}{\text{Total no. of } \textit{Ehrlichia} \text{ positive cases given by nested PCR (N)}} \times 100$$

Percentage positivity on the basis of breed

Percentage positivity of ehrlichiosis was recorded on

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the basis of Breed. For that dogs were categorized into 8 breeds (German shepherd, Rottweiler, Labrador, Pomeranian, Saint Bernard, Pug, Spitz and Non-descript). Most of the time, the breed wise positivity depends on popularity of breed in the region therefore it could not be considered as prevalence of disease and breed predisposition for the disease.

$$\% \text{ Positivity} = \frac{\text{Total no. of } \textit{Ehrlichia} \text{ positive cases given by nested PCR (N)}}{\text{Total no. of } \textit{Ehrlichia} \text{ positive cases given by nested PCR (N)}} \times 100$$

Percentage positivity on the basis of season

Per cent positivity in dogs was recorded on the basis of season. For that dogs were categorized in 2 categories summer and winter. Season seems to play an important role in transmission of disease as proliferation of ticks depends on the season.

$$\% \text{ Positivity} = \frac{\text{No. of positive cases by nested PCR in different season (n)}}{\text{Total no. of } \textit{Ehrlichia} \text{ positive cases given by nested PCR (N)}} \times 100$$

Results and Discussion

Percentage positivity of ehrlichiosis was recorded on the basis of age with a highest positivity of 63.33 % in category 3 followed by category 2 (26.67 %) and category 1 (10%). On the basis of sex of animal, the percentage positivity in male and female was 60% and 40%, respectively. Breed wise percentage positivity of ehrlichiosis was recorded as highest in German shepherd with a positivity of 36.67% followed by Rottweiler (20%), Labrador (16.67%), Non-descript (10%), Pomeranian (6.67%), Saint Bernard (3.33%) Spitz (3.33%) and Pug (3.33%). Season wise percentage positivity was observed as 80% and 20% in summer and winter, respectively. In the present study, overall occurrence of ehrlichiosis was more in the summers, which in harmony with Milanjeet *et al*. (2014), Eljadar (2010), Green, (2006), Harikrishnan *et al*. (2001), Harrus *et al*. (1997). In contrary to the present findings Kottadamane *et al.* (2017) observed more prevalence of ehrlichiosis in rainy season. High incidence of ehrlichiosis in summers might be due to high ambient temperature which is conducive for breeding and hence increased activity of the vector tick, *Riphicephalus sanguineous* (Soulsby, 2006). The differences in the prevalence could also be due to the geographical region studied, presence and abundance of the vector *Rhipicephalus sanguineus* in the region which was studied. In the present study, overall occurrence of ehrlichiosis was higher in the breed German shepherd, which in harmony with the findings of Milanjeet *et al*. (2014), Dhankar *et al*. (2011), Lakshmanan *et al*. (2007). In Discussion 82 contrary to present finding, Bai *et al*. (2019), Kottadamane *et al*. (2017) recorded significantly higher prevalence of ehrlichiosis in Labrador breed of dog, this may be due to more availability of this breed in the region. German shepherd breed of dog is most susceptible for canine ehrlichiosis, which may be due to the imperfect cell mediated immune response seen in this breed (Dhankar *et al*., 2011).

Table 1:Percentage positivity of CME according to age, breed, sex and season

Risk factors	Parameters	Positive cases given by (Nested PCR) n=30	Percentage (%) Positivity
Age	0-6 month	3	10
	6 month-12 months	8	26.67
	More than 12 months	19	63.33
Breed	German Shepherd	11	36.67
	Rottweiler	6	20
	Labrador	5	16.67
	Non-Descript	3	10
	Pomeranian	2	6.67
	Saint Bernard	1	3.33
	Spitz	1	3.33
	Pug	1	3.33
Sex	Male	18	60
	Female	12	40
Season	Summer	24	80
	Winter	6	20

Low amount of cellular immune response against *E. canis* (Nyindo *et al*., 1980), inherent breed inability of blast formation and leucocyte migration inhibition factor (Huxsoll *et al*., 1972) makes German shepherd breed more susceptible for ehrlichiosis. In the present study, overall occurrence of ehrlichiosis was higher in adult dogs with more than 1 years of age. The present findings in this regard is in harmony with the findings of Bai *et al*. (2019), Parmar *et al*. (2013), in contrary Milanjeet *et al*. (2014), Chandrasekar *et al*. (2002), recorded higher prevalence of ehrlichiosis in dogs which were less than 1 year of age. Rahman *et al*. (2010) stated that there is no correlation between age groups for occurrence of canine ehrlichiosis. In the present study, sex-wise occurrence was recorded higher in male as compared to female dogs which was contrary with Bhadesiya and Modi (2015). The present findings of sex wise occurrence of ehrlichiosis is in harmony with the findings of Bai *et al*. (2019), Kottadamane *et al*. (2017), Guedes *et al*. (2015), Parmar *et al*. (2013), Manigandan *et al*. (2003). In contrast Rahman *et al*. (2010), Bindu *et al*. (2006) and Rodriguez *et al*. (2005) suggested that there is no correlation between occurrence of ehrlichiosis and sex of animal.

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