Study on epidemiological trends of canine rabies between 2011 and 2014 in Chennai city, South India

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ABSTRACT

The objective of the present study was to identify various epidemiological factors associated with canine rabies in Chennai city. Data were collected from a total of 169 canine rabies suspected cases which included, retrospective data of 102 (September 2011 to March 2013) and prospective data of 67 that were collected from Under Observation for Rabies (UOR) ward, Teaching Hospital, Madras Veterinary College. The data compiled over 3 years from 169 suspected canine rabid animals were analyzed based on Seller’s staining, of which 125 dogs (91.2%) tested positive. Rabies positives were encountered at a higher level in non-descript dogs (77.6%) and males comprised a larger number of rabies positives (57.6%) with susceptible age group of 1 to 3 years. Greater incidence was reported in the month of February, May and October. Age, breed and sex had no significant effect on the occurrence of rabies in animals. Canine rabies appears to be concentrated around North and Central Chennai compared to other parts of Chennai, hence people in these areas may be considered to be at a higher risk for dog bites. Owned Non-descript dogs attributed to the higher incidence. Hence, educating owners about rabies vaccination is needed because they are closer source of rabies to human than stray dogs.

Key words: Canine rabies, Chennai, Epidemiological factors.

INTRODUCTION

Rabies is a violent viral zoonosis that poses serious global public health threat with canine mediated rabies causing an estimated 55,000 human deaths per year (Knobel et al., 2005). Mortality from rabies is highest in developing communities from Africa and Asia where domestic dogs are pre-dominate free-roaming (Kitala et al., 2002). Dogs are the major reservoirs and source of rabies contributing transmission to other animals and humans in India. More than 20,000 people die of rabies every year in India, and the majority of victims acquire the disease from the bite of a rabid stray dog (Sudarshan et al., 2007). India has approximately 25 million dogs, with an estimated dog: man ratio of 1:36 and the dog population in Chennai city was 18,293 in the year 2007 as estimated by Department of Animal Husbandry and Veterinary Services, 18th Livestock Census. The prevalence of rabies is higher in dogs than any other animals in Chennai from 2001 to 2011 (Rahman, 2011).

Efforts have been made in India to effectively control rabies in dogs. Two main methods used to control canine rabies are vaccination and measures aiming to reduce dog population density, usually by culling (i.e. the widespread killing of dogs regardless of infection status) and also by sterilization. Canine vaccinations are often undertaken as annual campaigns that aim to achieve 70 per cent coverage (Reece and Chawla, 2006).

Knowledge on the epidemiological factors for canine rabies is needed to assess danger to public health and development of effective, sustainable disease control measures. Relatively few studies have been published on the risk factors associated with rabies in India, especially in veterinary research. The objective of this study was therefore to identify various epidemiological factors associated with canine rabies in Chennai city from September 2011 to April 2014.

MATERIALS AND METHODS

Study population: The data were collected from 169 canine cases suspected for rabies and included retrospective data of 102 and prospective data of 67 cases collected from Under Observation for Rabies (UOR) ward, Madras Veterinary College, Teaching Hospital, Chennai.

Data Collection: Rabies suspected animals that were brought to Madras Veterinary College, Teaching Hospital were confined and observed till death. If the animal was alive for more than 10 days in confinement they were vaccinated and handed over to the owner. Information regarding the dogs included breed, sex, age, locality were collected along with laboratory results.
The results of the conventional Seller’s stain for Negri bodies between September 2011 to April 2014 was used as the criteria for establishing positivity in the dogs admitted in UOR. Since presence of Negri bodies is considered positive for rabies (Tierkel and Atanasiu, 1996) and this was the test most often conducted to declare rabies positives in post mortem brain hippocampus smears. The data based on these results (retrospective data for September 2011 to March 2013 and prospective data for April 2013 to April 2014) thus collected were analyzed for epidemiological attributes to determine the pattern of canine rabies in Chennai city during study period.

Statistical analyses: Chi- square test was used to demonstrate epidemiological factors that significantly correlate with incidence of canine rabies. P-value ≤ 0.05 was considered statistically significant, P- value ≤ 0.01 was considered statistically highly significant and P- value > 0.05 was considered statistically non - significant.

RESULTS AND DISCUSSION

Demographic attributes: Retrospective and prospective data which included details of age, sex, breed and locality were tabulated based on laboratory diagnostic results of 169 rabies suspected cases and analyzed to study the epidemiological attributes of canine rabies pattern in Chennai city during the study period. Out of 169 canine cases 125 dogs were positive, 23 dogs tested negative and 21 dogs were discharged.

Breed and sex wise distribution of canine rabies in Chennai city, 2011-2014: In the present study rabies positives were encountered at a higher level in non-descript dogs (77.6%) while in pedigree dogs it was only 22.4% (Table 1). An almost identical proportion of positives were noticed for non-descript (71%) by Gunaseelan et al. (2004) in Chennai and 76.4% by Yale et al. (2013) in Chennai.

Non- descript stray dogs contributed greatly to the prevalence of rabies in other dogs and humans, (Dutta et al., 1992). Though the positive non-descript dog cases in this study were all owned dogs the reason that could be attributed to the higher incidence in this group could be explained by the reluctance or ignorance of prophylactic rabies vaccination by the owners for these non-descript.

Males comprised a larger number of rabies positives (57.6%) in comparison to females (42.4%) (Table 1) with similar observations made by Gunaseelan et al. (2004) and Yale et al. (2013) in Chennai and by Widdowson et al. (2002) in Santa Cruz, Bolivia.

Statistical analysis for this parameter revealed no significant difference (P > 0.05) that could be attributed to the occurrence of rabies with regards to breed and sex (Table 1) and hence breed and sex were not significant risk factors for dog rabies which is in agreement with the findings of the study by Widdowson et al. (2002), Thiptara et al. (2011) and Karshima et al. (2013).

Age wise distribution of canine rabies in Chennai city, 2011-2014: The age group of 1 to 3 years was found to show a higher incidence of rabies 28% (Table 1) followed by 7 to 12 months age group 25.6% , the least incidence was amongst 1 to 3 months being 6.4%.

Higher incidence was recorded in the age group of 1 to 3 years (Table 1) which coincides with the results of Gunaseelan et al. (2004) who found 27% for the same age group in their study of canine rabies in Chennai city. This possibility is due to greatest activity during breeding cycles providing greater opportunities for rabies transmission in this age group (Narayan, 1985). In Plateau State, Nigeria, Karshima et al. (2013) however, reported a higher incidence amongst age group 0 to 6 months (53.5%) but in this study only 17.6% were from this age group (0 to 6 months). Rabies in this age group may be attributed to lack of maternal immunity due to the inability of dog owners to vaccinate their bitches which would have protected the puppies (Karshima et al., 2013).

Statistical analysis of our data revealed no significant difference (P > 0.05) in the occurrence of rabies with regards to age (Table 1) however, Thiptara et al. (2011) in Southern Thailand and from Plateau State, Nigeria, Karshima et al. (2013) in contrast found that age separately had a significant contribution to the occurrence of rabies.

Temporal distribution of canine rabies in Chennai city, 2011-2014: The monthly distribution of canine rabies (includes both retrospective and prospective data) in dogs were presented in Fig. 1. Rabies cases in the canine species occurred throughout the year, however, three peaks of incidences were obvious, February (30), May (17) October (14), (Fig 1 and Table 2). Over the years several workers had identified different peaks of incidence but were consistent in their findings with regards to the endemicity throughout the year for canine rabies.

Table 1: Age, Sex and Breed wise distribution of canine rabies in Chennai, 2011-2014

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Positive (%)</th>
<th>Chi-square test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-3 months</td>
<td>8 (6.4)</td>
<td>3.63 NS</td>
</tr>
<tr>
<td>4-6 months</td>
<td>14 (11.2)</td>
<td></td>
</tr>
<tr>
<td>7- 12 months</td>
<td>32 (25.6)</td>
<td></td>
</tr>
<tr>
<td>1-3 years</td>
<td>35 (28)</td>
<td></td>
</tr>
<tr>
<td>3-5 years</td>
<td>20 (16)</td>
<td></td>
</tr>
<tr>
<td>&gt;5 years</td>
<td>16 (12.8)</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>72 (57.6)</td>
<td>1.75 NS</td>
</tr>
<tr>
<td>Female</td>
<td>53 (42.4)</td>
<td></td>
</tr>
<tr>
<td>Breed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-descript</td>
<td>97 (77.6)</td>
<td>1.52 NS</td>
</tr>
<tr>
<td>Pedigree dogs</td>
<td>28 (22.4)</td>
<td></td>
</tr>
</tbody>
</table>

NS No significance P > 0.05
The peaks in February and October were also observed by Gunaseelan et al. (2004) but Yale et al. (2013) who recorded peaks in February and March in Chennai and Narayan (1985) recorded high incidence of canine rabies between August and May while Appaji Rao et al. (1983) found a rise in incidence from December to April. The peaks are possibly determined by dog densities, coinciding with the terminal part of the breeding season of dogs and hence high mobility and interaction of the dogs during this period. Statistical analysis revealed highly significant (P < 0.01) difference with regards to month wise distribution of canine rabies (Table 2).

Spatial distribution of canine rabies in Chennai city, 2011-2014: The locality specific details for the period (September 2011 to April 2014) of the rabid dogs admitted in UOR when plotted on a map of Chennai was found to show the ‘hot spots’ for canine rabies to be congregated more towards northern and central parts of the city with 3 or more cases (Fig. 2) which corroborated with the observation of Yale et al. (2013) where in most positive cases were from North Chennai (46.11%).

CONCLUSION

In conclusion, canine rabies is endemic throughout the year with peaks in February, May and October being predominant in 1-3 years prime age groups dogs. Owned non descript dogs attributed to a higher incidence which explains reluctance or ignorance of rabies vaccination by the owners for these non-descripts. Educating owners about rabies vaccination of this group of dogs is needed because they are likely to be a common source of rabies to human than stray dogs. Canine rabies appears to be concentrated around north and central Chennai compared to other parts of Chennai, hence people in these areas may be considered to be at a higher risk for dog bites.

Our epidemiological study highlights important information on age, sex, and breed, spatial and temporal trends for canine rabies in and around Chennai city. The true dog population is underestimated and there is a
need for accurate means of evaluating dog population and dog vaccination coverage and focus on other parts of Tamil Nadu regarding canine rabies status is much desired.

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