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A STUDY ON PREVALENCE STATUS OF ANAPLASMA MARGINALE INFECTION AMONG CATTLE POPULATION OF KANCHEEPURAM AND IN AND AROUND CHENNAI DISTRICTS OF TAMIL NADU

***S. Arunkumar¹ and K. Nagarajan²**

¹Department of Veterinary Parasitology and ²Department of Veterinary Pathology,
Madras Veterinary College, Chennai-600007

*Author for Correspondence

ABSTRACT

A study was carried out to investigate the prevalence of *Anaplasma marginale* infection in cattle population of Kancheepuram and Chennai districts of Tamil Nadu. A total of 429 whole blood sample and blood smears were prepared from small holder dairy units and processed for examination. On Leishmann-Geimsa stained blood smear examination, it was observed that the overall prevalence rate of *Anaplasma marginale* infection was 19.3%. On haematological examination, it was observed that a progressive decrease in haemoglobin concentration ($6\pm 1.21\text{g/dl}$) and packed cell volume ($15\pm 1.48\%$) in infected animals.

Key Words: *Anaplasma Marginale*, Prevalence, Cattle, Tamil Nadu

INTRODUCTION

Bovine anaplasmosis caused by intraerythrocytic rickettsial organism, *Anaplasma marginale* is mainly affecting adult cattle (Kocan *et al.*, 2003). It is transmitted cyclically by ixodid ticks; mainly *Boophilus microplus* (*Rhipicephalus B. microplus*) but other species of the genera *Rhipicephalus*, *Dermacentor*, *Haemaphysalis*, *Hyalomma* and *Ixodes* can also transmit *Anaplasma* spp. In addition, iatrogenic and mechanical transmission by insects (i.e. *Tabanus* spp. *Stomoxys* spp.) is also possible. There are many *Anaplasma* species but, *A. marginale* is the most important one (Kumar *et al.*, 2010). Microscopically, *A. marginale* looks like solid dots on the margins of RBC. As the infection progresses, more and more RBCs contain parasites and are destroyed (Stewart *et al.*, 1981). It usually causes sub-acute or chronic disease but sometimes acute disease is observed in older animals especially in dairy cows of non-indigenous breeds. The disease is characterized by fever, severe anemia, jaundice, brownish urine, loss of appetite, dullness or depression, rapid deterioration of physical condition, muscular tremors, constipation and pale mucous membrane and labored breathing. In acute cases, 10 to 50 % of the RBCs can be infected. These are easy to observe in smears stained with Giemsa stain unless at the peak of phagocytosis. Animals that recover from primary attack remain as lifelong carriers. During the carrier stage, rickettsaemia occurs, which may permit vector transmission to take place and hence diagnosis of carrier status is most important. Routine laboratory diagnosis in acutely infected cattle is based on the microscopic examination of peripheral blood smears. Serological tests even though developed, lack the required specificity and sensitivity for a reliable diagnosis (Aubry and Geale, 2011). The study was designed to investigate the prevalence of *Anaplasma marginale* infection in cattle population of Kancheepuram and in and around Chennai district of Tamil Nadu.

MATERIALS AND METHODS

The present study was conducted in different cattle population in and around Kancheepuram district of Northern Tamil Nadu and some adjoining areas of Chennai district of Tamil Nadu. Cattle blood samples were collected from small holder dairy units and processed for haematological examination. Before collection of blood, the area of the ear tip was thoroughly clipped and wiped with methanol. The blood smears were prepared on clean, grease free glass slides, air dried and labeled with a lead pencil. Smears

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were stained with the standard procedure of Leishmann-Giemsa staining. A total of 429 thin blood smears (321 from Kancheepuram and 108 from Chennai) were prepared for the prevalence studies of anaplasmosis. Approximately, 5ml of blood was drawn from Jugular vein in vacuutainers test tube that contained disodium ethylene diamine tetra acetic acid (Disod. EDTA) was used for determining the following hematological parameters: packed cell volume (PCV %), haemoglobin concentration (Hb g/dl) total erythrocytes count (RBCs $\times 10^6/\mu\text{l}$), total leukocytic count (WBCs $\times 10^3/\mu\text{l}$) and calculated mean corpuscular volume (MCV/fl), Mean corpuscular haemoglobin (MCH/pg) and mean corpuscular haemoglobin concentration (MCHC g/dl). Blood smears were examined microscopically. Approximately 12,500 RBCs (50 fields) per slide were observed. Morphologically, *A. marginale* were observed as solid dots on the periphery of the RBCs. For comparing the prevalence of anaplasmosis in blood smears of cattle population Chi square test was applied.

RESULTS AND DISCUSSION

A total of 429 whole blood samples and smears (321 from Kancheepuram and 108 from Chennai districts of Tamil Nadu) were collected from suspected cattle showing a clinical picture of high fever, pale mucous membrane, lacrimation and lymph node enlargement. On Leishman-Giemsa stained blood smear examination, it was observed that out of 429 cattle, 83 were found positive for *A. marginale* infection with a prevalence rate of 19.3%. Therefore, 59 out of 321 smears from Kancheepuram (18.3%) and 14 out of 108 from Chennai (12.9%) were prevalence percentage in these districts. Organisms in blood smears appeared as spherical dot like bodies located in periphery of the infected RBCs and overall rickettsaemia among the infected animals ranged between 20 to 30%. Blood picture also revealed anisocytosis, basophilic stippling, macrocytic normochromic type of anaemia. On haematological examination, it was observed that a significant progressive decrease in haemoglobin concentration (6 ± 1.21 g/dl), packed cell volume ($15\pm 1.48\%$), RBC counts ($3.38\pm 1.37 \times 10^6/\text{cumm}$) and total leukocyte counts ($7.38\pm 1.39 \times 10^3/\text{cumm}$) in the affected cattle. An increase in mean corpuscular volume (36.40 ± 6.27 fl), decrease in mean corpuscular haemoglobin (06.40 ± 2.27 pg) and mean corpuscular haemoglobin concentration (24.53 ± 3.59 g/dl) were also observed in infected animals. Based on this study, it was concluded the overall prevalence of infection was found to be 19.3% and cross bred cattle above 2 years of age were highly susceptible for the infection. When compared to present findings, the earlier studies revealed low prevalence rate of anaplasmosis in Chennai district (Soundararajan and Rajavelu 2006). Similarly, Muraleedharan *et al.*, (2005) also reported low prevalence rate in some districts of Karnataka state.

Anaplasmosis is considered as one of the top ten economically important rickettsial diseases affecting ruminants in India (PDADMAS Annual Report, 2005-06). The higher prevalence of the anaplasmosis in clinically normal crossbreds of South India indicates subclinical infections or carrier status of these vector borne diseases. Though the carrier animals does not exhibit any symptoms; they remain patent to the vectors and remain silent source of infection to other susceptible animals (Kieser *et al.*, 1990). *Rhipicephalus (B.) microplus* is reported as the commonest tick species in southern region of the country particularly in Tamil Nadu (Koshy *et al.*, 1982). The abundance of biting flies (*Tabanus* spp. and *Stomoxys* spp.) due to the hot and humid tropical climatic conditions prevailing in the state may augment the mechanical transmission of the disease to naïve animals.

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