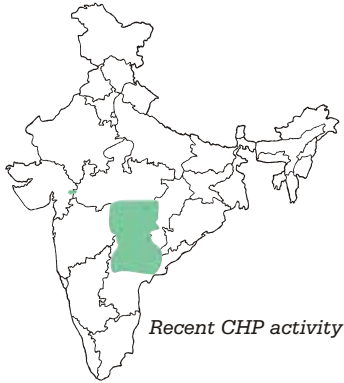


Chandipura Encephalitis

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Chandipura (CHP) virus

The virus was first discovered by NIV from a serum sample of a patient, collected during an outbreak of febrile illness in Nagpur area of Maharashtra state, India in 1965. The virus was not assigned any public health importance until 2003, when investigations conducted by NIV associated CHP virus with a large encephalitis outbreak in children in many districts of Andhra Pradesh and Maharashtra, India.

Clinical characteristics

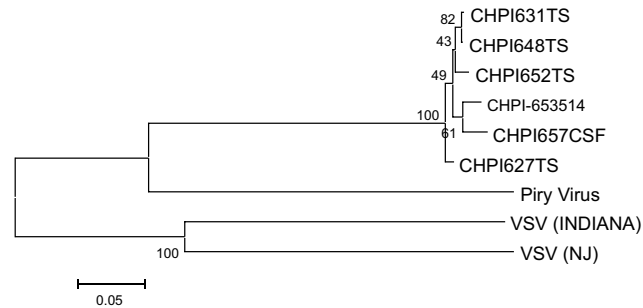
High grade fever of short duration, vomiting, altered sensorium, generalized convulsions, decerebrate posture, leading to Grade IV coma, acute encephalitis / encephalopathy, death within a few hours to 48 hrs of hospitalization.

Full clinical spectrum is not clear. Preliminary data suggest the range to be from subclinical infection / mild to high-grade fever to acute encephalitis. CSF is usually under pressure; pleocytosis absent.

The virus

Chandipura virus belongs to family *Rhabdoviridae*, genus *Vesiculovirus*.

Characterized by bullet shaped particles, 150-165 nm long, 50-60 nm wide, showing distinct surface projections 9-11 nm in size and a stain-filled canal at the base of the virus particles.



Diagnostics

The following diagnostics have been developed by NIV and are being used for providing diagnosis for management and control of the disease.

- Virus isolation: Cell culture, infant mice, embryonated eggs
- Antigen detection: ELISA, IFA
- Genome detection: PCR-G gene
- Serological tests: IgM and IgG ELISA, HI, CF and N tests

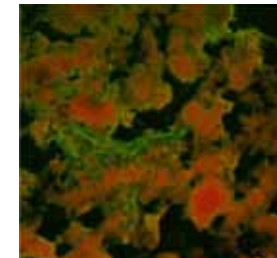


Electron micrograph of CHP virus

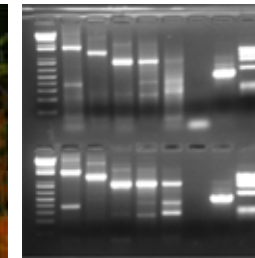
CPE in cell culture



Infected sick mice



Immunofluorescence



PCR amplification



HI antibodies in sera from cases



A typical mud house in the affected area

Epidemiology

- Distribution predominantly rural.
- Many districts of Maharashtra, Andhra Pradesh and Chhatisgarh involved.
- The case distribution is spotty, without clustering.

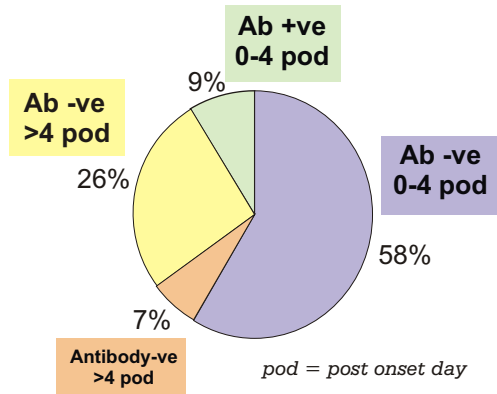
- Pediatric age group from 9 months to 14 years involved.
- The male : female ratio was 1:0.77
- Neurological sequelae rare in recovered children.

Antibodies have been detected from humans from many parts of India, Sri Lanka, and Africa. A retrospective serologic investigation in populations from different regions of India demonstrated that the anti-CHP virus antibody prevalence ranged from 10% to 89%.

Encephalitis outbreak in AP-2003

- Chandipura virus was isolated from 6 encephalitis cases using throat swabs and brain suspension in MDCK, Vero, RD cell lines and PBMC co-cultures
- Identity of all the virus isolates was confirmed by electron microscopy, complement fixation and neutralization tests.
- CHP-RNA was detected in the clinical samples of 9 cases of which 5 were sequenced. Results showed 96.7 to 97.5% identity with the reference 1965 strain.

Encephalitis cases



- CHP viral antigen and RNA were detected in brain tissue of a deceased child by IFA and PCR, respectively.
- Serological tests confirmed the presence of neutralizing (36.2%), IgG (19.6%) and IgM (30.5%) antibodies to CHP virus in the patients.
- CHP reactive IgM positivity was significantly higher in samples collected after 4 days of illness (69%), in comparison to those collected within 4 days (10%) of illness.
- Neutralizing antibodies were detected in samples collected after 4 days (78.78%) of illness. This was significantly higher than in samples collected within 4 days (13.43%) of illness.
- These findings suggested strong association of CHP virus with acute encephalitis outbreak in Andhra Pradesh, 2003.

Outbreak in Maharashtra

An outbreak, similar to the one from AP, was also reported from 11 districts of Maharashtra during the same period in 2003. Serology revealed similar trend in IgM antibody response in early (<4days) and late samples (>4days).

Vector

- The virus was earlier isolated from sandflies - *Phlebotomus* species - in Aurangabad, Maharashtra, India.
- Successful experimental mouse-mosquito-mouse transmission has been carried out by six species of mosquitoes *Ae.aegypti*, *Ae.albopictus*, *An.stephensi*, *Cx.tritaeniorhynchus*, *Cx.bitaeiorhynchus*, and *Cx.quinquefasciatus*.
- However 34 pools, comprising 1182 female *Ae.aegypti* mosquitoes tested from the locality from where the virus was first isolated in 1965, were negative for the virus.
- Transovarial transmission in *Phlebotomus papatasi* has been documented under laboratory conditions.
- During the investigations of 2003 outbreak in Andhra Pradesh, CHP RNA was detected from one pool of sandflies by RT-PCR.

Perhaps, sandfly is the main vector as well as maintenance host of Chandipura virus.

Involvement of vertebrates

In India, neutralizing antibodies to CHP virus were detected in camels, horses, cows, buffaloes, sheep, goats, rhesus and other monkeys.

In the recent study in Andhra Pradesh, N antibodies were detected in about 18% of the animal sera tested.

Animals	Nos +ve/ nos tested		Total
	Warangal	Karimnagar	
Pigs	13/37	2/12	14/49 (28.6%)
Cattle	2/14	2/14	4/28 (14.3%)
Buffalo	3/10	2/18	5/28 (17.9%)
Goat	1/17	3/26	4/43 (9.3%)
Sheep	1/6	1/20	2/26 (7.7%)
Dog	3/4	0/2	3/6 (50%)



Sandfly - bite marks on hand



Sandfly larvae



Sandfly feeding on man

The involvement of CHP virus in outbreak of encephalitis has underscored the importance of this virus in public health. Studies on the natural cycle of CHP to develop control strategies shall be the priority area for research.