AUCTORES
Globalize your Research

Journal of Clinical Surgery and Research

Ahmad Reza Shahraki *

Open Access

Mini Review

Chandipura Virus (Chpv) -The Deadly Paediatric Disease of Monsoon in Bharat

Ahmad Reza Shahraki [1]*, Elham Shahraki [2], Elahe Shahraki [3]

[1]General Surgeon, Department of Surgery, Medical Faculty, Zahedan University of Medical Sciences and Health Services, Zahedan, Iran.

[2]Associated professor of nephrology, Department of Internal medicine, Nephrologist, Ali Ibne Abitaleb Hospital, Zahedan University of medical Sciences, Zahedan, I.R. Iran.

[3]Dentist, Dental faculty, Zahedan University of Medical Sciences and Health Services, Zahedan, Iran.

***Corresponding Author:** Ahmad Reza Shahraki., General Surgeon, Department of Surgery, Medical Faculty, Zahedan University of Medical Sciences and Health Services, Zahedan, Iran.

Received Date: 13 February, 2024 | **Accepted Date:** 19 February, 2024 | **Published Date:** 28 February, 2024

Citation: Ahmad R. Shahraki, Elham Shahraki, Elahe Shahraki, (2024), Chandipura Virus (Chpv) -The Deadly Paediatric Disease of Monsoon in Bharat, *Journal of Clinical Surgery and Research*, 5(6); **DOI:10.31579/2768-2757/136**

Copyright: © 2024, Ahmad Reza Shahraki. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract:

The virus has been detected in CSF as well as sera collected from the patients in the acute phase of illness using CHPV specific one-step RT-PCR assay that detects 10-100 pfu / ml of the virus in human clinical specimens. Real-time one-step RT-PCR indicates linear relationship for a wide range of viral RNA 102-1010.

keywords: epidemiology; diagnosis; vaccinology and biology

Introduction

Chandipura Virus (CHPV) is a virus belongs to the Rhabdoviridae family, which includes rabies, the deadliest zoonotic disease. It is transmitted by sandflies and mosquitoes, including Aedes aegypti, which is also a vector for dengue too. The virus resides in the salivary glands of these insects and can be transmitted to humans or domestic animals through bites of these infected insects. The infection may lead to encephalitis and inflammation of the brain's most active tissues. The Chandipura virus, belonging the Vesiculovirus genus, was discovered in 1965 in the blood of two individuals suffering from febrile sickness in a hamlet near Nagpur, Maharashtra.

The virus usually spread by the female phlebotomine sandfly, which is abundant during the y monsoon season. Sergentomyia sandflies play a role in the virus's spread, with Aedes aegypti being highly susceptible and effective in laboratory conditions. Chandipura infection produces encephalitis, which is the inflammation or swelling of brain tissue. However, no viral isolations from mosquitoes have been documented till date.

Chandipura virus (CHPV): Symptoms, impact, treatment and prevention

Typical symptoms include a rapid onset of fever, vomiting, altered mental state, convulsions, diarrhoea, neurological deficits, and signs of meningeal irritation. The virus predominantly affects children under the age of 15, mostly in rural areas. Most affected children experience rapid deterioration, with deaths occurring within 48 hours of hospital admission. Enlisted below are some of the symptoms:

- Sudden fever onset
- Vomiting
- Changes in mental status
- Seizures
- Diarrhea
- Impaired neurological function (e.g., difficulty speaking, loss of balance, vision changes)
- Meningeal irritation (evidenced by symptoms such as headaches, stiff neck, sensitivity to light, aand seizures)

Currently, there is no specific antiviral treatment or vaccine available for the Chandipura virus. Early diagnosis and supportive care, such as managing airways, fluid balance, and the prevention of secondary bacterial infections, are essential for patient management.

Chandipura virus (CHPV) was first discovered during an acute febrile outbreak in Nagpur, Maharashtra state, India from two febrile cases [1965] [1, 2]. It belongs to the genus Vesiculovirus, family Rhabdoviridae. This virus has single-stranded RNA genome with

negative polarity and size about 11 kilobases. It has five structural proteins which are coded by genome: the nucleocapsid protein (N), the phosphoprotein (P), the matrix protein (M), the glycoprotein (G) and large structural protein (L). These are produced in the form of five monocistronic mRNAs [3]. The available information suggests that sandflies are the vectors for this virus while antibodies against this have been detected in a wide range of vertebrate animals [4].

General clinical features include high-grade fever of short duration, vomiting, altered sensorium, generalized convulsions and decerabrate posture leading to grade 4 coma, acute encephalitis-encephalopathy and death within a few to 48 hours of hospitalization [5]. The available epidemiological data suggest that this disease mostly occurs in sporadic forms; however, has potential to cause outbreaks. This disease is not in a routine laboratory screening for acute encephalitis syndrome [AES]. Therefore, during any AES syndrome, the role of this virus is not understood. Besides this, there have been many queries about CHPV: is sandflies the only vector? What is the natural cycle? Do small mammal, domestic animals have any role and since the transovarial transmission of virus in sandflies may not be enough for its maintenance in nature. Understanding the natural cycle can help in interventions and prediction off or breaks. This article reviews research activities and further developments occurred during the last 10 years, which are necessary to understand CHPV as a growing concern in India, its epidemiology, diagnosis, vaccinology and biology of the virus.

It is recorded from Indian subcontinent [India, Bhutan and Nepal], Sri Lanka, and Africa (Nigeria, Senegal) [6,7]. Hence, it is speculated that CHPV may be present in other parts of the country. Although, this was first time identified in India during 1965 but the retrospective serological studies indicate exposure of the human population as early as during 1957–58 [1]. Earlier reports suggest that the association of CHPV with a few undiagnosed outbreaks occurred in 1954 in Bihar [8]. However, CHPV was isolated from sera collected from clinically confirmed encephalitis cases in 1983 from Raipur [9] and the Warangal district of Andhra Pradesh (1997 and 2002) [10] suggesting its wide circulation in the country. However, CHPV re-emerged during 2003 in the form of an encephalitis outbreak affecting 11 districts of Andhra Pradesh with a high fatality ratio of about 56% [11]. CHP encephalitis (CHPE) outbreak was simultaneously documented in 15 districts of Maharashtra during the same time [12, 13]. During the subsequent year (2005), CHPV outbreak with 70% case fatality rate in the pediatric population of Vadodara district of Gujarat was documented [12]. It has been associated with a number of encephalitis epidemics in different states of India viz. Andhra Pradesh in 2003 and 2007, Gujarat in 2004, Maharashtra in 2007 and 2009, and Odisha in 2015 [13, 14]. The CHPV has also been isolated in Nigeria from hedgehogs and in Sri Lanka from macaques [15].

Molecular Diagnostic Assays for CHPV

CHPV causes acute encephalitis in pediatric population under the age of 15 years. The critical feature of CHPE is sudden onset of the clinical symptoms including neurological complications (within 24-30 hrs.) and high fatality rate. Due to the short duration between the onset of clinical feature and neurological illness, serological diagnostsis is not useful. The virus has been detected in CSF as well as sera collected from the patients in the acute phase of illness using CHPV specific one-step RT-PCR assay that detects 10-100 pfu / ml of the virus in human clinical specimens. Real-time one-step RT-PCR indicates linear relationship for a wide range of viral RNA 102-1010. When RNA from other viruses or healthy individual was used, specificity was found to be 100% [16].

Serological Diagnosis Assay for CHPV

CHPV specific IgM capture ELISA with specific polyclonal antibodies shows polyclonal antibodies masking the specificity of the assay to be used for the detection of anti-CHPV IgM antibodies in the patient's CSF and sera. Monoclonal antibodies were generated and replaced in anti-CHPV IgM ELISA to increase the sensitivity, specificity and rapidity of the assay [17]. Plaque reduction neutralization test (PRNT) is considered as 'gold standard' to detect neutralizing antibodies against Chandipura virus. However, the test is cumbersome to perform, time intensive and reading is subjective. Recently developed micro-neutralization ELISA (MN ELISA) detects neutralizing antibodies against CHPV with readouts in the form of optical density and shorter turnaround time. This test may serve as an alternative to conventional assay in serosurveillance and vaccine studies [18].

Prevention strategies include vector control, identifying and eliminating sandfly breeding sites, and using protective measures to prevent sandfly bites, such as wearing protective clothing and using repellents and nets.

Environmental control, including proper waste disposal and sanitation, is also critical to preventing the spread of the virus. Public health authorities must take proactive measures to curb the spread of the virus and provide the necessary support and resources to the affected regions.

References

1. Bhatt P.N., Rodrigues F.M. (1967). Chandipura: A new Arbovirus isolated in India from patients with febrile illness. *Indian J. Med. Res*;55(12):1295–1305. [PubMed] [Google Scholar]
2. Dhanda V., Rodrigues F.M., Ghosh S.N. (1970). Isolation of Chandipura virus from sandflies in Aurangabad. Indian J. Med. Res;58(2):179–180. [PubMed] [Google Scholar]
3. Menghani S., Chikhale R., Raval A., Wadibhasme P., Khedekar P. (2012). Chandipura Virus: An emerging tropical pathogen. *Acta Trop*;124(1):1–14.
4. Mishra A.C. (2007). Chandipura encephalitis: A newly recognized disease of public health importance in India. [Google Scholar]
5. Sudeep A.B., Gurav Y.K., Bondre V.P. (2016). Changing clinical scenario in Chandipura virus infection. *Indian J. Med. Res*.;143(6):712–721.
6. Ba Y., Trouillet J., Thonnon J., Fontenille D. (1999). [Phlebotomus of Senegal: Survey of the fauna in the region of Kedougou. Isolation of arbovirus]. *Bull. Soc. Pathol. Exot*;92(2):131–135. [PubMed] [Google Scholar]
7. Kemp G.E. (1975). Viruses other than arenaviruses from West African wild mammals. Factors affecting transmission to man and domestic animals. *Bull. World Health Organ*;52(4-6):615–620. [PMC free article] [PubMed] [Google Scholar]
8. Khan N. (1954). Jamshedpur fever. *Indian J. Med. Sci*.; 8:597–608. [Google Scholar]
9. Rodrigues J.J., Singh P.B., Dave D.S., Prasan R., Ayachit V., et al. (1983). Isolation of Chandipura virus from the blood in acute encephalopathy syndrome. *Indian J. Med. Res*.;77:303–307. [PubMed] [Google Scholar]

10. Shaikh N.J., Wairagkar N.S., Reddy S.V., Thakare J.P., Gadkari D.A. (2002). Acute encephalitis without rash in Warangal, Andhra Pradesh and Vadodara, Gujarat associated with measles virus. *J. Assoc. Physicians India*.;50:1198. [letter]. [PubMed] [Google Scholar]
11. Rao B.L., Basu A., Wairagkar N.S., Gore M.M., Arankalle V.A., et al. (2004). A large outbreak of acute encephalitis with high fatality rate in children in Andhra Pradesh, India, in 2003, associated with Chandipura virus. *Lancet*;364(9437):869–874.
12. Chadha M.S., Arankalle V.A., Jadi R.S., Joshi M.V., Thakare J.P., et al. (2005). An outbreak of Chandipura virus encephalitis in the eastern districts of Gujarat state, India. *Am. J. Trop. Med. Hyg*;73(3):566–570. [PubMed] [Google Scholar]
13. Gurav Y.K., Tandale B.V., Jadi R.S., Gunjikar R.S., Tikute S.S., et al. (2010). Chandipura virus encephalitis outbreak among children in Nagpur division, Maharashtra, 2007. Indian J. Med. Res.;132:395–399. [PubMed] [Google Scholar]
14. Dwibedi B., Sabat J., Hazra R.K., Kumar A., Dinesh D.S., et al. (2015). Chandipura virus infection causing encephalitis in a tribal population of Odisha in eastern India. *Natl. Med. J. India*;28(4):185–187. [PubMed] [Google Scholar]
15. Peiris J.S., Dittus W.P., Ratnayake C.B. (1993). Seroepidemiology of dengue and other arboviruses in a natural population of toque macaques (Macaca sinica) at Polonnaruwa, Sri Lanka. *J. Med. Primatol*;22(4):240–245. [PubMed] [Google Sc
16. Kumar S., Jadi R.S., Anakkathil S.B., Tandale B.V., Mishra A.C., et al. (2008). Development and evaluation of a real-time one step reverse-transcriptase PCR for quantitation of Chandipura virus. *BMC Infect. Dis*; 8:168–174.
17. Rao B.L., Basu A., Wairagkar N.S., Gore M.M., Arankalle V.A., et al. (2004). A large outbreak of acute encephalitis with high fatality rate in children in Andhra Pradesh, India, in 2003, associated with Chandipura virus. *Lancet*.;364(9437):869–874.
18. Damle R.G., Patil A.A., Bhide V.S., Pawar S.D., Sapkal G.N., et al. (2017). Development of a novel rapid micro-neutralization ELISA for the detection of neutralizing antibodies against Chandipura virus. *J. Virol. Methods*;240:1–6.

This work is licensed under Creative Commons Attribution 4.0 License

To Submit Your Article Click Here: **Submit Manuscript**

DOI: 10.31579/2768-2757/136

Ready to submit your research? Choose Auctores and benefit from:

- fast, convenient online submission
- rigorous peer review by experienced research in your field
- rapid publication on acceptance
- authors retain copyrights
- unique DOI for all articles
- immediate, unrestricted online access

At Auctores, research is always in progress.

Learn more https://www.auctoresonline.org/journals/journal-of-clinical-surgery-and-research