

Overview on clinical findings of dengue fever in North India.

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Abstract: -

Aedes mosquitoes, which carry the dengue virus, are responsible for transmitting this serious and widespread viral disease in people. It affects more than 120 countries. It increases vascular fragility and permeability. It is related to the Flavivirus family and it has four Serotypes and the fifth has yet to be confirmed. Infection with one Serotype -lifetime protection from those specific Serotypes. Secondary infection with another Serotype - severe dengue. An individual could be ultimately infected by all 4 Serotypes.

Introduction: -

The *Aedes aegypti* mosquito, and occasionally the *Aedes albopictus*, transmits the dengue virus. It is widespread throughout much of the world. A single-stranded RNA virus of the genus *Flavivirus* is the culprit behind dengue. A mosquito carrying any of the four viruses can cause dengue fever. Dengue fever is considered to be at its peak during the monsoon months of July to October. The mosquito usually bites during the day.[1]

Dengue has four Serotypes. It is important to have knowledge of these serotypes. Only subsequent infections from different Serotypes will raise the risk of infection because recovering from a dengue infection will provide a person permanent immunity against that specific Serotype. It is also called break-bone fever, Dandy fever, Dengue fever.

Most *Aedes* mosquito populations are located in urban and suburban settings. Because they enjoy reproducing in man-made containers like tyres, flower pots, and domestic water. As a result of these mosquitoes' ability to endure below-freezing conditions, dengue has migrated to areas with lower temperatures. When the dengue virus initially isolated itself from humans in 1943, Ren Kimura and Susumu Hotta both made the discovery. Almost every year, up to 390 million people get infected with dengue. Approximately 99 million people get affected by this virus, and 50,000 die from severe dengue. Dengue poses a risk to 50% of the population of the world. 84 countries are affected by Zika. Every four minutes, a case of chikungunya is confirmed. The world mosquito Program is working to reduce the threat of these diseases for global communities. Serotypes of the dengue virus cause the disease. Because of this, we have a four-time risk of contracting the dengue virus in our lifetime. [2]

Following a dengue virus infection: -

1. Dengue fever
2. Dengue hemorrhagic fever (DHF) or Dengue shock syndrome(DSS)

Dengue Fever:-

A mosquito bite from a mosquito carrying one of the dengue viruses will transmit dengue fever to humans.

4 to 10 days after the infection, dengue fever symptoms typically appear. Older children and adults may experience a milder illness than younger children and adults who have never had this virus. Within 2 to 7 days, the majority of common symptoms manifest.

Symptoms of Dengue Fever:-

- High fever (105 degree)
- Headaches
- Eyes pain
- Joint and muscle pain
- Fatigue
- Nausea

Dengue hemorrhagic fever:-

A mosquito-transmitted tropical illness called dengue hemorrhagic fever (DHF) is brought on by the dengue virus. It was discovered in the Philippines in 1953. DHF is the most serious infection in India. There was also an outbreak in Delhi 1996. It is caused by Arbovirus. It belongs to the Flaviviridae Family. Symptoms usually begin at 3-8 days. The disease is most common during the rainy seasons This is also called Dengue shock syndrome. [3]

Symptoms of Dengue Hemorrhagic fever:-

- Fever
- Back pain
- Retro- orbital pain
- Weak pulse
- Tachycardia
- Hypotension

Dengue virus Phase: -

1. Phase of Febrile
2. Phase of Critical
3. Phase of Recovery

Febrile Phase:-

- Typically, symptoms appear between days 4 and 7 fever:
- High-grade
 - Sudden onset (greater than 38.5 degree Celsius)
- Headache
 - Pain behind the (eye's) orbit

Critical Phase:-

- Occurs in small subset of patients
- Occurs in 3-7 days
- Lasts 24-48 hours
- Thrombocytopenia (can be severe)
 - Bleeding
 - Dengue Hemorrhagic fever
- Vascular leakage
 - Shock

Recovery Phase:-

- Resolution of vascular permeability , Hemorrhagic risk
- Vital sign stabilize
- Eruption of new rash
 - May be pruritic
- 1 - 5 days in length
 - May have chronic fatigue.[4][5]

Pathogenesis: -

Female mosquitoes require blood for egg maturation, so they bite a person. Virus inoculated into blood.

Three major organs affected by the virus:-

1. Immune system
2. Liver
3. Endothelial lining of blood vessels.[6]

Transmission: -

- Dengue virus is transmitted by a mosquito Aedes that lay eggs in stagnant fresh water, for example Coolers.
- Viruses of dengue transmit when mosquitoes inject their saliva in Humans.
- Only female mosquitoes bite frequently to get human blood for egg production.
- After 9 to 10 days of sucking blood the mosquitoes become infected and thereafter die whether they transmit dengue or not.
- After infection humans develop Dengue haemorrhagic fever. Thus, there are four types of virus.
- It was found in Delhi that all the viruses were not equally effective. Only one out of four was dangerous.[7]

Prevention: -

- Wear long-sleeved clothes.
- Cover your arms and legs
- Remove the water from container
- Destroy mosquito breeding
- Avoid public places
- Check your symptoms
- Keep your surroundings neat and clean
- Cover the garbage

Diagnosis:-

When a patient exhibits compatible signs and symptoms and has recently visited or resides in a region where the disease is endemic, dengue should be considered. Usually present are:[8][9]

- quickly developing fever
- Headache
- body pains occasionally rash

- Detection of NS1 antigen by immunoassay (<7 days after symptoms onset).
- Serologic test:- Presence of antibodies against DEN-V.
- IgM against DEN-V :- 4 days after symptoms onset.
- Patients present with in the first week after symptoms onset - IgM +NS1/NAAT
- Patients present >1 week after symptoms onset - IgM
- Nucleic acid Amplification Test(NAATs):- Preferred method of diagnosis.
- rRT- PCR:- To detect the viral genomic material .

Dengue virus NS1 Antigen Detection: -NS1 Antigen

- Conserved glycoprotein secreted from infected cells
- Acute infection marker
- Identify the dengue virus's NS1 non-structural protein.
- During a dengue infection, this protein was produced into the blood.

Antibody detection to dengue virus: -IgM Antibodies

- 3-5 days post illness onset
 - Persist for 30-90 days
 - FDA- cleared assay available
 - Sensitivity: 60%-99%
 - Specificity: 80%-98%
 - Flavivirus cross reactivity
- IgG Antibodies
- >10 days post illness onset
 - Persist for years
 - Flavivirus cross- reactivity

Complete blood count:-

Low platelet count at later stages of the virus and a decline in hemoglobin, hematocrit, and red blood cell (RBC) count (evidence of anemia) that would occur with blood loss related to severe dengue fever are both seen in CBC tests.

NAATs for Dengue virus:-

Useful for acute disease (<5 days of symptoms)

- No FDA- cleared assays
- Performance characteristics vary
- Sensitivity: 80%-90%
- Specificity:>95%

Laboratory Findings: -

- Leukopenia
- Thrombocytopenia
- Mild- moderate elevation of ALT/AST
- Increased Hct
- Prolonged PT and APTT
- Decreased fibrinogen

Treatment: -

- No specific antiviral drug available
- Stay well hydrated
- Avoid aspirin
- To control fever
- Avoid mosquitoes bites
- Reduce transmission[10]

Discussion:-

Dengue is an acute infection disease characterised by headaches, excruciating joint pain, and a rash. It is brought on by a virus and is a member of the flavivirus family. Four unique serotypes exist. The majority of mosquitoes that transmit the virus are *Aedes aegypti*, with *Aedes albopictus* mosquitoes spreading it to a smaller level. Urban and suburban areas are where the majority of *Aedes* mosquito populations are found. Because they enjoy breeding in artificial environments like flower pots, tyres, and domestic water.

Conclusion:-

Dengue fever is a viral disease and a developing public health problem. The illness is spread by mosquitoes. Moreover, it is often referred to as Dandy fever or breakbone fever. It is present in tropical and subtropical regions.

As a viral infection, dengue can also be spread to people by mosquitoes that have been infected. The Mosquito species responsible for dengue infection is *aedes aegypti* or *aedes albopictus* (in some cases).

Virus responsible for causing disease is Dengue virus (DEN-V) and It exhibits symptoms including joint discomfort and headaches and has four serotypes. There is no particular antiviral medication or method of prevention. For instance, cover your arms, put on long sleeves, and empty the water bottle. Avoid going out in the open, check your symptoms every day, and sleep with a mosquito net.

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