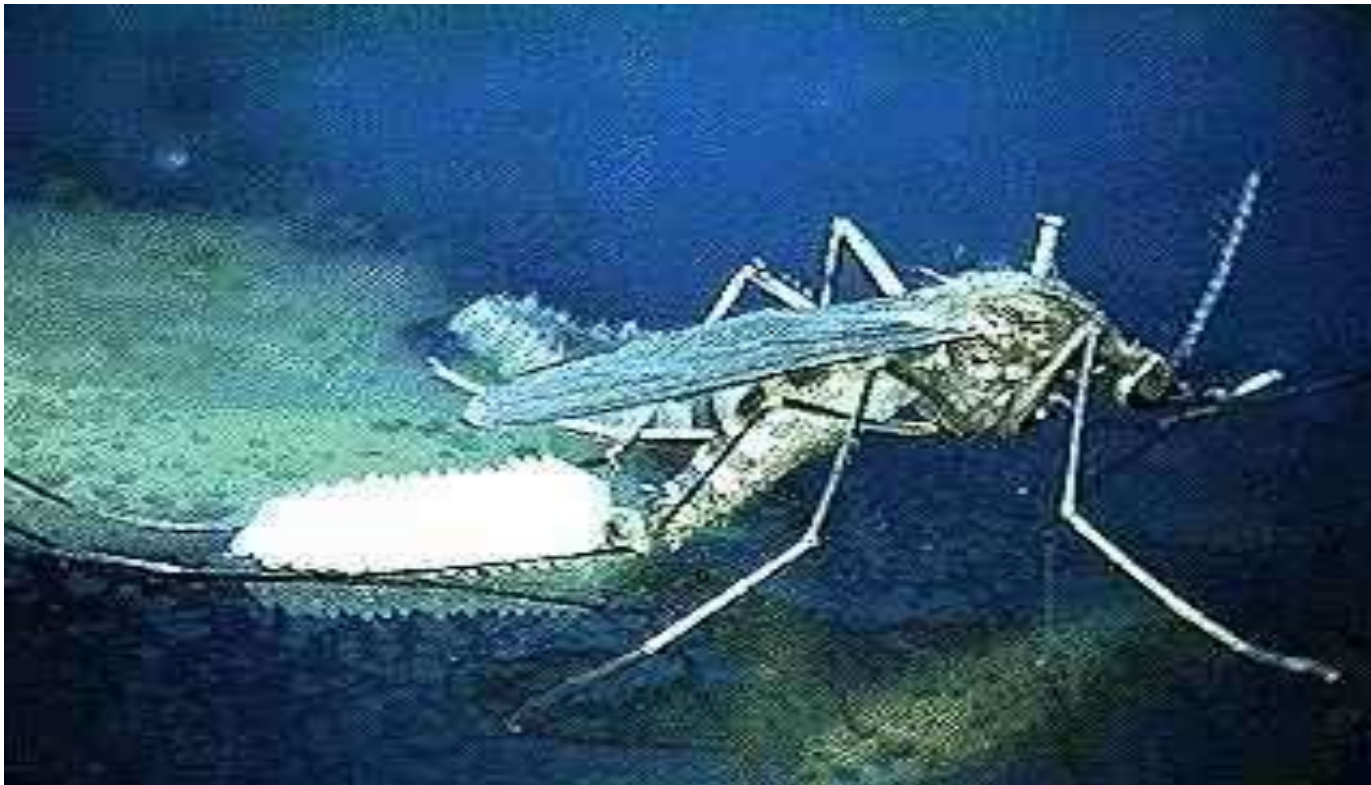


# JAPANESE ENCEPHALITIS





# LESSON OBJECTIVES



- **At the end of the class the learner should be able to :**
- **Define Japanese B Encephalitis**
- **Explain epidemiological determinants**
- **Describe the pathophysiology**
- **Explain the management of Jap B Encep in detail**
- **Enumerate and explain preventive interventions**



# **LESSON OBJECTIVE**

- **At the end of the class the learner should be able to:**
  - 1. Explain in detail the programme to prevent Japanese B Encephalitis**
  - 2. Explain It's focus and implementation strategies**
  - 3. Enumerate the preventive measures**

# WHAT IS JAPANESE ENCEPHALITIS?

- **Japanese Encephalitis is a viral disease**
- **It is transmitted by infective bites of female mosquitoes mainly belonging to *Culex tritaeniorhynchus*, *Culex vishnui* and *Culex pseudovishnui* group.**

**However, some other mosquito species also play a role in transmission under specific conditions**

- **JE virus is primarily zoonotic in its natural cycle and man is an accidental host.**
- **JE virus is neurotropic and arbovirus and primarily affects central nervous system**



# WHAT ARE SIGN AND SYMPTOMS OF JE?

- JE virus infection presents classical symptoms similar to any other virus causing encephalitis
- JE virus infection may result in febrile illness of variable severity associated with neurological symptoms ranging from headache to meningitis or encephalitis. Symptoms can include headache, fever, meningeal signs, stupor, disorientation, coma, tremors, paralysis (generalized), hypertonia, loss of coordination, etc.

- **Prodromal stage may be abrupt (1-6 hours), acute (6-24 hours) or more commonly subacute (2-5 days)**
- **In acute encephalitic stage, symptoms noted in prodromal phase convulsions, alteration of sensorium, behavioural changes, motor paralysis and involuntary movement supervene and focal neurological deficit is common. Usually lasts for a week but may prolong due to complications.**



- **Amongst patients who survive, some lead to full recovery through steady improvement and some suffer with stabilization of neurological deficit. Convalescent phase is prolonged and vary from a few weeks to several months.**
- **Clinically it is difficult to differentiate between JE and other viral encephalitis**





- **JE virus infection presents classical symptoms similar to any other virus causing encephalitis**



# HOW JAPANESE ENCEPHALITIS IS TRANSMITTED?

- **Japanese encephalitis is a vector borne disease.**
- **Several species of mosquitoes are capable of transmitting JE virus.**

- JE is a **zoonotic infection**. Natural hosts of JE virus include water birds of Ardeidae family (mainly pond herons and cattle egrets). Pigs play an important role in the natural cycle and serve as an amplifier host since they allow manifold virus multiplication without suffering from disease and maintain **prolonged viraemia**.

- **Due to prolonged viraemia, mosquitoes get opportunity to pick up infection from pigs easily.**
- **Man is a dead end in transmission cycle due to low and short-lived viraemia. Mosquitoes do not get infection from JE patient.**



# JAPANESE ENCEPHALITIS VECTORS IN INDIA

- Culicine mosquitoes mainly *Culex vishnui* group (*Culex tritaeniorhynchus*, *Culex vishnui* and *Culex pseudovishnui*) are the chief vectors of JE in different parts of India.

# LIFE CYCLE

- Life cycle consists of egg, four instars of larvae, pupa and adult. The whole cycle takes more than a month, however, duration depends on temperature and other ecological conditions.
- *Culex vishnui* subgroup is very common, widespread and breed in water with luxuriant vegetation mainly in paddy fields and the abundance is related to rice cultivation, shallow ditches and pools.

- **These vectors are primarily outdoor resting in vegetation and other shaded places but in summer may also rest in indoors.**
- **They are in principally cattle feeders, though human and pig feeding are also recorded in some areas.**

- **Female mosquitoes get infected after feeding on a viraemic host and after 9-12 days incubation period, they can transmit the virus to other hosts**



# JE IN MAN

- **The incubation in period in man is 5-15 days. The course of disease in man may be divided into three stages**
- **PRODROMAL STAGE**
- **ENCEPHALITIC STAGE**
- **LATE STAGE & SEQUELAE**



# PRODROMAL STAGE

- **The onset of illness is usually acute and is marked by fever, headache, GI disturbance, lethargy and malaise. The duration of this stage usually 1-6 days**

# ACUTE LYMPHATIC STAGE

- **Fever is usually high (38 -40.7 C). The prominent features are fever, nuchal rigidity, focal CNS symptoms, convulsions, signs of raised intra cranial pressure, difficulty of speech, dystonia, ocular palsies, hemiplegia, quadriplegia, extra pyramidal signs, altered sensorium progressing to coma**

# LATE STAGE & SEQUELAE

- **This stage begins when active inflammation is at end. The temperature and ESR are normal. Neurological signs become stationary or tend to improve. Convalescence may be prolonged with neurological defects.**



# HOW JE IS DIAGNOSED?

- **Clinical:**

cases present signs and symptoms similar to encephalitis of viral origin and cannot be distinguished for confirmation.

However, JE can be suspected as the cause of encephalitis as a febrile illness of variable severity associated with neurological symptoms ranging from headache to meningitis or encephalitis. Symptoms can include headache, fever, meningeal signs, stupor, disorientation, coma, tremors, paralysis (generalized), hypertonia, loss of coordination.

# Laboratory:

- **Several laboratory tests are available for JE virus detection which include;**  
**Antibody detection: Heamagglutination Inhibition Test (HI), Compliment Fixation Test (CF), Enzyme Linked Immuno-Sorbant Assay (ELISA) for IgG (paired) and IgM (MAC) antibodies, etc.**
- **Antigen Detection: RPHA, IFA, Immunoperoxidase etc.**

## Clinical Suspect

- **Febrile illness of variable severity associated with neurological symptoms ranging from headache to meningitis or encephalitis.**
- **Symptoms can include headache, fever, meningeal signs, stupor, disorientation, coma, tremors, paralysis (generalized), hypertonia , loss of coordination.**

# CONFIRMED

- **A suspect case with confirmed laboratory result : JE IgM in CSF or 4 fold or greater rise in paired sera (acute & Convalescent) through IgM/IgG ELISA, HI, Neutralisation test or detection of virus, antigen or genome in tissue, blood or other body fluid by immunochemistry, immunofluorescence**



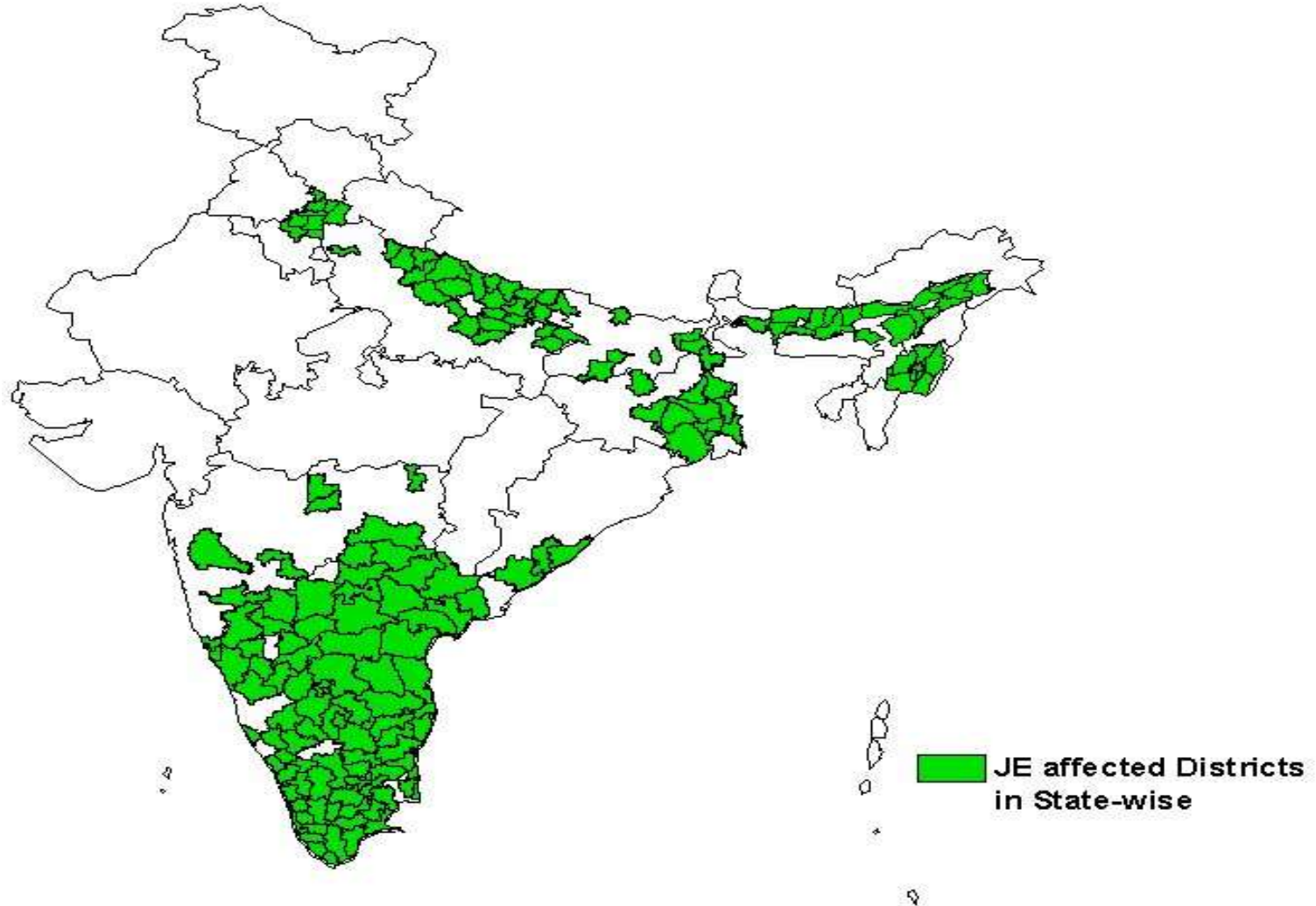


# TREATMENT OF JAPANESE ENCEPHALITIS



- There is no specific anti-viral medicine available against JE virus. The cases are managed symptomatologically.
- Clinical management of JE is supportive and in the acute phase is directed at maintaining fluid and electrolyte balance and control of convulsions, if present. Maintenance of airway is crucial.

# EXTENT OF THE PROBLEM





# PREVENTION AND CONTROL MEASURES

**The preventive measures are directed at reducing the vector density and in taking personal protection against mosquito bites using insecticide treated mosquito nets. The reduction in mosquito breeding requires eco-management, as the role of insecticides is limited. Piggeries may be kept away (4-5 kms) from human dwellings**



# VACCINATION

- **Currently three types of JE vaccines are used**
- **MOUSE BRAIN DERIVED –PURIFIED & INACTIVATED VACCINE**
- **CELL CULTURED DERIVED INACTIVATED JE VACCINE**
- **CELL CULTURED DERIVED LIVE ATTENUATED VACCINE**



# VECTOR CONTROL

- **The vector mosquitoes of JE are widely scattered and are not easily amenable to control**
- **The effective way to control is through ground or Ariel fogging with ultra low volume of Malathion, Fenithrothion**



- **All villages reporting should be brought under indoor residual spray**
- **The spraying should cover the vegetation around the houses, breeding sites and animal shelters in affected villages**



- **Uninfected villages falling within 2 to 3 km radius also receive spraying as preventive measure**
- **Villages within the proximity of infected villages should be kept under surveillance.**
- **The use of mosquito net should be advocated**



# GUIDELINES FOR MANAGEMENT OF JE

- Includes the following:
  - **1. CASE DEFINITION**
  - **2. CASE CLASSIFICATION**



# **CASE DEFINITION as follows**

- **Acute onset of fever, not more than 5-7 days duration**
- **Change in mental status with or without – new onset of seizures (excluding febrile seizures)**
- **Other early clinical findings – irritability, somnolence or abnormal behaviour greater than that seen with usual febrile illness**

# **CASE CLASSIFICATION**

- **FOR LAB CONFIRMED CASE:**
- **A suspected case with any of the following markers:**
- **Presence of IgG antibody titre in paired sera**
- **Virus isolation from brain tissue**
- **Antigen detection by immunofluorescence**
- **Nucleic acid detection by PCR**



# PROBABLE CASES

- **Suspected case in close geographic and temporal relationship to a lab confirmed case of AES (Acute Encephalitic Syndrome) in an outbreak**

# AES (due to other agent)

- A suspected case in which diagnostic testing is performed and an aetiological agent other than JE/AES is suspected



# MANAGEMENT

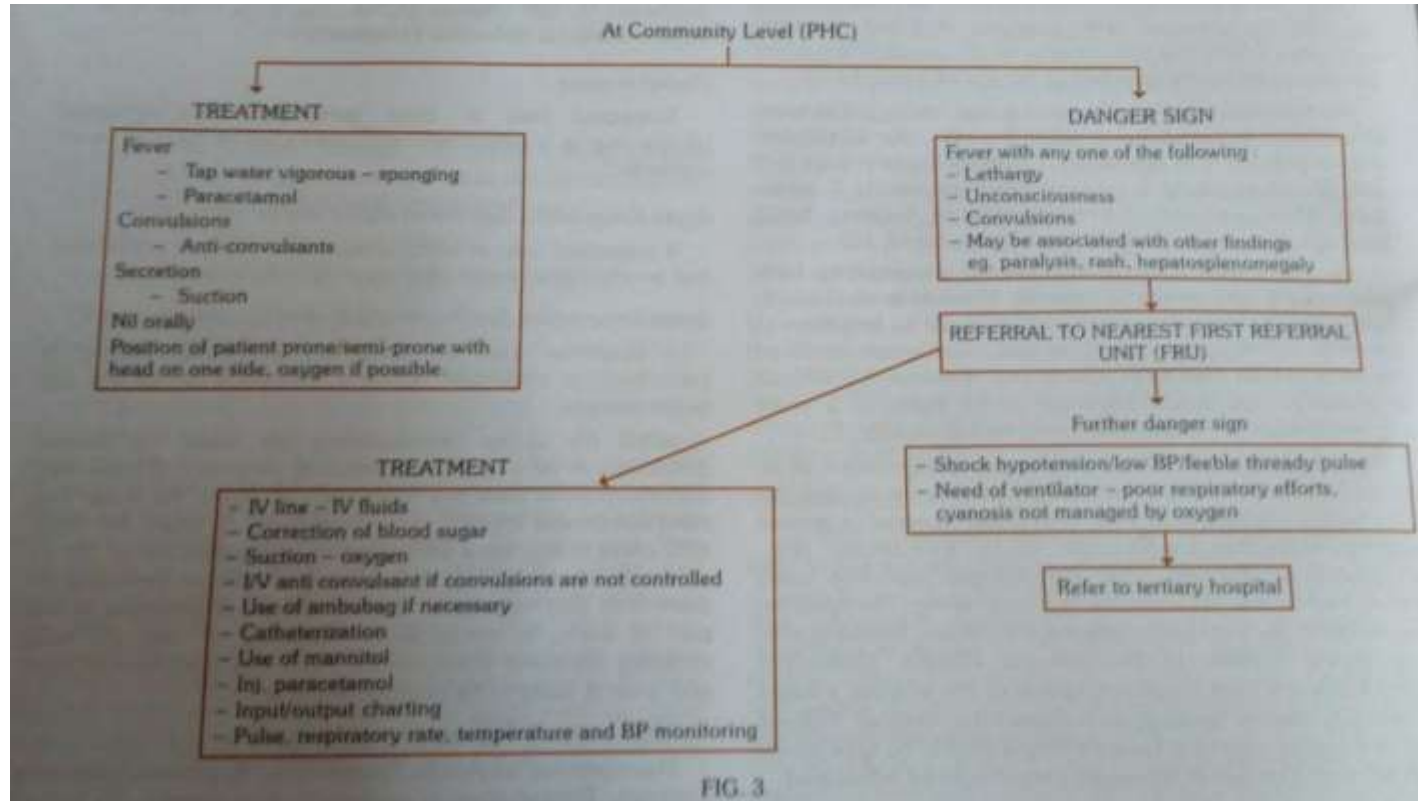
- **Management of AES is essentially symptomatic. To reduce severe morbidity and mortality it is important to identify early warning signs and patients to referral center.**



# TREATMENT OF SPECIFIC CASE

- **Meningitis due to other causes have to be treated following specific treatment protocols.**

# MANAGEMENT AT COMMUNITY LEVEL



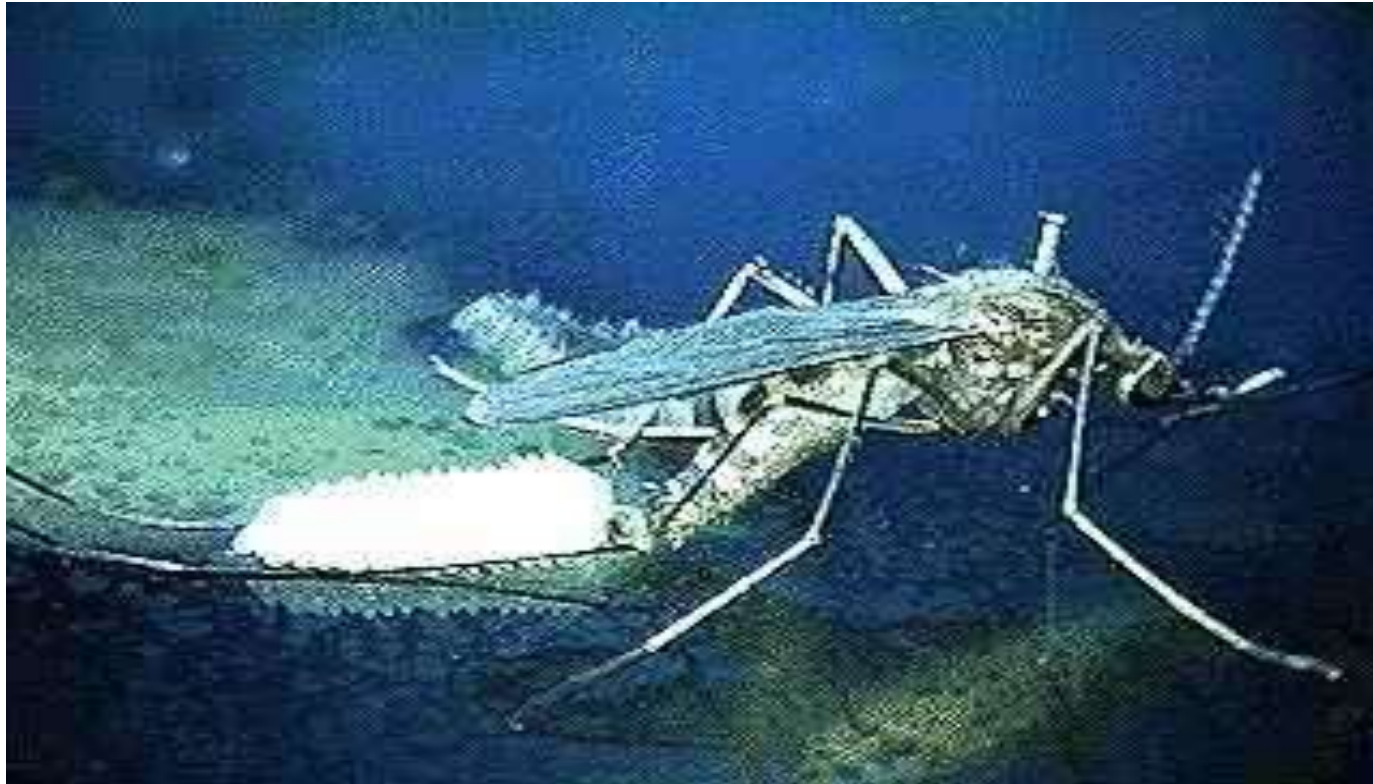


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# THANK YOU





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