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THE PREVALENCE OF ARBOVIRAL INFECTIONS DENGUE AND CHIKUNGUNYA IN AND AROUND BELLARY DISTRICT, KARNATAKA

***Narayan Shrihari and Kumudini TS**

Department of Microbiology, Vijayanagar Institute of Medical Sciences (VIMS), Bellary-583104, Karnataka, India.

ABSTRACT

Background: An arbovirus is one that multiplies in a blood sucking arthropod and is transmitted by the bite to a vertebrate host. Objective: To know the prevalence of dengue and chikungunya arboviral infections in and around Bellary district. Material and Methods: The laboratory records of clinically suspected dengue and chikungunya patients from January 2009 to December 2011 were analyzed retrospectively and results of Ig M anti dengue and chikungunya antibodies tested by Ig M capture enzyme linked immunosorbant assay (Mac ELISA). A total of 1396 dengue suspected serum samples were analyzed, out of which 160 (11.46%) samples were found positive for dengue virus infection. Maximum positive cases were seen in 2009 (15.72%). A total of 1386 chikungunya suspected serum samples were analyzed, out of which 343 (24.75%) samples were found positive for chikungunya virus infection. Maximum numbers of positive cases were seen in 2010 (28.40%). Here maximum cases were found in 2009 (7.09%). The present study emphasizes the continuous sero-epidemiological surveillance for the effective arboviruses mainly dengue and chikungunya control programme.

Key words: Dengue, Chikungunya and Ig M antibody capture ELISA.

INTRODUCTION

The arboviruses are transmitted by blood sucking arthropods from one vertebrate host to another. The vector acquires a lifelong infection through the ingestion of blood from a viremic vertebrate host. The viruses multiply in the tissues of the arthropod without evidence of disease or damage. Some arboviruses are maintained in nature by transovarian transmission in arthropods [Figure 1]. The major arboviral diseases distributed worldwide are yellow fever, dengue (DEN), Japanese B encephalitis (JE), chikungunya (CHIK), St. Louis encephalitis, western equine encephalitis, eastern equine encephalitis, Russian spring summer encephalitis, west Nile fever and sand fly fever [1]. The dengue is a flue like viral disease characterized by fever, rash, muscle and joint pain. The chikungunya disease is characterized by fever, rash and arthralgia. Both the infections were spread by the bite of infected Aedes mosquitoes [1]. The vector-borne diseases

and mosquitoes breeding sites are playing an important role in the transmission and propagation of dengue and chikungunya.

MATERIAL AND METHODS

The study was conducted at a tertiary care Hospital from January 2009 to December 2011. A total of 1396 serum samples from suspected dengue cases and 1386 serum samples from suspected chikungunya cases were included in our study. Aseptic precautions, two to five ml of blood samples were collected by venipuncture for DEN and CHIK. Both samples were transported to the Microbiology laboratory in vaccine carriers with duly filled requisition forms. The serum was separated by centrifugation of the whole blood sample. The serum samples were transferred to sterile aliquots, labelled with the particulars of the patient and stored in the refrigerator

Corresponding Author: - **Dr.Narayan Shrihari** Email: - shriharimicro@gmail.com

at -20°C [2]. The test kits used were dengue Ig M antibody capture ELISA and chikungunya Ig M antibody capture ELISA supplied by Group leader, Arbovirus Diagnostics, National Institute of Virology, Pune, India. The tests were performed strictly as per the manufacturers' instructions.

RESULTS

During the three years of study period, 1396 DEN suspected serum samples were analyzed, out of these

160 (11.46%) samples were positive for DEN virus infection [Table 1]. The prevalence of DEN is high in 2009 (15.72%) [Table 2]. 1386 CHIK suspected serum samples were analyzed, out of these 343 (24.75%) samples were positive for CHIK virus infection [Table 3], the prevalence of CHIK is high in 2010 (28.40%) [Table 2]. Male to Female ratio of fever diagnosis in both (DEN and CHIK) cases is 1.2 [Table 4] and majority of cases belong to age group more than 15 years [Table 5].

Table 1. Distribution of suspected and confirmed Dengue cases

Suspected	Confirmed	Percentage	Negative
1396	160	11.46	1236

Table 2. Distribution of Dengue and Chikungunya suspected and confirmed cases according to year

Year	Dengue			Chikungunya		
	Suspected	Confirmed	%	Suspected	Confirmed	%
2009	388	61	15.72	802	185	23.07
2010	448	59	13.17	500	142	28.40
2011	560	40	07.14	84	16	19.05

Table 3. Distribution of suspected and confirmed Chikungunya cases

Suspected	Confirmed	Percentage	Negative
1386	343	24.75	1043

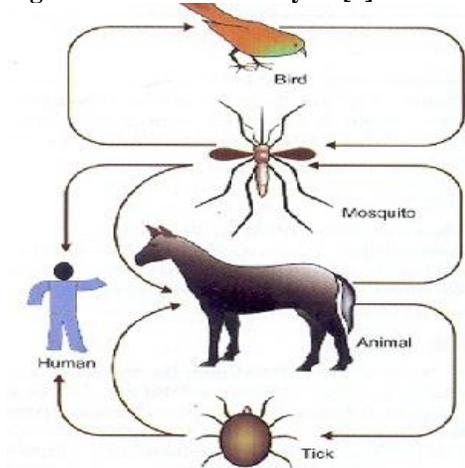
Table 4. Distribution of fever diagnosis according to Gender of the patients

Gender	No. of Cases	Dengue	Chikungunya
Male	2168	833	689
Female	1811	563	697
Total	3979	1396	1386

Table 5. Distribution of fever diagnosis according to age of the patients

Age in Years	No. of Cases	Dengue	Chikungunya
Less than 5	590	079	12
5 to 10	379	124	38
10 to 15	738	147	261
More than 15	2272	1046	1075

Figure 1. Arbovirus life cycle [7]



DISCUSSION

The serological study indicated that both (Dengue and Chikungunya) arthropod-borne viruses studied were prevalent in and around Bellary district, although the prevalence differed according to age, sex, geographic location and the individual virus. The geographical distribution had a significant influence on the prevalence of antibodies to viruses. This might be explained by the possible impact of ecological characteristics of the areas on the natural cycles of the arthropod-borne viruses under consideration [3]. Dengue is an important emerging disease of the tropical regions. After analyzing the year wise distribution of dengue cases an unsteady increase in the number of dengue cases over the past few years was noted. The number of DEN positive cases more during 2010 (20.56%) according to one study [4]. But in our study DEN

positive cases more in 2009 (15.72%). CHIK disease recently emerged as an important public health problem in India. The epidemic occurs in the Indian Ocean islands during 2006 [5]. Karnataka was the worst affected state during 2006 CHIK outbreak, 27 districts of the state reported over 7, 62,026 (54.74%) suspected cases. Several districts of the state such as Bellary, Gulbarga, Tumkur, Bidar, Raichur, Dharwad, Chitradurga, Davangere, Kolar and Bijapur have recorded large number of CHIK virus related fever cases in 2006 [6]. More than 64% of the entire suspected cases were reported in India during 2008^[6]. We have noticed that CHIK outbreak in and around Bellary

district. The number of confirmed cases were more in 2010 (28.40%) than in 2009 (23.07%) and subsequently decreased in 2011 (19.05%).

CONCLUSION

The arboviral infections mainly dengue and chikungunya are most common in tropical and subtropical regions. The vector (Aedes mosquitoes) control is important preventive measure in community. The serological results (Ig M antibody capture ELISA) clearly establish the etiology. *Key message:* The prevention is better than cure.

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