WEEKLY EPIDEMIOLOGICAL REPORT

A publication of the Epidemiology Unit
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Chandipura Virus Infection

Overview

Chandipura virus (CHPV) is a significant emerging pathogen that belongs to the genus Vesiculovirus and the family Rhabdoviridae, under the order Mononegavirales. Viruses within this order are characterized by their non-segmented, single-stranded RNA genomes of negative sense, meaning the viral RNA must first be transcribed into positive-sense RNA before it can be translated by the host's cellular machinery. The family Rhabdoviridae is named after the Greek word "rhabdo," meaning rod-shaped, referring to the distinctive bullet-shaped morphology of these viruses. Other notable human pathogens in this family include the rabies virus, underscoring the clinical importance of this group.

Morphology and Life Cycle

The virus is enveloped, meaning it is surrounded by a lipid bilayer derived from the host cell membrane, and contains a helical nucleocapsid, which houses the viral RNA genome.

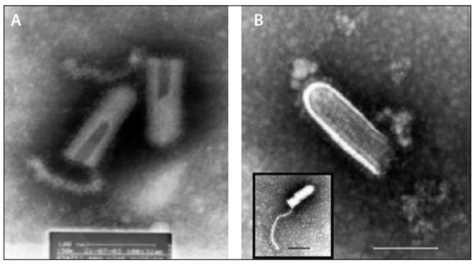

Figure 1: Transmission electron micrographs of primary Chandipura virus isolates from culture

(Source: A large outbreak of acute encephalitis with high fatality rate in children in Andhra Pradesh, India, in 2003, associated with Chandipura virus by Rao BL et al)

The CHPV life cycle begins with the attachment of viral glycoproteins to specific receptors on the host cell surface. After entry via endocytosis, the viral RNA is released into the cytoplasm, where it undergoes transcription to produce mRNA and then viral proteins. This is followed by replication of the viral genome and assembly of new viral particles. These newly formed virions are then released from the host cell to infect other cells, continuing the cycle of infection.

(Source: Messenger RNA cap methylation in vesicular stomatitis virus, a prototype of non-

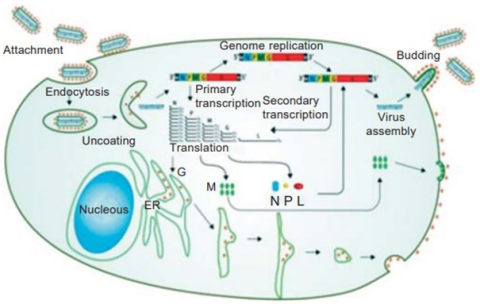

Figure 2: Steps of virus life cycle

segmented negative sense RNA virus by Jianrong Li and Yu Zhang)

History of Discovery

CHPV was first identified in 1965 in a febrile patient from the village of Chandipura in Maharashtra, India, hence the virus's name. Initially, it was noted for its cytopathic effects on cells in tissue culture and was associated with relatively mild symptoms in humans. However, the virus gained clinical significance in 1980 when it was isolated from patients suffering from encephalopathy, suggesting that it had the potential to cause more severe disease in humans.

The first major epidemic linked to CHPV occurred in 2003, when an outbreak of acute encephalitis in central India caught the attention of the medical community. It mainly occurred in the Andhra Pradesh state of India, affecting children primarily. This outbreak marked the first time CHPV was directly associated with a large-scale human epidemic. The virus was

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detected in patient samples through laboratory testing, confirming it as the causative agent of the outbreak. It was marked by a high fatality rate, indicating that CHPV could cause severe and lethal illnesses.

In 2004, another outbreak occurred in the state of Gujarat, India, further solidifying the deadly nature of CHPV. This outbreak was particularly severe, with a mortality rate exceeding 75%, causing alarm among health authorities.

Vector and Transmission

The primary vector of CHPV is the sandfly, specifically belonging to the Phlebotomus genus. These small, blood-feeding insects are prevalent in rural and semi-rural areas and play a significant role in transmitting CHPV to humans. Sandflies thrive in warm, humid environments, typically found in rural, forested, or semi-rural areas. They prefer to breed in moist soils, cracks in walls, animal burrows, and other damp environments, often in close proximity to humans and livestock. Female sandflies are blood-feeders and typically bite at dusk or during the night. It is during this feeding process that they transmit CHPV from infected animals or humans to new hosts.

While the exact animal reservoirs of CHPV are not fully known, it is believed that small mammals may play a role in maintaining the virus in nature. Sandflies acquire the virus from feeding on infected animals or possibly humans during an outbreak. Humans are infected when bitten by an infected sandfly.

Though various mosquito species have been experimentally shown to replicate and transmit CHPV, mosquitoes are not considered natural vectors of the virus. Laboratory studies demonstrated that Aedes aegypti mosquitoes could transmit CHPV through vertical and venereal routes, yet no evidence has confirmed the role of mosquitoes in natural transmission. Thousands of mosquito pools collected from outbreak areas in Warangal district, India, failed to yield CHPV, further solidifying that sandflies are the primary vector in natural settings.

Clinical Symptoms and Progression

The clinical presentation of CHPV infection can range from mild to severe. The early stages of infection are often marked by non-specific symptoms such as:

- Sudden onset of high fever
- Headache
- Myalgia (muscle pain)

However, in severe cases, particularly in children, the virus can rapidly progress to acute encephalitis, a serious inflammation of the brain. This phase is often accompanied by:

- Altered mental status (confusion, disorientation)
- Seizures
- Vomiting
- Coma

The progression from initial symptoms to encephalitis is usually rapid and can be fatal if not managed promptly. Unfortunately, the lack of specific antiviral treatment complicates management, and supportive care remains the mainstay of treatment for severe cases.

Current situation

CHPV is known to cause sporadic cases and outbreaks of acute encephalitis syndrome in western, central and southern parts of India, especially during the monsoon season. Between early June and August 2024, 245 cases of acute encephalitis syndrome were reported from 43 districts of India including 82 deaths (Case Fatality Rate 33%). Of these, 64 are confirmed cases of CHPV infection. Although, CHPV is endemic in India, with previous outbreaks occurring regularly, the current outbreak is the largest in the past 20 years.

Epidemic Potential

CHPV poses a significant threat of causing future outbreaks due to several factors that enhance its epidemic potential:

- Efficient vector transmission: The sandfly vectors are highly effective at spreading the virus, particularly in endemic regions.
- Rapid disease progression: Severe cases can progress quickly to encephalitis, leading to high fatality rates.
- Lack of immunity: Populations in endemic areas may lack widespread immunity to CHPV, making them vulnerable to outbreaks.

Recent outbreaks of CHPV highlight the need for ongoing surveillance, vector control, and public health interventions to prevent future epidemics. Since no vaccine or specific treatment exists for CHPV, early diagnosis and prompt management of symptoms are critical in mitigating the impact of the disease.

Compiled by:

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Table 1: Selected notifiable diseases reported by Medical Officers of Health 31st – 06th Sep 2024 (36th Week)

RDHS	Dengue Fever		Dysentery		Encephalitis		En. Fever		F. Poisoning		Leptospirosis		Typhus F.		Viral Hep.		H. Rabiies		Chickenpox		Meningitis		Leishmania-		Tuberculosis		WRCD	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	T*	C**
Colombo	192	8640	2	28	0	7	1	47	0	19	12	381	0	8	0	8	0	0	14	397	1	31	0	2	39	1543	**100**	**100**
Gampaha	128	3995	0	33	3	29	0	13	2	75	18	548	1	9	0	8	0	0	10	308	4	103	0	19	20	869	**71**	**100**
Kalutara	39	2176	0	21	0	2	0	30	0	36	15	550	0	8	0	8	0	1	5	467	1	28	0	1	0	443	**100**	**100**
Kandy	73	3479	0	32	1	3	0	9	2	56	3	194	0	28	0	11	0	1	6	313	0	13	2	43	16	468	**100**	**100**
Matale	17	584	1	12	0	1	0	7	1	21	0	78	1	3	0	5	0	0	6	123	0	11	16	245	2	95	**100**	**100**
Nuwara Eliya	1	280	0	109	0	7	1	10	0	201	3	146	2	36	1	7	0	0	5	191	0	15	0	1	9	197	**100**	**100**
Galle	38	1629	0	41	0	20	0	10	3	87	31	593	2	93	0	9	0	1	19	584	2	67	0	3	5	316	**100**	**100**
Hambantota	10	681	0	26	0	3	0	5	0	45	9	372	1	41	0	6	0	2	4	254	2	25	7	368	4	125	**100**	**100**
Matara	31	772	0	8	0	6	0	2	0	26	18	373	0	20	2	8	0	0	6	276	1	64	0	90	6	117	**100**	**100**
Jaffna	8	5216	2	54	0	2	1	24	0	34	0	17	3	444	0	7	0	1	11	173	2	20	0	1	5	199	**100**	**93**
Kilinochchi	0	286	1	14	0	0	0	2	0	2	0	18	0	11	0	0	0	2	0	8	0	6	0	1	1	19	**100**	**100**
Mannar	3	249	0	7	0	0	0	1	4	4	0	21	0	11	0	1	0	0	0	7	1	4	0	1	2	43	**100**	**100**
Vavuniya	1	163	0	12	0	1	0	1	0	21	2	78	0	4	0	4	0	0	1	34	0	19	0	9	4	31	**100**	**100**
Mullaitivu	2	196	0	8	0	0	0	0	0	17	0	67	0	11	0	0	0	1	1	5	0	5	0	10	0	23	**100**	**100**
Batticaloa	16	1384	4	103	0	10	0	6	2	55	1	62	0	2	1	18	0	2	2	95	2	41	0	4	2	116	**86**	**100**
Ampara	2	224	1	28	0	3	0	0	1	18	4	162	0	1	0	5	0	1	4	99	0	32	0	20	1	97	**100**	**100**
Trincomalee	2	619	0	13	0	1	0	3	0	7	1	132	0	12	0	3	0	0	6	73	2	16	0	16	9	94	**100**	**100**
Kurunegala	21	1887	0	38	0	31	0	3	4	350	12	494	0	20	0	4	0	4	16	409	1	210	11	463	8	381	**100**	**100**
Puttalam	11	911	1	8	0	3	0	3	0	3	7	196	3	30	0	4	0	1	3	110	2	56	1	29	3	149	**85**	**100**
Anuradhapura	7	630	2	27	0	6	0	2	0	38	11	344	1	29	0	11	0	1	6	211	2	43	11	654	7	215	**100**	**100**
Polonnaruwa	3	313	2	20	1	3	0	1	0	7	5	222	0	2	3	48	0	0	2	115	0	26	8	397	0	86	**100**	**100**
Badulla	15	716	2	28	0	6	0	5	22	53	5	404	2	34	2	26	0	0	7	280	1	29	1	32	5	172	**100**	**100**
Monaragala	17	653	0	15	0	3	0	3	0	84	4	572	1	26	1	34	0	1	3	100	1	79	3	190	6	94	**91**	**100**
Ratnapura	51	2220	5	90	0	5	0	8	1	16	49	1369	2	24	1	21	0	2	8	254	4	106	3	135	14	257	**95**	**100**
Kegalle	38	1666	2	15	0	6	0	9	0	11	21	552	0	23	0	9	0	1	14	666	0	51	2	23	13	272	**91**	**100**
Kalmunai	7	662	1	17	0	0	1	2	11	27	1	63	0	5	0	4	0	0	8	187	1	13	0	0	8	109	**92**	**100**
SRILANKA	**733**	**40231**	**26**	**807**	**5**	**158**	**4**	**206**	**53**	**1313**	**232**	**8008**	**19**	**935**	**11**	**269**	**0**	**22**	**167**	**5739**	**32**	**1134**	**65**	**2757**	**189**	**6464**	**97**	**99**

Source: Weekly Returns of Communicable Diseases (esurvillance.epid.gov.lk). T=Timeliness refers to returns received on or before 06th Sep, 2024 Total number of reporting units 358 Number of reporting units data provided for the current week: 358**C****-Completeness *

A = Cases reported during the current week. B = Cumulative cases for the year.

Table 2: Vaccine-Preventable Diseases & AFP

31st – 06th Sep 2024 (36th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2024	Number of cases during same week in 2023	Total number of cases to date in 2024	Total number of cases to date in 2023	Difference between the number of cases to date in 2024 & 2023
	W	C	S	N	E	NW	NC	U	Sab					
AFP*	00	00	00	00	00	00	00	00	00	00	01	50	66	-24.2 %
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Mumps	00	00	02	01	01	01	02	00	01	08	09	204	171	19.3 %
Measles	00	01	00	00	00	00	00	00	00	01	64	284	439	-35.3 %
Rubella	00	00	00	00	00	00	00	00	00	00	01	02	04	-50%
CRS**	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Tetanus	00	00	00	00	00	00	00	00	00	00	00	05	06	-16.6 %
Neonatal Tetanus	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Japanese Enceph-alitis	00	00	00	00	00	00	00	00	00	00	00	06	02	200 %
Whooping Cough	01	00	00	01	00	00	00	00	00	00	00	41	06	583.3 %

Key to Table 1 & 2

Provinces: **W**: Western, **C**: Central, **S**: Southern, **N**: North, **E**: East, **NC**: North Central, **NW**: North Western, **U**: Uva, **Sab**: Sabaragamuwa.

RDHS Divisions: **CB**: Colombo, **GM**: Gampaha, **KL**: Kalutara, **KD**: Kandy, **ML**: Matale, **NE**: Nuwara Eliya, **GL**: Galle, **HB**: Hambantota, **MT**: Matara, **JF**: Jaffna, **KN**: Killinochchi, **MN**: Mannar, **VA**: Vavuniya, **MU**: Mullaitivu, **BT**: Batticaloa, **AM**: Ampara, **TR**: Trincomalee, **KM**: Kalmunai, **KR**: Kurunegala, **PU**: Puttalam, **AP**: Anuradhapura, **PO**: Polonnaruwa, **BD**: Badulla, **MO**: Moneragala, **RP**: Ratnapura, **KG**: Kegalle.

Data Sources:

Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Neonatal Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps., Rubella, CRS,

Special Surveillance: AFP* (Acute Flaccid Paralysis), Japanese Encephalitis

CRS =**Congenital Rubella Syndrome

NA = Not Available

Take prophylaxis medications for leptospirosis during the paddy cultivation and harvesting seasons.

It is provided free by the MOH office / Public Health Inspectors.

Comments and contributions for publication in the WER Sri Lanka are welcome. However, the editor reserves the right to accept or reject items for publication. All correspondence should be mailed to The Editor, WER Sri Lanka, Epidemiological Unit, P.O. Box 1567, Colombo or sent by E-mail to **chepid@sltnet.lk. Prior approval should be obtained from the Epidemiology Unit before publishing data in this publication**

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