R. P. Vashist,
Consultant Public Health,

DENGUE FEVER AND DENGUE HAEMORRHAGIC FEVER

Dengue:
An emerging arboviral disease

- Dengue is the most important emerging tropical viral disease of humans in the world today. It is estimated that there are between 50 and 100 million cases of dengue fever (DF) and about 500,000 cases of dengue haemorrhagic fever (DHF) each year which require hospitalization.
- Over the last 10-15 years, DF/DHF has become a leading cause of hospitalization and death among children in the South-East Asia Region of WHO, following diarrhoeal diseases and acute respiratory infections.

Standard treatment-right way

- Standard treatment of DF/DHF has many advantages. Deaths due to DHF can be reduced to less than 1% among hospitalized patients by the widespread use of standard treatment. It also rationalizes hospitalization, reduces the pressure of admissions, and prevents unnecessary blood transfusions.

Dengue viruses

- Dengue virus four serotypes.
- DEN-1, DEN-2, DEN-3, DEN-4,
- Each serotype provides specific lifetime immunity and short-term cross-immunity
- All serotypes can cause severe and fatal disease
- Genetic variation within serotypes; some appear to be more virulent or have greater epidemic potential
- All serotypes can produce outbreaks/epidemics

Diagnosis

- The diagnosis of dengue is usually made clinically.
- The classic picture is high fever with no localizing source of infection.
- A petechial rash with thrombocytopenia and relative leucopenia.
- Low platelet and white blood cell count
- Antigen detection test (NS-1) and antibodies detection test(MAC ELISA) to the virus.

Manifestation of Dengue Infection

- All four dengue virus (Den 1, 2, 3 and 4) infections may be asymptomatic or symptomatic.

Dengue fever- clinical features that vary widely

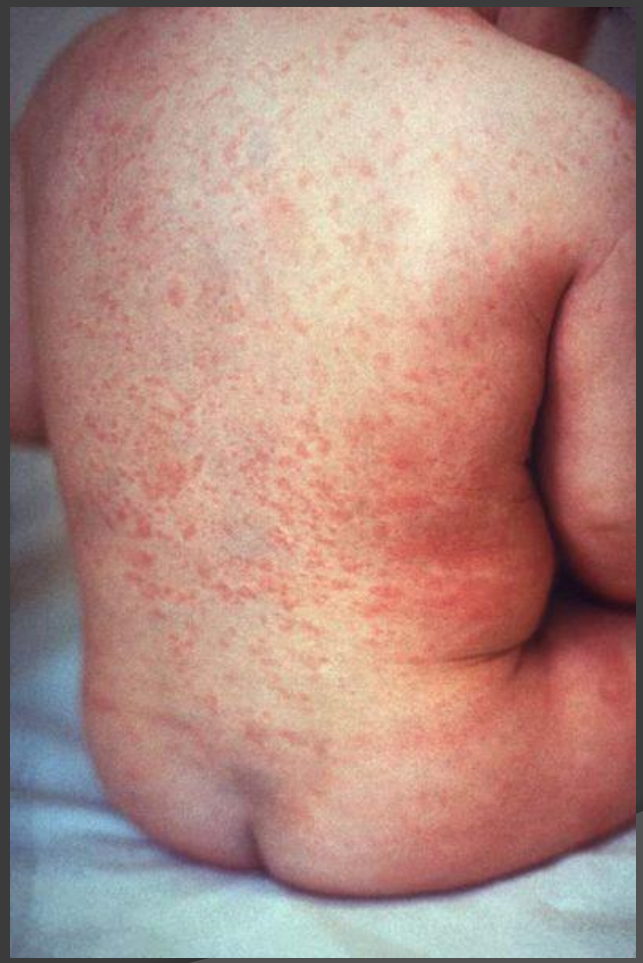
- It may present as an undifferentiated febrile illness with a maculopapular rash (often seen in children), a mild febrile syndrome similar to the flu, or the classical disease .
- During dengue epidemics, hemorrhagic complications may also appear, such as bleeding from the gums, nosebleeds, and bruising. It is very important to distinguish between DF with hemorrhagic symptoms and DHF so that appropriate therapy can be initiated in the case of DHF.

SYMPTOMATIC DENGUE INFECTION

Undifferentiated fever	Maculopapular rash
Dengue Fever	Without haemorrhage
	With unusual haemorrhage
Dengue Haemorrhagic Fever	No shock
	DSS

Recognition of Dengue Fever

- **An acute febrile illness of 2-7 days duration** (sometimes with two peaks) with **two or more** of the followings:
- headache
- retro -orbital pain
- myalgia/arthralgia
- rash
- haemorrhagic manifestation (petechiae and positive tourniquet test) and,
- leukopenia.



Tourniquet test procedure

- Get blood pressure properly by covering 2/3 of arm with cuff
- Get the mean blood pressure :
- Mean blood pressure = systole + diastole / 2
- Maintain for 5-10 minutes at mean blood pressure
- Check for petechiae using a 1x1 inch opening on a cardboard
- A positive tourniquet test means at least 20 Petechiae per square inch

Clinical Criteria of DHF:

- Fever w/ acute onset, high continuous, lasting 2-7 days
- (+) toniquet test and any of petechiae, purpura, ecchymosis, bleeding from gums, injection sites or other sites,epistaxis, haematemesis or melena,
- Signs of plasma leakage (pleural effusion, ascites or hypoproteinaemia).

Pathogenesis of DHF:

- **Increase capillary fragility-** immune-complex rxn similar to anaphylactoid rxn that produce toxic substances (histamines, serotonin, bradykinins) which damage capillary walls
- **Thrombocytopenia**-faulty maturation of megakaryocytes – dec production of plt
  - Consumption of plt due to generalized intravascular clotting
  - Dec blood coagulation factor(fibrinogen) and Factors II,V,VII,and IX.

Laboratory criteria of DHF:

- Plt 100,000 or less
- Hemoconcentration – hct increased by 20% or more
- WBC in DHF is variable

WHO Criteria for diagnosis of DHF:

- Fever
- Major/minor hemorrhagic manifestations
- Thrombocytopenia (<=100,000)
- Objective evidence of capillary permeability(inc HCT =20%, pleural effusion, hypoalbuminemia)

Dengue Shock Syndrome:

- DHF +
- Hypotension for age, cold and clammy skin and restlessness.
- Narrow pulse pressure (=20 mmHg)
- signs of circulatory failure manifested by rapid and weak pulse

Reporting of cases

- for reporting of the disease, cases should be classified as suspected DF/DHF/DSS on the basis of above the criteria.
- Added serological evidence would categorize them into probable and confirmed cases.

There are difficulties in categorizing the disease.

- A patient can progress from DHF to DSS, and depending on the stage of the disease when the patient reports, a mixed picture can be seen.
- However, as long as the patient evaluation is done systematically, there should be no difficulties in providing treatment, or in decision making about admission to a hospital, or in referring patients for specialised care.

DF/DHF	Grade*	Symptoms	Laboratory
DF		**Fever & 2/> signs: headache,retro - orbital pain,myalgia, arthralgia**	**Leukopenia (occa) sometimesThrombocytopenia, no plasma loss**
DHF	1	**Above signs plus positive tourniquet test**	**Thrombocytopenia <100,000, Hct rise >20%**
DHF	2	**Above signs plus spontaneous bleeding**	**Thrombocytopenia <100,000, Hct rise >20%**
DHF	3	**Above signs plus circul failure (wk pulse,hypotension, restlessness)**	**Thrombocytopenia <100,000, Hct rise >20%**
DHF	4	**Profound shock with undetectable blood pressure and pulse**	**Thrombocytopenia <100,000, Hct rise >20%**

*** DHF Grade III and IV are also called as Dengue Shock Syndrome (DSS)**

Febrile phase	Manifestation	Management
Duration 2-7 days	Temp 39-40ºC – Headache – Retro-orbital pain – Muscle pain – Joint/bone pain – Flushed face – Rash – Skin haemorrhage, bleeding from nose, gums – Positive tourniquet test – Liver often enlarged – Leucopenia – Platelet/haematocrit normal	– At home* – Bed rest – Keep the body temperature below 390 – Paracetamol-Yes** – Aspirin-No – Brufen-No – Oral fluids and electrolyte therapy – Follow-up for any change in platelet/haematocrit

* Pts & families be informed that abdominal pain, black stools,bleeding,sweating, and cold skin are danger signs, and if any of these signs is noticed, the patient should be taken to the hospital immediately.

** Paracetamol be administered not more than 4 times in a 24 hrs (250mg): <1yr-1/4 tablet; 1-4 years – ½ tablet; 5 yrs and above – one tablet.

Afebrile phase (critical stage)	Manifestation	Management
Duration – 2-3 days after febrile stage	– Same as during febrile phase – Improvement in general condition – Platelet/ haematocrit normal – Appetite rapidly regained	– Bed rest – Check platelets/ haematocrit – Oral fluids and electrolyte therapy

Convalescence Phase	Manifestation	Management
Duration – 7-10 days after critical stage	– Further improvement in general condition and return of appetite – Bradycardia – Confluent petechial rash with white centre/ itching – Weakness for 1 or 2 weeks	– No special advice. – No restrictions. – Normal diet

DHF (Grades I and II) (The manifestations and management of DF and DHF during the febrile phase are the same)		
Afebrile Phase (critical stage)	**Manifestation**	**Management**
Duration 2-3 days	– Same as during febrile phase. – Thrombocytopenia and rise in haematocrit level	– OPD – ORS – Check plts/haematocrit. If haematocrit is more than 20%: Refer to hospital

What not to do

- **Do not give Aspirin or Ibuprofen for treatment of fever.**
- **Avoid giving intravenous therapy before there is evidence of haemorrhage and bleeding.**
- **Avoid giving blood transfusion unless indicated, reduction in haematocrit or severe bleeding.**
- **Avoid giving steroids. They do not show any benefit.**
- **Do not use antibiotics**
- **Do not change the speed of fluid rapidly, i.e. avoid rapidly increasing or rapidly slowing the speed of fluids.**
- **Insertion of naso gastric tube to determine concealed bleeding or to stop bleeding (by cold lavage) is *not* recommended since it is hazardous.**

Signs of Recovery

- Stable pulse, blood pressure and breathing rate
- Normal temperature
- No evidence of external or internal bleeding
- Return of appetite
- No vomiting
- Good urinary output
- Stable haematocrit
- Convalescent confluent petechiae rash

Criteria for Discharging Patients

- Absence of fever for at least 24 hours without the use of anti-fever therapy
- Return of appetite
- Visible clinical improvement
- Good urine output
- Minimum of three days after recovery from shock
- No respiratory distress from pleural effusion and no ascites
- Platelet count of more than 50,000/mm3

Prevention

- Elimination of *A. aegypti* breeding sites
- Insecticides/Larvicide
- Avoiding mosquito bites by use of repellants, body covering with clothing, screening of houses and nets