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Review Article

A REVIEW ON ETIO-PATHOGENESIS OF DENGUE FEVER AND ITS MANAGEMENT-AN UPDATED REVIEW

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Abstract

Dengue is the fastest spreading vector borne viral infection due to a causative agent female mosquito *Aedes aegypti* and transmitted between the humans. Nearly upto 3.6 billion people had got infected and more over found risks in many of the countries. These infections are caused by 4 closely related viruses namely DENV-1, DENV-2, DENV-3 and DENV-4. This review article provides an overview on the Epidemiology, Etio-pathogenesis, Classification, Diagnosis and Management of the Dengue fever.

Keywords: COVID 19 Pandemic, Homoeopathy, SARS-Cov-2.



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INTRODUCTION

The term “Dengue” is derived from the African word “Denga” which means the fever with haemorrhages. The disease called dengue fever which is caused by a mosquito vector called female *Aedes aegypti* mosquito. Transmission being highest during or after the Rainy season when mosquitoes are numerous. It is the fastest spreading vector borne viral infection which is transmitted between the humans. The infection can be caused by the 4 closely related viruses namely DENV-1, DENV-2, DENV-3 and DENV-4. Dengue virus belongs to the genus *Flavivirus* and family *Flaviviridae*. The genus *Flavivirus* also includes some of the pathogens which can cause Zika virus disease, Yellow fever and West Nile fever [2-4].

EPIDEMIOLOGY

Nearly upto 3.6 billion people are estimated in tropical and sub-tropical areas where the Dengue viruses have the potential for spreading. Estimations may vary, but approximation of 50 million to 200 million of dengue infections and 500000 episodes of severe dengue (DHF/DSS) and more over 20,000 dengue infected deaths occurs annually [3,4].

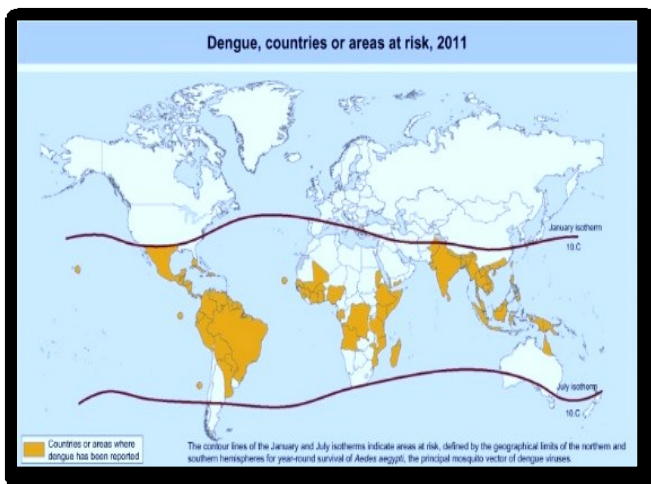


Figure 01: Representing the Geographic distribution of many dengue cases are reported in 2011 [3].

ETIOLOGY

- DENGUE VIRUS
- GENUS- *Flavivirus*.
- FAMILY- *Flaviviridae*.
- SEROTYPES- DENV-1, DENV-2, DENV-3 and DENV-4.
- CAUSATIVE AGENT/ VECTOR: Female *Aedes aegypti* mosquito.

DENGUE OCCURS IN TWO FORMS

- Dengue fever or break bone fever.
- Dengue haemorrhage fever.

PATHOGENESIS

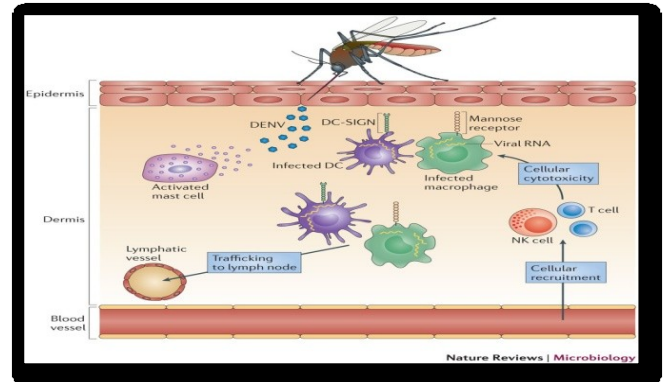


Figure 02: Representing the pathogenesis of dengue fever [2].

The step wise detailed pathogenesis of dengue fever [1,2]

- ❖ Dengue virus where after entering into the body, primarily the viral replication occurs in Macrophages and multiply there.
- ❖ The infected cells then migrate from one site of infection to the lymph nodes, where monocytes and macrophages are located, which then becomes as targets of the infection.
- ❖ Then the infection is amplified and the virus is disseminated through the lymphatic system. As a result of this primary viremia, several cells of the mononuclear lineage, including blood- derived monocytes.
- ❖ Viremia develops within the 24 hours. During this period, virus spreads throughout the body.
- ❖ Immunological and chemical mediated mechanisms induced by host- viral interactions.
- ❖ Bone marrow cells also have been shown to be susceptible for the infection with DENV.
- ❖ In the severe case, the viral load is very high and many vital organs are affected.
- ❖ Virus infected macrophages will produces a number of signalling proteins such as interferons, cytokines, chemokines, TNF and many other mediators which are responsible for many symptoms such as flue like syndrome and pain.
- ❖ These mediators affects haemostatic system of the body.

- ❖ Fluid from the blood vessels starts to leak out so that the blood volume decreases and resulting to low blood pressure.
- ❖ Decrease in blood pressure causes insufficient supply of blood and oxygen to viral organs such as brain.
- ❖ Dengue also infects the bone marrow, so that the bone marrow cannot produce the sufficient platelets.
- ❖ Since the platelets are needed for the blood clotting, dengue infection causes the blood clotting defects and then increases the risk of bleeding.

CLASSIFICATION

According to the 1997 classification the dengue fever can be classified into Un-differentiated fever, Dengue fever and DHF[3].

DHF WAS FURTHER SUB-DIVIDED INTO 4 GRADES [3]

1. GRADE-1: Only mild or positive tourniquet test.
2. GRADE-2: Sudden bleeding into the skin and parts.
3. GRADE-3: Clinical sign of shock.
4. GRADE-4: Severe shock, fluttering pulse rate and even the blood pressure cannot be detected appropriately.

Here, GRADES 3 & 4 comprises DSS.

- 3) Rapid methods such as reverse transcriptase- PCR and fluorogenic-ELISA[5,6].

At Autopsy, the predominant organ changes observed are as follow [5,6]

- a. Brain Intracranial haemorrhages, cerebral oedema, dengue encephalitis.
- b. Liver Enlarged: necrosis of hepatocytes and Kupffer cells, Reyes syndrome in children.
- c. Kidneys Petechial haemorrhages and features of renal failure.
- d. Muscles and joints Perivascular mononuclear cell infiltrate.

MANAGEMENT

The step wise detailed management of dengue fever [6-9]

- Fluid replacement therapy and antipyretic therapy by using Paracetamol is the most preferred therapy for the following febrile condition.
- CAUTION- Care should be taken to not use any other NSAIDS (Non- steroidal anti-inflammatory drugs).
- Judicious fluid administration forms the important procedure of treatment during the critical phase of the dengue viral infection. Normal saline, Ringer’s Lactate and 5% albumin are the routinely administered fluids.
- According to the WHO guidelines some of the principles of the fluid therapy are as follows:
- Oral fluid supplements should be more as much as possible. And however, intravenous fluid administration is compulsory in the cases such as shock, severe vomiting and prostration (patients who are unable to take fluids orally).
- Crystalloids forms the first-line drug of choice of intravenous fluids (0.9% saline).
- Hypotension which states that are unresponsive for boluses of intravenous crystalloids, colloids (e.g., dextran) from the second-line measures.
- If the patients remains in the critical condition with the low platelet counts, there should be a serious observation for bleeding. And the cases which are suspected

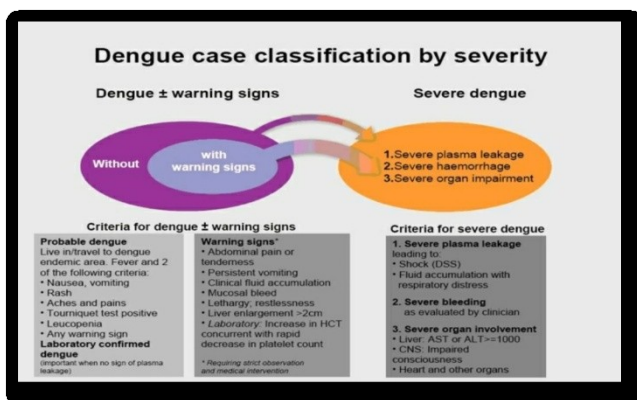


Figure 03: Representing the The revised dengue case classification.

DIAGNOSIS

Diagnosis of DHF is confirmed by using the following tests:

- 1) Serologic testing for the detection of the antibodies.
- 2) Detection of virus by immunofluorescence method and monoclonal antibodies.

with bleeding are well managed by the transfusion of fresh whole blood.

PREVENTIVE MEASURES FOR DENGUE FEVER

The preventive measures of dengue fever [9]

- ✓ Use to wear long sleeved shirts and long pants.
- ✓ Treat the clothes with the mosquito repellents like permethrin.
- ✓ Use EPA-registered mosquito repellent like DEET.
- ✓ Use the mosquito nets if there are many mosquitoes.
- ✓ Avoid stagnation water.
- ✓ Clean the water tanks by using bleaching powder.

AYURVEDIC TREATMENT BY USING HOME REMEDIES

- A. Use to drink Giloy juice, which is well known remedy for dengue fever [9].
- B. Use Papaya leaf juice which functions to increase the platelet count in the dengue patients. Most of the people uses papaya leaf juice such that it provides the good results in the treatment of the dengue fever [9].
- C. Use Guava juice, such that it is loaded with multi-nutrients. To provide the good nutrition the patients with malnutrition [9].
- D. Try always to have immunity boosting foods[9].

CONCLUSION

Dengue fever is also known as break borne fever and it is a viral infection, which is caused by a vector *Aedes aegypti* mosquito. Many of the countries globally are suffering from this infection from since decades, which is seems to be as a life-threatening disease. Hence, to avoid this viral infection everyone should follow such that they are well protected from the mosquitoes especially during or after the rainy seasons, which is the main vector for the transmission of the Dengue fever.

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