

Original Research Article

<https://doi.org/10.20546/ijcmas.2019.809.111>

Clinical and Serological Diagnosis of Chikungunya Fever in a Tertiary Care Centre of Bihar, India

Richa Sinha, Ratnesh Kumar* and S.N. Singh

Department of Microbiology, Patna Medical College, Patna, Bihar, India

*Corresponding author

ABSTRACT

Chikungunya fever is caused by an arbovirus belonging to the Alphavirus genus of the Togaviridae family. It was first isolated in the Newala district of Tanzania in 1952–1953. Chikungunya virus is no stranger to the Indian subcontinent. It was first reported from Calcutta (Kolkata now) and was responsible for about 200 mortality³. Since then several outbreaks of Chikungunya fever have been documented from different parts of India. Chikungunya virus is transmitted to humans by *Aedes* mosquitoes. Chikungunya virus infection is characterized by abrupt onset of fever, headache, rash, nausea, vomiting, myalgia and arthralgia. This retrospective study was carried out in Department of Microbiology, PMCH, Patna over 9 months. All the suspected cases with symptoms indicative of chikungunya fever visiting our department were included in our study. Confirmation of cases was carried out by detection of CHIKV IgM antibodies in serum using IgM Antibody capture ELISA Kit (NIV, Pune, India). Demographic details and clinical complaints of the patients coming positive for chikungunya were noted. Out of 226 serum samples, 72 (31.85%) were IgM positive. Largest group (44.44%) of the patients belonged to the age group 20-40 years, followed closely by 0-20 years. Among the 72 positive case, 44 (61.1%) were male and 28 (38.88%) were female. Most of the cases (77.77%) occurred in the month of September followed by August (16.66%). Majority of the positive cases were from urban areas.

Keywords

Chikungunya fever, Conjunctival congestion, Joint pain, CHIKV infection and IgM ELISA

Article Info

Accepted:

15 August 2019

Available Online:

10 September 2019

Introduction

Chikungunya fever is caused by an arbovirus belonging to the Alphavirus genus of the Togaviridae family. It was first isolated in the Newala district of Tanzania in 1952–1953¹. It has become an important global health threats and has spread from their original niche in sub-Saharan Africa to most areas of the world. Chikungunya virus is no stranger to

the Indian subcontinent. It was first reported from Calcutta (Kolkata now)² and was responsible for about 200 mortality³. Since then several outbreaks of Chikungunya fever have been documented from different parts of India including Vellore, Chennai (then called Madras) in Tamil Nadu, and Puducherry (then called Pondicherry), Visakhapatnam, Rajahmundry, and Kakinada in Andhra Pradesh, Nagpur, and Barsi in Maharashtra⁴.

Chikungunya virus is transmitted to humans by *Aedes* mosquitoes. Although both *Aedes aegypti* and *A. albopictus* mosquitoes are prevalent in India, the predominant vector is the urban, peri-domestic, *Aedes aegypti* mosquito, which is responsible for large-scale out-breaks⁵. Chikungunya virus infection is characterized by abrupt onset of fever, headache, rash, nausea, vomiting, myalgia and arthralgia. The joint pain caused by CHIKV infection is severe and may limit the simple daily activities⁶. The disease may be confused with Dengue, O'nyong-nyong or Sindbis virus infection. The word chikungunya comes from the Bantu language of the Makonde ethnic group from Tanzania and Mozambique which refers to the curved position of the patient due to debilitating joint pain. This is a self-limited infection and symptoms usually resolve within one–two weeks. However, this polyarthralgia is recurrent in 30–40% of infected individuals and may persist for years.

There has been considerable morbidity reported in recent years in India due to chikungunya, but the actual disease burden is much higher due to potential underestimation from lack of accurate reporting. Due to paucity of literature about incidence, clinical profile, atypical manifestations and complications of the Chikungunya from Northern India we carried out a study on diagnosing and analysing various manifestations of Chikungunya cases at Patna Medical College and Hospital (PMCH) Patna.

Materials and Methods

This retrospective study was carried out in Department of Microbiology, PMCH, Patna over 9 months. All the suspected cases with symptoms indicative of chikungunya fever visiting our department were included in our study. Confirmation of cases was carried out by detection of CHIKV IgM antibodies in serum using IgM Antibody capture ELISA

Kit (NIV, Pune, India). Demographic details and clinical complaints of the patients coming positive for chikungunya were noted. Other investigations like IgM ELISA for Dengue, IgM ELISA for JE were carried out as requested by the concerning clinician.

Statistical analysis

Data were entered in an excel file and analyzed using Stata 9.2 (College Station Tx, USA). Clinical and epidemiological features were studied in Chikungunya positives. $p < 0.05$ was taken as significant.

Results and Discussion

A total of 226 patients with clinical suspicion of Chikungunya presented to Department of Microbiology, PMCH, Patna from January 2017 to September 2017. Serum from each sample was separated. On all the serum samples, IgM ELISA (NIV, Pune) for Chikungunya was done. Out of 226 serum samples, 72 (31.85%) were IgM positive (figure 1). Largest group (44.44%) of the patients belonged to the age group 20-40 years, followed closely by 0-20 years (figure 2). Among the 72 positive case, 44 (61.1%) were male and 28 (38.88%) were female (Figure 3). Male: female ratio was 1.57: 1.

Most of the cases (77.77%) occurred in the month of September followed by August (16.66%). No positive cases were reported in the month of January, April and May (figure 3). Majority of the positive cases were from urban areas, maximum (68%) reported from Patna district (figure 4).

Common clinical complaints noted in chikungunya patients were fever, conjunctival congestion, joint pain, headache, rash and pruritus (figure 5). Rashes in these patients were erythematous and maculopapular. Joint pain was mainly of lower limbs.

As dengue and chikungunya infections elicit similar symptoms and can be present in the same locations, clinical differentiation may be difficult. In Bihar, it was found that the major chikungunya outbreak in the month of August and September of 2017. This study was carried out to ensure that accurate and robust diagnostic tools were used to diagnose chikungunya fever in Bihar. The probable diagnosis of chikungunya fever can be made on the basis of presence of the virus in community, and a clinical triad of fever, rashes and arthralgia is suggestive of the illness. Confirmation of the illness is done by detection of the antigen or antibody to the agent in the blood sample of patient^{7,8}.

Age seemed to play a significant role in the manifestation of symptoms with infants experiencing an abrupt onset of fever followed by flushing of the skin and a generalized maculo-papular rash and older children experiencing an acute fever, headache, myalgia, and arthralgia involving various joints with conjunctival infection, swelling of the eyelids, pharyngitis, and symptoms of upper respiratory tract disease⁹. Similar results were recorded in this study also. In India, during 2006 CHIKV epidemic more cases were reported in the adult age groups even though all age groups were affected^{10,11}. In Kerala oedema, distaste and nausea were found to be much lower manifested in children as compared to those in older age groups. In Andhra Pradesh, Chikungunya fever affected all the age groups and both gender¹². In this study male female ratio was 1.57: 1.

In the present study majority of Chikungunya suspected and positive cases occurred in the months of September (77.77%), followed by August (16.66%). No positive cases were reported in the month of January, April and May which can be explained by the high vector density in the post monsoon period. Majority of the positive cases (68%) were

from urban areas. Most of the previous outbreaks in India were also found to be confined mainly to urban areas and large cities. This can be attributed to *A. aegypti* being the dominant CHIKV vector in India which has a strong predilection for urban and semi-urban environments¹³.

The main clinical features in the present study were fever, conjunctival congestion, joint pain, headache, rash and pruritus. Rashes in these patients were erythematous and maculopapular. Joint pain was mainly of lower limbs. Our study strongly supports CHIKV to be an important cause of neurological disorders in children and that clinicians should be aware of the fact that CHIKV may be a cause of CNS infections in children.

CHIKV is probably often under-diagnosed or misdiagnosed as dengue due to similarities in clinical presentation, limited awareness and lack of laboratory diagnostic capability.¹⁴ Routine blood Serology can be done for detection of antigens or antibodies of suspected case of Chikungunya. IgM capture ELISA helps in distinguishing the disease from dengue fever. There has been development of reverse transcriptase PCR/nested PCR for confirmative diagnosis of CHIKV¹⁵.

In conclusion, CHIKV IgM positivity of 31.85% was seen in the present study. Largest proportions 44.44% of confirmed cases were in the age group 20- 40 years. Most of the cases (77.77%) occurred in the month of September followed by August (16.66%). No positive cases were reported in the month of January, April and May. Majority of the positive cases were from urban areas, maximum (68%) reported from Patna district. Common clinical complaints noted in chikungunya patients were fever, conjunctival congestion, joint pain and headache.

References

1. Mohan A, Kiran DH, Manohar IC, Kumar DP. Epidemiology, clinical manifestations, and diagnosis of Chikungunya fever: lessons learned from the re-emerging epidemic. *Indian J Dermatol*. 2010;55(1):54-63.
 2. Shah KV, Gibbs CJ, Banerjee G. Virological investigation of the epidemic of haemorrhagic fever in Calcutta: Isolation of three strains of Chikungunya virus. *Indian J Med Res*. 1964;52:676-83.
 3. Sudeep AB, Parashar D. Chikungunya: an overview. *J Biosci*. 2008;33:443-449. doi: 10.1007/s12038-008-0063-2.
 4. Yergolkar PN, Tandale BV, Arankalle VA, *et al.*, Chikungunya outbreaks caused by African genotype, India. *Emerg Infect Dis*. 2006;12(10):1580-3.
 5. Jupp PG, McIntosh BM. Chikungunya virus disease. In: Monath TP, editor. *The arboviruses: epidemiology and ecology*. Vol. II. Boca Raton: CRC Press; 1988. p.137-57.
 6. Vijayakumar KP, Nair Anish TS, George B, Lawrence T, Muthukkutty SC, Ramachandran R. Clinical Profile of Chikungunya Patients during the Epidemic of 2007 in Kerala, India. *J Glob Infect Dis*. 2011; 3(3): 221-6.
 7. Brooks GF, Butel JS, Morse SA. Human arboviral infections. In: Jawetz, Melnick and Adelberg's *Medical microbiology*. 23rd edn. Singapore: Mc Graw Hill, 2004: p. 514-24.
 8. Barrett ADT, Weaver SC. Arboviruses: alphaviruses, flaviviruses and bunyaviruses. In: *Medical microbiology*. Greenwood D, Slack RCB, Peutherer JF (editors). 16 edn. London: Churchill Livingstone, 2002: p 484-501.
 9. Ligon BL. Reemergence of an unusual disease: The chikungunya epidemic, *Semin Pediatr Infect Dis* 2006; 17 : 99-104.
 10. Mourya DT, Yadav P, Mishra AC. The current status of Chikungunya virus in India, *National Institute of Virology, Commemorative compendium*, Mishra AC, editor; 2004. p. 265-77.
 11. Jain SK, Kaushal K, Bhattacharya D, Venkatesh S, Jain DC, Lal S. Chikungunya viral disease in Bhilwara district, Rajasthan state, India. *J Commun Dis* 2007; 37 : 25-32.
 12. Mohan A. Chikungunya fever: clinical manifestations & management. *Indian J Med Res* 2006; 124 : 471-4.
 13. Kumar NP, Joseph R, Kamaraj T, Jambulingam P A226V mutation in virus during the 2007 chikungunya outbreak in Kerala, India. *J Gen Virol*. 2008; 89: 1945-8.
 14. Sam IC and Abubakar S. Chikungunya virus infection. *Med J Malaysia*. 2006;61(2):264-9.
- Pfeffer M, Linszen B, Parker M.D and Kinney RM. Specific detection of Chikungunya virus using RT-PCR/nested PCR combination. *J Vet Med*. 2002; 49(1): 49-54.

How to cite this article:

Richa Sinha, Ratnesh Kumar and Singh, S.N. 2019. Clinical and Serological Diagnosis of Chikungunya Fever in a Tertiary Care Centre of Bihar, India. *Int.J.Curr.Microbiol.App.Sci*. 8(09): 943-946. doi: <https://doi.org/10.20546/ijcmas.2019.809.111>